

World Sustainability Series

Marcellus F. Mbah
Walter Leal Filho
Sandra Ajaps *Editors*

Indigenous Methodologies, Research and Practices for Sustainable Development

 Springer

World Sustainability Series

Series Editor

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Due to its scope and nature, sustainable development is a matter which is very interdisciplinary, and draws from knowledge and inputs from the social sciences and environmental sciences on the one hand, but also from physical sciences and arts on the other. As such, there is a perceived need to foster integrative approaches, whereby the combination of inputs from various fields may contribute to a better understanding of what sustainability is, and means to people. But despite the need for and the relevance of integrative approaches towards sustainable development, there is a paucity of literature which address matters related to sustainability in an integrated way.

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Editors


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Preface

Whilst academic research has long been grounded on the idea of western or scientific epistemologies, this often does not capture the uniqueness of Indigenous contexts, and particularly as it relates to the achievement of the United Nations Sustainable Development Goals (SDGs). The SDGs were announced in 2015, accompanied by 17 goals and 169 targets. These goals are the means through which Agenda 2030 for sustainable development is to be pursued and realised over the next 15 years, and the contributions of Indigenous peoples are essential to achieving them. Indigenous peoples can be found in practically every region of the world, living on ancestral homelands in major cities, rainforests, mountain regions, desert plains, the arctic, and small Pacific Islands. Their languages, knowledges, and values are rooted in the landscapes and natural resources within their territories. However, many Indigenous peoples are now minorities within their homelands, and globally, and there is a dearth of research based on Indigenous epistemologies and methodologies. Furthermore, academic research on Indigenous peoples is typically based on western lenses, and emancipatory methodologies have primarily been defined by the epistemological framework of the western culture, including Eurocentric emancipatory scholarship acting to decolonise research.

Despite the value of the subject matter of Indigenous knowledge in a sustainable development context, there is a paucity of publications specifically focusing on this topic. It is on the basis of the need to address this gap that this book has been produced. It, therefore, asserts the need to articulate, as well as bring to the nexus of research aimed at fostering sustainable development, a decolonising perspective in research design and practice. This would not only have the potential to overcome any form of epistemic violence perpetuated towards Indigenous communities and their knowledge systems, but also can engender the achievement of the SDGs, with a focus on supporting Indigenous groups to drive their own development agenda, based on their worldviews and priorities.

The various submissions on Indigenous methodologies, research, and practices with a focus on sustainable development serve the purpose of advancing knowledge in an unprecedented way. The book is structured into two parts:

Methodological and theoretical considerations

Case studies and initiatives that illustrate the interplay between Indigenous knowledge and different contexts that underpin sustainable development.

These broad parts of the book tackle topics such as:

- Decolonisation of research methodologies for sustainable development in Indigenous settings
- Deconstructing community-based research for sustainable development: The role of Indigenous knowledge holders
- Integration of Indigenous knowledge as part of a one health research toolkit to end hunger and improve nutrition
- Tribal collaborations and Indigenous representation in higher education: Challenges, successes, and suggestions for attaining the SDGs
- South Pacific post-colonial Indigenous praxis for resilient sustainable community development
- Public health education in Africa: The case of epistemic (in) justice and Indigenous health systems
- Indigenous peoples' views on climate change and their experiences, coping, and adaptation strategies in South Asia.

We thank the authors for sharing their knowledge and their experience by means of their chapters, and those colleagues who have contributed to it by assisting with the reviews. This is a valuable handbook for those researching any subject related to the SDGs in Indigenous settings. It also provides a welcome contribution to the literature on sustainable development, and it may inspire further works in this field.

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Methodological and Theoretical Considerations

Unpacking Key Terms: Sustainable Development, Indigenous Knowledges, Methodology



Iryna Kushnir 

Abstract This chapter aims to unpack through a relevant literature review the three key concepts this book, which is focused on Indigenous methodologies, research and practices for sustainable development, operates with. These key concepts include: sustainable development, Indigenous knowledges and methodology. While the chapter separates the explanation of these notions for analytical purposes, it also aims to bring the discussion of them together, highlighting intrinsic links amongst them, by putting forward the following argument. Although the coordination, or orchestration, of sustainable development by the United Nations to date has pitfalls, this organisation with its worldwide reach, has the power to coordinate the awareness raising and the dissemination of cutting-edge ideas about sustainable development which are interlinked with sustainable entrepreneurship. This can be done by appealing to knowledge as a major tool in this process. Researching and mobilising Indigenous knowledges in this process is a specific case that this chapter explores. Instead of integrating Indigenous knowledges with Western knowledges, which is what a range of prior studies suggest, this chapter demonstrates the need to decolonise Indigenous knowledges so they can occupy an active position in the global knowledge systems. Indigenous knowledges can be decolonised through emancipatory research that steps away from Western limiting approaches. Liberated Indigenous knowledges are presented in this chapter as a tool for a new sustainable development agenda informed by the idea of sustainable entrepreneurship.

Keywords Sustainable development · United Nations · SDGs · Indigenous knowledges · Western knowledges · Decoloniality · Indigenous research paradigm · Methodology

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1 Introduction

Sustainable development has moved to the forefront of international policy discussion, given the interconnected nature of all areas of life and significant problems in them that the world has been dealing with. This is encapsulated in the recent global project of the United Nations—the Sustainable Development Goals (SDGs, 2021). Its aim has been to mobilise global and local actors to solve the issues which undermine and threaten the wellbeing of the planet and its populations, particularly those who are marginalised. In pursuit of this aim, it is important to appeal to the available knowledge and further research for the production of knowledge to promote sustainable development (Annan-Diab & Molinari, 2017).

This chapter aims to explain the three key concepts this book operates with: sustainable development (SD), Indigenous knowledges (IKs) and methodology. The chapter is based on relevant literature review in these three areas, highlighting the links and gaps amongst them. While the chapter presents an analytic separation of these three concept in their explanation, it also aims to bring the discussion of them together, highlighting intrinsic links amongst them, by putting forward the following argument. Although United Nations' coordination of the progress towards SD in the world has pitfalls, this organisation does have potential to orchestrate the application in practice of the revised definition of SD which is related to sustainable entrepreneurship, put forward by Hummels and Argyrou (2021). This can be done by appealing to knowledge as a useful tool in this process. Researching and mobilising IKs in this process is a specific case this chapter explores. Rather than simply aiming to combine IKs with Western knowledges, which would not dismantle the colonised position of IKs, this chapter demonstrates the need to decolonise IKs by going beyond Western approaches in research into IKs. This is crucial in liberating IKs to enable them take, rather than be granted by colonisers, their equal position in the system where other knowledges exist. This is crucial also for SD, which has already been deemed as dependant on IKs as well as other forms of knowledge. Liberated IKs would also actively influence SD which is rooted in sustainable entrepreneurship which, in turn, should be seen as an international endeavour, integral not just to the Euro-North-American context but to the Global South as well.

The chapter unfolds as follows. The idea of SD is discussed first. In this effort, a review of the evolving nature of the meaning of the concept 'SD' is presented as well as the orchestration of SD by the United Nations which has become an integral feature of SD. The second part of the chapter explores the concept 'IKs'. This section will unpack relevant definitions and call attention to the fact that Indigenous peoples remain marginalised in different areas of life, despite the limitations of the existing international efforts to develop an inclusive global society. The need will be highlighted to continue researching IKs and ultimately enabling them to actively decolonise themselves. The final part of the chapter presents a literature review about the concept 'methodology', building on the discussion of the other two terms and fostering a discussion around the shortcomings of Western methodological approaches on IK research as well as fostering discussion about the need for IK

research to be informed by decoloniality as an overarching research vision, rather than Western standpoints. This section also outlines a few success stories in IK research after emphasising the shortcomings of a wide range of studies into IK that have not managed to move away from Western ways of doing research.

2 The Concept ‘Sustainable Development’

The first part of the chapter will discuss the definition of the first of the three key concepts covered in this book—SD—and begin unpacking the main argument of this chapter by detailing the work of the soft governance of international policy through ‘policy orchestration’. It has been emerging as a new powerful method of governing, first, the Millennium Development Goals (MDGs), and then the Sustainable Development Goals (SDGs), by the United Nations (UN) through the growth of ‘orchestrated networks’ (Viola, 2015: 24). The orchestration of SD in the UN projects to date will be problematised but, at the same time, the capacity of the UN to orchestrate the application of a revised definition of SD in practice will be proposed.

2.1 *An Evolving Definition of ‘SD’*

According to Keiner (2005: 1), SD as an idea can be traced back to 1713 ‘when Carlowitz edited the first book on forest sciences’, arguing timber would become as important for the humanity as daily food, and calling for caution in its usage. However, it was the UN that has been playing a pivotal role in the promotion of SD in the world for decades. The commission established by the UN General Assembly in 1983, which later adopted the name World Commission on Environment and Development (WCED) launched an investigation into the problems that the society faced globally in the 1980s (SDGs, 2021). This commission is also commonly referred to as the Brundtland Commission (Hummels & Argyrou, 2021). WCED provided an explanation that ‘sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs’ (WCED, 1987: 25). As any burgeoning idea, a precise definition of SD was yet to be developed but the urgency of putting SD at the forefront of policymaking was evident. For instance, it was presented as one of the most urgent subjects for international policy at the 1992 UN Earth Summit in Rio de Janeiro (Chichilnisky, 1997).

Despite international attention on all levels of policy-making, or perhaps better to say, because of the attempts of all these interested parties to identify and steer an SD agenda in their preferred direction, SD has been a contested concept. Parris and Kates (2003: 559) explain that the ‘proponents of sustainable development differ in their emphases on what is to be sustained, what is to be developed, how to link

environment and development, and for how long a time'. These scholars illustrate this by listing twelve selected efforts to characterise and measure SD which include, for example, the Wellbeing Index, the Environmental Sustainability Index, etc. The multiplicity of these efforts has been coupled with changing ideas in development and environmentalist thinking (Elliott, 2012).

In addition to the changing context of SD, Hummels and Argyrou (2021: 2) blame the vagueness of WCED definition of SD, provided earlier, for the violation of 'planetary boundaries' in the recent decades, such as climate change, the scarcity of natural resources, social inequalities, threat of terrorism, etc. The authors debate the elusiveness of SD as a practice because of the unresolved contradiction among its components: economic growth, human development and environmental protection. This recent publication has successfully collated and analysed a range of definitions of SD and called for a revised definition that places sustainable entrepreneurship in the centre of SD. This new definition 'allows the pursuit of economic growth but requires compliance with the planetary boundaries. A potential way out of the tragedy is offered by sustainable entrepreneurship that promotes economic growth while intends to overcome sustainability related challenges through the creation and distribution of solutions' (Hummels & Argyrou, 2021: 1).

The authors of the revised definition of SD focus on an example of a particular company which demonstrates the applicability of the definition in practice. However, arguably, the UN with its orchestration power has the capacity to orchestrate awareness raising about this way of seeing SD in the world and to promote the adoption of sustainable entrepreneurship for SD.

2.2 UN's Orchestration of SD

The UN has been coordinating the improvement of life globally in different areas through its two related big projects: the MDGs which commenced in 2001 with the deadline in 2015, and the subsequent SDGs with the deadline in 2030. The MDGs and SDGs have been led by a set of goals, targets, and indicators. To give an idea of the scope of the projects, the current SDG project is accompanied by 17 goals with 169 targets and 230 indicators (Yap & Watene, 2019: 452). The aim of the interconnected projects has been to mobilise everyone to tackle the problems, which threaten the wellbeing of the planet and its peoples (SDG, 2021). Previous research in the area of MDGs and SDGs is diverse. Its foci include the international governance of the two projects (Biermann et al., 2017; Fukuda-Parr, 2014; Kanie and Biermann, 2017), the extent to which the SDG project became an improved version of the MDG project (Carant, 2017), and evaluating the achievements and challenges in the design and implementation of both sets of goals in national contexts (Assefa et al., 2017; Fukuda-Parr et al., 2013; Jacob, 2017).

The efforts in the formation and achievement of these goals have not been a complete success story. First of all, the MDGs were developed by Western countries and did not take a participatory approach (Ogujiuba & Jumare, 2012), unlike the

SDGs which sought input from governments, civil societies and individuals from the My World Survey (Gellers, 2016). However, despite the fact that the UN stepped up its effort in orchestrating a shared design of the SDGs, the SDGs have shortcomings in other respects. For example, some marginalised groups such as Indigenous peoples and women remain marginalised, even despite the universality and participatory nature of the SDGs (Winkler & Satterthwaite, 2017). There is also a lack of emphasis on higher education in the SDGs, without which the progress of developing countries is hindered (Heleta & Bagus, 2020). The emphasis on animal health, welfare and rights has been overlooked in the 17 SDGs, which helps Visseren-Hamakers (2020) make a case for calling for the creation of the 18th goal dedicated to this matter. The goals are meant to be comprehensive, interrelated and universal. However, the language is not strong enough, policies and funding provisions are not always clear, and the goals are still strongly embedded in the neoliberal framework and traditional economic growth (Assefa et al., 2017; Jacob, 2017).

These pitfalls in the design and implementation of the MDGs and the SDGs is not surprising as doing world-wide projects is far from being easy and straightforward. Despite these weaknesses of the process, the UN remains the world-encompassing leader in SD, exercising its soft governance while carrying on with the SDGs.

It is important to review how SDGs are governed on the international level to understand their essence better. Soft governance is the concept that, arguably, explains the management of different matters specifically on the international scale. It is so because of the participation of country representatives and various stakeholders in the main international governing establishments, such as the UN. Moreover, Fejes (2006: 224) argues that ‘no longer is governing made through legislation. Instead it is made through different techniques/tactics’. Although soft power at the international scale has partially reduced the power of the states in directing their domestic matters (Grek, 2008), it is still too early to disregard the authority that the states have to steer the development of their domestic contexts, as well as to fully shape the international policy scale itself. Hudson (2011: 671) suggests that soft government may be ‘as powerful as direct control mechanisms’.

Soft power is a broad notion. Different international organisations would govern their projects in different ways, all possibly being classified as soft governance. For instance, Abbott et al. (2016) distinguish orchestration from delegation, although they acknowledge that the distinction is made for analytical purposes as the two models overlap in practice. According to the scholars, delegation is based on the principal-target actor contractual relationship, whereas orchestration is based on orchestrator-intermediary-target actor relationship, which is more fluid. Orchestration through the three actors suggested by Abbott et al. (2016) has been turning into a much more complex issue in practice. It is because orchestration has been emerging as a new powerful method of governing through the growth of ‘orchestrated networks’ (Viola, 2015: 24). The author explains that these networks have one or more focal or nodal institutions that orchestrate—lead through facilitation. When they cannot engage in direct regulation, they rely on other public or private organisations that volunteer in this process and share a common goal, and in this way exert their indirect control that allows them to construct the world in which they operate.

Abbott and Bernstein (2015) and Bernstein (2017) scrutinise the actors involved in the orchestration of the SDGs. Abbott and Bernstein (2015) explain that the term ‘orchestration’ is a metaphor for the UN High-level Political Forum on Sustainable Development which is a subsidiary body of both the United Nations General Assembly and the United Nations Economic and Social Council which are responsible for sustainable development policy-making. This Forum became the ‘platform through which the governments can promote the coordination and combination of policies to defuse and integrate the Sustainable Development Goals into global, country-level, and marketplace policies and practices’ (Bernstein, 2017: 214). According to Weiss (2018: 1), ‘The UN system was born plural and decentralised and was never intended to approximate a formal world government’. The UN system is composed of three elements: the First UN which is the UN institutional framework of member states, the Second UN which is the secretary-general and the international civil service that are independent from the member states, and the Third UN which is a range of NGOs, experts, corporate executives, media representatives as well as academics. These elements form an interconnected network that extends its cooperation with other institutions, particularly within member states. Thus, the UN works as ‘the orchestrator of orchestrators’ (Bernstein, 2017: 214). Since the policy actors in the UN orchestration network for SDGs are volunteers, the orchestrator cannot prescribe what do, and can only point to directions for work which results in both opportunities and challenges (Bernstein, 2017). Although orchestration is not discussed explicitly in relation to MDGs, it may as well have been the method of governing in that project too as polycentrism in SD during the MDG project is mentioned by Ostrom (2010).

Although the orchestration of SD in the UN projects to date has pitfalls, the UN evidently has the power to orchestrate so it can orchestrate the applicability of the revised definition of SD, put forward by Hummels and Argyrou (2021) by appealing to knowledge as a useful tool in this process. Researching and mobilising Indigenous knowledge in this process is a specific case this chapter explores, in the effort to bring the ideas about sustainable development, Indigenous knowledge and Indigenous methodologies together and highlight their interconnected nature.

3 The Concept ‘Indigenous Knowledge’

This part of the chapter will place IKS in the spotlight which is the second of the three key concepts this chapter discusses in light of the available scholarship. This section will unpack the relevant definition and call attention to the fact that Indigenous peoples remain marginalised in different areas of life. The discussion below will demonstrate the need to recognise the importance of IKS for advancing the applicability of the revised definition of SD, which was presented earlier.

Similarly to the term SD, the term IKS has evolved over time. To understand the nuances of the meaning of this term, Purcell (1998) encourages to break the term down into two parts: ‘Indigenous’ and ‘knowledge’. The author explains that the part

'Indigenous' signifies 'specific groups of people defined by the criteria of ancestral territory, collective cultural configuration, and historical location in relation to the expansion of Europe' (Purcell, 1998: 258). However, the practice of combining this word with the term 'knowledge' since the 1980s has developed an ideological and social sciences perspective which highlights the presence of unequal power relations brought about by colonisation and the post-colonial context.

Sillitoe (2006: 1–2) elaborates on the definition of IKs by emphasising that they mean 'any understanding rooted in local culture. It includes all knowledge held more or less collectively by a population that informs interpretation of things. It varies between regions. It comes from a range of sources, is a dynamic mix of past 'tradition' and present invention with a view to the future...Although IK is more widely shared generally than specialized scientific knowledge, no one person or social group knows it all. Its distribution is uneven. There may be some clustering of certain knowledge within populations (e.g. by gender, age, specialist status etc., maybe reflecting political power)'. The essence of IKs may be summarised in the following seven principles, 'First, knowledge is holistic, cyclic, and dependent upon relationships and connections to living and non-living beings and entities. Second, there are many truths, and these truths are dependent upon individual experiences. Third, everything is alive. Fourth, all things are equal. Fifth, the land is sacred. Sixth, the relationship between people and the spiritual world is important. Seventh, human beings are least important in the world' (Hart, 2010: 3, citing Simpson, 2000).

The history of colonialism and its aftermath has been coupled with epistemic violence against IKs as well as assigning a secondary position to IKs (Ocholla, 2007; Mawere, 2014; Mawere and Awuah-Nyamekye, 2015). This has resulted in little institutionalisation of IKs (Ezeanya-Esiobu, 2019). 'The international scientific knowledge' (Sillitoe, 2006: 2) which is a form of Western knowledges (WKs) (Brigg, 2016) has occupied the primary position, taking away from IKs' right to be a form of science too. Nevertheless, the framing of IKs as a science is illustrated, for example, by Mawere (2014) who referred to African localised understanding of the environment as science. Similarly, the term 'Indigenous science' is used by Wooltorton et al. (2020: 931) to mean 'a way of understanding and finding our way in the world' and 'challenge the often-assumed idea that western science represents definitive 'truth''. Clearly, the inclusion of the term 'international' in 'the international scientific knowledge', which does not represent the international context fully, serves as evidence of the epistemic colonisation of IK. The distinction between IK and 'the international scientific knowledge' necessitates clarifying the geopolitical localisation of the two. We should turn here to the ideas of the Global South and the Global North. Dados and Connell (2012: 12) explain that "The phrase "Global South" refers broadly to the regions of Latin America, Asia, Africa, and Oceania. It is one of a family of terms, including "Third World" and "Periphery," that denote regions outside Europe and North America, mostly (though not all) low-income and often politically or culturally marginalized". The Global North, which is also often referred to as the West, is Euro-North American-centred (Ndlovu-Gatsheni, 2015).

The difference between IKs and WKs is that ‘IKs are typically identified as holistic, embedded, contingent and relational in contrast to WKs as atomistic, reductionist, abstract and absolute’ (Brigg, 2016: 152). However, the distinction is not that clear-cut. Brigg (2016) warns against making wholesale distinctions between IKs and WKs because WKs, she argues, are more relational than they may appear predominantly because of the relational aspect of Western science. Conversely, IKs are not merely cultural as, for example, ‘IKs can and do speak to crucial questions about the nature and ordering of the world in ways that are not always fluid and negotiable’ (Brigg, 2016: 153). A more pessimistic image of the relationship between IKs and WKs is presented by Higgins and Kim (2019: 124): ‘most social science methodologies always already have a relationship to Indigeneity, albeit a problematic one in which processes of knowledge production (re)produce Indigenous bodies and ways-of-knowing-in-being as abject otherness against which Western modernity is normalized and naturalized’.

The marginalisation of IKs has been at the heart of the idea to integrate them with other forms of knowledge. Action has been taken by stakeholders to achieve this aim (Battiste & Youngblood, 2000; Mbah et al., 2021; Ocholla, 2007). A range of efforts by various stakeholders with a broader agenda to support Indigenous populations targeted not only to protect but also to include and empower Indigenous peoples in the interventions which target benefitting them. The UN has orchestrated a number of such interventions (Breidlid, 2009; Kaya, 2014). According to these authors, in addition to the interventions specifically targeting Indigenous peoples such as the 2007 UN Declaration on the Rights of Indigenous Peoples, there are others—such as the famous SDGs. While all SDGs are relevant to Indigenous populations and there are six specific references to such populations in the SDG agenda, the importance of ‘culture as a dimension of development’ is side-lined and does not represent Indigenous philosophies as it should be indivisible from other dimensions of development such as economy, environment, etc. (Yap & Watene, 2019: 456). Indigenous peoples remain marginalised in different areas, such as education as well as in the framing of the current SDG project, even despite the universality and participatory nature of the SDGs (Winkler & Satterthwaite, 2017).

Apparently, more work needs to be done to correct this problem. Increasing the representation of Indigenous peoples in, for instance, the exercising of the SDGs and ensuring that international actors take IKs into account more, risks perpetuating the marginalisation of this group because of the perpetuation of their passive position which has been constructed as such by colonialism and the post-colonial world. Appealing to decoloniality is presented in this chapter as an essential medium of mobilising IKs for SD.

Decoloniality is distinct from decolonisation, the latter being one of the aspects of decoloniality—predominantly about the liberation of ‘colonised and Indigenous subjects’ (Kumalo & Praeg, 2019: 1). ‘Decoloniality is not only a long-standing political and epistemological movement aimed at the liberation of (ex-) colonized peoples from global coloniality but also a way of thinking, knowing, and doing. It is part of marginalized but persistent movements that merged from struggles against

the slave trade, imperialism, colonialism, apartheid, neo-colonialism, and underdevelopment as constitutive negative elements of Euro-North American-centric modernity' (Ndlovu-Gatsheni, 2015: 485). The decoloniality movement rests on the idea that the following three domains are colonised. First, the coloniality of power is recognised in how world politics was constructed as 'racially hierarchised, Euro-American-centric, Christian-centric, patriarchal, capitalist, hetero-normative, hegemonic, asymmetrical, and modern power structure' (Ndlovu-Gatsheni, 2015: 489, citing Grosfoguel, 2007). Second, the coloniality of knowledge is seen in how 'indigenous knowledges have been pushed to what became understood as 'the barbarian margins of society'' (Ndlovu-Gatsheni, 2015: 489). Finally, the coloniality of being is expressed in how people understand their own selves as well as those around them and it is 'a struggle to regain lost subjecthood' for the those who are marginalised (Ndlovu-Gatsheni, 2015: 489).

Arguably, these three aspects of coloniality are interrelated as, for instance, certain power relations facilitate the production of a central knowledge that sustains those power relations. Ndlovu-Gatsheni (2015) further states that decoloniality calls on intellectuals from imperialist countries to take action, which suggests that the author sees the decoloniality knowledge of the intellectuals as having potential to change the asymmetrical power in the world and free the colonised being of marginalised Indigenous groups.

Knowledge is produced and disseminated through different forms of education, which is positioned as a soft power in the global sustainability debate because education contributes to the formation of certain human habits related to SD (Sayamov, 2013). Unterhalter (2014) suggested that education might have been one of the most important areas for supporting MDGs, and there are a few studies that highlight the driving role of education in the SDG agenda (Annan-Diab & Molinari, 2017; Bengtsson et al. 2018; Persaud, 2017; Vladimirova & Le Blanc, 2016). This is despite the existence of a goal specifically focused on education: Goal 2 within the MDGs—MDG 2 'Achieve universal primary education', and Goal 4 within the SDGs—SDG 4 'Quality Education' (Sinha, 2016; Unterhalter, 2014).

Rather than integrating colonised IKs with WKs, this chapter calls for the need to continue researching IKs and ultimately to decolonise them. IKs would then themselves take, rather than be granted by colonisers, their place in the global system of knowledges. IKs would also more actively influence SD which, in Hummels and Argyrou's (2021) terms, is rooted in sustainable entrepreneurship which should be seen as an international endeavour integral not just to the Euro-North-American context but to the Global South. Ultimately, a shift of knowledge paradigms is needed whereby global inclusive knowledge systems exist. This is possible largely due to a shift in research methodologies, which currently are dominated by Western approaches.

4 The Concept ‘Methodology’

This section presents a literature review about the concept ‘methodology’, which is the final key term this chapter aims to explain, having unpacked the terms ‘SD’ and ‘IKs’. While this section is focused on the term ‘methodology’, it builds on the discussion of the other two terms above and fosters a discussion around the shortcomings of Western methodological approaches on IK research as well as a discussion about the need for IK research to be informed by decoloniality as an overarching research vision, rather than Western standpoints. This section also outlines a few success stories in IK research after emphasising the shortcomings of a wide range of studies into IK that have not managed to move away from Western ways of doing research.

4.1 *Shortcomings of Westerns Methodological Approaches on IK Research*

A lot of existing research into IKs draws on established Western lenses. For example, in science education studies, researchers draw on aspects of the scientific paradigms from their science training, seeking to be objective which may not be appropriate for IK research (Keane et al., 2016, 2017). Most of these paradigms are associated with specific disciplines and act as the primary way in which knowledge is generated which, again, does not always work for IK research (Smith et al., 2016). The same goes for Western convention of separating methodology from the content of the results which it produces. However, IK methodology may, in fact, itself be the content (Gupta, 2012; Martin, 2017).

A lot of IK research also tends to be done in consultation with Indigenous communities rather than with their involvement as equal actors in the research process (Goulding et al., 2016). Such unequal power relations between the WKs and IKs whereby WKs lead the enquiry into IKs can be summarised as ‘the 5D data’ that is about difference, disparity, disadvantage, dysfunction, and deprivation (Walter, 2018: 257).

The unequal power relations are also accompanied by a particular pattern of the dissemination and usage of the results of such research. They become consolidated and institutionalised away from the Indigenous communities, where it is not relevant for the majority of the knowledge holders. An example of this are academic publications which follow the rules of Western academia and are out of the reach of a non-specialised Indigenous audience (Keane et al., 2017; Smith et al., 2016).

These shortcomings of Western approaches to IKs research amount to a failure to do much progress for the emancipation of Indigenous populations but rather to honour Western approaches in addressing the issue of the marginalisation of IKs. Kumalo and Praeg (2019: 1) illustrate this, stating that such ‘performances of ‘decoloniality’, which often takes the form of elaborately ritualised and expensive decolonial lectures

delivered by international scholars, amount to a form of ‘box-ticking’ that lacks substantive engagement with locally situated struggles, debates and dialogues. The latter ...do little more than shore up white ignorance and intellectual mediocrity’.

4.2 An Indigenous Research Paradigm Informed by Decoloniality

Decoloniality, introduced earlier in this chapter, is a solution to this problem. It is a tool to liberate IKs from their victimised position, into which they were forced by Western approaches. It is important to understand that IK research is not about ‘inventing anything but reclaiming Indigenous research Knowledges and methodologies [that] have existed over millennia’ (Ryder et al., 2020: 255). Dados and Connell’s (2012: 13) representation of the ‘world perspective from the Global South’, using the world map with the South appearing at the top and the North at the bottom, can also be seen as a portrayal of the repositioning of the focus when approaching IK research.

While the background of the researcher matters in shaping research (Keane et al., 2016; Rubin & Rubin, 2012), it is the adoption of ‘an indigenous research paradigm’ (Hart, 2010: 1) or ‘a decolonising research paradigm’ (Wooltorton et al., 2020: 918) that can decolonise IK research and make it serve its emancipatory purpose. Guba and Lincoln (1994) argue that the decisions about research methods are secondary to the questions of wider methodological choices, such as the research paradigm. Although the term a ‘research paradigm’ has been over-used in its application to a wide range of issues, the general consensus is that it is as a scientific tradition or approach that presupposes certain assumptions and influences research (Blaikie, 2000; Gilbert, 2001); Guba and Lincoln, 1994). The question of paradigms is key when designing research which, according to Annan-Diab and Molinari (2017), is a guiding power in all areas and a potential central driver in SD. In order to identify what makes the Indigenous research paradigm, the answers to four fundamental pillars of research paradigms should be reviewed: ontology, epistemology, methodology and axiology (Guba and Lincoln, 1994; Wilson, 2001).

Hart (2010) presents an excellent account of the answers to these questions which are also partly traced in the work of other authors, cited below. In brief, reciprocity and spirituality form two key elements of an Indigenous ontology.

An Indigenous epistemology ‘is a fluid way of knowing derived from teachings transmitted from generation to generation by storytelling, where each story is alive with the nuances of the storyteller. It emerges from traditional languages emphasizing verbs, is garnered through dreams and visions, and is intuitive and introspective. Indigenous epistemology arises from the interconnections between the human world, the spirit, and inanimate entities. Another aspect of Indigenous epistemology is perceptual experiences. However, an Indigenous definition of perception is relevant’ (Hart, 2010: 8).

Indigenous methodologies are those where the approach to, and the undertaking of, research process and practices are about Indigenous perspectives and values (Walter & Suina, 2019). Such approaches make the researcher an Indigenous researcher (Hart, 2010) who researches what is important for Indigenous populations and what can be used in practice (Goulding et al., 2016; Hart, 2010), who is guided by respect, responsibility, reciprocity, reverence (Smith, 2019), resistance to oppression and the privileging of Indigenous voices (Martin, 2017) as ethical principles of working with Indigenous peoples.

An Indigenous axiology relies on the following values, identified by Hart (2010: 9–10):

1. Indigenous control over research, which can be demonstrated by having Indigenous people developing, approving, and implementing the research;
2. A respect for individuals and community, which can be demonstrated by a researcher seeking and holding knowledge and being considerate of community and the diversity and unique nature that each individual brings to community;
3. Reciprocity and responsibility, which can be demonstrated in ways a researcher would relate and act within a community, such as a researcher sharing and presenting ideas with the intent of supporting a community;
4. Respect and safety, which can be evident when the research participants feel safe and are safe. This includes addressing confidentiality in a manner desired by the research participants;
5. Non-intrusive observation, where one, such as a researcher, would be quietly aware and watching without interfering with the individual and community processes;
6. Deep listening and hearing with more than the ears, where one would carefully listen and pay attention to how his/her heart and sense of being is emotionally and spiritually moved;
7. Reflective non-judgement, where one would consider what is being seen and heard without immediately placing a sense of right or wrong on what is shared and where one would consider what is said within the context presented by the speaker;
8. To honor what is shared, which can be translated to fulfilling the responsibility to act with fidelity to the relationship between the participants and the researcher and to what has been heard, observed, and learned;
9. An awareness and connection between the logic of the mind and the feelings of the heart, where both the emotional and cognitive experiences are incorporated into all actions;
10. Self-awareness, where one would listen and observe oneself, particularly in relation to others during the research process;

11. Subjectivity, where the researcher acknowledges that she or he brings her or his subjective self to the research process and openly and honestly discusses this subjectivity.

4.3 *Examples of Indigenous Methodologies*

An Indigenous research paradigm is not any definitive and prescriptive single way of doing IK research but rather a lighthouse in the research journey of an Indigenous researcher. Indigenous methodologies are meant to be decolonising and emancipatory (Chilisa, 2017; Clement, 2019; Keane et al., 2017; Smith, 2019), producing the knowledge which can coexist productively and equally with WK (Goulding et al., 2016; Higgins & Kim, 2019; Ryder et al., 2020), actively taking the equal position in the global system of knowledges to which it belongs.

The concept ‘methodology’ is often confused with the notion ‘method’ (VanWynsberghe & Khan, 2007). The definition of methodology which demonstrates that it is a broader term than a method is the following, ‘a theory and analysis of how research should proceed... in the context of the dominant paradigm’ (VanWynsberghe & Khan, 2007: 3, citing Harding, 1987). Gilbert’s (2001: 220) reference to a combination of ‘techniques and epistemology’ as a feature of methodology highlights the interconnection amongst methodology and epistemology as elements of a research paradigm.

Gilbert’s (2001) emphasis on the link between epistemology and methodology can be illustrated by Juutilainen et al.’s (2020) study who view nonhierarchical approaches to relationships as an expression of Indigenous epistemologies guiding Indigenous methodology in health care and biomedical research.

Similarly, Wooltorton et al. (2020) develops a place-based cooperative inquiry methodology which demonstrates the link to the axiology values identified by Hart (2010) and presented above, such as value seven about being reflective. Wooltorton et al.’s (2020) methodology uses Indigenous and Western science within Indigenous-led environmental education. This methodology is a form of action research which ‘includes four ways of knowing: experiential (action), presentational or creative (reflective), propositional or conceptual (reflective) and post-conceptual/participative (action and preplanning for future cycles)’ (Wooltorton et al., 2020: 920).

Hart’s (2010) axiology ideas of the connection between the logic of the mind and feeling can also be traced in Te Ava and Page’s (2020) proposition to use Tivaevae Model as an Indigenous Methodology in Cook Islands education settings. This model draws from artistic quilting which plays an important part in the lives of Cook Islanders. Te Ava and Page (2020: 70) explain ‘how patchwork creative pieces come together to create a story and can be used as a metaphor of the past, present and future integration of social, historical, spiritual, religious, economic and political representations of Cook Island culture’.

These are a few examples of IK research which attempted to follow an Indigenous research paradigm and liberate itself and its results from Western approaches. Decoloniality as an indispensable medium in this process is a way forward in the quest for the emancipation of IKs as one of the important tools in SD.

5 Conclusion

This chapter has provided another step in global efforts to highlight the problems that undermine the wellbeing of the marginalised which, in turn, compromises, global progress towards developing a sustainable and inclusive society. This review chapter has mapped three key notions of the book: SD, IKs and methodology, emphasising the importance of decolonising the voices of Indigenous groups in knowledge production. The review of these three key concepts has also explained that despite the fact that the orchestration of SD in the UN projects to date has pitfalls, the UN evidently has the power to orchestrate policy so it can orchestrate the applicability of the revised definition of SD, put forward by Hummels and Argyrou (2021) by appealing to knowledge as a useful tool in this process. Appealing to the available knowledge and further research for the production of new global knowledge is key for SD. While this broad idea is not new and has attracted the attention of scholars (e.g., Annan-Diab & Molinari, 2017), the origin, nature and effect of the knowledge that is produced should be problematised. It is the Western epistemologies that dominate the global knowledge systems. Researching and mobilising IKs was a key area in this chapter. Rather than simply aiming to combine IKs with WGs, which would not dismantle the colonised position of IKs, this chapter has demonstrated the need to decolonise IKs by going beyond Western approaches in IK research. This is crucial in liberating IKs to enable them themselves take, rather than be granted by colonisers, their equal position in the system where other knowledges exist. This is crucial also for SD, which has already been deemed as dependant on IKs as well as other forms of knowledge (Bredlid, 2009; Kaya, 2014; Magni, 2017). Liberated IKs would also actively influence SD which, in Hummels and Argyrou's (2021) terms, is rooted in sustainable entrepreneurship which, in turn, should be seen as an international endeavour, integral not just to the Euro-North-American context but to the Global South as well.

References

- Abbott, K. W., & Bernstein, S. (2015). The high-level political forum on sustainable development: Orchestration by default and design. *Global Policy*, 6(3), 222–233.
- Abbott, K. W., Genschel, P., Snidal, D., & Zangl, B. (2016). Two logics of indirect governance: Delegation and orchestration. *British Journal of Political Science*, 46(4), 719–729.

- Annan-Diab, F., & Molinari, C. (2017). Interdisciplinarity: Practical approach to advancing education for sustainability and for the Sustainable Development Goals. *The International Journal of Management Education*, 15(2), 73–83.
- Assefa, Y., Van Damme, W., Williams, O. D., & Hill, P. S. (2017). Successes and challenges of the millennium development goals in Ethiopia: Lessons for the sustainable development goals. *BMJ Global Health*, 2(2), 1–7.
- Battiste, M., & Youngblood, J. (2000). *Protecting indigenous knowledge and heritage: A global challenge*. Ubc Press.
- Bengtsson, S. E., Barakat, B., & Muttarak, R. (2018). *The role of education in enabling the sustainable development agenda*. Routledge.
- Bernstein, S. (2017). The United Nations and the governance of sustainable development goals. In Kanie, N., and Biermann, F. (eds) *Governing through goals: Sustainable Development Goals as governance innovation*. The MIT Press: London, pp.213–239.
- Biermann, F., Kanie, N., & Kim, R. E. (2017). Global governance by goal-setting: The novel approach of the UN Sustainable Development Goals. *Current Opinion in Environmental Sustainability*, 26, 26–31.
- Blaikie, N. W. H. (2000). *Designing social research: The logic of anticipation*. Polity Press.
- Breidlid, A. (2009). Culture, indigenous knowledge systems and sustainable development: A critical view of education in an African context. *International Journal of Educational Development*, 29(2), 140–148.
- Brigg, M. (2016). Engaging indigenous knowledges: From sovereign to relational knowers. *The Australian Journal of Indigenous Education*, 45(2), 152–158.
- Carant, J. (2017). Unheard voices: A critical discourse analysis of the Millennium Development Goals' evolution into the Sustainable Development Goals. *Third World Quarterly*, 38(1), 16–41.
- Chichilnisky, G. (1997). What is sustainable development? *Land Economics*, pp. 467–491.
- Chilisa, B. (2017). Decolonising transdisciplinary research approaches: An African perspective for enhancing knowledge integration in sustainability science. *Sustainability Science*, 12(5), 813–827.
- Clement, V. (2019). Beyond the sham of the emancipatory enlightenment: Rethinking the relationship of indigenous epistemologies, knowledges, and geography through decolonizing paths. *Progress in Human Geography*, 43(2), 276–294.
- Dados, N., & Connell, R. (2012). The global south. *Contexts*, 11(1), 12–13.
- Elliott, J. (2012). *An introduction to sustainable development*. Routledge.
- Ezeanya-Esiobu, C. (2019). *Indigenous knowledge and education in Africa*. Springer Nature.
- Fejes, A. (2006). The Bologna process—Governing higher education in Europe through standardisation. *Revista Española de Educación Comparada*, 12, 203–231.
- Fukuda-Parr, S. (2014). Global goals as a policy tool: Intended and unintended consequences. *Journal of Human Development and Capabilities*, 15(2–3), 118–131.
- Fukuda-Parr, S., Greenstein, J., & Stewart, D. (2013). How should MDG success and failure be judged: Faster progress or achieving the targets? *World Development*, 41, 19–30.
- Gellers, J. C. (2016). Crowdsourcing global governance: Sustainable development goals, civil society, and the pursuit of democratic legitimacy. *International Environmental Agreements: Politics, Law and Economics*, 16(3), 415–432.
- Gilbert, G. (2001). Research, theory and method. In G. N. Gilbert (Ed.), *Researching social life* (2nd ed.). Sage.
- Goulding, D., Steels, B., & McGarty, C. (2016). A cross-cultural research experience: Developing an appropriate methodology that respectfully incorporates both Indigenous and non-Indigenous knowledge systems. *Ethnic and Racial Studies*, 39(5), 783–801.
- Grek, S. (2008). From symbols to numbers: The shifting technologies of education governance in Europe. *European Educational Research Journal*, 7(2), 208–218.
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In: *Handbook of qualitative research* (pp. 105–117).

- Gupta, A. D. (2012). Way to study indigenous knowledge and indigenous knowledge system. *Cultural Anthropology*, 37(3), 373–393.
- Hart, M. A. (2010). Indigenous worldviews, knowledge, and research: The development of an indigenous research paradigm. *Journal of Indigenous Social Development*, 1(1), 1–16.
- Heleta, S., & Bagus, T. (2020). Sustainable development goals and higher education: Leaving many behind. *Higher Education*, 81(1), 163–177.
- Higgins, M., & Kim, E.-J.A. (2019). De/Colonizing methodologies in science education: Rebraiding research theory–practice–ethics with indigenous theories and theorists. *Cultural Studies of Science Education*, 14(1), 111–127.
- Hudson, C. (2011). Evaluation—The (not so) softly-softly approach to governance and its consequences for compulsory education in the Nordic countries. *Education Inquiry*, 4(2), 671–687.
- Hummels, H., & Argyrou, A. (2021). Planetary demands: Redefining sustainable development and sustainable entrepreneurship. *Journal of Cleaner Production*, 278, 1–11.
- Jacob, A. (2017). Mind the gap: Analyzing the impact of data gap in Millennium Development Goals' (MDGs) indicators on the progress toward MDGs. *World Development*, 93, 260–278.
- Juutilainen, S. A., Jeffrey, M., & Stewart, S. (2020). Methodology matters: Designing a pilot study guided by indigenous epistemologies. *Human Biology*, 91(3), 141–151.
- Kanie, N., & Biermann, F. (Eds.). (2017). *Governing through goals: Sustainable development goals as governance innovation*. MIT Press.
- Kaya, H. O. (2014). Revitalizing African indigenous ways of knowing and knowledge production. In S. Purvis, & M. Pang (Eds.), *Restoring indigenous self-determination: Theoretical and practical approaches* (pp. 88–95). E-International Relations.
- Keane, M., Khupe, C., & Muza, B. (2016). It matters who you are: Indigenous knowledge research and researchers. *Education as Change*, 20(2), 163–183.
- Keane, M., Khupe, C., & Seehawer, M. (2017). Decolonising methodology: Who benefits from indigenous knowledge research? *Educational Research for Social Change*, 6(1), 12–24.
- Keiner, M. (2005). *History, definition (s) and models of sustainable development*. ETH Zurich.
- Kumalo, S., & Praeg, L. (2019). Decoloniality and justice a priori. *Journal of Decolonising Disciplines*, 1(1), 1–10.
- Magni, G. (2017) Indigenous knowledge and implications for the sustainable development agenda. *European Journal of Education*, 52(4), 437–447.
- Martin, B. (2017). Methodology is content: Indigenous approaches to research and knowledge. *Educational Philosophy and Theory*, 49(14), 1392–1400.
- Mawere, M. (2014). *Culture, indigenous knowledge and development in Africa: Reviving interconnections for sustainable development*. Langaa Rpcig.
- Mawere, M., & Awuah-Nyamekye, S. (Eds.). (2015). *Between rhetoric and reality: The state and use of indigenous knowledge in post-colonial Africa*. Langaa RPCIG.
- Mbah, M., Johnson, A. T., & Chipindi, F. M. (2021). Institutionalizing the intangible through research and engagement: Indigenous knowledge and higher education for sustainable development in Zambia. *International Journal of Educational Development*, 82, 1–9.
- Ndlovu-Gatsheni, S. J. (2015). Decoloniality as the future of Africa. *History Compass*, 13(10), 485–496.
- Ocholla, D. (2007). Marginalized knowledge: An agenda for indigenous knowledge development and integration with other forms of knowledge. *The International Review of Information Ethics*, 7, 236–245.
- Ogugiuba, K., & Jumare, F. (2012). Challenges of economic growth, poverty and development: Why are the Millennium Development Goals (MDGs) not fair to sub-saharan Africa? *Journal of Sustainable Development*, 5(12), 52–64.
- Ostrom, E. (2010). Beyond markets and states: Polycentric governance of complex economic systems. *American Economic Review*, 100(3), 641–672.
- Parris, T. M., & Kates, R. W. (2003). Characterizing and measuring sustainable development. *Annual Review of Environment and Resources*, 28(1), 559–586.

- Persaud, A. (2017). Integrated planning for education and development. *European Journal of Education*, 52(4), 448–459.
- Purcell, T. (1998). Indigenous knowledge and applied anthropology: Questions of definition and direction. *Human Organization*, 57(3), 258–272.
- Rubin, H. J., & Rubin, I. (2012). *Qualitative interviewing: The art of hearing data* (3rd ed.). SAGE.
- Ryder, C., Mackean, T., Coombs, J., Williams, H., Hunter, K., Holland, A. J., & Ivers, R. Q. (2020). Indigenous research methodology—weaving a research interface. *International Journal of Social Research Methodology*, 23(3), 255–267.
- Sayamov, Y. N. (2013). Education as a global “soft power” for sustainable development. *Campus-Wide Information Systems*, 30(5), 346–357.
- SDGs. (2021). *Report of the World Commission on environment and development—Our common future*. <https://sustainabledevelopment.un.org/milestones/wced>. Accessed September 24, 2021.
- Sillitoe, P. (2006). Indigenous knowledge in development. *Anthropology in Action*, 13(3), 1–12.
- Sinha, N. (2016). Evaluation of Right to Education (RTE) in the light of Millennium Development Goals (MDG): A psycho-social study. *International Journal of Arts & Sciences*, 9(1), 469–479.
- Smith, L. T. (2019). *Decolonizing research: Indigenous storywork as methodology*. Bloomsbury Publishing.
- Smith, L. T., Maxwell, T. K., Puke, H., & Temara, P. (2016). Indigenous knowledge, methodology and mayhem: What is the role of methodology in producing indigenous insights? A discussion from mātauranga Māori. *Knowledge Culture*, 3(4), 131–156.
- Te Ava, A., & Page, A. (2020). How the Tivaevae model can be used as an indigenous methodology in Cook islands education settings. *The Australian Journal of Indigenous Education*, 49(1), 70–76.
- Unterhalter, E. (2014). Measuring education for the millennium development goals: Reflections on targets, indicators, and a post-2015 framework. *Journal of Human Development and Capabilities*, 15(2–3), 176–187.
- VanWynsberghe, R., & Khan, S. (2007). Redefining case study. *International Journal of Qualitative Methods*, 6(2), 1–9.
- Viola, L. (2015). The governing shift: From multilateral IGOs to orchestrated networks. In R. Mayntz (Ed.), *Negotiated reform: The multilevel governance of financial regulation* (Vol. 85). Campus Verlag.
- Visseren-Hamakers, I. J. (2020). The 18th sustainable development goal. *Earth System Governance*, 3, 1–5.
- Vladimirova, K., & Le Blanc, D. (2016). Exploring links between education and sustainable development goals through the lens of UN flagship reports. *Sustainable Development*, 24(4), 254–271.
- Walter, M. (2018). The voice of indigenous data: Beyond the markers of disadvantage. *Griffith Review*, 60, 256–263.
- Walter, M., & Suina, M. (2019). Indigenous data, indigenous methodologies and indigenous data sovereignty. *International Journal of Social Research Methodology*, 22(3), 233–243.
- WCED. (1987). *Report of the World Commission on Environment and Development*. https://www.un.org/ga/search/view_doc.asp?symbol=A/42/427&Lang=E. Accessed October 1, 2021.
- Weiss, T. G. (2018). *The United Nations and changing world politics*. Routledge.
- Wilson, S. (2001). What is indigenous research methodology? *Canadian Journal of Native Education*, 25(1), 175–179.
- Winkler, I. T., & Satterthwaite, M. L. (2017). Leaving no one behind? Persistent inequalities in the SDGs. *The International Journal of Human Rights*, 21(8), 1073–1097.
- Wooltorton, S., Collard, L., Horwitz, P., Poelina, A., & Palmer, D. (2020). Sharing a place-based indigenous methodology and learnings. *Environmental Education Research*, 26(7), 917–934.
- Yap, M. L. M., & Watene, K. (2019). The sustainable development goals (SDGs) and indigenous peoples: Another missed opportunity? *Journal of Human Development and Capabilities*, 20(4), 451–467.

Decolonisation of Research Methodologies for Sustainable Development in Indigenous Settings



Marcellus F. Mbah and Megan Bailey

Abstract Within dominant Western research frameworks, researchers hold the power to disseminate information that can be used for or against the interests of the researched. Historically, this is evidenced by the repeated study of indigenous peoples, territories, and natural resources with little regard to the impact such research has on indigenous peoples' present and future lives. As such, a growing body of research has emphasised the need for research paradigms that reflect indigenous views and beliefs. This includes employing inherently indigenous methodologies that capture indigenous knowledge and indigenous ways of knowing to topics in which indigenous perspectives have been historically absent. Sustainable development is one such area in which indigenous perspectives have been side-lined. Through the lens of postcolonial theory and epistemic injustice, we conducted a systematic review of the extant literature that investigated the Sustainable Development Goals (SDGs) in indigenous settings, presenting a case for the decolonisation of research methodologies in this context. The prevalent methodologies used in the extant literature are outlined and discussed in relation to establishing a precedence of conducting future research collaboratively with indigenous peoples.

Keywords Decolonisation · Indigenous · Research methodologies · Sustainable development

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1 Introduction

Whether stated or not, all research takes place within a research paradigm: a philosophical set of beliefs, assumptions, concepts, and values that guide research choices and actions (Held, 2019). Research paradigms are often defined by philosophical assumptions regarding ontology (the nature of reality), epistemology (what is knowledge), axiology (values), and methodology (research design and process). Presently, there are four major research paradigms: post-positivist, constructivist, transformative, and pragmatic (Held, 2019). These paradigms vary in how they view reality, what they consider knowledge, the values they uphold, and the methods used to uncover knowledge. These paradigms are all situated within Western views, traditions, and beliefs. As outlined by Scheurich and Young (1997), when one group within a society significantly dominates other minority groups for long periods of time, the ways of the dominant group (the ontologies, epistemologies, axiologies, and methodologies) become the dominant ways of that society to the extent to which these ways are viewed as the norm and as superior to the ways of the minority groups (Cajete, 2000).

A growing body of research has highlighted the urgent need for a research paradigm that reflects the perspectives of indigenous communities (Buntu, 2013; Chilisa, 2012; Mbah, 2019; Romm, 2015; Russon, 2008; Wilson, 2008). Historically, exploitation and oppression via research has fostered a deep mistrust among indigenous peoples and research institutions (Smith, 2012). Under colonial rule, indigenous peoples were among one of the most researched human groups (Rigney, 1999; Smith, 2005, 2012). Indigenous territories and natural resources were studied without permission for financial gain (e.g., by pharmaceutical companies utilising indigenous plants and knowledge), and social scientists studied indigenous peoples to try to solve “indigenous problems” that would inform government policy and “improve” the lives of indigenous peoples (Martin & Miraboopa, 2003; Wilson, 2008). However, these “indigenous problems” were not reported by indigenous peoples but rather were generated by the dominant West when indigenous peoples failed to entirely conform to colonial rule. As noted by Ormond et al. (2006), researchers, seldom the researched, hold the power to collect and report information that can be used for or against the interests of the researched. As such, present research with indigenous communities necessitates the use of methods and techniques that reconstruct power dynamics and decolonise the entire research process.

Distinctly indigenous research paradigms have thus been proposed to decolonise the research process. Chilisa (2012) provides an overview of an indigenous paradigm rooted in relationality. Unlike Western cultures, the customs, values, and beliefs of indigenous communities are rooted in a shared relationality, whereby all human and non-human animals and the natural world have a shared common origin, history, and future. From this worldview, humans are inseparable from each other and inseparable from the natural world (Mbah et al., 2021; Watene & Yap, 2015). Thus, a relational ontology focuses on the web of connections between living and non-living things (Romm, 2015). A relational epistemology closely aligns with the epistemology of the

social constructivist paradigm in that knowledge is socially constructed by people, living and non-living, who share relationships and connections with each other and the natural environment (Romm, 2015). Finally, Chilisa (2012) describes how a relational axiology encompasses values surrounding accountability, responsibility, respect, representation, reciprocal appropriation, and indigenous rights. One example of a paradigm encompassing relationality and indigenous worldviews is centred upon *Ubuntu*: a communal way of life summed up in the African proverb “I am because we are; we are because I am” (Mbah, 2016; Romm, 2015). Relationality is at the centre of *Ubuntu*, requiring respect and recognition for the living, non-living, and the surrounding world. As a research paradigm, *Ubuntu* requires that the indigenous community is at the centre of the research process and emphasises a collaborative process between researchers and indigenous peoples that respects the values, beliefs, and customs of the community (Muwanga-Zake, 2009).

1.1 Indigenous Methodologies

Participatory Action Research (PAR) approaches are one such method that place indigenous communities at the centre of the research process and engage researchers in the key values of a relational axiology (Evans et al., 2009; Kidd & Kral, 2005). PAR approaches emphasise that research is a collaborative process and involves reconstructing the inherent power dynamics of research conducted from a Western perspective. In western paradigms, researchers hold the power to extract information from people and use it for purposes that do not benefit the community (Ormond et al., 2006). In contrast, PAR approaches take individuals who would previously be considered participants and reconstructs them as collaborators and co-producers of research (Evans et al., 2009). This redistribution of power places indigenous peoples at the centre of the research process, empowering communities to find solutions to issues that matter to them by generating an investigation into their lived experiences and actions (Eruera, 2010). In this way, PAR approaches often incorporate various other indigenous methodologies to investigate the experiences of the indigenous community, such as participatory rural appraisal (PRA) techniques and storytelling methodologies.

PRA describes a family of methods and techniques that enable the sharing, enhancement, and analysis of knowledge among indigenous people, empowering communities to address issues that matter to them (Chambers, 1992). PRA techniques are characterised by a reversal of learning, whereby researchers learn from indigenous peoples. Critically, this does not simply involve questioning indigenous people about their knowledge and customs, but often involves the researcher as an active participant in cultural activities. For instance, rather than being told about the farming practices within an indigenous community, a researcher might ask to be taught the practices and may become involved in everyday farming activities as part of this. Participatory mapping and diagramming are also PRA techniques often used with indigenous cultures. These involve indigenous peoples collaboratively creating

maps and diagrams of their territories, their social structures, their demographics, and their natural resources, to share this information and knowledge among themselves and researchers. Other examples of PRA techniques include transect walks, timelines, trend analyses, scoring and ranking activities, and storytelling (Chambers, 1992).

Storytelling is a key facet of many indigenous societies (McIvor, 2010), providing indigenous peoples with reminders of who they are, where they came from, and what they understand (Caxaj, 2015; Iseke, 2013; Kovach, 2009). Storytelling methodologies enable the communication of holistic knowledge within the context of time, place, and relationships, which aligns with indigenous beliefs surrounding relationality. Additionally, the ability to freely use indigenous languages enables indigenous peoples to provide truer expressions of emotions and meanings (Rieger et al., 2020) that they perhaps would not be able to if research took place within a Western framework. One popular form of storytelling within the extant literature is yarning: a conversational process that involves the sharing of stories to develop knowledge (Fredericks et al., 2011; Walker et al., 2014). In yarning, data collection takes on the form of a dialogical, co-constructed conversation between indigenous peoples and researchers wherein indigenous participants are granted the power to guide the direction of the conversation (Ghys & Gray, 2012; Walker et al., 2014). Similarly, talking/sharing circles are characterised by sharing information and discussions within a group with a particular focus on group cooperation (Drawson et al., 2017). Typically, in talking circles, a talisman is used to identify the speaker at any given time. Lavallée (2009) discusses how sharing circles rebalance the power dynamics between the researcher and indigenous peoples as the participants must grant the researcher permission to use the conversations from the sharing circle for research purposes. Finally, culture-specific methods of storytelling may be adopted for research purposes, for instance, Suaalii-Sauni and Fulu-Aiolupotea (2014) used *talanoa* and *faafaletui* as storytelling research methods, both of which are unique to the indigenous peoples of Samoa and involve storytelling and the sharing of these stories to generate knowledge.

The extant literature has thus utilised several methodologies for conducting participatory research in collaboration with indigenous communities. These methods are rooted in indigenous worldviews and aim to promote the self-determination of the community (Held, 2019) and protect indigenous knowledge from misuse by western institutions (Porsanger, 2004). Processes of healing, mobilisation, transformation, and decolonisation are incorporated within these indigenous methodologies to achieve these goals (Smith, 2012). Critically, indigenous research methodologies do not only serve data collection but also support the creation and maintenance of relationships between scholars and indigenous communities and support the autonomy of these communities (Cueva et al., 2012; Lavallée, 2009).

1.2 *The Case of Indigenous Methodologies for Sustainable Development*

Research is integral to achieving sustainable development, whereby the needs of the present are met without comprising the ability of future generations to meet their own needs (United Nations [UN], 2015). Research enables the identification of problems and the development of solutions that can be tested, evaluated, and adapted in light of new and pre-existing knowledge (Fayomi et al., 2018). Indigenous knowledge has been identified as an underutilised resource for the development of problem-solving strategies (World Bank, 1998). Thus, if sustainable development is to be actualised, indigenous perspectives must be researched, and outcomes used to fuel the paradigm shift, as well as utilised in policy around sustainable development. This must be done using decolonised indigenous methods, ensuring that indigenous knowledge is treated with respect and considered equal to knowledge that has been generated via western methodologies. This knowledge can then be used for the betterment of all societies via the actualisation of the Sustainable Development Goals (SDGs).

The SDGs were adopted by the UN in 2015 as a “universal call to action to end poverty, protect the planet, and improve the lives and prospects of everyone, everywhere” (UN, 2015). Despite indigenous people holding first-hand experience of the impact of development on their present lives and continued existence, indigenous perspectives are largely missing from the SDGs (Yap & Watene, 2019). Across the 17 goals, 169 targets, and 231 unique indicators, indigenous people are referenced only four times in relation to targets 2.3 (increasing the agricultural activity of small-scale food producers) and 4.5 (eliminating gender disparities in education). Reflecting this side-lining of indigenous perspectives, culture is mentioned in only three SDG targets (Target 4.7, 8.9, and 12.b) as a means to achieve sustainable development and not something worth sustaining in its own right (Watene & Yap, 2015). This is a stark contrast to indigenous perspectives of development, wherein culture is indistinguishable from social, economic, and environmental dimensions.

The present chapter provides an overview of methodologies that can be used when investigating sustainable development in indigenous communities, from a decolonisation standpoint. This will fill a gap in the literature whereby overviews of indigenous methodologies have been conducted but never in the context of the SDGs. This review will hopefully provide a useful guide by which future researchers working with indigenous peoples in this context can refer to throughout the research process.

2 **Theoretical Underpinning**

This chapter is framed within post-colonial theory and critique. Originating from Edward Said’s *Orientalism* published in 1978, post-colonial critique emphasises that any piece of literature or media cannot be truly understood without considering the relationship to colonial hegemony, wherein western colonisers controlled and

dominated minority indigenous groups. Critically, we want to emphasise that within this framework we are not suggesting that colonialism has ended. Rather we are concerned with the still existing forms of colonial power and how indigenous research methodologies can be used to decolonise academic and research spaces which often form the backdrop against which national and international policies are created and implemented. By decolonising methodologies, colonial power imbalances are reconstructed to empower indigenous peoples and encourage western researchers to reflect on their own position of authority throughout the research process (Ormond et al., 2006). This ensures that indigenous knowledge is not mistreated but is recognised equally to knowledge generated via typically western methodologies.

The case of the marginalisation of indigenous knowledge systems and other ways of knowing is associated with the concept of epistemic injustice. Coined by British philosopher Miranda Fricker in 1999, epistemic injustice concerns injustice related to knowledge often enacted through the exclusion and silencing of minority groups by undervaluing their status within society. Fricker discusses how credibility is unevenly distributed among different speakers. When a speaker is perceived by others to have too little credibility, the speaker suffers an injustice and is “harmed in her capacity as a knower” (McKinnon, 2016, p. 438). In the context of indigenous peoples, less credibility is attributed to indigenous knowledge compared to knowledge generated using western methodologies. Epistemic violence is a consequence of this injustice. Gayatri Spivak first used the term epistemic violence as a way of highlighting the silencing of marginalised groups, including “the illiterate peasantry”, “the tribals”, and the “lowest strata of the urban subproletariat” (Spivak, 2003, p. 78). While these descriptions offered by Spivak have been criticised, the concept of epistemic violence captures the privileging of western knowledge against indigenous knowledge. Hornsby (1995) discusses the reciprocal relationship between a speaker and an audience and articulates what makes a successful exchange of information. This is aptly summarised by Dotson (2011) in the quote “to communicate *we all need an audience willing and capable of hearing us*” (p. 238). Here, “hearing” is not just actively listening but also encompasses an audience attempting to understand the speaker’s words and perspective. Epistemic violence, in sum, is the denial of this reciprocal exchange of information by western individuals to indigenous peoples, often resulting in the devastating loss of indigenous knowledge and ways of knowing.

Through the lens of epistemic injustice and epistemic violence, rooted in post-colonial theory, a case can be made for indigenous methodologies or decolonisation of western methodologies in researching the subject of sustainable development in indigenous contexts.

3 Methods

3.1 Study Design

A systematic review approach was employed (Aromataris & Pearson, 2014; Denyer & Tranfield, 2009). It consisted of the following steps: identify an answerable question (drawing from the extant literature, what research methodologies can be used/or decolonised for use with indigenous peoples in the context of sustainable development?), determine inclusion and exclusion criteria (see below), formulate the search strategy (including search terms; see below), search pre-selected databases, remove any duplicates that emerged, and screening of the remaining articles. Three researchers conducted the preliminary screenings, consisting of screening titles and abstracts, before the same three researchers conducted full-text reviews of the remaining articles to assess eligibility against the inclusion and exclusion criteria.

3.2 Procedure and Search Terms

Scopus, Web of Science, and PubMed were searched using the following search terms to screen article titles and abstracts: “indigenous population*”, “indigenous people*”, “indigenous person*”, “indigenous setting*”, “indigenous culture*”, “indigenous community*”, “indigenous group*”, “indigenous context*”, “Sustainable Development Goals”, SDGs, “Sustainable Development”, and “Global Goals”. Google was used to search for grey literature. We selected these three databases as we believe that, when combined, their outputs sufficiently cover the extant literature in relation to our research question. PubMed was particularly selected to identify articles related more closely to physical and mental wellbeing, a key component of the SDGs, which may have been overlooked if we had just searched Scopus and Web of Science. Furthermore, the present study often also relied on researchers making subjective decisions regarding the methodological group a study could be assigned to and even the specific type of methodology used, as these were often not explicitly referred to as such (e.g., a mapping/diagramming tool not referred to explicitly as a PRA technique). However, interrater agreement was achieved by three researchers conducting the screening process.

3.3 Inclusion Criteria

Only articles published between 2015 and 2021, corresponding with the introduction of the SDGs, that were either published in English or had an available translation were considered for inclusion. Although the targeted period corresponds to the introduction of the SDGs, sustainable development was not a new construct and similar goals for future development had been adopted as part of the Millennium Development Goals (MDGs) and the 2015 Agenda (UN, 2000). It is, therefore, right to conclude that this review excluded articles that could have provided further insight

into the methodological approaches used in the context of sustainable development in indigenous settings prior to 2015. Additionally, only articles that reported primary collection of qualitative data with indigenous peoples were included. Articles were excluded if the sample was a mixed population and the methods had not been adapted for inclusion of indigenous participants. Articles were also excluded if limited information was provided about the methods used. Finally, articles had to have a clear link to sustainable development and/or the SDGs to be included.

4 Results

Initial searches using the above criteria uncovered 951 articles. 309 articles were retained after screening of the title and abstract. Following an in-depth screening of the full text of the articles, 69 articles were deemed to meet the inclusion criteria (Fig. 1). Three groups of articles emerged during screening based on their methodology: western methods that were not culturally adapted for use with indigenous populations ($n = 27$); western methods that were culturally adapted for use with indigenous populations ($n = 12$); and indigenous methodologies ($n = 30$).

Twenty-seven articles were categorised as using typically western methodologies that were not culturally adapted for use with indigenous participants. The methods captured primarily included semi-structured interviews (SSIs), key informant interviews (KIIs), focus group discussions (FGDs) and observations. It is worth noting that articles within this methodology group, in comparison to the other two groups, were characterised by the limited information that was provided about the methods that were used. It is possible that adaptations were made for conducting research with indigenous peoples, but for this group of articles these were not made clear. Notwithstanding, culturally adapted western methods and methodological instruments that were exclusively indigenous were our focus.

4.1 *Culturally Adapted Western Methods*

Twelve articles were categorised as using typically western methodologies that were culturally adapted for use with indigenous participants (see Table 1 for a summary of these articles). These adaptations reflected attempts by the researchers to decolonise the inherent power dynamics of western methodologies, wherein the researcher holds significant power over and above the participants as they ultimately make the final decision of what does and does not get reported and in what light (Ormond et al., 2006).

The most common adaptation among the articles we reviewed was the use of a more informal approach to data collection. Five studies reported the use of an informal approach to interviewing (El Mekaoui et al., 2020; Gauvreau et al., 2017; Karst & Nepal, 2019; Sidali et al., 2016; Yu, 2018), which sometimes included interviews being conducted while participants and the researcher were involved in other activities. Had these articles provided more in-depth explanations of the specifics of this informal style, they would have been categorised as a PRA tool, and thus would

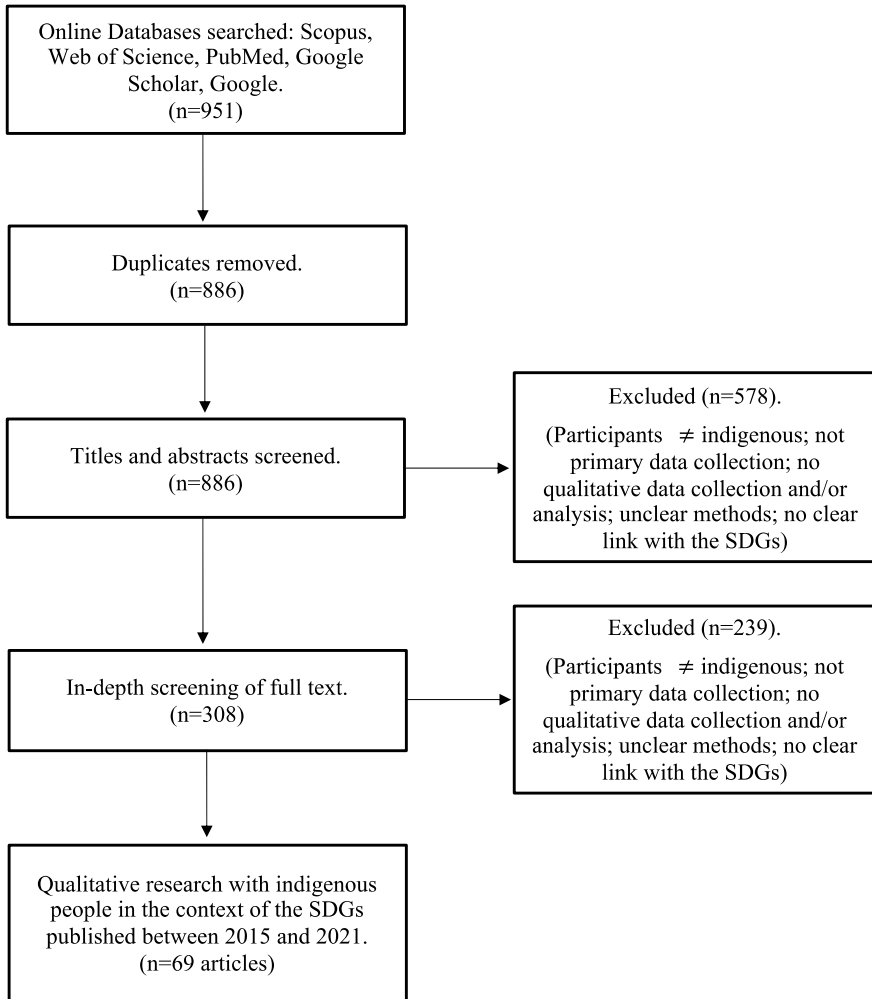


Fig. 1 Flow diagram of screened articles

have been assigned to the indigenous methodologies group. Another notable cultural adaptation involved returning interview and focus group transcripts to the participating community members for review and validation (Chanza & Musakwa, 2021; Molina Maturano et al., 2021; Sandoval-Rivera, 2020). This provides indigenous peoples with access to the data they generated and enables and empowers them to give input on what is reported and for what means, ensuring the research has actual benefits for the community. Research within this methodology group also reported the use of unique adaptations that specifically reflected the customs and values of the indigenous group. For instance, Hansen and Antsanen (2018) describe how Cree First Nation Elders who participated in their interviews were offered culturally appropriate gifts as a sign of reciprocity, and Renwick et al. (2020) detail how younger

Table 1 Research articles published between 2015 and 2021 that report the use of western methodologies that were adapted for use with indigenous peoples in the context of the SDGs

Author and year	Indigenous group	Methods/Special features
Adewusi and Akanle (2020)	Yoruba indigenous people located in the Southwestern region of Nigeria	In-depth interviews delivered in the Yoruba language. The interview guide was informed by input from three Yoruba experts
Buss et al. (2021)	Five indigenous communities located in Canada—Fort McPherson, in Northwest Territories, Cold Lake First Nations in Alberta and Barren Lands (Brochet), Northlands (Lac Brochet), and Tadoule Lake (Sayisi Dene) in Manitoba	Each community had an assigned community consultant who gathered data from their community and passed this onto the authors
Chanza and Musakwa (2021)	Three indigenous villages in Mbire, Zimbabwe—Angwa, Chitsungo and Gonono	FGDs. Participants were selected after referrals from the village head. Responses were read to the participants at the end of the FGD for validation
El Mekaoui et al. (2020)	San José Tipceh community located in Yucatan, Mexico	Observations, interviews, guided tours, and informal group discussions to accommodate the needs of the group
Gauvreau et al. (2017)	Heiltsuk First Nation herring resource users, including elders and hereditary chiefs	SSIs and informal conversations with community members, and potlatches
Hansen and Antsanen (2018)	Cree First Nation community in Canada	Open-ended interviews with Elders, field notes, and general observations. Elders were offered tobacco, sweetgrass, coffee, and a meal as a culturally appropriate reflection of reciprocity
Karst and Nepal (2019)	Brokpa indigenous group living in the Sakteng Wildlife Sanctuary, Bhutan—three settlements: Merak, Sakteng and Joenkhar	SSIs and FGDs complemented participant observation methods including informal discussions, records of daily activities, and participating in religious festivals and events

(continued)

Table 1 (continued)

Author and year	Indigenous group	Methods/Special features
Molina Maturano et al. (2021)	Indigenous Zapotec community of Teotilán del Valle, Oaxaca, Mexico	Sustainability Assessment Method for Indigenous Communities (SAIC)—developed with indigenous people. SSIs to collect information about the measure. Results presented to participants during a participatory meeting
Renwick et al. (2020)	Kaingang indigenous community located in Southern Brazil	Individual and group interviews with self-selected participants. Kaingang name given to the researcher by younger participants
Sandoval-Rivera (2020)	Indigenous community located in the south of Veracruz State in Mexico	Participant observations and SSIs. Interview transcripts were shared with the interviewees to enable their verification
Sidali et al. (2016)	Kichwa indigenous community in Ecuador	Interviews (sometimes conducted while participating in community activities), participant observations, and guided tours/walks
Yu (2018)	Indigenous Smangus tribe located in Taiwan	Observations and in-depth interviews. Researcher also participated in community events

Kaingang community members bestowed the researcher with a Kaingang name that reflected the researchers position within the community. Ultimately, articles categorised within this group utilised methodologies that, we believed at their core, were still westernised but we identified some adaptations that were made to reflect indigenous customs and worldviews. As previously highlighted, categorisation into these groups was subjective, but agreement was reached between three researchers and in light of the methodologies that we had already categorised into the groups.

4.2 Indigenous Methodologies

Thirty articles were categorised as using indigenous methodologies during research with indigenous populations, including PAR approaches ($n = 8$), PRA techniques ($n = 16$), and storytelling methodologies ($n = 12$). See Table 2 for a summary of these articles.

Table 2 Research articles published between 2015 and 2021 that report the use of indigenous methodologies in the context of the SDGs

Author and year	Indigenous group	Methods/Special features
Airey and Krause (2017)	Chenapou—Patamona Amerindian community located in Guyana	Joint narratives constructed by community members and the researcher, often while engaging in a cultural community activity
Ali et al. (2021a)	Yolnu indigenous people located in the Galiwin'ku community on Elcho Island in the Northern Territory of Australia	One-to-one conversations, yarning circles, and participant observations. One researcher participated in daily cultural activities. Findings were presented to the community before publication to validate the research and analyses
Ali et al. (2021b)	Badalai indigenous community located in the Swat Valley in Khyber-Pakhtunkhwa (KPK), Pakistan	Conversations, yarning circles, and participant observations. Primary researcher lived with the community for several months to build trust and relationships
Aniah and Yelfaanibe (2018)	Soe, Vea, Yorogo and Zorko indigenous communities in the Bongo District of Ghana	FGDs that utilised PRA tools, including participatory mapping and collective reflection
Ba et al. (2018)	Rukai people located in Wutai Village, Taiwan	Interviews, participant observations, FGDs, and participatory mapping workshops. One researcher participated in cultural activities to document the practices
Chiaravalloti (2019)	Indigenous communities located in the western border of the Pantanal wetland, Brazil	Observations, one-to-one interviews, and group interviews, often held during a cultural activity and sometimes involved participatory mapping
Datta and Marion (2021)	Cree First Nation communities in Canada	Sharing circles, individual story sharing, and collective stories shared by Elders, Knowledge Keepers, and leaders. Second author of the article is one of the Knowledge Keepers who guided the first author in learning 25 traditional stories

(continued)

Table 2 (continued)

Author and year	Indigenous group	Methods/Special features
Ferraro et al. (2020)	Mixed population of participants, including <i>Lafkenche</i> indigenous communities, involved in the Litoral del Biobío Mining Geopark project in Chile	PAR: participants involved in every stage of the research design. Workshops and focus groups
González-Padrón et al. (2019)	La Laguna, a Wixaritari community within the Mezquitic municipality, in the North of Jalisco, Mexico	Informal SSIs. Researcher participated in rituals, at the request of the community. Used 'The Ecohealth Calendar' in interviews—participatory tool using cards and colours
Holmes et al. (2016)	Lutsel K'e Dene (Denesoline) indigenous community, Canada	Narrative enquiry via life-focus interviews—unstructured and dialogical telling of stories. Transcripts returned to interviewees for review
Huambachano and Cooper (2020)	Indigenous people of the Peruvian Amazonian communities of Matsigenka and Yine living in the Shima and Diamante communities	Storytelling, unstructured interviews, workshops, participant observations, and talking circles
INDIS project https://indisproject.org	Three indigenous communities: Lomerio in Bolivia, Karamoja in Uganda, and Ok Tedi in Papua New Guinea	Storytelling, life history interviews, mapping exercises, landscape walks, focus group discussions, participatory videos, visioning/scenario building exercises, and digital story mapping
Jarzebski (2016)	Tuwali tribe—located in two remote districts, Lingay and Dalliga, in Kiangon, Phillipines, and the Aeta people located in the Angeles municipality	Workshops using participatory mapping and problem ranking exercises
Johnson et al. (2021)	Alaskan native tribes	PAR: participants involved in every stage of the research design via potluck-style meetings with participants contributing food
Kotut & McCrickard (2021)	Kalenjin indigenous group in Kenya	Interviews with elders wherein "audience members" were able to interject and provide their thoughts

(continued)

Table 2 (continued)

Author and year	Indigenous group	Methods/Special features
Krusz et al. (2019)	Australian Aboriginal and Torres Strait Islander women	Yarning circle
Lara et al. (2018)	Eight indigenous communities in Huehuetla municipality in Mexico—Huehuetla, Leagaman, Cinco de Mayo, Kuwikchuchut, Putlunichuchut, Las Chakas, Putaxcat and Xonalpu	PRA workshop delivered to community members by students or professionals from the same community and attended by at least one indigenous judge and a member of the Council of Elders. Information generated in the workshop remained in the community so any follow-up could take place
Mistry et al. (2021)	Five indigenous communities (Misak, Yanacona, Curripaco, Wayuu and Puinave) located in three different regions of Colombia (the Amazons, Cauca, and Guajira)	Participatory video research
Morales et al. (2021)	Five indigenous communities (Misak, Yanacona, Curripaco, Wayuu and Puinave) located in three different regions of Colombia (the Amazons, Cauca, and Guajira)	Participatory video research
Pásková (2017)	Chorotegas indigenous group located in Chiapas, Mexico	Participative research in which local indigenous students obtained training to conduct research activities. Primary methods included interviews, FGDs, participant observations, and mapping
Pereiro (2016)	Guna indigenous communities in Panama	PAR with indigenous Gunas. Primary methods included participant observations and interviews
Rakshit et al. (2018)	Keewaytinook Okimakanak (KO) First Nation communities in north-western Ontario, Canada	PAR: participants involved in every stage of the research design. Primary methods included SSIs as well as informal group discussions while engaging in a cultural activity

(continued)

Table 2 (continued)

Author and year	Indigenous group	Methods/Special features
Reggers et al. (2016)	Australian indigenous communities located along the Kokoda Track	PRA techniques—social mapping, patrolling, workshops, informal interviews, and FGDs
Ruwhiu et al. (2021)	Kāti Huirapa Rūnaka ki Puketeraki—an indigenous Māori community located in the South Island of Aotearoa New Zealand	PAR: Māori student researcher engaging in observation and conversations with Elders. Worked with community to design and implement participatory workshops in the community to discuss tourism
Scheyvens et al. (2021)	Indigenous communities located in Fiji, Australia (Adjahdura and Ngadjrui communities), and New Zealand (Māori communities)	In-depth conversations (rather than formal interviews)— <i>Kōrero</i> in New Zealand, <i>talanoa</i> in Fiji, and <i>dadirri</i> in Australia
Singh et al. (2020)	Adi indigenous group located in the Arunachal Pradesh state in north-eastern India	Participatory recipe contest among Adi women. These women were also interviewed. Other methods included transect walks and visits to food production sites with elders, FGDs, participant observations, and participatory audio recordings
Song et al. (2020)	Four Naxi and Naxi-Moso communities located in the Three Parallel Rivers region in Yunnan, China	PAR: oral histories, FGDs, SSIs, and participatory natural resource and biodiversity mapping. Findings were also presented at village meetings for validation. Community members and leaders acted as internal researchers
Torres-Slimming et al. (2019)	Two indigenous Shawi communities located in the Peruvian Amazon	FGDs, in-depth interviews, transect walks, and PhotoVoice
Whitney-Squire (2016)	Indigenous communities located in Haida Gwaii (Canada), Hawai'i and Aotearoa (New Zealand)	Key members of the Haida community participated in the development of interview questions. Key methods included semi-formal and informal narrative interviews

(continued)

Table 2 (continued)

Author and year	Indigenous group	Methods/Special features
Yuliani et al. (2018)	Two Iban Dayak villags in Danau Sentarum wetlands located in Kalimantan, Indonesia	SSIs in an informal setting; FGDs using the participatory village sketch method; and informal discussions while participating in day-to-day activities

4.2.1 Participatory Action Research

Eight articles (Datta & Marion, 2021; Ferraro et al., 2020; Johnson et al., 2021; Pásková, 2017; Pereiro, 2016; Rakshit et al., 2018; Ruwhiu et al., 2021; Song et al., 2020) reported conducting PAR with indigenous communities. Ferraro et al. (2020) discuss using PAR to “empower” the Lafkenche indigenous communities in Chile, and how community members were perceived to be crucial contributors to the entire research process. These perceptions are reflected in Johnson et al. (2021), Pereiro (2016), Rakshit et al. (2018), Ruwhiu et al. (2021), and Song et al. (2020) who all reported involving community members in all aspects of research design and activities. Notably, Song et al. (2020) outlined how their first step was to gain free, prior, and informed consent from the community leaders of the four Naxi and Naxi-Moso communities involved in their research and to provide them with the opportunity to review all aspects of the research design. This ensured that the indigenous community was at the centre of the research process and that the research was being conducted for the benefit of the community, not just conducted on them. Finally, Datta and Marion (2021) provide a unique example whereby the second author is one of the Cree First Nation Knowledge Keepers, who provided significant guidance to the first author when learning 25 traditional stories as part of the data collection process.

4.2.2 Participatory Rural Appraisal Techniques

Sixteen articles reported the use of at least one participatory rural appraisal technique. Notable techniques within this body of literature included participatory mapping (n = 10), participatory media (n = 5), active researcher involvement (n = 5), and landscape walks (n = 3).

Unsurprisingly, participatory mapping was the most common PRA tool used in these articles. The flexibility of this tool to map not only territories and natural resources but also social structures and demographics make it a valuable tool for research concerning the actualisation of the SDGs. Mapping of land was the most common use of participatory mapping among these articles (n = 9; Aniah & Yelfaanibe, 2018; Ba et al., 2018; Chiaravalloti, 2019; Jarzebski, 2016; Lara et al., 2018; Pásková, 2017; Reggers et al., 2016; Song et al., 2020; Yuliani et al., 2018).

These articles generally discussed sustainable development issues surrounding environmental protection and land use (e.g., for farming, community-based tourism, natural resources), and generally corresponded to SDGs 8 (decent work and economic growth), 11 (sustainable cities and communities), 12 (responsible consumption and production), 13 (climate action), and 15 (life on land). Notably, Jarzebski (2016) involved Tawali indigenous peoples in the Philippines in two participatory mapping tasks: a map of the community before the implementation of a community-based forest management programme and a map of the community after this programme had been implemented in an attempt to identify the changes in the community as a result of the programme. González-Padrón et al. (2019) investigated water access and sanitation conditions (SDG6) among the Wixaritari indigenous community in La Laguna in Mexico using a unique participatory mapping exercise, 'The Ecohealth Calendar'. During interviews, a calendar board was presented to participants with various cards that could be placed on the calendar to map seasonal activities, weather conditions, rituals, and disease throughout the calendar year. This method was used to overcome some of the language barriers working with this community presented as many participants understood very little Spanish (the native language of the researchers). This method also enabled the relationships and connections between the natural world (the weather) and the community to be narrated in depth, aligning with indigenous beliefs surrounding relationism and storytelling.

Another popular PRA technique was the use of participatory media, including participatory videos, audios, and PhotoVoice. Participatory media closely aligns with indigenous modes of communication (visual and oral) and reflects efforts to decolonise research methods by empowering indigenous peoples to self-direct data collection. Additionally, these methods enable in-depth explorations of indigenous perspectives and worldviews (Mistry et al., 2014) in relation to a range of topics, as evidenced by the five articles that report using this methodology. Mistry et al. (2021) used participatory videos to investigate indigenous knowledge in relation to sustainability of the environment (SDG13—climate action). Similarly, on their website, the INDIS project (n.d.), a community-centred approach to achieving the SDGs in three indigenous communities (Lomerio in Bolivia, Karamoja in Uganda, and Ok Tedi in Papua New Guinea), feature videos created by indigenous peoples about the environment and their perceptions of development. In contrast, Morales et al. (2021) use participatory videos to examine the development of indigenous social enterprises (SDG8—decent work and economic growth; SDG9—industry, innovation, and infrastructure) in five indigenous communities in Colombia, and Singh et al. (2020) use participatory audio recordings to document cultural food practices (SDG2—zero hunger; SDG15—life on land) among Adi indigenous women in India. Singh et al. (2020) also employed a unique form of participatory media via a recipe contest. Adi women presented dishes prepared from local plants and animals enabling the researchers to explore culinary methods, cultural dishes, and ingredients originating from the local environment. Finally, Torres-Slimming et al. (2019) use PhotoVoice to investigate water access and sanitation (SDG6) in two indigenous Shawi communities located in the Peruvian Amazon. PhotoVoice involves participants taking photographs in response to a research question, and these photographs

then become the foundation of group discussion. These participatory media methods are particularly useful for research with indigenous peoples as they necessitate engagement from participants and promote a sense of ownership over the data that has been collected, contributing to the decolonisation of the power dynamics between researchers and indigenous participants (Drawson et al., 2017).

Active engagement in indigenous cultural activities by the researcher was also a common PRA technique that emerged in the literature. Rather than a researcher simply observing participants to learn about a custom or practice, as is often the case in western frameworks, the researcher actively engages with the custom or practice alongside indigenous peoples to learn about it. This active involvement of the researcher sometimes took place before official data collection to build trust between the researcher and the indigenous community and to provide the researcher with a greater understanding of the customs and practices of the community before initiating formal data collection. For instance, Ali et al. (2021b) and González-Padrón et al. (2019) both report that the first author spent significant time living with the respective indigenous communities before formal data collection began. Alternatively, the researcher's active engagement in cultural activities and practices may be a method of data collection, as was reported in Ali et al. (2021a), Ba et al. (2018) and Chiaravalloti (2019). These articles outlined that as researchers participated in cultural practices they documented the processes, meanings, and perspectives of indigenous people to inform data consolidation and analyses. Notably, this PRA technique was used to research sustainable development across a broad range of goals, including SDG1 (no poverty; Ali et al., 2021a), SDG6 (clean water and sanitation; González-Padrón et al., 2019), SDG8 (decent work and economic growth; Ali et al., 2021b), SDG11 (sustainable cities and communities; Chiaravalloti, 2019), and SDG13 (climate action; Ba et al., 2018).

The use of transect walks as a method of data collection was used primarily in research investigating SDGs related to the environment. On their website, the INDIS project (n.d.) report the use of transect walks to build researcher understanding of the land and natural resources (SDG13—climate action; SDG15—life on land) available to three indigenous communities in Bolivia, Uganda, and Papua New Guinea. Singh et al. (2020) report that transect walks were conducted with Adi Elders to provide insight into land use, food production, and conservation areas (SDG2—zero hunger; SDG15—life on land). Finally, Torres-Slimming et al. (2019) report that researchers walked with Shawi indigenous peoples to explore their connection to their environment, their sense of place, and specifically their relationship with water (SDG6), emphasising how this PRA technique reflects indigenous relationality and respects indigenous connections to the natural world.

4.2.3 Storytelling Methodologies

Twelve articles reported the use of at least one storytelling methodology, encompassing narrative interviews (n = 6), yarning (n = 3), talking circles (n = 2), and culture-specific dialogues (n = 1).

In the present articles, narrative interviews were informal and could be one-to-one between a researcher and an indigenous participant or between a group of indigenous peoples in the presence of the researcher. Holmes et al. (2016), the INDIS project (n.d.), Song et al. (2020), and Whitney-Squire (2016) reported the use of one-to-one narrative interviews as a form of data collection in their research. This method was used to gather retrospective personal stories and life histories from indigenous peoples. Notably, Holmes et al. (2016) detail how the interviews they conducted with the Łutsël K'é indigenous community in Canada were unstructured, dialogical, and guided primarily by the participant with select prompts delivered by the researcher when necessary to draw out details pertaining to sustainable tourism activities in the community (SDG8—decent work and economic growth; SDG12—responsible consumption and production). This approach closely aligns with indigenous practices surrounding storytelling and relationality and contributes to the decolonisation of power dynamics by affording indigenous interviewees with greater freedom to guide the data collection process via their personal stories and narratives. Two studies (Airey & Krause, 2017; Kotut & McCrickard, 2021) report their intentions to carry out one-to-one narrative interviews but that these evolved into joint narrative interviews between several indigenous peoples. Airey and Krause (2017) detail how their narrative interviews were often conducted while the participant was engaged with other activities, such as weaving crafts and preparing cassava. As a result, these interviews often became informal discussions among community members in the presence of the researcher. Similarly, Kotut and McCrickard (2021) outline their intentions of interviewing indigenous Kalenjin elders, but once news had spread within the community about their research activities, there were audiences of community members who attended the interviews. They reported how, alongside listening to the narratives provided by elders, audience members would often interject with their own thoughts and questions. While joint narratives were not the initial intentions of the researchers in both of these studies, they arguably reflect a more indigenous worldview than one-to-one narrative interviews as they view the community as a whole and not as disconnected individuals (Fabinyi et al., 2014), aligning with indigenous beliefs surrounding relationality. Data collection via joint narratives also enables researchers to obtain collective perspectives on a particular subject that are co-constructed by participating community members and researchers through informal dialogue that decolonises the research process by side-lining western individualistic values and adopting a collectivist stance.

Three articles reported using a yarning circle approach to data collection, wherein a dialogical, group-constructed conversation becomes an avenue for data collection. Ali et al. (2021a, 2021b) investigated disaster risk reduction strategies within Yolnu and Badalai indigenous communities located in Australia and Pakistan, respectively. Both studies used yarning circles to initiate discussions surrounding pre-existing and yet-to-be-actualised strategies to reduce the risk of poverty, ill health, and economic and social decline in the aftermath of natural and manmade disasters, corresponding to the ability to actualise SDG 1 (no poverty), SDG3 (good health and wellbeing), SDG8 (decent work and economic growth), and SDG11 (sustainable cities and communities). Furthermore, in their investigation of menstrual health and hygiene

(SDG3—good health and wellbeing; SDG5—gender equality; SDG6—clean water and sanitation) among indigenous women and girls in Australia, Krusz et al. (2019) used a yarning circle to enable an organic and culturally appropriate discussion to occur. The yarning circle was not audio recorded, rather a researcher typed participant contributions on a laptop throughout the yarning circle to respect the views of an indigenous women's alliance organisation that had been invited to work in partnership with the researchers throughout the research process. Two further studies (Datta & Marion, 2021; Huambachano & Cooper, 2020) reported the use of talking or sharing circles, which share similar characteristics with yarning circles, although talking circles typically involve the use of a talisman to identify the speaker at any given time. Both studies used talking circles to facilitate group dialogue surrounding climate action (SDG13) and environmental land management (SDG15).

Finally, one article reported the use of culture-specific storytelling methodologies. Scheyvens et al. (2021) investigated tourism (SDG8—decent work and economic growth; SDG12—responsible consumption and production) in indigenous communities located in Fiji, Australia, and New Zealand using three culture-specific conversational methods: *talanoa*, *dadirri*, and *korero*, respectively. *Talanoa* refers to the conversational sharing of ideas and stories between two or more people (Movono et al., 2018). Vaioleti (2006) outlines how practices including listening, allowing silences, and exercising patience should guide conversations and enable the researcher to “see, not just look; to hear, not just listen” (p. 30). Similarly, *dadirri* and *korero* refer to conversations and discussions held between individuals with priorities placed on active listening and shared dialogue.

5 Discussion

Despite movements toward decolonising research methodologies for use with indigenous peoples (Kovach, 2009; Smith, 1999, 2012), this review reveals that, in the context of sustainable development and the SDGs, the field of research is still divided between those using western methodologies and those using indigenous methodologies, with a small number of research articles reporting the use of some cultural adaptations to western methods. Chilisa et al. (2017) previously outlined that research with indigenous peoples can be placed along an indigenous research continuum scale, from the least indigenous approach to the approach that best reflects indigenous customs, beliefs, and values. The three groups of research methodologies identified within this overview reflect different positions on this scale, wherein western methods that were adapted for use with indigenous peoples are the integrative middle ground between inherently western methods and inherently indigenous methods.

We also found that the depth and breadth of the methods described in this literature varied along this scale. Articles categorised as using the least indigenous approach to research notably included fewer details about the methodological processes that

were undertaken. This was a stark contrast to the articles categorised as using inherently indigenous methodologies which often extensively detailed the methodological processes. The articles categorised as using an integrative approach to research with indigenous communities were situated somewhere in the middle of these two extremes, whereby detail on the methodological processes was sufficient for us to identify that some attempt had been made to reflect the customs and beliefs of the indigenous participants, but not enough detail was provided that enabled us to say with certainty that an inherently indigenous approach to data collection had been adopted. Future research must explicitly detail the methods used, particularly when western researchers are conducting research with indigenous peoples. This information enables the critical analysis and evaluation of the literature to ensure decolonised methods are utilised to their fullest extent in order to contribute to the decolonisation of the processes of knowledge creation in academic and research institutions.

Longstanding colonial domination and oppression enacted by the West against indigenous communities is present within every major institution, including academic and research spaces. Knowledge generated within western research paradigms via western methodologies is recognised as “true science”, while indigenous knowledge and ways of knowing are marginalised as folklore and myth (Smith, 2012). Decolonising research aims to enact epistemic justice by placing indigenous voices and perspectives at the centre of the research process when conducting research with indigenous peoples. Decolonised paradigms and approaches aim to critically examine the underlying assumptions that inform western research (Simonds & Christopher, 2013), and confront colonial power dynamics by employing methodologies that reflect indigenous worldviews, beliefs, and customs.

Indigenous perspectives have historically been excluded from international conversations surrounding sustainable development. Adopted by the UN in 2000, the MDGs (UN, 2000) shaped the international development agenda by emphasising the need for sustainability. Despite indigenous people making up 5% of the world’s population but accounting for 15% of the world’s poor (UN Development Programme, 2010), indigenous peoples and perspectives were largely missing from the MDG goals and targets, and this pattern persisted in the subsequent SDGs. However, indigenous perspectives are necessary for the actualisation of the SDGs (Fayomi et al., 2018; World Bank, 1998). Thus, research with indigenous peoples must reflect indigenous worldviews and beliefs through the use of decolonised paradigms and methodologies.

Notably, the use of indigenous methodologies addresses the many limitations of using inherently western methods in indigenous settings. Indigenous methodologies are situated within indigenous ontologies, epistemologies, and axiologies and therefore reflect indigenous worldviews and beliefs. Indigenous methodologies respect indigenous knowledge, indigenous ways of knowing, and indigenous values through the active involvement of indigenous peoples in the research process. By placing indigenous peoples and perspectives at the centre of the research process, colonial power dynamics are critically evaluated, and credibility is equally redistributed, enacting epistemic justice. Indigenous peoples are involved in research

design, ensuring that the aims of the research align with the needs of the community. Indigenous peoples actively participate in data collection processes, establishing a sense of ownership over this knowledge and empowering future involvement with research activities. Finally, indigenous peoples are granted the freedom of controlling what information is disseminated and where, ensuring the outcomes of research are beneficial for indigenous communities. This extensive participation of indigenous peoples decolonises the research process and incites the development of positive, trusting relationships between indigenous peoples and researchers associated with academic institutions still rooted in colonial beliefs of western superiority (Lavallée, 2009). Development of these positive relationships is necessary for securing continued collaboration with indigenous peoples in a space that is deemed equal and safe (McClelland, 2011; Roe et al., 2012), not just in the context of sustainable development but to many other issues on a national and international level.

6 Conclusion

This chapter has provided an insight into methodological approaches that could be applicable when investigating sustainable development in indigenous settings, particularly from a decolonisation standpoint. Although we uncovered three distinct groups within the literature: research that uses western methods, research that adapts western methods for use with indigenous populations, and research that uses inherently indigenous methodologies, the latter two were our focus. Despite a shift in the literature towards the decolonisation of research by adopting relevant indigenous approaches for sustainable development, there remained an almost equal number of studies that failed to make any adaptations to the research process when working with indigenous populations. The adoption and implementation of decolonised research methods that are indigenous in nature can overcome many of the issues rooted in the colonial past and epistemic violence, and reflect local perspectives which are critical for relatable and enduring outcomes of development. Decolonised methodologies, such as PAR approaches, PRA techniques, and storytelling are essential to ensuring indigenous perceptions of sustainable development are considered within a collaborative framework with targeted communities and incorporated into national and international projects surrounding the actualisation of the SDGs. Given that research is an essential facet of the global effort towards the achievement of the SDGs, the present review makes an important contribution. Ultimately, future work can continue to emphasise the role of decolonised methodologies by creating an enabling environment whereby indigenous persons can be empowered to exercise a sense of ownership of research processes intended for the realisation of relevant targets or aspects of the SDGs they are interested in.

References

- Adewusi, A. O., & Akanle, O. (2020). Oṣe Dúdú: Exploring the benefits of Yoruba indigenous black soap in Southwest, Nigeria. *The International Indigenous Policy Journal*, 11(1), 1–20. <https://doi.org/10.18584/iipj.2020.11.1.10258>
- Airey, S., & Krause, T. (2017). “Georgetown ain’t got a tree. We got the trees”—Amerindian power & participation in Guyana’s low carbon development strategy. *Forests*, 8(3), 51. <https://doi.org/10.3390/f8030051>
- Ali, T., Buergelt, P. T., Paton, D., Smith, J. A., Maypilama, E. L., Yuṅgirrija, D., Dhamarrandji, S., & Gundjarranbuy, R. (2021a). Facilitating sustainable disaster risk reduction in Indigenous communities: Reviving Indigenous worldviews, knowledge and practices through two-way partnering. *International Journal of Environmental Research and Public Health*, 18(3), 855. <https://doi.org/10.3390/ijerph18030855>
- Ali, T., Paton, D., Buergelt, P. T., Smith, J. A., Jehan, N., & Siddique, A. (2021b). Integrating Indigenous perspectives and community-based disaster risk reduction: A pathway for sustainable Indigenous development in Northern Pakistan. *International Journal of Disaster Risk Reduction*, 59, 102263. <https://doi.org/10.1016/j.ijdrr.2021.102263>
- Aniah, P., & Yelfaanibe, A. (2018). Environment, development and sustainability of local practices in the sacred groves and shrines in Bongo district: A bio-cultural study for environmental management in Ghana. *Environment, Development and Sustainability*, 20(6), 2487–2499. <https://doi.org/10.1007/s10668-017-0001-2>
- Aromataris, E., & Pearson, A. (2014). The systematic review: an overview. *AJN The American Journal of Nursing*, 114(3), 53–58. <https://doi.org/10.1097/01.NAJ.0000444496.24228.2c>
- Ba, Q. X., Lu, D. J., Kuo, W. H. J., & Lai, P. H. (2018). Traditional farming and sustainable development of an indigenous community in the mountain area—a case study of Wutai village in Taiwan. *Sustainability*, 10(10), 3370. <https://doi.org/10.3390/su10103370>
- Buntu, B. A. (2013). Claiming self; the role of Afrikology in social transformation. *Scriptura: Journal for Contextual Hermeneutics in Southern Africa*, 112(1), 1–12.
- Buss, J., Mansuy, N., & Madrali, S. (2021). De-risking wood-based bioenergy development in remote and indigenous communities in Canada. *Energies*, 14(9), 2603. <https://doi.org/10.3390/en14092603>
- Cajete, G. (2000). *Native science: Natural laws of interdependence*. Clear Light
- Caxaj, C. S. (2015). Indigenous storytelling and participatory action research: Allies toward decolonization? Reflections from the peoples’ international health tribunal. *Global Qualitative Nursing Research*, 2, 1–12. <https://doi.org/10.1177/2333393615580764>
- Chambers, R. (1992). *Rural appraisal: rapid, relaxed and participatory*. Institute of Development Studies (UK)
- Chanza, N., & Musakwa, W. (2021). “Trees are our relatives”: Local perceptions on forestry resources and implications for climate change mitigation. *Sustainability*, 13(11), 5885. <https://doi.org/10.3390/su13115885>
- Chiaravalloti, R. M. (2019). The displacement of insufficiently “Traditional” communities. *Conservation & Society*, 17(2), 173–183.
- Chilisa, B. (2012). Postcolonial indigenous research paradigms. *Indigenous Research Methodologies*, 98–127. <https://doi.org/10.1007/s11213-015-9344-5>
- Chilisa, B., Major, T. E., & Khudu-Petersen, K. (2017). Community engagement with a postcolonial, African-based relational paradigm. *Qualitative Research*, 17(3), 326–339. <https://doi.org/10.1177/1468794117696176>
- Cueva, M., Dignan, M., & Kuhnley, R. (2012). Readers’ theatre: A communication tool for colorectal cancer screening. *Journal of Cancer Education*, 27(2), 281–286. <https://doi.org/10.1007/s13187-011-0295-y>
- Datta, R., & Marion, W. P. (2021). Ongoing Colonization and indigenous environmental heritage rights: A learning experience with Cree first nation communities, Saskatchewan, Canada. *Heritage*, 4(3), 1388–1399. <https://doi.org/10.3390/heritage4030076>

- Denyer, D., & Tranfield, D. (2009). Producing a systematic review. In D. A. Buchanan & A. Bryman (Eds.), *The Sage handbook of organizational research methods* (pp. 671–689). Sage Publications Ltd.
- Dotson, K. (2011). Tracking epistemic violence, tracking practices of silencing. *Hypatia*, 26(2), 236–257. <https://doi.org/10.1111/j.1527-2001.2011.01177.x>
- Drawson, A. S., Toombs, E., & Mushquash, C. J. (2017). Indigenous research methods: A systematic review. *International Indigenous Policy Journal*, 8(2), 1–25. <https://doi.org/10.18584/iipj.2017.8.2.5>
- El Mekaoui, A., Tariq, R., Ramírez, O. B., & Méndez-Monroy, P. E. (2020). Sustainability, sociocultural challenges, and new power of capitalism for renewable energy megaprojects in an indigenous Mayan community of Mexico. *Sustainability*, 12(18), 7432. <https://doi.org/10.3390/su12187432>
- Eruera, M. (2010). *Ma te whānau te huarahi motuhake: Whānau participatory action research groups. Mai Review*, 3(1), 1–9.
- Evans, M., Hole, R., Berg, L. D., Hutchinson, P., & Sookraj, D. (2009). Common insights, differing methodologies: Toward a fusion of indigenous methodologies, participatory action research, and white studies in an urban aboriginal research agenda. *Qualitative Inquiry*, 15(5), 893–910. <https://doi.org/10.1177/1077800409333392>
- Fabinyi, M., Evans, L., & Foale, S. J. (2014). Social-ecological systems, social diversity, and power: insights from anthropology and political ecology. *Ecology and Society*, 19(4).
- Fayomi, O. S. I., Okokpujie, I. P., & Udo, M. (2018, September). The role of research in attaining sustainable development goals. *IOP Conference Series: Materials Science and Engineering*, 413(1), 012002).
- Ferraro, F. X., Schilling, M. E., Baeza, S., Oms, O., & Sá, A. A. (2020). Bottom-up strategy for the use of geological heritage by local communities: Approach in the “Litoral del Biobío” mining Geopark project (Chile). *Proceedings of the Geologists’ Association*, 131(5), 500–510. <https://doi.org/10.1016/j.jgeola.2020.06.001>
- Fredericks, B., Adams, K., Finlay, S., Fletcher, G., Andy, S., Briggs, L., Briggs, L., & Hall, R. (2011). Engaging the practice of Indigenous yarning in action research. *ALAR: Action Learning and Action Research Journal*, 17(2), 12–24.
- Fricker, M. (1999). Epistemic oppression and epistemic privilege. *Canadian Journal of Philosophy Supplementary*, 25, 191–210. <https://doi.org/10.1080/00455091.1999.10716836>
- Gauvreau, A. M., Lepofsky, D., Rutherford, M., & Reid, M. (2017). “Everything revolves around the herring” the Heiltsuk–herring relationship through time. *Ecology and Society*, 22(2).
- Ghys, L., & Gray, S. (2012). Location Matters: overcoming the barriers to education for indigenous students in rural and remote Australia. In *International conference of education, research and innovation* (pp. 2099–2106). ICERI 2012.
- González-Padrón, S. K., Lerner, A. M., & Mazari-Hiriart, M. (2019). Improving water access and health through rainwater harvesting: Perceptions of an indigenous community in Jalisco, Mexico. *Sustainability*, 11(18), 4884. <https://doi.org/10.3390/su11184884>
- Hansen, J. G., & Antsanen, R. (2018). What can traditional indigenous knowledge teach us about changing our approach to human activity and environmental stewardship in order to reduce the severity of climate change? *International Indigenous Policy Journal*, 9(3). <https://doi.org/10.18584/iipj.2018.9.3.6>
- Held, M. B. (2019). Decolonizing research paradigms in the context of settler colonialism: An unsettling, mutual, and collaborative effort. *International Journal of Qualitative Methods*, 18, 1–16. <https://doi.org/10.1177/1609406918821574>
- Holmes, A. P., Grimwood, B. S., King, L. J., & Lutsel K’e Dene First Nation. (2016). Creating an indigenized visitor code of conduct: The development of Denesoline self-determination for sustainable tourism. *Journal of Sustainable Tourism*, 24(8–9), 1177–1193. <https://doi.org/10.1080/09669582.2016.1158828>
- Hornsby, J. (1995). Disempowered speech. *Philosophical Topics*, 23(2), 127–147.

- Huambachano, M., & Cooper, L. (2020). Values, knowledge, and rights shaping land use in the Peruvian Amazon: The Shimaa and Diamante case studies. *Case Studies in the Environment*, 4(1). <https://doi.org/10.1525/cse.2020.1234945.1>
- INDIS Project (n.d.). *INDIS—Indigenous sustainable development*. <https://indisproject.org>. Accessed March 9, 2022.
- Iseke, J. (2013). Indigenous storytelling as research. *International Review of Qualitative Research*, 6(4), 559–577. <https://doi.org/10.1525/irqr.2013.6.4.559>
- Jarzelski, M. P. (2016). Participatory mapping and problem ranking methodology in the research of sustainable communities—Workshop with indigenous people under community-based forest management program in the Philippines. In *Sustainability science: Field methods and exercises* (pp. 177–197). Springer.
- Johnson, A., Clavijo, A. E., Hamar, G., Head, D. A., Thoms, A., Price, W., Lapke, A., Croteau, J., Cervený, L. K., Wilmer, H., Petershoare, L., Cook, A., & Reid, S. (2021). Wood products for cultural uses: Sustaining native resilience and vital lifeways in southeast Alaska, USA. *Forests*, 12(1), 90. <https://doi.org/10.3390/f12010090>
- Karst, H. E., & Nepal, S. K. (2019). Conservation, development and stakeholder relations in Bhutanese protected area management. *International Journal of Sustainable Development & World Ecology*, 26(4), 290–301. <https://doi.org/10.1080/13504509.2019.1580628>
- Kidd, S. A., & Kral, M. J. (2005). Practicing participatory action research. *Journal of Counseling Psychology*, 52(2), 187–195. <https://doi.org/10.1037/0022-0167.52.2.187>
- Kotut, L., & McCrickard, S. D. (2021, March). Trail as heritage: Safeguarding location-specific and transient indigenous knowledge. In *3rd African human-computer interaction conference: Inclusiveness and empowerment* (pp. 94–102). <https://doi.org/10.1145/3448696.3448702>
- Kovach, M. (2009). *Indigenous methodologies: Characteristics, conversations, and contexts*. University of Toronto Press.
- Krusz, E., Hall, N., Barrington, D. J., Creamer, S., Anders, W., King, M., Martin, H., & Hennegan, J. (2019). Menstrual health and hygiene among Indigenous Australian girls and women: Barriers and opportunities. *BMC Women's Health*, 19(1), 1–7. <https://doi.org/10.1186/s12905-019-0846-7>
- Lara, C. S., Crispin, A. F., & Téllez, M. C. L. (2018). Participatory rural appraisal as an educational tool to empower sustainable community processes. *Journal of Cleaner Production*, 172, 4254–4262. <https://doi.org/10.1016/j.jclepro.2017.08.072>
- Lavallée, L. F. (2009). Practical application of an Indigenous research framework and two qualitative indigenous research methods: Sharing circles and Anishnaabe symbol-based reflection. *International Journal of Qualitative Methods*, 8(1), 21–40. <https://doi.org/10.1177/160940690900800103>
- Martin, K., & Mirraabooa, B. (2003). Ways of knowing, being and doing: A theoretical framework and methods for indigenous and indigenist research. *Journal of Australian Studies*, 27(76), 203–214. <https://doi.org/10.1080/14443050309387838>
- Mbah, M. (2019). Can local knowledge make the difference? Rethinking universities' community engagement and prospect for sustainable community development. *The Journal of Environmental Education*, 50(1), 11–22. <https://doi.org/10.1080/00958964.2018.1462136>
- Mbah, M. F. (2016). Towards the idea of the interconnected university for sustainable community development. *Higher Education Research & Development*, 35(6), 1228–1241. <https://doi.org/10.1080/07294360.2016.1144570>
- Mbah, M., Ajaps, S., & Molthan-Hill, P. (2021). A systematic review of the deployment of indigenous knowledge systems towards climate change adaptation in developing world contexts: Implications for climate change education. *Sustainability*, 13(9), 4811. <https://doi.org/10.3390/su13094811>
- McClelland, A. (2011). Culturally safe nursing research: Exploring the use of an indigenous research methodology from an indigenous researcher's perspective. *Journal of Transcultural Nursing*, 22(4), 362–367. <https://doi.org/10.1177/1043659611414141>

- McIvor, O. (2010). I am my subject: Blending Indigenous research methodology and autoethnography through integrity-based, spirit-based research. *Canadian Journal of Native Education*, 33(1), 137–151.
- McKinnon, R. (2016). Epistemic injustice. *Philosophy Compass*, 11(8), 437–446. <https://doi.org/10.1111/phc3.12336>
- Mistry, J., Berardi, A., Haynes, L., Davis, D., Xavier, R., & Andries, J. (2014). The role of social memory in natural resource management: Insights from participatory video. *Transactions of the Institute of British Geographers*, 39(1), 115–127. <https://doi.org/10.1111/tran.12010>
- Mistry, J., Jafferally, D., Xavier, R., Albert, G., Robertson, B., Benjamin, R., Mendonca, S., & Ingwall-King, L. (2021). Assessing the state of traditional knowledge at national level. *Global Environmental Change*, 71, 102409. <https://doi.org/10.1016/j.gloenvcha.2021.102409>
- Molina Maturano, J., García Serrano, L. A., Carmona García, J. A., García de Alva Magos, M. A., & Hersperger, A. M. (2021). An indicator-based sustainability assessment method for indigenous communities: A case study from Mexico. *Environment, Development and Sustainability*, 1–41. <https://doi.org/10.1007/s10668-021-01567-x>
- Morales, A., Calvo, S., Martínez, J. M. G., & Martín, J. M. M. (2021). Hybrid forms of business: Understanding the development of indigenous social entrepreneurship practices. *Journal of Business Research*, 124, 212–222. <https://doi.org/10.1016/j.jbusres.2020.11.060>
- Movono, A., Dahles, H., & Becken, S. (2018). Fijian culture and the environment: A focus on the ecological and social interconnectedness of tourism development. *Journal of Sustainable Tourism*, 26(3), 451–469. <https://doi.org/10.1080/09669582.2017.1359280>
- Muwanga-Zake, J. W. (2009). Building bridges across knowledge systems: Ubuntu and participatory research paradigms in Bantu communities. *Discourse: Studies in the Cultural Politics of Education*, 30(4), 413–426. <https://doi.org/10.1080/01596300903237198>
- Ormond, A., Cram, F., & Carter, L. (2006). Researching our relations: Reflections on ethics and marginalisation. *AlterNative: An International Journal of Indigenous Peoples*, 2(1), 174–193. <https://doi.org/10.1177/117718010600200108>
- Pásková, M. (2017, December). Local and indigenous knowledge regarding the land use and use of other natural resources in the aspiring Rio Coco geopark. *IOP Conference Series: Earth and Environmental Science*, 95(5), 052018.
- Pereiro, X. (2016). A review of Indigenous tourism in Latin America: Reflections on an anthropological study of Guna tourism (Panama). *Journal of Sustainable Tourism*, 24(8–9), 1121–1138. <https://doi.org/10.1080/09669582.2016.1189924>
- Porsanger, J. (2004). An essay about indigenous methodology. *Nordlit*, 15, 105–120.
- Rakshit, R., Shahi, C., Smith, M. A., & Cornwell, A. (2018). Bridging gaps in energy planning for first nation communities. *Strategic Planning for Energy and the Environment*, 37(3), 17–42. <https://doi.org/10.1080/10485236.2018.11958658>
- Reggers, A., Grabowski, S., Wearing, S. L., Chatterton, P., & Schweinsberg, S. (2016). Exploring outcomes of community-based tourism on the Kokoda track, Papua New Guinea: A longitudinal study of participatory rural appraisal techniques. *Journal of Sustainable Tourism*, 24(8–9), 1139–1155. <https://doi.org/10.1080/09669582.2016.1145229>
- Renwick, N., Reid, D. R., Santos, J. A., & Piovezana, L. (2020). Indigenous people and the sustainable development goals in Brazil: A study of the Kaingang people. *Journal of Developing Societies*, 36(4), 390–414. <https://doi.org/10.1177/0169796X20937583>
- Rieger, K. L., Gazan, S., Bennett, M., Buss, M., Chudyk, A. M., Cook, L., Copenace, S., Garson, C., Hack, T. F., Hornan, B., Horrill, T., Horton, M., Howard, S., Linton, J., Martin, D., McPherson, K., Moore Rattray, J., Phillips-Beck, W., Sinclair, R., & Schultz, A. S. (2020). Elevating the uses of storytelling approaches within indigenous health research: A critical and participatory scoping review protocol involving indigenous people and settlers. *Systematic Reviews*, 9(1), 1–9. <https://doi.org/10.1186/s13643-020-01503-6>
- Rigney, L. I. (1999). Internationalization of an Indigenous anticolonial cultural critique of research methodologies: A guide to indigenist research methodology and its principles. *Wicazo Sa Review*, 14(2), 109–121. <https://doi.org/10.2307/1409555>

- Roe, Y. L., Zeitz, C. J., & Fredericks, B. (2012). Study protocol: establishing good relationships between patients and health care providers while providing cardiac care. Exploring how patient-clinician engagement contributes to health disparities between indigenous and non-indigenous Australians in South Australia. *BMC Health Services Research*, 12(1), 1–10. <https://doi.org/10.1186/1472-6963-12-397>
- Romm, N. R. (2015). Reviewing the transformative paradigm: A critical systemic and relational (indigenous) lens. *Systemic Practice and Action Research*, 28(5), 411–427. <https://doi.org/10.1007/s11213-015-9344-5>
- Russon, C. (2008). An eastern paradigm of evaluation. *Journal of Multidisciplinary Evaluation*, 5(10), 1–7.
- Ruwhiu, D., Arahanga-Doyle, H., Donaldson-Gush, R., Bragg, C., & Kapa, J. (2021). Enhancing the sustainability science agenda through indigenous methodology. *Sustainability Science*, 1–12. <https://doi.org/10.1007/s11625-021-01054-2>
- Said, E. W. (1978). *Orientalism*. Pantheon Books.
- Sandoval-Rivera, J. C. A. (2020). Environmental education and indigenous knowledge: Towards the connection of local wisdom with international agendas in the framework of the Sustainable Development Goals (SDGs). *Diaspora, Indigenous, and Minority Education*, 14(1), 14–24. <https://doi.org/10.1080/15595692.2019.1652588>
- Scheurich, J. J., & Young, M. D. (1997). Coloring epistemologies: Are our research epistemologies racially biased? *Educational Researcher*, 26(4), 4–16. <https://doi.org/10.3102/0013189X026004004>
- Scheyvens, R., Carr, A., Movono, A., Hughes, E., Higgins-Desbiolles, F., & Mika, J. P. (2021). Indigenous tourism and the sustainable development goals. *Annals of Tourism Research*, 90, 103260. <https://doi.org/10.1016/j.annals.2021.103260>
- Sidali, K. L., Morocho, P. Y., & Garrido-Pérez, E. I. (2016). Food tourism in indigenous settings as a strategy of sustainable development: The case of Ilex Guayusa Loes in the Ecuadorian Amazon. *Sustainability*, 8(10), 967. <https://doi.org/10.3390/su8100967>
- Simonds, V. W., & Christopher, S. (2013). Adapting Western research methods to indigenous ways of knowing. *American Journal of Public Health*, 103(12), 2185–2192. <https://doi.org/10.2105/AJPH.2012.301157>
- Singh, R. K., Kumar, A., Singh, A., & Singhal, P. (2020). Evidence that cultural food practices of Adi women in Arunachal Pradesh, India, improve social-ecological resilience: Insights for sustainable development goals. *Ecological Processes*, 9(1), 1–19. <https://doi.org/10.1186/s13717-020-00232-x>
- Smith, L. T. (1999). *Decolonising methodologies: Research and indigenous peoples* (1st ed.). Zed Books.
- Smith, L. T. (2005). On tricky ground. *The Sage Handbook of Qualitative Research*, 3, 85–107.
- Smith, L. T. (2012). *Decolonizing methodologies: Research and indigenous peoples* (2nd ed.). Zed Books.
- Song, Y., Li, G., Zhang, Y., Song, X., & Swiderska, K. (2020). Indigenous Naxi-Moso cultural values and worldviews for sustainable development: Four village biocultural heritage coalition, Yunnan, China. *Policy*.
- Spivak, G. C. (2003). Can the subaltern speak? *Die Philosophin*, 14(27), 42–58. <https://doi.org/10.5840/philosophin200314275>
- Suaalii-Sauni, T., & Fulu-Aiolupotea, S. M. (2014). Decolonising Pacific research, building Pacific research communities and developing Pacific research tools: The case of the talanoa and the faafaletui in Samoa. *Asia Pacific Viewpoint*, 55(3), 331–344. <https://doi.org/10.1111/apv.12061>
- Torres-Slimming, P. A., Wright, C., Carcamo, C. P., Garcia, P. J., & Harper, S. L. (2019). Achieving the sustainable development goals: A mixed methods study of health-related water, sanitation, and hygiene (WASH) for indigenous Shawi in the Peruvian Amazon. *International Journal of Environmental Research and Public Health*, 16(13), 2429. <https://doi.org/10.3390/ijerph16132429>

- United Nations. (2000). *Millennium summit goals*. New York, NY. <https://www.un.org/en/conferences/environment/newyork2000>. Accessed March 9, 2022.
- United Nations Development Programme. (2010). *Millennium development goals and indigenous peoples*. https://www.undp.org/content/dam/rbap/docs/Research%20&%20Publications/democratic_governance/APRC-2010-MDG-Indigenous-Peoples.pdf. Accessed March 9, 2022.
- United Nations General Assembly. (2015). Transforming our world: the 2030 agenda for sustainable development. *Sustainable Development Knowledge Platform*. <https://sustainabledevelopment.un.org/post2015/transformingourworld>
- Vaiolenti, T. M. (2006). Talanoa research methodology: A developing position on Pacific research. *Waikato Journal of Education*, 12. <https://doi.org/10.15663/wje.v12i1.296>
- Walker, M., Fredericks, B., Mills, K., & Anderson, D. (2014). “Yarning” as a method for community-based health research with indigenous women: The indigenous women’s wellness research program. *Health Care for Women International*, 35(10), 1216–1226. <https://doi.org/10.1080/07399332.2013.815754>
- Watene, K., & Yap, M. (2015). Culture and sustainable development: Indigenous contributions. *Journal of Global Ethics*, 11(1), 51–55. <https://doi.org/10.1080/17449626.2015.1010099>
- Whitney-Squire, K. (2016). Sustaining local language relationships through indigenous community-based tourism initiatives. *Journal of Sustainable Tourism*, 24(8–9), 1156–1176. <https://doi.org/10.1080/09669582.2015.1091466>
- Wilson, S. (2008). *Research is ceremony: Indigenous research methods*. Fernwood Publishing.
- World Bank. (1998). *Indigenous knowledge systems in sub-Saharan Africa: An overview*. IK Notes.
- Yap, M. L. M., & Watene, K. (2019). The sustainable development goals (SDGs) and indigenous peoples: Another missed opportunity? *Journal of Human Development and Capabilities*, 20(4), 451–467. <https://doi.org/10.1080/19452829.2019.1574725>
- Yu, C. Y. (2018). An application of sustainable development in indigenous people’s revival: The history of an indigenous tribe’s struggle in Taiwan. *Sustainability*, 10(9), 3259. <https://doi.org/10.3390/su10093259>
- Yuliani, E. L., de Jong, E. B., Knippenberg, L. W. J., Bakara, D. O., Salim, M. A., & Sunderland, T. (2018). Keeping the land: Indigenous communities struggle over land use and sustainable forest management in Kalimantan, Indonesia. *Ecology and Society*, 23(4), 49. <https://doi.org/10.5751/ES-10640-230449>

On the Impossibility of Instrumentalising Indigenous Methodologies for the Sustainable Development Agenda



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Abstract In this chapter, we argue that instrumentalising indigenous methodologies for the Sustainable Development Agenda is strictly spoken impossible. We discuss the nature of indigenous ways of knowing and the encompassing worldview of Ubuntu which rests on the understanding of the interconnectedness of all life; that seeks harmony with nature and the well-being of community. Indigenous ways of knowing are ironically absent from the Sustainable Development Agenda, but have been recognised in the Human Development Report. We problematise these inclusions as tokenistic and contributing to an anthropocentric essentialist notion of development that has its roots in 19th and 20th European Enlightenment thinking. Indigenous methodologies are embedded in decolonial agendas and in Southern Africa often conceptualised within the paradigm of Ubuntu. If these methodologies are sought to be instrumentalised for an agenda that is devoid of the indigenous Ubuntu paradigm, they will lose one of their defining characteristics. We call for the integration of indigenous epistemologies, ontologies and axiologies in international agendas not at the instrumental, but at the conceptual level.

Keywords Decolonisation · Human development report (HDR) · Indigenous methodologies · Indigenous ways of knowing · Planetary survival · Sustainable development goals (SDGs) · Ubuntu

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1 Introduction

Amidst the global Covid 19 pandemic, the so-called international community finally starts acknowledging indigenous ways of knowing as necessary for the survival of our shared planet. The UNDP's, 2020 Human Development Report (HDR) explicitly problematises the advances of humans at the cost of other species and calls for '[b]ringing the planet back into development thinking (UNDP, 2020, p. 25). Noting that many of the world's healthiest ecosystems are areas involving 'a long-term relationship between indigenous peoples and their territories' (p. 33), the report recognises the role of indigenous peoples and their knowledge systems as well as the precarious status of indigenous knowledges and the peoples holding these knowledges. Accordingly, the report formulates a need for 'new collaborative ways of mobilizing knowledge and learning across diverse systems [that] can contribute to innovations and new solutions to sustainable human development' (p. 34).

Concurrently, the longstanding indigenous critiques of the coloniality of Western knowledge production (e.g. Kovach, 2011; Mignolo, 2007; Smith, 1999) have eventually gained momentum in mainstream intellectual discourses in the global North. These critiques unsettle the thinking in, and about, almost all traditional (Western) scientific disciplines. Decolonial projects such as provincialising Europe and deprovincialising Africa (Ndlovu-Gatsheni, 2018), unsettling Eurocentrism in the Westernised university (Cupples & Grosfoguel, 2019) and movements such as the South African #RhodesMustFall or the resulting British #Why-is-my-curriculum-white (Peters, 2015) all speak about embracing epistemic diversity and diversifying knowledge production to include non-Western ways of knowing and coming to know into mainstream academia.

Considering both the HDR's appeal for weaving together knowledge systems and the decolonial strides on all continents, the mainstreaming and instrumentalising of indigenous research methodologies may appear as the obvious next step towards acknowledging, generating and revitalising indigenous ways of knowing in support of the UN's 2015 Sustainable Development Goals (SDGs). Such conclusions, however, must not be drawn hastily. They need careful examination regarding possible colonial pitfalls. The aim of this chapter is to unpack and discuss the danger—or rather the impossibility—of instrumentalising indigenous methodologies and indigenous ways of knowing for the SDG agenda. Thereby, our point is not that indigenous ways of knowing are unsustainable or that they should not be considered in local and international agendas. Quite the contrary, we align ourselves with the calls to draw on more than one knowledge archive to enable the survival of our shared planet. However, our focus here is to caution against uncritical attempts to incorporate indigenous knowledges into so-called universal agendas that promote modernist anthropocentric understandings of development which contribute to the perpetuated subjugation of indigenous ways of knowing and being in the world.

While there are commonalities between indigenous methodologies and epistemologies worldwide, the chapter is loosely situated in a Southern African context. We

apply the broad understanding of indigenous ways of knowing that includes knowledge systems of majority populations in Africa that would not necessarily identify as indigenous, but who still engage in indigenous ways of knowing. This understanding is common in South(ern) African academic discourse and policy practice. We draw on the Southern African lived philosophy of Ubuntu as a framework to situate African indigenous worldview and methodologies. We engage with Cameroonian thinker Mbembe's (2021) writing to connect Ubuntu with the struggles for decolonisation and sustainable development or rather, planetary survival.

In this conceptual chapter we discuss key theories of indigenous knowledges and, despite their decades of marginalisation, their importance for—not 'sustainable development' but the more frank and accurate term 'planetary survival'. We draw on debates on decolonisation and Ubuntu in relation to the espoused SDGs, which, as we argue, are in fact *unsustainable* in their continued foundation on the Enlightenment Project. We extend this argument claiming that 'how' and 'what' we research needs to be aligned; vision and strategy of SDGs need to align. Our central conclusion is a stated need for rethinking and reconceptualising development by integrating indigenous epistemologies, ontologies and axiologies not at the instrumental, but at the conceptual level of international agendas.

2 Concepts and Theoretical Perspectives

Indigenous ways of knowing and being

Indigenous ways of knowing constitute the totality of a community's way of life reflected in the factual and practical knowledge that a community continually constructs from their interactions within given natural, spiritual, and socio-cultural environments. Interacting with different environments results in a plurality of knowledges (Mbiti, 1969; Smith, 1999) that develop through peoples' longstanding relationships to, and acknowledgement of, place (Dei & Asgharzadeh, 2006). Elders (both living and once living) are at the centre of the development, storage, and transmission of indigenous ways of knowing, which are therefore sometimes used synonymously with 'traditional knowledge'. Yet, indigenous ways of knowing are not static or 'pure' but refer to dynamic and open knowledge systems that have evolved through interaction with other ways of knowing. They are thus not to be relegated to the past, but have contributed, and continue to contribute, to community survival and flourishing. What people know is not only an oral expression or tangible product, but is actually lived. Knowledges are expressed as a way of life and reflected through language and culture; they are not culture-free (Khupe, 2020; Odora Hoppers, 2000). Indigenous ways of knowing and being are holistic in that they uphold the interconnectedness of life at the natural (physical), social and spiritual levels (Khupe, 2014, 2020). They are not developed for their own sake or for profit and have thus sustained ecological systems for centuries prior to the invasion

of Western knowledge and practices. Epistemic colonisation is not a defining characteristic of indigenous ways of knowing, but many indigenous peoples share the common experience of their ways of knowing being subjugated through colonial education (Breidlid, 2013; Molosi, 2019). For generations, indigenous peoples have suffered epistemic bias through systems that deliberately (and continually) invalidated, marginalised and eroded their knowledges, experiences and rights. As Bulhan (2015) puts it, the colonial project culminated in the capture of identity, which he aptly describes as occupation of being.

Indigenous and Western knowledge are not per definition opposing categories. Much rather, the respective underlying epistemological assumptions may lead both to *knowing the same thing in a different manner* as well as to conflicting conclusions of what constitutes valid knowledge and how such knowledge is generated (see Kovach, 2011 for a detailed discussion of the relationships between indigenous and Western ways of knowing and knowledge generation). As elaborated, holism is central in indigenous epistemologies, while this holism was undermined in Europe during the advent of modernity and the rise of modern science. Due to their place-based nature, indigenous ways of knowing have local relevance and do not claim universality, while universality claims—though not unchallenged—still stand strong within Western knowledge traditions.

Ubuntu

The indigenous understanding of humans as existing in relationship is at the core of the African Philosophy of Ubuntu. From an Ubuntu perspective, humans are in collective co-existence with, and dependent on, each other and the natural world. This interconnection is intended to occur ethically (Cornell & van Marle, 2015). There is a clear understanding that the wellbeing of all of humanity, indeed all beings, is intricately connected. At a social level, the co-existence and interdependence is aptly expressed by Mbiti (1969) as, ‘I am because we are; and since we are, therefore I am’ (p.141). In isiXhosa, one of the South African indigenous languages, Ubuntu is expressed in the proverb *Umuntu ngumuntu ngabantu*, literally translated into *a person is a person through other people*. Behind the literal is a depth of meaning that emphasises humanness, compassion, and social responsibility (Sambala et al., 2020). Thereby, in line with indigenous knowledges that are not static, but constantly developing according to the context, Ubuntu’s humanness is not to be understood as a static condition. Rather, as Ramose (2009) explains, humanness comprises ‘both a *condition of being* and the *state of becoming*, of openness or ceaseless unfolding’ (p. 308, emphases added). *We are* human through lived caring relationships and our humanness is constantly *evolving* through these relationships. Such relationships go beyond the anthropocentric, but, in recognition of the interdependence of humans (including the ancestral world) and nature, they also include ‘ecological togetherness’ (Murove, 2009).

During the past two decades, Ubuntu has enjoyed high popularity as an academic concept. At the same time, it has been subject to critique from different angles. Some African scholars such as Matolino and Kwindingwi (2013, p. 197) while acknowledging Ubuntu as a ‘definition of life itself’ go on to critique ‘ubuntu-isation’

of various aspects of society as a fatuous project of Black elitism. Zimbabwean womanist Manyonganise (2015) discusses partially oppressive structures within Ubuntu and ponders whether ‘the glorification of the concept without due analysis of its implications for gender is being done mostly by those who are enjoying the patriarchal dividend’ (p. 2, also see Seehawer, 2018). Ubuntu has sparked controversy between those who criticise it as an essentialist narrative of return to a pre-colonial past (e.g. Matolino, 2015; Matolino & Kwindigwi, 2013) and those who examine and seek to actualise its meaning for contemporary African societies (e.g., Cornell & Van Marle, 2015; Mawere & van Stam, 2016; Metz, 2014) (for an overview over, and discussion of, different positions in this debate, see van Norren, 2014).

This chapter builds on the position that neither indigenous ways of knowing nor Ubuntu should be idealised, romanticised, or used uncritically. Knowledge in itself is not inherently good. Indigenous ways of knowing are not inherently good. And Ubuntu, though alive as a world view and rooted in the understanding of our interconnection, is an ideal that exists alongside *Un-Ubuntu* (Eliastam, 2015), which finds expression in corruption, violence and xenophobia. There is a need to heal from colonisation, marginalisation, and pandemics. We propose that the value of Ubuntu for such healing lies in its nature of constant actualisation and unfolding that occurs through caring relationships with others as outlined above. In the words of Cornell and van Marle (2015):

The community ... is not something abstract and outside. It is part of who and how we are with others. It is this intertwinement that makes ubuntu transformative as there is always more work to do together in shaping our future. The future in a deep sense is always a collective project (p. 5).

Ubuntu, indigenous ways of knowing, planetary survival and decolonisation

The characteristics of indigenous ways of knowing, that is, deep knowledges about specific territories as well as the worldview of the individual-in-community and the interdependence with nature that sustained subsistence cultures and their environments over the centuries is what is now recognised in the UNDP’s, 2020 HDR. This recognition is a late acknowledgement of what both environmental scientists, educationalists, social scientists and decolonial thinkers have long been calling for: a dialogical and complementary use of knowledge systems put into action for the well-being of planet earth and all that inhabit it (Seehawer & Breidlid, 2021). Because humanness in the sense of Ubuntu includes ecological togetherness, there seems to be scope for research on sustainable development within an Ubuntu paradigm (Seehawer, 2018). The definition of sustainable development that is commonly used by UN organisations and upon which the SDGs are built is ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs.’ (UNCED, 1987, n.p.). At a superficial glance, this definition does not seem to be at odds with Ubuntu as it considers the interconnectedness between past and future generations. We will, however, return to this issue, after discussing the concept of development in more detail in the next section.

In light of our planet's virulent ecological crises, the term sustainability runs the risk to be euphemistic of what is actually at stake. Sustainability suggests that by introducing certain measures and behaviours the earth will become a more sustainable—that is a better—place, while what these measures can do is reduce the degree of some of the pressures that humans currently put on the earth. Therefore, rather than speaking of sustainable development, we prefer the term *planetary survival*. We argue that the task of the Anthropocene is not to work for more sustainability, but—in line with Mbembe (2021)—for the survival of our shared planet:

To reopen the future of our planet to all who inhabit it, we will have to learn how to share it again among humans, but also between humans and nonhumans, between the multiple species that populate our planet. It is only under these conditions that, becoming aware of our precariousness as a species in the face of ecological threats, we will be able to overcome the possibility of outright human extinction opened up by this new epoch, the epoch of the Anthropocene. (Mbembe, 2021, p. 41)

In the thinking of Mbembe (2021) and others, the condition of coloniality and the current status of planet earth are closely connected. As Odora Hoppers (2000) stated more two decades ago: '...a major threat to the sustainability of natural resources is *the erosion of people's knowledge*, and the basic reason for this erosion is *the low value attached to it*' (p. 7, emphases in original). The idea of white superiority was at the heart of colonialism (Mbembe, 2021) and it included the superiority of the colonisers' knowledge that did not acknowledge other ways of knowing. In Mbembe's (2021) understanding, the philosophical meaning of decolonisation 'lies in an active will to community—as others used to speak of a will to power. This will to community is another name for what could be called the *will to life*' (pp. 2–3, emphasis in original). This understanding of decolonisation as *active will to community* links the project of re-learning how to share our planet between among humans, non-humans and nature directly to the humble togetherness and relationality that are at the core of Ubuntu. Thus, the struggle for decolonisation is not a precondition, but ultimately the same as the struggle for planetary survival (Seehawer, 2022).

3 An Unsustainable Continuation of a Modernist Enlightenment Project

In this section, we return to the context of the SDGs and elaborate on the introductory statement that the supposedly universal 2030 agenda is rather a continuation of the modernist Enlightenment project that led to the suppression of indigenous ways of knowing and being in the first place. We then discuss that this suppression is not repealed by the retrospective recognition of indigenous knowledges and indigenous methodologies as instruments to achieve the SDGs.

Indigenous ways of knowing are not mentioned in the SDG document. This omission suggests a non-prioritisation of epistemic issues in the 2030 Agenda (Breidlid, 2020). While the concepts of knowledge and knowledge society are generally

marginalised in the SDG document, the few cases in which knowledge is mentioned can mostly be situated within a *techno-scientific-economic knowledge discourse* (Cummings et al., 2018). This discourse acknowledges the primacy of scientific and technological knowledge and promotes a knowledge-based economy. During the SDG negotiations, some representatives of civil society and international organisations promoted a *pluralist-participatory knowledge discourse* that embraces indigenous ways of knowing as part of epistemic pluralism. However, in the final SDG document, appearances of this discourse are limited to the vision and strategy (Cummings, et al., 2018). Thus, Cummings et al. (2018) diagnose the SDGs a ‘mismatch between vision and strategy, and implementation and goals. The vision and strategy are, on the whole, transformational while the implementation and goals and targets appear to represent business as usual’ (p. 739).

Van Norren’s (2017) thorough analysis of the SDG negotiations and her interviews with representatives of main UN implementing organisations and other involved stakeholders, further confirms the marginalisation not only of non-Western epistemologies, but also of non-Western ontologies and axiologies. Rather, the SDGs constitute a step backwards in terms of recognising indigenous peoples’ knowledges and rights that had found acknowledgement in earlier UN conventions, such as the 1992 Convention on Biodiversity (van Norren, 2017). By some SDG-negotiators, van Norren was bluntly told that non-Western philosophies of well-being were ‘not relevant’ (p. 25), while others thought such philosophies could prove useful at the implementation level. None of the interviewees, however, regarded non-Western philosophies of well-being as relevant ‘at a conceptual level, thus before implementation takes place, and not merely as a cultural ‘aberration’ to the general rule’ (van Norren, 2017, p. 25). In the case of African ways of knowing and being, van Norren (2017) ponders whether these might have been advanced more strongly if more African states had participated in the negotiations. She poses the question whether Africa’s ‘low representation may signify lesser interest or trust in a new goal scheme’ (p. 135). Relatedly, Sayed and Ahmed (2015, drawing on King and Palmer, (2013) note a limited interest in the UNDP-led ‘global conversation’ on post-2015 educational and development goals among countries in the global south. Furthermore, they point out that ‘participation is not simply about greater involvement by the Global South, but also *which* Southern voices are heard’ (p. 332, emphasis added). They suggest that the global South voices that did participate in the conversations ‘probably represent[ed] a particular “privileged” constituency already well-resourced and connected to a global policy community’ (Sayed & Ahmed, 2015, p. 332, also see Seehawer & Breidlid, 2021).

Telleria (2021) explores the ontological assumptions of the 26 global HDRs that were published by the UNDP between 1990 and 2018. His interest is the ‘specific understanding of reality’ that is presented in the reports and that, in turn, informed both the Millennium Development Goals and the SDGs. Telleria deconstructs the UNDP’s human development framework as building on three essentialist assumptions: First, *freedom* is the ‘natural, universal and most basic essence of human beings’ (p. 28). Second, ‘[t]he proper unfolding of this essence produces rational, intelligent, skilful and healthy individuals’ (p. 28.), in short *ideal individuals* who, thirdly, are

capable of building *ideal societies* with stable institutions, peace, democracy and equally distributed wealth. Consequently, human development becomes ‘the process of unfolding the human essence to create ideal individuals and societies’ (Telleria, 2021, p. 29). The human development index (HDI) measures nations’ progress in this process. The HDI is constructed by ‘defin[ing] a measure of deprivation that a country suffers’ (UNDP, 1990, p. 109, quoted in Telleria, 2021, p. 31). This measure of deprivation, for example 0.394 for Niger at the bottom rank or 0.957 for Norway at the top (UNDP, 2020), is then contrasted with the ideal of 100% human development, that is, the three above named essentialist assumptions. These assumptions are at the core ‘of the highest Humanist and Enlightened ideals that have fed, at least at an ideological and political level, the Western civilizational project during the last few centuries’ (p. 29). Telleria demonstrates how the UNDP’s understanding of development prolongs the thinking of nineteenth and twentieth century British and US-American evolutionist sociologists such as Herbert Spencer and Talcott Parsons. Both Spencer and Parsons understood social change and evolution as processes of adaptation. In Telleria’s analysis, the UNDP conceptualises development as the adaptation of individuals to the economic system and social institutions as well as the adaptation of nations to global trends in economics, finance, and trade. As explained in the 1992 HDR:

A key challenge for Africa is to accelerate investment in people: in their nutrition and health (especially that of women and children) and in their education, particularly in science and technology. This could help African countries *adapt* to new technologies and become more productive, creative and enterprising – and start *catching up with the rest of the world*. (UNDP, 1992, p. 40, quoted in Telleria, 2021, p. 43, emphases added)

The SDGs have been hailed as revolutionary and radically different from the MDGs because of their transformative ambitions and because of the notion that all nations are now developing countries (Tikly, 2019). While this might indeed be a shift away from the MDGs’ focus on the so-called developing world, it is not a shift away, but much rather a celebration of, the UNDP’s development logic. Since 1990, the HDI establishes that no country, neither Norway nor Niger, is fully developed, but that all, through an evolutionary adaptation process, strive towards the same anthropocentric, individualist and essentialist ideal of development. According to Telleria’s (2021) analysis, the SDGs present a re-articulation of the MDGs in which the antagonistic divide of *developed* versus *underdeveloped* that underpinned development discourses from the 1990s to the 2010s has been replaced by the antagonistic divide of *humankind* versus *inhumanity*. The narrative of the SDGs embraces humanity as one worldwide community. A community that is threatened by external dangers such as climate change, terrorism, financial crises or pandemics, which were ‘presented as events that just happen, devoid of any agency or intention’ (p. 123).

The 2020 HDR that is devoted to the era of Anthropocene and explicitly articulates the Covid 19 pandemic ‘as a reflection of the pressures people put on planet Earth’ (UNDP, 2020, p. iii) is not included in Telleria’s analysis. Does this HDR mark a shift towards recognising that the ‘menace to humankind is not outside, but inside’ (Telleria, 2021, p. 126)? Even if it did, the narrative of development as the process towards an ideal future stands firm:

To survive and thrive in this new age, we must redesign a *path to progress* that respects the intertwined fate of people and planet ... Thirty years [after the publication of the first HDI] on, much has changed, but hope and possibility have not. If people have the power to create an entirely new geological epoch, then people also have the power to choose to change. We are not the last generation of the Anthropocene; we are the first to recognize it. ... Will we be remembered by the fossils we leave behind: swaths of species, long extinct, sunken, and fossilized in the mud alongside plastic toothbrushes and bottle caps, a legacy of loss and waste? *Or will we leave a much more valuable imprint: balance between people and planet, a future that is fair and just?* (UNDP, 2020, p. iii, emphases added)

The recognition of indigenous ways of knowing, does not challenge the essentialist anthropocentric underpinnings of development and the SDGs, but supports them. Indigenous ways of knowing are called upon as a way out of the planet's humanmade misery and towards 'new solutions to sustainable human development' (UNDP, 2021, p. 34), that is, new solutions to pursue the same modernist version of development. Likewise, the UNDP's acknowledgement of indigenous ways of knowing is not a retroactive redress of their omission in the SDGs. Rather, indigenous ways of knowing are an *instrument* to achieve the same SDGs that were ratified in 2015 and which present an agenda that ignores indigenous ways of knowing and being in the world.

Ironically, by ascribing indigenous epistemologies, ontologies, and axiologies instrumental value only, the SDGs are undermining the "S" of the 2030 agenda. Rather, as Cummings et al. (2018) observe, 'the inspirational vision of the knowledge society and of the SDG agenda as a whole is being used to gain support for a strategy which will not be able to solve the complex problems facing the global community but will rather preserve the status quo' (p. 739).

4 Ubuntu Research Methodologies: *How We Research is Inseparable from What We Research*

In this section, we turn to indigenous research methodologies and ethics and discuss the chapter's central point: the impossibility of instrumentalising indigenous methodologies for the SDG agenda.

Indigenous research methodologies evolved as moves towards liberation from epistemic colonisation. Mohawk scholar Brant Castellano (2004), then co-director of research in the Royal Commission on Aboriginal Peoples in Canada, recalls the protest she encountered in 1992 when introducing the Commission's research agenda to a group of aboriginal people:

'We've been researched to death!' they protested. The workshop was not off to a promising start, until an Elder who had opened the meeting spoke quietly from a corner of the room. 'If we have been researched to death,' he said, 'maybe it's time we started researching ourselves back to life.' (Brant Castellano, 2004, p. 98)

The protest as well as the notion of *researching back* are reactions to the inseparable links between research and colonialism. Colonial needs for knowledge to improve governance of the colonised went hand in hand with economic benefit from

the export of expert knowledge about the colonies. This kind of extractive research has been famously criticised by Maori scholar Smith (1999) as stealing knowledge from indigenous peoples who served as voiceless research objects and who were defined through the colonisers' epistemological lenses and methodologies. 'Research acquired a bad name among Aboriginal Peoples', elaborates Brant Castellano (2004), 'because the purposes and meanings associated with its practice by academics and government agents were usually alien to the people themselves and the outcomes were, more often as not, misguided and harmful' (p. 98).

Thus, indigenous research is an explicit part of 'the decolonization politics of the indigenous peoples' movement' and aims at the 'self-determination of indigenous peoples' (Smith, 1999, pp. 115–116). Chilisa (2012) conceptualises indigenous research paradigms as challenging 'deficit thinking and pathological descriptions of the formerly colonized' and as aiming at the reconstruction of 'a body of knowledge that carries hope and promotes transformation and social change among the historically oppressed' (p. 40). Thereby, indigenous methodologies are not defined through their differentness to so-called Western methodologies. Based on their experience with research with communities in rural South Africa, Khupe and Keane (2017) suggest methodologies that comprise 'a mix of the more conventional qualitative methods and instruments (such as focus group discussions, interviews, open-ended writing tasks, worksheets)' as well as of those instruments 'that are more eccentric (such as playing games, hearing stories, audiences with traditional healers, home visits)' (p. 34). Decolonising methodologies does not imply a complete rejection of Western methodologies, theories, or knowledge (Kovach, 2011; Patel, 2016; Smith, 1999). As mentioned above concerning the relationship between indigenous and Western knowledges, also concerning methodology the central point is not the degree of difference on the level of concrete research methods or instruments. What is central is that indigenous methodologies are grounded in local indigenous epistemologies, ontologies and axiologies (Seehawer, 2018). Such grounding implies that methodologies cater to the above-discussed characteristics of indigenous ways of knowing and being. Thus, methodologies will embrace holistic indigenous worldviews that recognise the interconnectedness of humans with the spiritual world and nature. They will be relational and build on trusting relationships between those involved in the research. Rather than seeking to separate the knower from the known, subjectivity and emotions may be part of the inquiry (Khupe, 2014; Lavallée, 2009). Furthermore, methodologies will align with the place-based nature of indigenous ways of knowing not only by considering and appreciating the place/context within which the research is undertaken, but also in that methodologies will be localised, including following local ethics protocol (Brant Castellano, 2004; Keane, 2021; Khupe, 2020). As indigenous ways of knowing are lived experience, research as such is inseparable from life, and becomes lived inquiry. Therefore, Khupe and Keane (2017, referring to Law, 2003) are doubtful whether the term *research method* is suitable and suggest that *research process* would capture better the real-life messiness that such research implies. A key aspect of this is the giving up of the conventional power dynamic: who decides the research agenda? Who participates? Who benefits? (Smith, 1999).

In line with the broad understanding of indigenous ways of knowing that extends to the knowledges of Africans and African ethnic groups that do not self-identify as indigenous, Southern African indigenous research is not linked to the movement of specific indigenous peoples as it is the case in other geographical contexts, but to African decolonial projects more broadly. Calls to decolonise academic knowledge production draw on theoretical frameworks of Afrocentric perspectives (e.g. Asante, 1987), freedom movements such as the Négritude (Cesaire, 1955/2000; Fanon, 1961/2004), or the Black Consciousness movement (Biko, 1978/1987), the idea of an African Renaissance as well as contemporary thinkers such as Mbembe, whose recent (2021) work guides this chapter's understanding of decolonisation. In the African context, indigenous methodologies are often grounded in, or developed on the basis of, Ubuntu (see e.g. Keane, 2008; Keikelame et al., 2019; Khupe & Keane, 2017; Mucina, 2011; Swanson, 2007) and there is increasing recognition and exploration of Ubuntu as a research paradigm (Khupe, 2014; Mkabela, 2015; Oviawe, 2016; Seehawer, 2018, 2022). As a paradigm, Ubuntu caters for indigenous methodologies as outlined above. Ubuntu provides a relational ethics for before, during and after the research process, including processes of data analysis and all aspects of validating new knowledge (Keane, 2021; Seehawer, 2018). Ubuntu also speaks to the ceaseless unfolding of humanness through relationality, which Shutte (2001, p. 30, quoted in Molefe, 2019) describes as the 'moral obligation to become more fully human. And this means entering more and more deeply into community with others. So although the goal is personal fulfilment, selfishness is excluded.' (p. 102). Thus, Ubuntu as an indigenous research paradigm, does not only guide methodology, processes, and ethics, but also the aims and purposes of research, that is, the *research agenda*. In other words, indigenous methodologies cannot be detached from the research agenda, but *how* research is undertaken is linked to *what* is researched (Seehawer, 2022). Ubuntu research agendas aim at strengthening community and togetherness on the local, regional or on the planetary level. As such, there is scope within Ubuntu agendas for healing and transformation as outlined above as well as for striving for planetary survival by entering deeper into community not only with other humans, but also with other species and nature. This agenda, is—in the sense of Mbembe—inherently decolonial as it depends on an *active will to community*.

The UN's 2030 SDG agenda is misaligned with the more holistic aims, processes and understandings of indigenous research that aims at healing, (epistemic) decolonisation and self-determination. As discussed above, indigenous perspectives were marginally present during the negotiation process, but did not make it into the final product, the seventeen SDGs. Indigenous methodologies require researchers' authentic engagement not only with contextualised cultural protocols, but also with the decolonial and communal aims of indigenous research. They cannot be used without the appropriate acknowledgement of social justice concerns that arose from the narrow definition of development stemming from a so-called Western perspective (see Molefe, 2019). If indigenous methodologies are sought to be instrumentalised to rescue an agenda that does not reflect indigenous ontologies, epistemologies, axiologies and worldviews at the *conceptual level*, to borrow Van Norren's (2017) term, they will lose a defining characteristic of indigenous methodologies, their decolonial

agenda. Therefore, we argue that the instrumentalization of indigenous methodologies for the SDG agenda is not only a prolongation of the condition of coloniality in knowledge production that current decolonial movements are seeking to overcome, but strictly spoken, impossible.

5 Approaching Agendas for Planetary Survival Through Integrating Indigenous Ways of Knowing at the Conceptual Level

Our critique of the—impossible—instrumentalization of indigenous methodologies for the SDG agenda is not an argument against the integration of indigenous ways of knowing into international agendas. Neither is it an argument against collaborative struggles for planetary survival. Rather, we argue for the integration of indigenous epistemologies, ontologies and axiologies at the *conceptual level* of such agendas. As noted, on a first glance, Ubuntu as humanness and humble togetherness seems to be a natural segue for the achievement of sustainable development. However, the critical issue here is the conceptualisation of development, which currently runs against the decolonial will to (ecological) community.

Positively interpreted, the UNDP's (2020) recent call to *interweave knowledge systems* for the pursuit of sustainable development could be understood as a promising first step. However, if the statement to *bring back the planet into development* were to be taken seriously, the second step needs to be rethinking and reconceptualising development as such. Rather than seeking to rescue the modernist anthropocentric project of development through instrumentalist uses of indigenous methodologies and ways of knowing, this project needs to be disrupted and reconceptualised through a dialogue of epistemologies, ontologies and axiologies. Recent publications have started foregrounding such dialogues on an intellectual level. Van Norren (2017) explores such a dialogical encounter between the UN's SDGs, Ubuntu, the Latin American concept of *Buen Vivir* and the Bhutanese concept of Gross National Happiness, while Molefe (2019) draws on Ubuntu to conceptualise development from an African perspective. Addressing Goal 4 (quality education) within the SDG agenda, Seehawer and Breidlid (2021) suggest *dialogue between epistemologies* as a critical and constructive approach to the interaction of knowledges that allows knowledges to co-exist, complement or contradict each other without one knowledge dominating over the other. Telleria (2021) emphasises a relational approach to social issues. Our hope is that the initially mentioned decolonial strides in academia as well as the new interest for indigenous ways of knowing in mainstream development will spark more such intellectual thought work. And that this thought work will play a role in actual dialogues and negotiations.

References

- Asante, M. K. (1987). *The Afrocentric idea*. Temple University Press.
- Biko, S. (1987). *I write what I like*. Heineman. (Original work published 1978).
- Brant Castellano, M. (2004). Ethics of aboriginal research. *Journal of Aboriginal Health*, January 2014, 98–114.
- Breidlid, A. (2013). *Education, indigenous knowledges, and development in the Global South: Contesting knowledges for a sustainable future*. Routledge.
- Breidlid, A. (2020). Beyond the Western paradigm. Indigenization of education systems, the sustainable development goals and state building in sub-Saharan Africa. In A. Breidlid, & R. Krøvel, (Eds.), *Indigenous knowledges and the sustainable development agenda*. Routledge.
- Bulhan, H. A. (2015). Stages of colonialism in Africa: From occupation of land to occupation of being. *Journal of Social and Political Psychology*, 3(1), 239–256.
- Cesaire, A. (2000). *Discourse on colonialism*. Monthly Review Press. (Original work published 1955).
- Chilisa, B. (2012). *Indigenous research methodologies*. Sage.
- Cornell, D., & Van Marle, K. (2015). Ubuntu feminism: Tentative reflections. *Verbum et Ecclesia*, 36(2), Art. #1444, 8. <https://doi.org/10.4102/ve.v36i2.1444>
- Cummings, S., Regeer, B., de Haan, L., Zweekhorst, M., & Bunders, J. (2018). Critical discourse analysis of perspectives on knowledge and the knowledge society within the sustainable development goals. *Development Policy Review*, 36, 727–742. <https://doi.org/10.1111/dpr.12296>
- Cupples, J., & Grosfoguel, R. (Eds.). (2019). *Unsettling eurocentrism in the Westernized University*. Routledge.
- Dei, G. J. S., & Asgharzadeh, A. (2006). Indigenous knowledge and globalization: An African perspective. In A. A. P. Abdi, P. Korbla, & G. J. S. Dei (Eds.), *African education and globalization: Critical perspectives* (pp. 53–78). Lexington.
- Eliastam, J. L. B. (2015). Exploring Ubuntu discourse in South Africa: Loss, liminality and hope. *Verbum et Ecclesia*, 36(2), Art. #1427, 8. <https://doi.org/10.4102/ve.v36i2.1427>
- Fanon, F. (2004). *The wretched of the earth*. Grove Press. (Original work published 1961).
- Keane, M. (2008). Science learning and research in a framework of Ubuntu. In C. Malcolm, E. Motala, S. Motala, G. Moyo, J. Pampallis, & B. Thaver, (Eds.), *Democracy, human rights and social justice in education* (pp. 49–60). Centre for Education Policy Development (CEPD).
- Keane, M. (2021). Research ethics and diversity of worldviews: Integrated worlds and Ubuntu. *SOTL in the South*, 5(2), 22–35.
- Keikelame, M. J., & Swartz, L. (2019). Decolonising research methodologies: Lessons from a qualitative research project, Cape Town, South Africa. *Global Health Action*, 12(1), 1561175. <https://doi.org/10.1080/16549716.2018.1561175>
- Khupe, C. (2014). *Indigenous knowledge and school science: Possibilities for integration* [Unpublished doctoral dissertation]. University of the Witwatersrand, South Africa.
- Khupe, C. (2020). Indigenous knowledge systems. In *Science education in theory and practice* (pp. 451–464). Springer.
- Khupe, C., & Keane, M. (2017). Towards an African education research methodology: Decolonising new knowledge. *Educational Research for Social Change*, 6(1), 25–37.
- Kovach, M. (2011). *Indigenous methodologies: Characteristics, conversations, and contexts*. Toronto University Press.
- Manyonganise, M. (2015). Oppressive and liberative: A Zimbabwean woman's reflections on Ubuntu. *Verbum et Ecclesia*, 36(2), 7. <https://doi.org/10.4102/ve.v36i2.1438>
- Matolino, & Kwindigwi. (2013). The end of Ubuntu. *South African Journal of Philosophy*, 32, 197–205. <https://doi.org/10.1080/02580136.2013.817637>
- Mawere, M., & van Stam, G. (2016). Ubuntu/Unhu as communal love: Critical reflections on the sociology of Ubuntu and communal life in Sub-Saharan Africa. In M. Mawere, & N. Marongwe (Eds.), *Politics, violence and conflict management in Africa: Envisioning transformation, peace and unity in the twenty-first century* (pp. 187–304). Langaa RPCIG.

- Metz, T. (2014). 'Just the beginning for ubuntu: Reply to Matolino and Kwindigwi', *South African Journal of Philosophy*, 33(1), 65–72.
- Mbembe, A. (2021). *Out of the dark night: Essays on decolonization*. Columbia University Press.
- Mbiti, J. (1969). *African religions and philosophy*. Heinemann.
- Mignolo, W. (2007). Delinking: The rhetoric of modernity, the logic of coloniality and the grammar of de-coloniality. *Cultural Studies*, 21(2), 449–514.
- Mkabela, Q. N. (2015). Ubuntu as foundation for researching African indigenous psychology. *Indilinga—African Journal of Indigenous Knowledge Systems*, 4, 284–291. <http://journals.co.za/content/linga/14/2/EJC183440>
- Molefe, M. (2019). Ubuntu and development: An African conception of development. *Africa Today*, 66(1), 96–115.
- Molosi, D. (2019). *Dear upright African: A call to action for taking history into our own hands*. The Mantle.
- Mucina, D. D. (2011). Story as research methodology. *AlterNative: An International Journal of Indigenous Peoples*, 7(1), 1–14. <http://www.content.alternative.ac.nz/index.php/alternative/article/view/58>
- Murove, M. F. (2009). An African environmental ethic based on the concepts of Ukama and Ubuntu. In M. F. Murove (Ed.), *African ethics: An anthology of comparative and applied ethics* (pp. 315–331). University of Kwazulu-Natal Press.
- Ndlovu-Gatsheni, S. J. (2018). *Epistemic freedom in Africa. Deprovincialization and decolonization*. Routledge.
- Odora Hoppers, C. A. (2000). The centre-periphery in knowledge production in the twenty-first century. *Compare: A Journal of Comparative and International Education*, 30(3), 283–291. <https://doi.org/10.1080/713657471>
- Oviawe, J. O. (2016). How to rediscover the Ubuntu paradigm in education. *International Review of Education*, 62, 1–10. <https://doi.org/10.1007/s1159-016-9545-x>
- Patel, L. (2016). *Decolonizing educational research. From ownership to answerability*. Routledge.
- Peters, M. A. (2015). Why is my curriculum white? *Educational Philosophy and Theory*, 47(7), 641–646. <https://doi.org/10.1080/00131857.2015.1037227>
- Sambala, E. Z., Cooper, S., & Manderson, L. (2020). Ubuntu as a framework for ethical decision making in Africa: Responding to epidemics. *Ethics & Behavior*, 30(1), 1–13.
- Sayed, Y., & Ahmed, R. (2015). Education quality, and teaching and learning in the post-2015 education agenda. *International Journal of Educational Development*, 40(2015), 330–338. <https://doi.org/10.1016/j.ijedudev.2014.11.005>
- Seehawer, M. (2023). *Research agendas in an Ubuntu paradigm*. Manuscript under peer review.
- Seehawer, M. K. (2018). Decolonising research in a Sub-Saharan African context: Exploring Ubuntu as a foundation for research methodology, ethics and agenda. *International Journal of Social Research Methodology*, 21(4), 453–466. <https://doi.org/10.1080/13645579.2018.1432404>
- Seehawer, M., & Breidlid, A. (2021). Dialogue between epistemologies as quality education. Integrating knowledges in in Sub-Saharan African classrooms to foster sustainability learning and contextually relevant education. *Social Sciences & Humanities Open*, 4(1). <https://doi.org/10.1016/j.ssaho.2021.100200>
- Smith, L. T. (1999). *Decolonizing methodologies: Research and indigenous peoples*. Zed.
- Swanson, D. M. (2007). Ubuntu: An African contribution to re(search)for/with a 'humble togetherness.' *Journal of Contemporary Issues in Education*, 2(2), 53–67.
- Telleria, J. (2021). *Deconstructing human development. From the Washington consensus to the 2030 agenda*. Routledge.
- Tikly, L. (2019). *Education for sustainable development in the postcolonial world. Towards a transformative agenda for Africa*. Routledge.
- UNCED. (1987). *Our common future*. https://www.netzwerk-n.org/wp-content/uploads/2017/04/0_Brundtland_Report-1987-Our_Common_Future.pdf
- UNDP. (2020). *Human development report 2020. The next frontier. Human development and the anthropocene*. <http://hdr.undp.org/en/2020-report>

- United Nations. (n.d.). *The sustainable development agenda*. <https://www.un.org/sustainabledevelopment/development-agenda-retired/>
- Van Norren, D. E. (2014). The nexus between Ubuntu and global public goods: Its relevance for the post 2015 development agenda. *Development Studies Research: An Open Access Journal*, 1(1), 255–266. <https://doi.org/10.1080/21665095.2014.929974>
- Van Norren, D. E. (2017). *Development as service. A happiness, Ubuntu and Buen Vivir interdisciplinary view of the sustainable development goals*. Prisma Print.
- Wilson, S. (2001). What is an indigenous research methodology? *Canadian Journal of Native Education*, 25(2), 175–179.

Deconstructing Community-Based Research for Sustainable Development: The Role of Indigenous Knowledge Holders



Sandra Ajaps and Marcellus F. Mbah

Abstract Contributions from every segment of the global community, including Indigenous peoples are essential to achieving the United Nations (UN) sustainable development goals. Yet, research projects in Indigenous communities have largely been developed within a dominant Western research paradigm that values the researchers as knowledge holders and the community members as passive subjects. Whilst community-based research (CBR) is a contested space, we argued from a conceptual premise of reviewed literature that it needs to be reclaimed by and for Indigenous people to achieve the sustainable development of their communities. This is necessary to avoid epistemic hegemony or what Paulo Freire termed ‘cultural invasion’ and seek intentional and creative ways to engage target beneficiaries of sustainable development drives. The ultimate goal is to ensure that research does not continue to marginalise some Indigenous people, by assigning them a central role as co-creators, from the inception to the implementation of research activities and outcomes. The chapter concludes by attempting recommendations for CBR in Indigenous settings, with sustainable development as the resultant outcome.

Keywords Community-based research · Sustainable development · Indigenous knowledge · Participatory research · Community engagement

1 Introduction

Research projects with Indigenous communities have largely been developed within a dominant Western research paradigm that values the researchers as knowledge holders and the community members as passive subjects (Chilisa, 2017; Chilisa et al., 2017). This further marginalises Indigenous peoples and has led to the increasing

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calls for the decolonisation and contextualisation of research, epistemologically and methodologically, through the development of Indigenous research paradigms (LaVeaux & Christopher, 2009). Emphasis is made here on Indigenous communities at the nexus of the research, with community members involved from inception to the implementation of research activities and outcomes. This can be achieved through community-based research (CBR), but community participation in research varies widely and usually at insufficient levels (Cook, 2008; Coughlin et al., 2017). Therefore, as we argued in this chapter, it is necessary to deconstruct CBR because of its potential to overcome Eurocentric research paradigms if Indigenous knowledge holders are valued as active participants in the entire research process.

Whilst the concept of deconstruction has subjective meanings and implications, for the sake of clarity, we use it here to denote the disentangling or unravelling of community-based research from epistemic hegemony, with the resultant outcome being sustainable development. CBR is research that is conducted with members of a community. Levels of community engagement vary but we argue that all research with Indigenous communities should emphasise joint participation of researchers and community members, from identifying issues to implementing action plans and disseminating findings (Burns et al., 2011; Mbah, 2019; Strand et al., 2003). CBR has also been described as an orientation to research that focuses on the relationships between researchers and community members, with principles of co-learning, mutual benefit, and long-term commitment (Mbah & East, 2022; Wallerstein & Duran, 2006).

Yet, CBR is usually implemented based on western epistemological and methodological paradigms, even in Indigenous contexts, resulting in unsatisfactory levels of community involvement, unsustainable projects and unrelatable outcomes (LaVeaux & Christopher, 2009). Chilisa et al. (2017) argued for Indigenous-centred research methodologies that originate from the cultures, histories, philosophies, and lived experiences of those marginalised by Euro-Western paradigms. We argued in this chapter that CBR can be framed on an Indigenous-centred methodology if researchers understand and value the Indigenous communities of interest and uphold the basic tenets of community participation in research, as discussed later.

The premise that Indigenous peoples have an enduring history of marginalisation (LaVeaux & Christopher, 2009) calls for a rethink when researching their contexts. Indigenous peoples live on ancestral homelands worldwide (United Nations, 2009), although they are primarily concentrated in the continents of Africa, Asia, Oceania, and South America. Significant Indigenous populations are also present in the USA, Canada, and some Northern Europe countries like Norway. This indicates that they are not a monolithic or homogenous group. We therefore do not essentialise the group in this chapter but focus on shared worldviews like communality usually found among Indigenous peoples. Community-based research has the potential of centering Indigenous peoples in the research process, and this is consistent with the United Nations (2015) recognising their contributions as essential to achieving the sustainable development goals (SDGs). This will ultimately lead to the realisation of peace and prosperity for people and the planet, now and into the future. The SDGs,

intended to be achieved by 2030, are a collection of 17 interlinked global goals designed to be a blueprint to achieve a better and more sustainable future for all.

CBR can certainly contribute to the attainment of the SDGs, such as Goal 10 (reduce inequalities within and among countries), Goal 11 (sustainable cities and communities), and Goal 16 (peace, justice and strong institutions). Therefore, this chapter aims to demonstrate, conceptually and through the extant literature, that CBR, although a contested space, can be reclaimed by and for Indigenous peoples, towards achieving the SDGs. We also discussed pathways for this reclamation and emphasised the importance of ensuring that research does not continue to marginalise Indigenous peoples.

2 Deconstructing Community-Based Research

Community-Based Research (CBR) is an approach that emphasises community partnerships. Leung et al., (2004: 499) defined it as a ‘systematic inquiry, with the participation of those affected by the issue being studied, for the purposes of education and taking action or affecting social change’. Some of its principles are inclusion, collaboration, and change (LaVeaux & Christopher, 2009; Strand et al., 2003). However, studies show that these principles are not always upheld due to varying challenges that include logistical, epistemological, and methodological obstacles (Cook, 2008). A common issue is that researchers do not include community members in the problem identification and study design phases of the research process, and this could likely exacerbate the obstacles, especially with Indigenous communities who have different knowledge systems and research processes.

Therefore, to reclaim CBR by and for Indigenous peoples, researchers should seek to democratise knowledge by valuing all community members’ unique perspectives in the research process. Focus should also be on upholding teamwork among community members and academic researchers who work together to identify issues of mutual interest, determine appropriate investigation methods, and implement action plans. Thus, while contributing to knowledge, CBR can also contribute to social change by empowering communities and effecting relevant policy implementations. Burns et al. (2011) discussed the importance of community participation in the research process, summarised in Table 1.

However, there is a wide variation of the extent of community participation in many CBR studies, including studies that espouse participation as an important factor in their research process. For example, Samadipour et al.’s (2020) survey study evaluated Iranians’ risk perception of Covid-19, but it is not clear how much the community was involved in the research and there is no evidence that participants were involved in the components of the research process outlined in Table 1. However, snowball sampling was employed by the researchers to recruit participants, and this is an example of community involvement whereby the people who received the survey links shared them with other community members. Conversely, in Kyoon-Achan et al.’s (2018) mixed-methods study, most of the six components were collaboratively

Table 1 Community participation in the research process

	Community participation in:	Results in:
1	Identifying issues	Increased alignment with critical issues experienced from the community; empowers communities to take action; provides motivation to participate in the process
2	Development of study design and proposal submission	Increased acceptability of study approach by stakeholders, possibility of funds for community
3	Planning and/or carrying out recruitment and retention of participants	Enhanced recruitment and retention
4	Development of data collection tools and testing	Increased reliability of results; helps identify and better cope with potentially sensitive issues and situations
5	Development and implementation of action plan	Greater cultural and social relevance to the community; increased likelihood of effecting lasting positive change
6	Analysis, interpretation, translation, and dissemination of findings	Increased validation of results; enhancement of translating findings into action

engaged by researchers and community members, however the processes of issue identification and interpretation and dissemination of findings do not appear to have community input. Items 2, 4, and 6 in Table 1 were present in Tremblay et al.'s (2018) case study, discussing the challenges faced in trying to achieve the development and implementation of an action plan with community members. Furthermore, in Ogenchuk's (2022) study, community leaders contributed to the proposal design and participant recruitment, but not to the other aspects of the research process.

As the above examples show, community participation has been minimal in many community-based research projects. Only a few studies (e.g. Holkup et al., 2004); O'Fallon & Dearry, 2002) present studies that were successful at covering the six components of the research process, as outlined in the first column of Table 1. Although logistical challenges are usually cited as a reason for the minimal participation of community members in CBR, its lack of involvement of Indigenous communities in the research conceptualisation, especially identifying problems and designing the study, diminishes motivation to participate (Burns et al., 2011).

Furthermore, non-contextualisation by researchers contributes to the low levels of community participation. Contextualisation to the Indigenous community is necessary because CBR is a methodology derived from western epistemological and research paradigms, and so its methodological instruments and parameters are west-centric. For example, Conrad (1990) observed that conventional research interrogates a participant's identity through questions such as: What is your name? How old are you? Where do you come from? Conrad argued that this leaves unchallenged negative identities of Indigenous peoples. On the other hand, identity narratives decolonise negative stereotypes by reporting powerful stories that restore confidence and pride in identities, histories, and cultures (Drahm-Butler, 2015). Where Indigenous peoples

are involved in conceptualising a research project, they can contextualise the research to support their optimal and authentic participation.

Many Indigenous peoples suffer from loss of ontological security—“the confidence that most human beings have in the continuity of their self-identity” (Khudu-Petersen & Mamvuto, 2016: 59). This results in internalised unidirectional borrowing from the West, an uncritical imitation of Western research paradigms, and cultural betrayal (Alatas, 2004; Chilisa et al., 2017). Therefore, research with Indigenous peoples should critically interrogate the research methods, to ensure that Indigenous identities and cultures are respected. For example, demographic variables in conventional or western research are individualistic and seek to understand participants independent of their environment (Chilisa & Preece, 2005). In contrast, many Indigenous worldviews are communal and dependent on relation to others, the environment, and the spiritual realm.

Consequently, CBR should be reclaimed by and for Indigenous peoples, towards epistemic inclusivity, relatable outcomes, and sustainable development. As Koster et al. (2012) opined, any research conducted within a community, regardless of its purpose and methodology, should follow the general principles of Indigenous paradigms and respect the community through active communication, seeking their permission to conduct and publish the research, and giving results of the research back in ways that adhere to community practices. By focusing on community participation in CBR, Indigenous peoples’ cultures, could inform the research, as discussed in the ensuing section.

3 Indigenising Community-Based Research

Community-based research (CBR) has the potential to centre Indigenous peoples in the research process due to its emphasis on three elements that align with Indigenous worldviews: collaboration, contextualisation, and transformation. Collaboration refers to joint participation and equal authority among community members and researchers who are all co-participants of the research project—there is no hegemony of knowledge, language or communication. Collaboration is aligned with the communal nature of Indigenous societies where the people work together for the greater good with communal ownership of everything (Mushi, 2009). Contextualisation refers to placing all aspects of the research in a meaningful and relatable context that respects the community’s culture rather than, for example, having questions that the community do not care about or methods that are unconnected to the community’s worldviews and practices (Ajaps & Forh Mbah, 2022). Freire (1970: 83–84) maintains that ‘one cannot expect positive results from an educational or political action program which fails to respect the particular view of the world help by the people. Such as program constitutes cultural invasion’. To avoid the reality of CBR culturally invading Indigenous communities, it should be contextually aligned with the uniqueness of Indigenous cultures and contributes to the dismantling of stereotypes about Indigenous peoples (LaVeaux & Christopher, 2009).

Transformation or change refers to implementing the co-designed action plan derived from the research towards the attainment of the sustainable development goals. Transformation is aligned with the functional learning approach of Indigenous peoples where learning is relevant to the society and has direct application for transforming their existence positively (Kasulwe, 2014). These three elements of collaboration, contextualisation, and transformation align with the philosophical bases for African Indigenous Education (Mushi, 2009). By fully incorporating these elements in CBR, space and voice can be reclaimed for Indigenous peoples.

The integration of diverse knowledge systems is also a means of indigenising CBR, where researchers and community members combine western and Indigenous knowledge systems (Kwiatkowski, 2011). This integration is important to improve research processes, outcomes, and effectiveness. Reference to Indigenous knowledge systems (IKS) in this chapter signifies cultural, traditional, and local knowledge unique to a specific society or culture and encompasses skills and technology derived from systems of production and consumption (Derbile, 2013; Ubisi et al., 2020). IKS is also fundamentally relational, linked to the land, language and intergenerational transmission of songs, ceremonies, protocols, and ways of life (Greenwood & Lindsay, 2019).

Some scholars have proffered ideas for indigenising CBR. Identity narratives is one of such (Drahm-Butler, 2015), as mentioned earlier. When engaging Indigenous protocols for participants' introduction and identity inquiry, instead of the conventional biographical questions asked during interviews, identity narratives provide rich information about people's physical space, cultural location, ecological connection, and relationships to other people, other living things, and non-living things (Chilisa et al., 2017). These narratives may be presented through rituals, songs, myths, stories, or proverbs; for example, Musyoka and Mertens (2007) engaged proverbs to challenge stereotypes about people with disabilities.

Kovach (2010) employed the conversation method to gather knowledge through story in research with Indigenous peoples in Canada. Open-ended semi-structured interviews prompted conversation whereby researchers and community members co-create knowledge. This method aligns with the Indigenous worldview of orality for knowledge transmission and upholds the relational, necessary to maintain a collectivist tradition. Similarly, alternatives to the traditional form of interviewing that are more effective for eliciting information in Indigenous contexts have also been explored. For example, Bessarab and Ng'Andu (2010) explored the process of yarning, whereby researchers build relationships with Indigenous communities by engaging them in informal and relaxed conversations as they journey together visiting places and topics of interest to the research. Emphasis is on listening to the participants' stories about their lived experiences, feelings, thoughts, and ideas. The participatory rural appraisal method is also useful for indigenising CBR. Lara et al. (2018) employed this method in their research with an Indigenous community in Mexico. They conducted a participatory rural appraisal workshop to promote sustainable development that utilised action research and community problem-solving to analyse the situation from a cultural, biological, and legal perspective.

Based on research with Native American communities, Christopher et al. (2011) discussed emergent themes of sharing power and building trust as vital to the development of Indigenous CBR. This was based on nine principles they had previously developed, including acknowledging historical experience, recognising key gatekeepers, understanding tribal diversity, utilising Indigenous ways of knowing, and interpreting data within the cultural context. Also, Ninomiya and Pollock (2017) emphasised transparency around the challenges and solutions related to community-based research. In their study, they outlined the dilemmas they faced and pragmatic strategies to resolve the issues, even though some dilemmas remained unresolved. Some of the dilemmas they discussed are the difficulty of knowledge translation for diverse stakeholders, and conflicts between university bureaucratic processes and community administration protocols.

The above discourse point to the importance of indigenising CBR for the sustainable development of Indigenous communities. According to Leung et al. (2004), some benefits of indigenised research include trust between researchers and communities, increase in quantity and quality of data, emergence of new research questions, and translation of research into locally relevant policy and/or action. Therefore, to observe the operationalisation of the features of CBR captured in Table 1, researchers should assume a critical stance to analyse the methods they plan to employ and how aligned they are with the worldviews of the Indigenous peoples of interest. Researchers should also not impose their agenda on the community but listen to the community's interests and collectively agree on what questions to answer. The study design and data collection tools should also reflect the community's cultures and worldviews. In the ensuing section, we discussed how an indigenised CBR could lead to the attainment of the sustainable development goals, especially goals 10, 11, and 16.

4 Reclaiming CBR for Sustainable Development: The Role of Indigenous Knowledge Holders

Considering the need to frame but also firm-up CBR to be contextually relevant to Indigenous contexts, we now examine how this could be done practically, with reference to a number of sustainable development goals that have implications for research with Indigenous peoples. The role of Indigenous knowledge holders is also highlighted because they are well positioned to drive sustainable development in their environments. The sustainable development goals (SDGs) we have highlighted are Goals 10 (reduced inequalities), 11 (sustainable cities and communities) and 16 (peace, justice, and strong institutions).

SDG 10 focuses on *reducing inequalities within and among countries*. An indigenised CBR could focus on reducing epistemic inequalities by building on the philosophy of the ecology of knowledges (de Sousa Santos, 2009), whereby no knowledge system occupies a position of hegemony in the research to be jointly

executed by academics and community members. A conscious effort should be made to view participants as equals and their knowledge and expertise respected and effectively engaged in the research. Therefore, Indigenous knowledge, practices, and values within and among countries will be promoted through their elevation from the margins. Consequently, researchers need to embrace the ecology of knowledges (de Sousa Santos, 2009). This theoretical perspective contests the bias of the superiority of western knowledge systems and emphasises the multiple and *equal* ways of knowing.

SDG 11 is to *make cities and human settlements inclusive, safe, resilient, and sustainable*. In this context, CBR projects with Indigenous communities could focus on safe homes, accessible public transport, and green living. SDG 16 is to *promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable, and inclusive institutions at all levels*. Therefore, an indigenised CBR could focus on integrated decision-making and participation, anti-corruption, justice institutions, educational institutions, cultural institutions, violence against vulnerable people—children, women, the disabled, human rights defenders, etc.

Indigenous knowledge holders, also referred to as traditional or alternative knowledge holders are usually overlooked in research and other academic activities (Marlor, 2010). This is mainly due to the perceived irreconcilable differences in the epistemological and methodological underpinnings of western and Indigenous knowledge systems familiar to academics and Indigenous communities respectively (Paolisso, 2000). Yet, the collaboration between the holders of diverse knowledge systems would benefit Indigenous communities. Indigenous knowledge holders have a significant role in the research process because they tend to have a better understanding of their environment. For example, some researchers found that the fishes in their study 'are masters in understanding the Solunar theory [the concept of following the phases of the sun and moon], which remains a cynical and complicated concept for many natural scientists' (Salim & Monolisha, 2019: 786). Likewise, Wynne (1989) described how a group of sheep farmers in the UK contested the government's scientific advice on how to deal with radioactive contamination of their farms because the advice was incongruous with the timing and activities of farm life and the market.

Therefore, participation as an avenue for reclaiming CBR needs to be fully implemented for research in Indigenous contexts to foster the SDGs. Indigenous knowledge holders should be involved in the six phases of the research process outlined in Table 1, especially problem identification and study design, which are usually completed when academics contact Indigenous communities for research collaboration. Although there are many challenges for implementing an indigenised CBR, as discussed below, early involvement of Indigenous knowledge holders could help reduce some of the challenges. For example, when Indigenous knowledge holders are involved in identifying and defining issues, the research project has an increased alignment with critical issues experienced within the community. This empowers communities to act and provides motivation to participate in the process, overcoming challenges like low retention of participants and difficulty of accessing Indigenous knowledge.

5 Challenges and Prospects for Indigenising CBR

The challenges of conducting community-based research (CBR) have been discussed extensively in the extant literature (O'toole et al., 2003; Ogenchuk et al., 2022; Wilson et al., 2018), including the time and resource intensiveness, ethical challenges, and partnership tensions. Although many of these issues are common in qualitative social research, they are more pronounced in CBR due to the openness, fluidity, and unpredictability of the research process. This is often complicated by multi-layered partnerships based on negotiating power relations between different groups with specific histories, politics, cultures, and personalities. Thus, researchers who take an indigenised approach to CBR face further challenges. One of such challenges is access to gatekeepers, who are usually elders in the community and possess Indigenous knowledge. Another challenge is the tension between western and Indigenous knowledge systems; many researchers have been trained in the former, which shapes their worldviews, and research practices, even when they are from Indigenous backgrounds.

Despite these challenges, CBR has many prospects and benefits. Researchers and community members can recognise and build on each other's strengths and share resources and responsibilities (Horowitz et al., 2009). Sustainable development via CBR can be fostered when mutually respectful relationships, shared responsibilities, and an emphasis on local capacity building are underscored. CBR also provides insider perspectives and the opportunity to build trust and generate ideas. In addition, research questions, projects, and outcomes designed and implemented collaboratively have increased relevance and sustainability in communities.

The community context in CBR is pivotal and advocated for because Indigenous peoples can drive, or at least be involved, in their development. The inclusion of marginalised voices in CBR is necessary for knowledge democratisation and sustainable development. This inclusion contributes to outdoing the deficit narratives often found in research with Indigenous peoples, moving away from defining communities by their deficiencies toward seeking ways to identify and build on the communities' assets and strengths. This has implications for the way people feel about themselves and their future. To indigenise CBR, a shift towards community-initiated and action-oriented projects with Indigenous knowledge holders is required.

6 Conclusion

Indigenous peoples work and learn from their own standpoint and have significant knowledge and experience with their environments. Undermining their participation in the research process limits the quality and impact of the research and impedes their attainment of the sustainable development goals. Indigenised community-based research (CBR) has mutual benefits for academic researchers and communities. For instance, recognising multiple realities and sources of knowledge can increase the

validity of the research and its findings, as well as contribute to socially relevant and equitable research. Strong partnerships with communities also foster better recruitment of research participants. Communities can also benefit from increased knowledge and skills toward improving their lived experiences, and research projects that may positively transform their communities. Ultimately, this can contribute towards the achievement of the UN sustainable development goals, especially reduced inequalities, fostering of sustainable cities and communities, and peace, justice, and strong institutions.

Recommendations to researchers, funders, policymakers, and other stakeholders include the espousal of explicit ethical standards that ensure Indigenous people are involved from the inception of any research project to be carried out in their community. Whilst the ideas captured in this chapter have implications for practice, more research on Indigenous communities, focusing on Indigenous knowledge holders' research perspectives, and documentation of best practices are also needed. The deconstruction of CBR for sustainable development calls for indigenisation, engendered via the reclaiming of spaces for intentional and purposeful participation of Indigenous knowledge holders as co-researchers and key actors in the research continuum. Furthermore, any research conducted within an Indigenous community for the purposes of fostering sustainable development should be based on Indigenous paradigms, supported by active and transparent communication between researchers and the researched.

References

- Ajaps, S., & Forh Mbah, M. (2022). Towards a critical pedagogy of place for environmental conservation. *Environmental Education Research*, 28(4), 1–16.
- Alatas, S. H. (2004). *The captive mind and creative development* (pp. 83–98). Indigeneity and Universality in Social Science: A South Asian Response.
- Bessarab, D., & Ng'andu, B. (2010). Yarning about yarning as a legitimate method in indigenous research. *International Journal of Critical Indigenous Studies*, 3(1), 37–50.
- Burns, J. C., Cooke, D. Y., & Schweidler, C. (2011). *A short guide to CBR. A community research lab guide*. <https://hc-v6-static.s3.amazonaws.com/media/resources/tmp/cbpar.pdf>
- Chilisa, B. (2017). Decolonising transdisciplinary research approaches: An African perspective for enhancing knowledge integration in sustainability science. *Sustainability Science*, 12(5), 813–827.
- Chilisa, B., Major, T. E., & Khudu-Petersen, K. (2017). Community engagement with a postcolonial, African-based relational paradigm. *Qualitative Research*, 17(3), 326–339.
- Chilisa, B., & Preece, J. (2005). *Research methods for adult educators in Africa*. Pearson South Africa.
- Christopher, S., Saha, R., Lachapelle, P., Jennings, D., Colclough, Y., Cooper, C., Cummins, C., Eggers, M. J., FourStar, K., Harris, K., & Kuntz, S. W. (2011). Applying indigenous community-based participatory research principles to partnership development in health disparities research. *Family & Community Health*, 34(3), 246.
- Conrad, P. (1990). Qualitative research on chronic illness: A commentary on method and conceptual development. *Social Science & Medicine*, 30(11), 1257–1263.

- Cook, W. K. (2008). Integrating research and action: A systematic review of community-based participatory research to address health disparities in environmental and occupational health in the USA. *Journal of Epidemiology & Community Health*, 62(8), 668–676.
- Coughlin, S. S., Smith, S. A., & Fernandez, M. E. (Eds.). (2017). *Handbook of community-based participatory research*. Oxford University Press.
- de Sousa Santos, B. (2009). A non-occidental west? Learned ignorance and ecology of knowledge. *Theory, Culture & Society*, 26(7–8), 103–125.
- Derbile, E. K. (2013). Reducing vulnerability of rain-fed agriculture to drought through indigenous knowledge systems in north-eastern Ghana. *International Journal of Climate Change Strategies and Management*, 5(1), 71–94.
- Drahm-Butler, T. (2015). Decolonising identity stories. In B. Wingard, C. Johnson, & T. Drahm-Butler (Eds.), *Aboriginal narrative practice: Honouring storylines of pride and creativity* (pp. 25–45). Dulwich Centre Publications.
- Freire, P. (1970). *Pedagogy of the oppressed* (M. B. Ramos, Trans.). Seabury.
- Greenwood, M., & Lindsay, N. M. (2019). A commentary on land, health, and Indigenous knowledge(s). *Global Health Promotion*, 26(3_suppl), 82–86.
- Holkup, P. A., Tripp-Reimer, T., Salois, E. M., & Weinert, C. (2004). Community-based participatory research: An approach to intervention research with a Native American community. *ANS. Advances in Nursing Science*, 27(3), 162.
- Horowitz, C. R., Robinson, M., & Seifer, S. (2009). Community-based participatory research from the margin to the mainstream: Are researchers prepared? *Circulation*, 119(19), 2633–2642.
- Kasulwe, A. (2014). African indigenous education. Retrieved June 5, 2021, from <http://patient.over-blog.fr/2014/07/african-indigenous-education-by-apollinaire-kasulwe.html>
- Khudu-Petersen, K., & Mamvuto, A. (2016). Second chance education in Botswana: Implementing a holistic approach based on the Botho philosophy to empower marginalized youth in the Kweneng district. *AlterNative: An International Journal of Indigenous Peoples*, 12(1), 57–70.
- Koster, R., Baccar, K., & Lemelin, R. H. (2012). Moving from research ON, to research WITH and FOR Indigenous communities: A critical reflection on community-based participatory research. *The Canadian Geographer/le Géographe Canadien*, 56(2), 195–210.
- Kovach, M. (2010). Conversation method in Indigenous research. *First Peoples Child & Family Review: An Interdisciplinary Journal Honouring the Voices, Perspectives, and Knowledges of First Peoples through Research, Critical Analyses, Stories, Standpoints and Media Reviews*, 5(1), 40–48.
- Kwiatkowski, R. E. (2011). Indigenous community based participatory research and health impact assessment: A Canadian example. *Environmental Impact Assessment Review*, 31(4), 445–450.
- Kyoon-Achan, G., Lavoie, J., Avery Kinew, K., Phillips-Beck, W., Ibrahim, N., Sinclair, S., & Katz, A. (2018). Innovating for transformation in first Nations health using community-based participatory research. *Qualitative Health Research*, 28(7), 1036–1049.
- Lara, C. S., Crispín, A. F., & Téllez, M. C. L. (2018). Participatory rural appraisal as an educational tool to empower sustainable community processes. *Journal of Cleaner Production*, 172, 4254–4262.
- LaVeaux, D., & Christopher, S. (2009). Contextualizing CBPR: Key principles of CBPR meet the indigenous research context. *Pimatisiwin*, 7(1), 1.
- Leung, M. W., Yen, I. H., & Minkler, M. (2004). Community based participatory research: A promising approach for increasing epidemiology's relevance in the 21st century. *International Journal of Epidemiology*, 33(3), 499–506.
- Marlor, C. (2010). Bureaucracy, democracy and exclusion: Why indigenous knowledge holders have a hard time being taken seriously. *Qualitative Sociology*, 33(4), 513–531.
- Mbah, M. (2019). Can local knowledge make the difference? Rethinking universities' community engagement and prospect for sustainable community development. *The Journal of Environmental Education*, 50(1), 11–22.

- Mbah, M. F., & East, L. A. (2022). How can “community voices” from qualitative research illuminate our understanding of the implementation of the SDGs? A scoping review. *Sustainability*, *14*(4), 2136.
- Mushi, P. A. K. (2009). *History and development of education in Tanzania*. African books collective.
- Musyoka, M., & Mertens, D. M. (2007). Making research and evaluation our own: Ethical implications for strengthening the foundations for Africa-rooted and Africa-led inquiry. *Mosenodi*, *13*, 104–113.
- Ninomiya, M. E. M., & Pollock, N. J. (2017). Reconciling community-based Indigenous research and academic practices: Knowing principles is not always enough. *Social Science & Medicine*, *172*, 28–36.
- O’Fallon, L. R., & Dearry, A. (2002). Community-based participatory research as a tool to advance environmental health sciences. *Environmental Health Perspectives*, *110*(suppl 2), 155–159.
- O’toole, T. P., Aaron, K. F., Chin, M. H., Horowitz, C., & Tyson, F. (2003). Community-based participatory research: opportunities, challenges, and the need for a common language. *Journal of General Internal Medicine*, *18*(7), 592.
- Ogenchuk, M., Graham, J., Uswak, G., Graham, H., Weiler, R., & Ramsden, V. R. (2022). Pediatric oral health: Community-based participatory research. *BMC Pediatrics*, *22*(1), 1–9.
- Paolisso, M. (2000). Blue crabs and controversy on the Chesapeake Bay: A cultural model for understanding watermen’s reasoning about blue crab management. *Human Organization*, *61*, 226–239.
- Salim, S. S., & Monolisha, S. (2019). Indigenous traditional ecological knowledge of Tamil Nadu fisher folks: To combat the impact of climate and weather variability. *Indian Journal of Traditional Knowledge*, *18*(4), 781–792.
- Samadipour, E., Ghardashi, F., & Aghaei, N. (2020). Evaluation of risk perception of COVID-19 disease: a community-based participatory study. *Disaster Medicine and Public Health Preparedness*, 1–8.
- Strand, K. J., Cutforth, N., Stoecker, R., Marullo, S., & Donohue, P. (2003). *Community-based research and higher education: Principles and practices*. John Wiley & Sons.
- Tremblay, M. C., Martin, D. H., McComber, A. M., McGregor, A., & Macaulay, A. C. (2018). Understanding community-based participatory research through a social movement framework: A case study of the Kahnawake schools diabetes prevention project. *BMC Public Health*, *18*(1), 1–17.
- Ubisi, N. R., Kolanisi, U., & Jiri, O. (2020). The role of indigenous knowledge systems in rural smallholder farmers’ response to climate change: case study of Nkomazi local municipality, Mpumalanga, South Africa. *Journal of Asian and African Studies*, *55*(2), 273–284
- United Nations. (2009). *State of the world’s indigenous peoples*. www.un.org/esa/socdev/unpfi/documents/SOWIP/en/SOWIP_web.pdf. Accessed May 21, 2021.
- United Nations. (2015). *Sustainable development goals: 17 goals to transform our world. resolution adopted by the general assembly on 25 September 2015 (A/RES/70/1)*. <https://sdgs.un.org/goals>. Accessed May 5, 2021.
- Wallerstein, N. B., & Duran, B. (2006). Using community-based participatory research to address health disparities. *Health Promotion Practice*, *7*(3), 312–323.
- Wilson, E., Kenny, A., & Dickson-Swift, V. (2018). Ethical challenges in community-based participatory research: A scoping review. *Qualitative Health Research*, *28*(2), 189–199.
- Wynne, B. (1989). Sheepfarming after Chernobyl: A case study in communicating scientific information. *Environment: Science and Policy for Sustainable Development*, *31*(2), 10–39.

The Iloco *Ammu* as Indigenous Research Ontology, Epistemology, and Methodology



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Abstract In the Philippines, Iloco is one of the 19 languages that are officially recognized as media of instruction for the Mother Tongue-Based Multilingual Education (MTBMLE) (Estrada and Gargantiel, 2013). It is the education system's initial response to Millennium Development Goal (MDG) 2 or universal primary education in 2000–2015. Other initiatives were launched for Sustainable Development Goal (SDG) 4 or inclusive and equitable quality education and lifelong learning opportunities for all in 2016–2030 (United Nations, 2015). The ongoing education reform in the region and in the nation subscribes to this. The Department of Education (DepEd) and Commission on Higher Education (CHED) spearhead Indigenous Peoples Education (IPEd) and Indigenous Studies (IS) respectively. These can be essentialized by Indigenous perspectives and practices instead of simply invoking foreign worldviews. Iloco is the language mainly used in the Northern part of the archipelago, while Ilocano the people. It is also spoken in other regions of the nation and overseas. Moreover, mother tongues are essential in conceptualizing, constructing, and communicating research about the Indigenous. For instance, Indigenous ontologies, epistemologies, and methodologies can advance researches on the genetic diversity of plants and animals (SDG 1.5), role of culture in sustainable development (SDG 4.7), and preservation of cultural and natural heritage (SDG 11.4). This chapter demonstrates that Iloco is an Indigenous knowledge resource that can be optimized in theorizing and teaching research especially when it pertains to the SDG. More specifically, it proposes (1) a social ontology, (2) a constructivist epistemology, and (3) a methodology based on the nuances of *ammu*, which is an Iloco term for knowledge. Students, educators, curriculum developers, cultural workers, policy makers, researchers, funding agencies, and other stakeholders of the Indigenous or Iloco/Ilocano in the archipelago or overseas can derive insights from this preliminary work. They can extend this not only to contribute to the body of knowledge on

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Iloco/Ilocano and but also advance the SDG in local, national, regional, and global contexts.

Keywords Iloco/Ilocano · *Ammu* · Ontology · Epistemology · Methodology

1 Introduction

1.1 *Background of the Study*

In the Philippines, Iloco is one of the 19 mother tongues that are officially recognized for the implementation of the Mother Tongue-Based Multilingual Education (MTBMLE) in 2009, which replaced the Bilingual Education policy in 1987 that prescribed only English and Filipino (national language) as media of instruction. Other mother tongues in currency are Tagalog, Kapampangan, Pangasinense, Bicol, Cebuano, Hiligaynon, Waray, Tausug, Maguindanaoan, Maranaoan, Chavacano, Ybanag, Ivatan, Sambal, Aklanon, Kinaray-a, Yakan, and Surigaonon (Estrada and Gargantiel, 2013).

Traditionally, Iloco refers to the language, while Ilocano the people or the speakers or what sociolinguists call speech community. However, these are used interchangeably in many local and international publications. Agcaoili (2011) recounts that Iloco has a precolonial form called *kurditan*. It refers to (1) a writing system or orthography, (2) written texts that constitute a body of knowledge, and (3) a writer who understands, speaks, and reads the same. He adds that this was initially documented in 1620 in the book *Libro a naisuratan amin a bagas ti Doctrina Cristiana*, which is “a translation into Ilocano by Fray Francisco Lopez of the catechetical book of Robert Cardinal Bellarmine, the *Doctrina Cristiana*” (p. xii–xiii). The latter is the first book printed in the Philippines in 1593. Religious orders diligently produced the earliest documentation and preserved artifacts of various ethnolinguistic groups in the Philippines.

At present, Iloco is widely spoken in the Ilocos (Region I), Cagayan Valley (Region II), and Cordillera Administrative Region (CAR) in North Luzon or *Amianan*. This is why it is called the *lingua franca* of the *Amianan*. There are also Ilocano communities in Central Luzon (Nueva Ecija, Tarlac, and Zambales), Southern Tagalog (Mindoro and Palawan), Visayas (Cebu), and Mindanao (North Cotabato). Ilocanos are also dispersed overseas mainly as migrant workers in the United Arab Emirates, United Kingdom, United States, among others. They are most prominent in Hawaii because of the generations of Ilocanos who have been there for over a century now. Most of them started as sugarcane farmers called *sacada*. This includes Lorenzo dela Cruz (the author’s maternal great-grandfather), his brother Calixto dela Cruz (who never returned to the Philippines), and brothers-in-law Benito Agustin and Paulino Resurrection in the early 1900s. The University of Hawaii at Manoa maintains the Ilocano Language, Literature, and Culture Program. It was established in 1972, and it is the only degree-granting program in the world that offers major, minor, and certificate

courses in Iloco/Ilocano. The same university, in cooperation with universities and colleges in Ilocos, initiated in 2006 the annual NAKEM Conferences to commemorate the centennial anniversary of the *sacada*. The said academic organization is one of the advocates of *Amianan* studies in general and Iloco/Ilocano studies in particular. It closely collaborates with Cordillera, Pangasinan, Cagayano, Waray, Cebuano studies among other interest groups that promote the Indigenous. This also manifests its multilingual, multicultural, and multidisciplinary nature. Thus, it has mobilized and gathered scholars not only in the Philippines but also from other countries for more than a decade now.

This chapter is a commentary or a reflection on an ethnographic study in the *Amianan* (2015–2021). It consolidates the usually unspoken and unwritten philosophical principles underlying research through the nuances of *ammu*, an Iloco term for knowledge. These include ontology, epistemology, and methodology. Denzin and Lincoln (2013) explain that ontology is the theory or the claims or propositions about the nature of reality being investigated; epistemology points to the relationship of the researcher/knower and the researched/known; and methodology pertains to method/s of obtaining knowledge about what is investigated. Wei and Hua (2011) delineate method and methodology; the former being “strategies, techniques, or tools”, while the latter “principles” that guide how methods are applied and how data are analyzed (p. 497).

1.2 *Objective of the Study*

The objective of this chapter is to propose an Indigenous (1) social ontology, (2) constructivist epistemology, and (3) methodology of research based on the nuances of *ammu*, an Iloco term for knowledge. Theory across disciplines is dominated by the West, while the Indigenous or local are limited. This work discusses *ammu* as social ontology, which centers on contexts or settings, and it covers “agents, positions, roles, authority, organizations, structures, networks, alliances, and interdependencies” (Jurisica et al., 2004, p. 80). Further, most books on qualitative research present epistemology as the relationship of the researcher/knower and the researched/known, but this is much more complex in Indigenous or local settings. This work reports a network of knowledge custodians, holders, keepers, or managers besides the researcher and the researched dichotomy, hence, constructivist epistemology. The same books define methodology by delineating qualitative, quantitative, and mixed methods. In Indigenous contexts, methods and methodologies alike are embedded in communicative practices and linguistic expressions like the Iloco *ammu*.

1.3 *Significance of the Study*

The ongoing education reform in Southeast Asia and the nation are hinged on SDG 4 “inclusive and equitable quality education and promote lifelong learning opportunities for all” (United Nations, 2015, n.p.). Generally, the SDG seeks to empower the Indigenous, and for which research is an integral feature. This paper espouses that this must be necessitated by Indigenous perspectives and practices. Besides, if these work for education, it must, as well, be applied to the other goals. Educating individuals and communities about each of the 17 goals is an initial step in attaining sustainable development in general.

As of 2016, research courses in Senior High School (SHS) of Kto12 already include *Komunikasyon at Pananaliksik sa Wika at Kulturang Filipino* (Communication and Research in Filipino Language and Culture), *Pagbasa at Pagsusuri ng Iba’t Ibang Teksto sa Pananaliksik* (Reading and Analysis of Various Research Texts), Practical Research 1 (Qualitative), Practical Research 2 (Quantitative), and Inquiries, Investigations, and Immersion (III). These train citizens not only for knowledge-based education but also knowledge-driven economy. That same year, the Department of Education (DepEd) issued the Basic Education Research Agenda (BERA), which mandates all administrative, academic, and allied personnel to engage in research. This was reinforced by the Research Management Guidelines (RMG) and Philippine Professional Standards for Teachers (PPST) in 2017. DepEd constituents now (re)learn research in graduate school, seminar-workshops, and conferences. Such is the growing interest in research. Meanwhile, research has been a mandate of higher education for many years now. Indigenous or local perspectives can advance and be advanced through these mandates.

With higher community quarantine or alert levels, more commonly known as lockdowns due to a global health concern, mobility and operations are confined within the locality. This compels communities to reconsider Indigenous or local knowledge in addressing not only the disease but its debilitating consequences, among other issues. Amid distance, online, or remote learning, the research mandate continues. School heads, teachers, and SHS students keep on with their respective research projects and Schools Division Offices (SDO) with their research conferences. Because most researches these days are locally situated, Indigenous frameworks are desired instead of haphazardly using foreign worldviews. This chapter responds to this, other professions or communities of practice can consider the same. Ultimately, community-based research is conceptualized, constructed, and communicated in Indigenous or local terms. A large part of data collection or gathering and analysis, for instance, takes place in the mother tongue of the focal persons, respondents, and participants. Considering language constraints, a translator, ideally a native speaker, is outsourced. Innovations as a result of the research are also popularized in the mother tongue. The Indigenous or local cannot be dismissed because it is the nature of the phenomenon under study and the code of the knowledge being stored and shared. The research report is consequently written or codified in English to satisfy the requirements for an academic degree, an oral or poster presentation, or a publication such as this.

Further, knowingly or unknowingly, researchers comprehensively read, reflect, and write about ontology, epistemology, and methodology in their research reports even without directly mentioning these. SHS students, for example, encounter these in Inquiries, Investigations, and Immersion (III), where they (1) conceptualize a topic; (2) articulate research problems/questions; (3) construct a literature review; (4) collect or gather data; (5) discuss answers to the research questions; (6) report findings, draw conclusions, and make recommendations; and, (7) disseminate the research. As regards research topics, the SDG provides a list of concepts that can be narrowed down and contextualized. Since 2016, many research conferences in the Philippines had the SDG as its theme. Research is a very recent innovation in Philippine basic education, that is why many find it daunting. However, Indigenous or local concepts can initiate and facilitate the necessary instruction. This is vital for Indigenous peoples to not only understand researches about them, but also, more importantly, undertake research themselves in their own knowledge traditions.

2 Literature Review

Section 2.1 situates the Indigenous in research. It cites examples in the fields of communication, mathematics and science, and education. It also (Sect. 2.2) revisits global or international, regional, and national education policies that privilege the Indigenous. All of these are rooted in the SDG being the overarching policy statement. Lastly, it (Sect. 2.3) discusses how the Indigenous is perceived and practiced in the Philippine education system, hence pedagogy/pedagogies.

2.1 *The Indigenous in Research*

Researches about the Indigenous enormously increased with the expansion of the colonization project with colonizers observing, documenting, analyzing, and reporting the life ways of traditional communities or settlements they initially befriended and consequently conquered. With the emancipation of many colonized nations and the urgency to start anew after World War II, interest in the Indigenous has widened. On the one hand, foreigners or outsiders usually employ academic or scientific lenses. On the other hand, Indigenous or locals propagate their own usually in their mother tongues. This should not be always viewed as a contrast of extremes but as a continuum of various possibilities and persuasions. Since the late 1970's, studies about the Indigenous have been generally tagged as postcolonial, and this has been the trend since then. However, not all studies about the Indigenous are postcolonial.

This review starts with Communication studies being the academic discipline of the author and communicative practices as sites where the Indigenous or local surface. Craig and Muller (2007) notice that Communication as a field is largely Western or

Eurocentric. This suggests theories or concepts (ontology), researcher's knowledge (epistemology), and methods or strategies (methodology) are largely derived from classical Greek and Roman and contemporary European and Anglo-American lenses (West & Turner, 2011). Further, Communication theories are organized using broad categories called traditions or theoretical traditions: rhetorical, semiotic, phenomenological, cybernetic, socio-psychological, socio-cultural, critical (Craig, 1999), and pragmatic (Craig, 2007). These are not exclusive to the field. Communication is, in fact, multidisciplinary. These were derived from and can be applied across a wide range of disciplines, communities of practice, and professions. Because of its generally Western inclination, many scholars argue that these are not always applicable or appropriate in Indigenous or local settings, such as those in Southeast Asia in general and Philippines in particular. However, Gunaratne (2009) contests that these can, nevertheless, be used to explain Eastern or Oriental theories. He elucidates Asian Communication theory along Craig's theoretical traditions.

To add, Littlejohn and Foss (2009) compiled 300 theories from 200 authors in 10 different countries. While most of these are, indeed, Western, there are race- or region- or religion-specific entries: African, Asian, Asia-Pacific, Buddhist, Chinese, Daoist/Taoist, Hawaiian, Hindu, Japanese, Latino, among others. They also historicize Communication theory from around 500 BC until 2008. Amid the extensive discourse on Greek philosophy during the classical Greek and Roman period, African perspectives were also recognized. Maune (2017) elaborates that Hebrew or Jewish perspectives, which are originally accessible through the *Torah* and popularized through the Bible, developed from the African.

Asian Communication theory, as conceptualized by Gunaratne (2009), refers to India and China, thus, Hindu and Buddhist worldviews. It is characterized as Eastern (Oriental) and differentiated from the Western (Eurocentric). It is also connected to collectivism or a community-orientation. Because of this, it cannot be easily subjected to the usually normative, objective, and positivist gauge of Western knowledge. It flourished in the 1980s and advanced in the 1990s (Wang & Kwo, 2010). In the 2000s, cultural studies intensified. With NAKEM Conferences as a reckoning point in the Philippines in 2006, basic and higher education institutions, local government units, non-government and people's organizations, and other advocates in the *Amianan* have sustained annual multidisciplinary conferences and publications that celebrate the Indigenous or local for over 15 years now and notwithstanding the limitations caused by a global health concern.

Filipino practitioners and researchers have elicited Indigenous or local concepts to extend what is known as Asian Communication theory being mainly Indian or Chinese. This was intensified by the Association of Southeast Asian Nations (ASEAN) Integration in 2015 (ASEAN, 2016). Hence, researches underscore not only what is Indigenous or local but also regional or Southeast Asian. Themes include across culture-specificity and culture-general divide, intercultural communication, international communication, media cultures and publics, mobile communication, technological and intellectual geopolitics, communication research, advertising, new media, political communication, among others (Wang & Kwo, 2010).

For communication research, Farnacio-Cantancio (in Pernia, 2004) lists Indigenous Filipino research methods, which are necessary in connecting with communities and accessing the desired information or knowledge. These include *pagmamasiid* (observation), *pakikiramdam* (feeling of being accepted), *pagtatanong-tanong* (asking questions), *pakikipagkuwentohan* (storytelling), *pakikinig* (listening), *padalaw-dalaw* (visiting the research site), *pakikialam* (expression of concern), *pakikilahok* (engagement), *pakikisangkot* (action or agency), *pagmamatyang* (vigilance), and *pagsubaybay* (monitoring) (pp. 83–84). These categories in Filipino, the national language, are taught in a university research course in Communication.

Tirol (2010) documents Sugboanon Bisaya as medium of instruction in mathematics and science. He also lists Indigenous concepts for counting, basic operations, geometrical shapes, calendar and months, colors, geography, among others. Examples include *alamdag* (science), *gutling* (second—time; angle), *sip-ak* (series), *lipda* (sine), *mantamanta* (sketch), *kupa* (slope), *buad* (square; exponent), *santing* (strain), *ugnat* (stress), *husay* (solution), and *hulip* (substitute) (p. 34). He claims that these have been in use long before the colonization of the Philippines. There would have been no Bisayan sailors and ship builders without such complex Indigenous knowledge. While these are taught in basic education, the same can be integrated in relevant higher education programs like architecture, engineering, maritime, among others.

With regard to the implementation of the Indigenous Peoples Education (IPEd) in Mt. Province in the *Amianan*, Grande (2016) proposes *ammungan* as framework (pp. 28–29) instead of using a foreign model, for instance, the very popular diffusion of innovation. *Ammungan* refers to a literal space in indigenous communities or villages. It is circular in form with a diameter of two or three meters and typically tiled with flattened rocks or stones. Firewood is at its center for light and warmth as gatherings for a discussion or a decision, mainly with the community elders and concerned parties, are held at night. From the perspective of Communication, this practice is valuable because of its premium on dialogue. It concretizes, condescends or simplifies, and contextualizes abstract concepts, for instance, socially shared inquiry (Alfonso, 1999). Researchers or students can recall an enactment or an experience of *ammungan* as socially shared inquiry, hence, connecting the known to the unknown and the other way around.

Grande (2021) also reports that an Indigenous community in Kalinga, another province in the *Amianan*, has local terms for theory and practice. They have *igammu* for the former and *kopya* for the latter. These are different from academic knowledge, which is *achar*. These are instructive in explaining research methods, for instance, in Senior High School, undergraduate, and graduate classes. The province hosts a few colleges and a state university. An integral part of an ethnographic study conducted that province was the opportunity to discuss qualitative research in research writing workshops and division research conferences. More specifically, *igammu* (theory or what one knows) to *kopya* (practice or how one applies what he/she knows) is quantitative research; the other way around is qualitative research; and combining both is mixed methods. Employing Indigenous concepts, for instance, in teaching research is not only an exercise of translation but establishing community-based or local knowledge as a valuable resource that researchers can start with, and this is

a demonstration of sustainable development. Initially, the participants in a workshop commended the effort to convey the technical terms in their local language. Consequently, they reflected on the nuances of the same in their respective dialects. The local terms eased and enriched the understanding of the differences. The term ‘research method’ eventually had various conceptualizations in Kalinga dialects. What is considered only a word can elicit various meanings through its nuances. Sadly, these are neglected, obscured, taken for granted, and trivialized.

2.2 The Indigenous in Policy

In the Philippines, the decade before the global pandemic, specifically 2009–2019, was very favorable and fruitful for the Indigenous. Research initiatives on the Indigenous or local escalated with the issuance of the National Cultural Heritage Act of 2009 or Republic Act (RA) 10,066, which promotes cultural education. This policy aims to (1) incorporate national cultural heritage in all modes of education, such as formal, alternative, and informal, through the Philippine Cultural Education Program (PCEP); (2) institutionalize the Cultural Heritage Education Program (CHEP); and (3) regulate the accessibility of such heritage (National Commission for Culture and the Arts or NCCA, 2009).

Also in 2009, the Mother Tongue-Based Multilingual Education (MTBMLE) policy was issued, and this revitalized projects on Indigenous languages and cultures similar or related to what the Summer Institute of Linguistics (SIL) has done in the Philippines since 1953 (DepEd, 2009). This is an initiative of the Philippine education system for the Millennium Development Goals (MDGs) in 2000–2015. The United Nations Educational, Scientific, and Cultural Organization or UNESCO (2012) notes that many individuals across the globe cannot speak in the national or an international language. However, when development initiatives are conveyed in their Indigenous languages or mother tongues, they respond with creativity and sustainability. They themselves propose practicable measures and carry these out. Hence, Indigenous languages practically help achieve the SDG. Conversely, the absence or lack of Indigenous perspectives and practices, including mother tongues, for that matter, excludes Indigenous communities.

Mechanisms were institutionalized for Indigenous peoples because they often encounter challenges in accessing basic social services, engaging in economic and political activities, and exercising human rights. Such exclusion is caused primarily by the absence or lack of culturally relevant and responsive education. The Indigenous Peoples Education (IPEd) policy framework was launched (DepEd, 2011). It is based on the principles of “shared accountability, continuous dialogue, engagement, and partnership among government, Indigenous peoples’ communities, civil society, and other education stakeholders” (n.p.).

Meanwhile, because of the growing interest in the Indigenous through research grants, immersion programs, and other activities, the National Commission on Indigenous Peoples (NCIP) released Administrative Order No. 1, Series of 2012 or

the Indigenous Knowledge Systems and Practices and Customary Laws (IKSP/CL). It is a legal instrument that acknowledges, affirms, and applies Indigenous knowledge in development (Lohdi & Mikulecky, 2010). Specifically, it (1) defines ethical standards for any research initiative undertaken in an Indigenous community; (2) prescribes a framework in implementing, monitoring, evaluating, and terminating the same; (3) lists protocols in acquiring free and prior informed consent (FPIC); (4) states the creation of knowledge management mechanisms that document, disseminate, and develop the research outputs; (5) promotes sustainability of Indigenous knowledge; and (6) accords ownership of the same to the Indigenous community (NCIP, 2012). At the onset, it prevents outsiders from misinterpreting, misrepresenting, misusing/abusing the Indigenous. However, it is also laden with issues. Some scholars complain that it works for normative, objective, or positivist (quantitative) researches with a hypothesis ready to be tested but not for constructivist or interpretive (qualitative) studies that seek to capture the emergent. Indigenous communities also interpret some provisions differently. For instance, some are not keen on the benefit sharing clause, while others demand researchers to shoulder the cost of extravagant rituals, including a community feast, prior to data collection or gathering as this would guarantee the approval and cooperation of ancestral spirits. Others probe if an initiative has funding or none. The financial requirements become more of a constraint than a catalyst because not all research initiatives enjoy a grant or other forms of financial assistance. This is why the free and prior informed consent is usually waived because it can delay the graduation of students, progress of a project, or, worse, sustainable development. It is imperative for NCIP to revisit this policy after two decades of implementation.

In 2015, the IPed curriculum framework was launched. It enjoins the community in “localizing, indigenizing, and enhancing the Kto12 curriculum based on their educational and social contexts,” and this suggests the aims of the ongoing reform are realized through IPed (DepEd, 2015, n.p.). Indigenous perspectives and practices necessitate (1) curriculum development, (2) capacity building of administrative, academic, and allied personnel, (3) production of instructional materials, (4) maintaining a supportive community of learners, and (5) affirmative action programs. Each SDO has an IPED roadmap.

That same year, the Sustainable Development Goals (SDG) was launched for 2016–2030. This universal policy statement recognizes the situation of vulnerable sectors, including Indigenous peoples, and seeks to empower them primarily through knowledge so that they can optimize their potential and become more productive citizens. It has been like a keynote address for all academic or professional conventions at the global down to the local levels. It must rationalize any proposed policy, project, or program. This chapter highlights SDG 4 or “inclusive and equitable quality education and promote lifelong learning opportunities for all”, but it also relates to the following more specific goals:

- 1.5. ...maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional, and international levels, and promote access

to fair and equitable sharing of benefits arising from the utilization of genetic resources and associated knowledge, as internationally agreed;

4.7. ...ensure that all learners acquire the knowledge and skills needed to promote development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development; and

11.4 ...strengthen efforts to protect and safeguard the world's cultural and natural heritage (United Nations, 2015, n.p.).

At the community level, the knowledge base of these goals is accessible, available, and applied in Indigenous languages. People in the community are more familiar with the local terms for animal and plant species than scientific names. As espoused earlier, educating people or disseminating knowledge about these is more viable in the mother tongue/s. Cultural and natural heritage is, therefore, propagated and preserved in the same.

In the region, ASEAN Integration was popularized in 2015. For education, this was actualized through the Work Plan on Education (WPE) 2016–2020 (ASEAN, 2016). It banks on the notion of twenty-first century skills being a term in circulation worldwide. The plan rationalizes and harmonizes all initiatives that promote SDG 4 in the region. Interestingly, its first priority area is advancing ASEAN consciousness through local history and Indigenous knowledge. That said, it also serves as the framework for the other priority areas. While the Indigenous is acknowledged and celebrated in the regional level, appreciation and application of which at the local or community level, for instance, SDOs and districts in the Philippines, remain challenging. It is also regarded superficial because it is widely (re)presented through 'fashion, festival, food, and folk dances and songs' and not as frameworks that can advance SDG.

In 2019, the Commission on Higher Education (CHED) Memorandum Order No. 2, Series of 2019 or the Integration of Indigenous Peoples' Studies/Education into the Relevant Higher Education Curricula was issued. Specifically, it (1) includes Indigenous topics, contexts, and concepts in the Humanities and Social Sciences (HUMSS) and (2) infuses readings about the Indigenous in General Education (GE) curriculum (CHED, 2019). However, this cannot be confined in HUMSS or GE because the Indigenous is integrative and organic and not compartmentalized or fragmented in the same manner courses or subjects are classified in the academe.

2.3 The Indigenous in Pedagogy/Pedagogies

Grande (2018) synthesized more than 500 abstracts of paper presentations at research conferences on Indigenous and local culture in the Philippines within February 2016 to March 2017. He elicited four broad perspectives or categories of IPed. Initially, it is conceptualized as (1) a means that subtly revitalizes or perpetuates the colonial

project. This reflects the unequal and uneven experiences of many Indigenous peoples under colonialism. This caused the divide between Indigenous and non-Indigenous, highlander and lowlander, traditional and Christian, ethnic and non-ethnic, native and non-native, general population and cultural minority (Rovillos & Pamintuan-Riva, 2013). The Spanish friars educating natives about religion and the Americans teaching them English demonstrate this. They thought the natives needed education to serve the colonizers better. Such orientation was carried over to what is now the Republic of the Philippines. Today, some postcolonial scholars oppose IPEd. They contend that emphasizing the Indigenous extends exploitation by the same colonizers but in another fashion, particularly through knowledge. With Western models not being able to address global issues, Indigenous knowledge is now harnessed for capitalist ends and not necessarily for its bearers or holders.

Another lens is IPEd being (2) a movement that privileges the Indigenous peoples. This is the direction of the ongoing education reform in the Philippines and evident in the policies discussed earlier. IPEd started as random initiatives of different stakeholders in various areas. Its merit captivated legislators and then prioritized in education policy. For now, it is achieved through localization or aligning the curriculum to Indigenous or local circumstances, knowledge, processes, and resources. This undergoes an acid test as the entire education system, just like other nations, operates in local contexts amid the restraints due to a global health concern. Indigenous or local frameworks, methods, and policies are worked out to compensate for connectivity issues that limit online or remote learning. The gradual resumption of face-to-face classes also largely depend on any local development.

In contrast, others perceive IPEd as (3) a marginal experience. This resonates the sentiment that it is just idealized or imagined. In other words, it is not real. Some scholars report that this is due to ongoing armed conflicts, intimidation or manipulation of Indigenous leaders, lack of government support, among others. With these, the aspirations of IPEd are diminished and stakeholders frustrated. Others lament that the policies, programs, and roadmaps are like any typical government project, which is only good in principle and on paper but not in practice and lasts as to availability of funds. This rationalizes the ongoing advocacy of ownership among Indigenous peoples because IPEd is not just a program for or with them as beneficiaries or recipients. It is something that they should proactively and critically constitute.

Lastly, IPEd is seen as (4) a materiality of hybridity. This notion is widespread in communication research methods in postmodern culture, that is, reality is a social construction, hence, realities (Leslie, 2018). To add, it considers some aspects of culture as consequences of capitalism mainly through industrialization. With post-modernism, attention, including research interest, segues to poverty, social justice, corruption, and other issues. The different versions or constructions of reality are largely determined by the explosion of information or knowledge. This chapter argues that the ability to access and process information also matters. With these, ambiguity, discontinuity, and fluidity characterize contemporary life including Indigenous communities. This explains the notion of pedagogies and not just pedagogy as far as IPEd in particular or education in general is concerned. In other words, there is no one

definite perspective or practice of IPEd. These continually emerge and evolve, and such are crucial in understanding the Indigenous being complex and unpredictable.

3 Methodology

This work is a commentary or a reflection on an ethnographic study in the *Amianan* that started in February 2015, interrupted in March 2020, and completed in December 2021. It also coincided with the Kto12 Transition Program (2016–2022). Two years of schooling were added to what used to be only 10 in the Philippines.

Further, ethnography involves direct or indirect participation, formal or informal interviews, and archives or documents. Initially, target school partners in the *Amianan* were approached. Eventually, research activities focused on Kalinga and Mt. Province in CAR, where other Indigenous languages are in currency. However, focal persons, key informants, and participants are fluent in Iloco being the *lingua franca*. Communication has been maintained mainly with focal persons through short message sending or text messaging and social media in Iloco. With an invitation, community gatherings and life events of individuals were attended. It was only in 2019 when DepEd was accessed, and this resulted in certain engagements, such as capacity building or writing workshops and conferences on research. Besides, pertinent archives or documents were randomly accessed through generous individuals and institutions. However, accessing data is neither smooth nor spontaneous as planned. The focal person, key informant, or research participant can schedule an appointment or cancel the same on a very short notice or after some time, for example, a week or two. Hence, much time was spent waiting for any development or update. During these breaks or gaps, observations, frustrations, inspirations, and reflections were recorded through field notes in either English or Iloco. These are considered the core of ethnographic research. Field notes document social life as they occur, define actors and activities, and directly quote salient remarks (McCarty, 2015).

Ethnography was also complemented by ethnomethodology, which examines local communicative practices. Coffey (2018) clarifies that ethnomethodology is concerned with “the understanding of social life at the microlevel; uncovering meaning in the close and detailed study of interaction on how social actors work together to construct social order and, at times, change that order in subtle ways” (p. 8). After determining specific details or instances that elaborate the objectives of the research, reflexivity comes in. The researcher reflects on his/her assumptions (theory or ontology), position (relationship with the researched or epistemology), and strategies (methodology) and its consequences on what is being investigated. These largely involves the researcher’s impressions, insights, irritations, and interpretations. This explains the embeddedness of the researcher and rationalizes the attention on linguistic expressions or forms.

Ryser et al. (2017) list examples of Indigenous research methodologies: (1) comparing multiple variable relationships; (2) counting; (3) watching [or observing];

(4) storytelling of the past, present, future, or simultaneity; (5) dreaming; (6) meditating and waiting; (7) stressing or visioning; (8) narrative analysis, portraiture, and metaphor; (9) retrodiction; (10) analogizing and analogic reasoning; (11) relational reasoning; (12) remembering and sharing; (13) talking circles and community participation; and (14) dance, song, and image rendering (pp. 67–72). One methodology can certainly be reinforced by another or others, hence, a blend of methodologies.

4 Results and Discussion

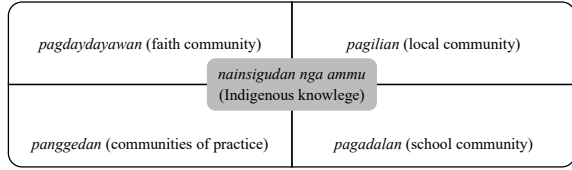
This elaborates (Sect. 4.1) a social ontology, (Sect. 4.2) a constructivist epistemology, and (Sect. 4.3) a methodology based on the nuances of *ammu*, an Iloco term for knowledge. The IPEd policy framework is written English, Filipino, Bisaya, and Ilocano. The same policy is disseminated, but its translations or versions usher in various notions and nuances. Making sense of, at least, Indigenous knowledge can be enriched or expanded as the policy gets translated in other mother tongues. In Iloco/Ilocano, Indigenous knowledge is *nainsigudan a ammu* (DepEd, 2011, n.p.). In line with contextualization through localization and indigenization, this chapter necessitates the said concept with Iloco perspective through the mother tongue. The root word of *nainsigudan* is *sigud*, which suggests a reality or a former state of affairs that got altered, interrupted, marginalized, neglected, obscured, but its intrinsic value is now revitalized not only for its own sake but to advance the SDG.

4.1 *Ammu as Indigenous Research Ontology*

Social ontology situates reality in social contexts or settings, such as alliances, networks, organizations, and relationships. Such collectivism or community orientation makes it truly Asian. Reality neither exists randomly nor individually elsewhere but in the interactions of the people in a group or community. Such group is also called a discourse community or a sector of society that maintains its own version of Indigenous or local knowledge in particular or construction of reality in general. They always have something to say about anything in the community and are acknowledged in decision making. They are knowledge managers in their own right, so researchers or practitioners should never miss them out.

These discourse communities include the (1) *pagilian* or *ili*, (2) *pagadalan*, (3) *panggedan*, and (4) *pagdaydayawan*. Initially, *pagilian* or *ili* is the local community or where one was born and resides, hence, home knowledge. It has parents and elders as bearers or custodians. Even before individuals start formal schooling, they had been initially trained at home. Further, *pagadalan* is where formal learning occurs or basic education, hence school community. It has teachers as knowledge managers. This does not refer to only academic but also Indigenous knowledge assuming that the teachers are locals. IPEd recognizes the role of Indigenous elders or leaders in

Fig. 1 Proposed social ontology of indigenous or local knowledge



community development. The Summer Institute of Linguistics (SIL) in the Philippines conducted over 3000 researches on various ethnolinguistic groups within 1953 to 2003 mainly with teachers as co-authors, partners, participants, research assistants, tour guides, trainers or translators in the mother tongue, among others. This shows that educators are knowledge managers not only of academic but also Indigenous or local knowledge. To add, *panggedan* are occupations (not necessarily professions), which are also influential in the community, thus, able to form public opinion. They are usually distinguished through common or shared issues, knowledge base, and strategies they employ to address these. Lastly, (4) *pagdayawayan* involves faith community or where one prays and worships with religion as basis of their knowledge tradition. Faith “communities” is a better term considering the different Christian denominations in the *Amianan*. More interestingly, an individual can be a constituent of all of these four discourse communities, and this suggests the versions of the Indigenous or local that he/she holds. This is apparent in research conferences wherein discourse on the Indigenous or local mainly comes from community or cultural workers, educators and students, researchers and professionals across academic disciplines, and church leaders. *Ammu* as the point where these four discourse communities interact is illustrated in Fig. 1. Initiatives that promote or implement the SDG in Indigenous or local contexts, for instance, in the *Amianan*, must be keen on these discourse communities.

Further, the classical mathematical model of communication by Harold Lasswell in 1948 can be revisited through the Iloco *ammu*. As espoused earlier, this is not a mere exercise in translation but elicitation of Indigenous or local perspectives. The model enumerates five components of communication: (1) who says, (2) what, (3) in what channel, (4) to whom, and (5) with what effect. In other words, these are the source, message, channel, receiver, and effect (SMCRE). In Iloco, source is *agpakpakammu*, message *pakammu*, channel *pagpakaammuan*, receiver is *pakaammuan*, and effect *naammuan*. The categories in English are evidently different words or concepts. However, in Iloco, the same key or root word is used, and the difference of the concepts are embedded in the conjugations or varieties of the word. SMCRE has widely been used to explain broadcasting in Communication studies. Moreover, it is used to rationalize transmission models in education. In reading education, one popular teaching and research tool is the Knowledge (KWL) Chart. This can also be expressed in Iloco especially reading in the mother tongue. It has three columns: (1) what you know, (2) what you learned, and (3) what else you want to know. In Iloco, these are *pannakaammu*, *naammuan*, and *maammuan* respectively. Such is the breadth and depth of Iloco *ammu*. With these examples, *ammu* can be

exhausted to teach and theorize not only communication but also education. It is essential not only for teaching in the mother tongue but theorizing across disciplines to elicit and popularize Indigenous and local perspectives and practices/processes. This can also be observed in various initiatives that make sense of the SDG. Using the illustration, SDG initiatives in Indigenous and local communities can also be situated and, therefore, start at that same intersection point.

4.2 *Ammu as Indigenous Constructivist Epistemology*

Generally, epistemology is the relationship of the researcher (knower) with the researched (known), but, more specifically, this chapter introduces a constructivist epistemology that contests such dichotomy. It acknowledges other players or stakeholders, who exist in each or across the four discourse communities discussed earlier. Such epistemology may not apply in quantitative or mixed research methods but apparent in qualitative or interpretive studies such as this. In the former, researchers keep distance or maintain an objective position, and the research report does not need to be explicit as regards epistemology. However, these principles are central in the latter, which largely involves interacting with people, not just gathering data; analyzing processes, not just product; creating and transforming societies, not just measuring and reporting.

This chapter lists other players or stakeholders of Indigenous or local knowledge besides the researcher (knower) or (1) *mangam-ammu* and the researched (known) or (2) *maamwan*. These categories are nuances of Iloco *ammu*. One more category is the (3) *makaammu*, which refers to those who know or are knowledgeable. Another is (4) *adu ammu na*, which usually connotes a negative impression, for instance, ‘they know everything’. However, they are characterized as such because they know much about the topic under investigation. These include, local elders or leaders, cultural masters, among others. Often, they are capable of identifying individuals and sectors of the locality who also have something to say about what is being investigated. Further, (5) *aggaammu* deals with the network of the knowledgeable or those who know. They are usually opinion leaders or influencers in the community. There are also (6) *agin-didiammu* or those who pretend not to know anything about the subject matter, and this is usually justified by the intent to conceal something or to avoid accountability or responsibility. In contrast, there are (7) *haan makaammu* or those who really do not know about the said topic. This is not due to ignorance but, more often than not, limited access to information. There are also the (8) *mapakaamuan* or those who need to know or be informed. Meanwhile, the (9) *mangpakammu* are the channels or conduits of knowledge or those who practically inform others. Meanwhile, those who are curious and, therefore, go out of their way and attempt to know more about the topic or concern gradually are the (10) *mangammu-ammu*. The contact or focal persons are the (11) *am-ammu*, whom a researcher usually coordinates with in line with relevant activities. Surprisingly, there are also those who volunteer information or assistance to obtain necessary data or document. They are the (12) *agpakpakaamu*.

The word *ammu* is the tie that binds all of these, but the role they play or stake is differentiated by the various conjugations of the same mainly through affixes. This conceptualization of constructivist epistemology can still be expanded. This implies that any development initiative, which mainly banks on knowledge, is not only between the experts of the funding and implementing agency but also with these players or stakeholders.

4.3 *Ammu as Indigenous Methodology*

Methodology involves certain perspectives (principles) and appropriate practices (methods) in collecting or gathering and analyzing data. This chapter conceptualizes the Iloco *ammu* as Indigenous methodology, which is characterized by the community-orientation of the people. Similarly, the categories are nuances of the same word. Typically, researchers approach a site to present the objectives of the initiative, seek free and prior informed consent, float and collect questionnaires or locate key informants, among others. There is no guarantee that the results and findings of their research return to the site for any development purposes that will serve them. However, this does not happen in a smooth or straight manner but through iterative communication practices and usually in the local language, which the researcher and other knowledge stakeholders speak or use.

These communicative practices include (1) *pannakiam-ammu* or to acquaint oneself with someone or something. Another is (2) *pannakaiyam-ammu* or to be introduced by someone to somebody or other. In addition, (3) *panangiyam-ammu* means to introduce or present oneself or an idea before an audience. Another is (4) *panangammu* or to inquire about, into, after someone or something. Further, (5) *panangpakaammu* is to disseminate, share, or transmit information. To indirectly know someone or something through a certain instrument, means, or a third party is (6) *pangam-ammu*. Besides, (7) *pannakanamung* is to agree with someone or an idea or to establish a consensus. There is also (8) *paka-pakaammu* or to gossip, reveal, or squeal. Alliances and networks as social capital are also considered a communicative practice called (9) *panagga-ammu*. It suggests established connections. Likewise, there is a term for the emergent or evolving, which is (10) *pagam-ammuam*. It means being disrupted or interrupted by the unexpected. It also suggests a sudden circumstance, epiphany, eureka moments, or when knowledge or a realization unexpectedly surfaces.

These categories must be explicitly taught among SHS students and seasoned scholars so that they will not construe that research methods are enacted and codified only in academic terms, hence, English. It is also plausible, possible, or practicable in the Indigenous or local languages, for instance, Iloco.

5 Conclusion

The education reform taking place in Southeast Asia in general and Philippines in particular subscribes to the SDG, particularly No. 4 or inclusive and equitable quality education and lifelong learning opportunities for all. In the Philippines, this is achieved through Mother Tongue-Based Multilingual Education and indigenization and localization of the Kto12 curriculum or Indigenous Peoples Education in basic education and integration of topics and readings in relevant academic courses or programs in higher education, hence Indigenous Studies. This paper espouses that these should be necessitated by Indigenous or local perspectives and practices especially when it refers to the implementation of the SDG as a whole. In line with this, the Indigenous in research or theory, policy, and practice were discussed. The Indigenous in research or theory, particularly communication, mathematics and sciences, and education, was revisited. Relevant global or international, regional, and local education policies were reviewed. How these are translated into practice or pedagogies was also explained.

This chapter proposes (1) a social ontology (theory), (2) a constructivist epistemology (researcher's relationship with the researched), and (3) a methodology of Indigenous or local knowledge, which are based on the nuances of *ammu*, an Iloco term for knowledge. Necessary cultural information was accessed and processed through ethnography, ethnomethodology, and reflexivity. As Indigenous social ontology, *ammu* is the interaction of four discourse communities: (1) *pagilian* or local community, (2) *pagadalan* or school community, (3) *panggedan* or communities of practice, and (4) *pagdaydayawan* or faith community. Further, as Indigenous constructivist epistemology, it contests the researcher-researched dichotomy. Aside from the researcher or (1) *mangammu* and the researched or (2) *maammuan*, it acknowledges the indispensable role of (3) *makaammu*, (4) *adu ammu na*, (5) *aggaammu*, (6) *agindidiammu*, (7) *haan makaammu*, (8) *mapakaamwan*, (9) *mangpakaammu*, (10) *mangammu-ammu*, (11) *am-ammu*, and (12) *agpakpakaammu*. As Indigenous methodology, it is hinged on the relational nature Indigenous knowledge embedded in local communicative practices and largely in the mother tongue. Specific methods or strategies include (1) *pannakiam-ammu*, (2) *pannakaiyam-ammu*, (3) *panangiyam-ammu*, (4) *panangammu*, (5) *panangpakaammu*, (6) *pangam-ammu*, (7) *pannakianamung*, (8) *paka-pakaammu*, (9) *panagga-ammu*, and (10) *pagam-ammuan*.

References

- Agcaoili, A. S. (2011). *Contemporary English-Ilokano dictionary*. Cornerstone of Arts and Sciences.
- Alfonso, H. C. M. (1999). *Socially shared inquiry: A self-reflexive, emancipatory communication approach to social science research*. Great Books Trading.
- Association of South East Asian Nations. (2016). *Overview of ASEAN cooperation on education* [Online]. www.asean.org [August 22, 2019].

- Coffey, A. (2018). Doing ethnography. In U. Flick (Ed.), *Doing ethnography: The SAGE qualitative research kit* (2nd ed.). SAGE Publications, Inc.
- Commission on Higher Education. (2019). *Integration of indigenous peoples studies into the relevant higher education curricula* [Online]. <https://ched.gov.ph> [August 22, 2019].
- Craig, R. T. (1999). Communication theory as a field. *Communication Theory*, 9(2), 119–161.
- Craig, R. T. (2007). Pragmatism in the field of communication theory. *Communication Theory*, 17, 125–145.
- Craig, R. T., & Muller, H. L. (2007). *Theorizing communication: Readings across traditions*. SAGE Publications Inc.
- Denzin, N. K., & Lincoln, Y. S. (2013). *Collecting and interpreting qualitative materials* (4th ed.). SAGE Publications Inc.
- Department of Education. (2009). *Mother tongue-based multilingual education* [Online]. www.edu.gov.ph [August 22, 2019].
- Department of Education. (2011). *National indigenous peoples education policy framework* [Online]. www.edu.gov.ph [22 August 2019].
- Department of Education. (2015). *Adopting the indigenous peoples education curriculum framework* [Online]. www.edu.gov.ph [August 22, 2019].
- Department of Education. (2016). *The indigenous peoples education (IPEd) program [Brochure]*. Indigenous Peoples Education Office, Department of Education.
- Estrada, J. M., & Gargantiel, K. T. (2013). *Kto12: RA 10533 and relevant education policies*. Vibal Foundation.
- Farnacio-Cantancio, M. (2004). Ethnography using Filipino indigenous research methods. In E. E. Pernia (Ed.), *Communication research in the Philippines: Issues and methods* (pp. 83–86). The University of the Philippines Press.
- Grande, E. D. (2016). Advancing culture-based education: An operational model in Paracelis, Mt. Province. *TALAS: An Interdisciplinary Journal in Cultural Education*, 1(1), 14–35.
- Grande, E. D. (2018). The positionality of indigenous studies in the ongoing education reform. *Bannag: A Journal of Local Knowledge*, 5(1), 1–12.
- Grande, E. D. (2021). *Research-practice partnership as indigenous knowledge management: Exploring Tuping as a methodology in understanding basic education's research culture in Cordillera administrative region, Philippines* [Unpublished dissertation]. University of the Philippines Open University.
- Gunaratne, S. A. (2009). Asian communication theory. In S. Littlejohn & K. Foss (Eds.), *Encyclopedia of communication theory* (pp. 47–52). SAGE Publications Ltd.
- Jurisica, I., Mylopoulos, J., & Yu, E. (2004). Ontologies for knowledge management: An information systems perspective. *Knowledge and Information Systems*, 6, 380–401. <https://doi.org/10.1007/s10115-003-0135-4>
- Leslie, L.Z. (2018). *Communication research methods in postmodern culture: A revisionist approach*. Routledge Taylor and Francis Group.
- Littlejohn, S., & Foss, K. (2009). *Encyclopedia of communication theory*. SAGE Publications Ltd.
- Lohdi, S., & Mikulecky, P. (2010). *Management of indigenous knowledge for developing countries* [Online]. <https://www.researchgate.net/publication> [July 20, 2019].
- Maune, A. (2017). Indigenous Knowledge Intelligence and African development. In P. Ngulube (Ed.), *IGI handbook on research on theoretical perspectives on indigenous knowledge systems in developing countries* (pp. 125–173). IGI Global.
- McCarty, T. L. (2015). Ethnography in language planning and policy research. In F. M. Hult, & D. C. Johnson (Eds.), *Research methods in language policy and planning* (pp. 81–93). John Wiley & Sons, Inc.
- National Commission for Culture and the Arts. (2009). *National Heritage Act of 2009 or Republic Act 10066* [Online]. <https://ncca.gov.ph/> [August 22, 2019].
- National Commission on Indigenous Peoples. (2012). *Administrative order no. 1, series of 2012: The indigenous knowledge systems and practices (IKSPs) and customary laws (CLs) research and documentation guidelines*.

- Rovillos, R. D. & Pamintuan-Riva, M. (2013). The 'indigenous' in the Cordillera studies program of the University of the Philippines Baguio. In *Unsettling discourses: The theory and practice of indigenous studies* (pp. 111–120). University of the Philippines Baguio.
- Ryser, R., Gilio-Whitaker, D., & Bruce, H. G. (2017). Fourth world theory and methods of inquiry. In P. Ngulube (Ed.), *IGI handbook on research on theoretical perspectives on indigenous knowledge systems in developing countries* (pp. 50–83). IGI Global.
- Summer Institute of Linguistics. (2003). *50th anniversary bibliography of SIL Philippines 1953–2003*.
- Tirol, J.B. (2010). Sugbuanon Bisaya as medium of instruction in mathematics and science. In R.M.D. Nolasco, F.A. Datar, & A.M. Azurin (Eds). *Starting where the children are: A collection of essays on Mother Tongue-Based Multilingual Education and language issues in the Philippines*. 170+ Talaytayan MLE, Inc.
- United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development* [Online]. Available www.sustainabledevelopment.un.org [March 2, 2016].
- United Nations Educational, Scientific, and Cultural Organization. (2012). *Why language matters in the Millennium Development Goals*. UNESCO Asia and Pacific Regional Bureau for Education.
- Wang, G., & Kuo, E. C. Y. (2010). The Asian communication debate: Culture specificity, culture-generality, and beyond. *Asian Journal of Communication*, 20(2), 152–166.
- Wei, L., & Hua, Z. (2011). Doing applied linguistics: Methodological considerations. In L. Wei (Ed.), *The Routledge applied linguistics reader* (pp. 511–797). Routledge Taylor and Francis Group.
- West, R., & Turner, L. H. (2011). *Introducing communication theory: Analysis and application* (4th ed.). McGraw Hill.

South Pacific Post-Colonial Indigenous Praxis for Resilient Sustainable Community Development



Keith Morrison

Abstract Indigenous communities in the South Pacific maintain traditional cultural practices of sustainable community development, which have co-evolved with local environments over centuries and millennia. The ontology of their praxis provide insight into what maintains their communities' resilient sustainable development. But the centuries of colonization and recent postcolonial endeavours, raise two issues. First, indigenous communities continue to struggle to overcome institutional racism, in terms of lost access to material resources, and socially and culturally in terms of lost agency to maintain their sustainable development. There has however been some success in doing so in the South Pacific, which can be learnt from. Second, the postcolonial struggle is a process that is also positively influencing inherited unsustainable and unjust practices associated with colonialism, which can also be learnt from. Based on community-based research with indigenous communities over three decades in primarily Samoa and Aotearoa-New Zealand, this chapter outlines key features of a methodology and the ontology underpinning it, which continues to be used by indigenous communities to guide praxis in the South Pacific. The ontology and methodology are shown to contribute to social ecological system (SES) theory. The methodology is shown to be able to form a bridge between indigenous knowledge and other methodologies, including evidence-based research and outcome-based management used by the United Nations. The chapter outlines how the methodology ensures evolutionary adaptation to enable transformation SES to avoid disasters, and to maintain continually adaptive sustainable development through maintenance of ecological resilience, social resilience, and psychological resilience. This is shown to be due to a focus on what is essential, namely social well-being and ecosystem health, and recursive adaptation maintained by transformative leadership spread throughout society, producing praxis of continuous learning at multiple levels within society.

Keywords Indigenous · South Pacific · Post-colonial · Social-ecological · Transformative leadership · Adaptation

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1 Introduction

Youth movements in the South Pacific, for example the Pacific Climate Warriors (RNZ, 2020), are acutely aware that we are entering an emerging storm of crises with epoch-making potential, and that what is currently considered to be development is inevitably going to have to change. Climate change and ecological destruction are forcing change. This process is however a contemporary manifestation of what former and current Western colonies have long known. Not surprisingly, many current narratives critical of what has been termed development are rooted in the experience of the colonized. These narratives are however only one theme. More important are pro-active development narratives, which have always been present, and continue to creatively emerge. These narratives portray development as a methodology of continual creative adaptation and are intrinsic to cultural traditions. In this chapter it is argued that a new epoch of sustainable development can be assisted to be ushered in through learning from the methodology of creative adaptation held and continuing to be created by indigenous communities in the South Pacific.

Narratives that are critical of development that began during the Western colonial era, are a subset of the methodology of creative adaptation. They are subsets that critique ideology, and often use dialectical analysis in search of liberation from hegemonic power. The methodology of creative adaptation held by indigenous communities in the South Pacific is however critical of the notion that liberation from hegemonic power is a dialectical continuation of development, which supposedly started with liberation from traditional societies (Morrison, 2019). It is a critical notion that is widespread. Jackson (2016) for example questioned the hegemonic process of economic growth for development. He concluded that hope lay in wisdom traditions' ability to better frame development. An earlier example is Weil (1952) who argued for the need for cultural roots. Some have shifted from an initial firm dialectical analysis of oppressor and oppressed, to greater recognition of need for cultural traditions to guide development (Freire, 1972). Others have theorised how a well-spring of critical creativity disrupts dialectical analysis, for example Hooks (2009) who argued for recognition of a 'thirdspace', where liberation creatively and freely emerges to transcend and redirect dialectical operation of power.

What makes the methodology of the indigenous South Pacific praxis outlined here significant, is that it provides a sophisticated and coherent methodology to engage in and out of 'thirdspace'. It is a methodology that can provide a path of liberation from the current global hegemonic development creating multiple crises. The hope of Jackson (2016), and more recently the possibility openly proclaimed by Wengrow and Graeber's (2021) reconstruction of archaeology, that development can be framed differently, is nurtured by the methodology. The methodology maintains the immediacy of a horizon of hope, in contrast to a dialectical straight jacket that restricts and puts off hope.

This chapter focuses on two features of the South Pacific Indigenous methodology. The first is how hope is maintained in its immediacy and inclusivity. The second is the recursive and integrated way in which praxis operates. The chapter first

outlines key features and relevance of the ontology of the methodology for enhanced understanding of social-ecological systems (SES). The chapter next considers three disciplines that are influenced by SES theory, and how they are enhanced by the methodology to better achieve the United Nations' sustainable development goals (SDGs). The methodology provides a sophisticated vision of sustainable development that can frame multiple cross-cutting integrative approaches to help in the achieving of all 17 SDGs. The three disciplines focused on in this chapter namely disaster risk reduction (DRR), ecological engineering and ecological economics do not exhaust the possible contributions.

2 Indigenous South Pacific Praxis

There is a distinct openness and humanness to development praxis maintained by South Pacific Indigenous cultures. Both the openness and humanness are maintained through the noetic dimension of the underpinning ontology, which has a paradoxical expression of universalism, offering a critique of both hegemonic global development and nationalistic reactions against it. The praxis critiques a notion of globalisation that envisages a patchwork of cultures and nations, where Western culture has privileged oversight over the rest of the patchwork. The methodology sees each cultural tradition as having universal significance and potential global reach, for mutual development of all other equally universal cultural traditions.

The methodology points to global interpenetration between cultural traditions. This is a feature of noetic nature. It is how spirits co-exist. They are not defined within four-dimensional space-time. Cultural traditions are spirits that can potentially influence all other cultural traditions and each human person. Likewise, it is the spiritual or noetic nature of humans that enables human relationships of community, including between persons who participate in different cultural traditions. Furthermore, the ontology of noetic nature also determines a distinct view of sovereignty as a quality of self-determination and potential leadership that all individuals have, but also all levels of community, including families, villages, nations and higher. There is affirmation of universal individual human rights, which resonate with the integrity of villages and nations, rather than existing in tension with them. The methodology has a democratic spirit that affirms universal potential leadership for all persons, villages, and nations. The result is the nurturing of high adaptive capacity, psychological resilience, social resilience, and ecological resilience (Morrison, 2016, 2019, 2021).

An outline of the ontology underpinning the methodology can be given by describing three types of union. One is the unity found in the material reality, and a second is the unity found in spiritual or noetic reality. The third unity is the unity of the first two types of unity. There is a complex dynamic relating the three types of unity, which underpins key principles of the methodology, namely, integrity, well-being, and transformative evolutionary adaptation.

First however a working definition of sustainable development is proffered. It is framed according to the ontology of South Pacific Indigenous cultural traditions and introduces how sustainable development is best understood according to the dynamics of SES.

2.1 Sustainable Development and Social Ecological Systems (SES)

The famous definition of sustainable development in *Our Common Future* (Brundtland, 1987) remains appropriate: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. What does require greater focus on however is a definition of development. When engaged in South Pacific Indigenous methodology, an appropriate working definition is: nurturing social well-being and ecosystem health. When development is seen in this way it is also intrinsically sustainable. Moreover, it is a definition that entails the dynamics of SES and community development.

The multi-dimensional aspects of social well-being provided by the ontology of South Pacific Indigenous cultural traditions, include the ecological context, and hence co-evolutionary adaptive processes that can be used to enhance ecosystem health. The multi-dimensionality of these traditions accords with analyses of the social-cultural entities involved in adaptive co-evolutionary processes of SES, which can be defined as a nested hierarchy of levels of cultural knowledge (Morrison, 2016, 2019, 2021; Rappaport, 1999). The nested levels dynamically integrate the material and noetic realities, with the essential dynamic movement defined as enhancing community. Therefore, when engaged in Indigenous South Pacific methodology, the definition of development entails sustainable community development.

The value of SES theory when engaged in Indigenous South Pacific methodology is to provide a bridge with which to incorporate all scientific disciplines that pertain to SES (Morrison & Singh, 2009). The physical and biological sciences are directly relevant, as are features of the social sciences and humanities. The bridge is formed because of the relationship between social well-being and the co-evolutionary dynamics of SES (Morrison, 2019, 2021). From the opposite perspective, a particular value of South Pacific Indigenous methodology for SES theory is that it clearly frames how to maintain necessary adaptive capacity, and how this is achieved through a focus on social well-being and ecosystem health, which is experienced in the immediacy of a horizon of hope.

2.2 *The Unity of the Material Reality*

The main characteristic of the unity found in material reality is that there is one living system. It means that all living bodies are inseparable from the life of other living bodies. There is a dynamic interconnectedness that is analysed at multiple levels. This understanding forms a clear bridge with physics, for example in relation to climate change. Similarly with chemistry in relation to nutrient cycles. Also, with biology in relation to evolutionary dynamics, giving rise to emergent ecological features. But underpinning all these is the 2nd law of thermodynamics.

One form of the 2nd law of thermodynamics is that the rate of dissipation across an energy differential is maximised (Swenson, 1997). Circulation patterns emerge to maximize the rate of dissipation. The emergence of life and its dynamism can be interpreted as sophisticated circulation patterns to maximize the rate of dissipation of energy across the biosphere (Morrison, 2021; Morrison & Singh, 2009). This interpretation enables ecosystem health to be defined as inversely proportional to infra-red radiation (Swenson, 1997). The main point of interest here is that this science implies that there is a complex but singular movement uniting all life, which is also explicit in the ontology underpinning the indigenous South Pacific methodology. To use the Aotearoa-New Zealand *te reo*¹ Maori term, the unity is the *mauri*, or one lifeforce. The term *mauri* is however ambiguous. It also refers simultaneously to two other types of unity, to imply that all the types of unity are united.

As well as referring to the one lifeforce and life movement of the biosphere, *mauri* refers to talismanic features of cultural traditions. Also, the equivalent term in Samoan, *mauli*, emphasizes another meaning, namely the centremost spiritual or noetic heart of a human being, which maintains the integrity of a person, where personal relationships of spiritual interpenetration with others occur, and where a horizon of hope is experienced (Aiono-Le Tagaloa, 2003).

There are several significant complex dynamic features entailed by the unity of the meanings of the term *mauri/mauli*. One refers to the process of evolutionary adaptation that manifests *mauri* as lifeforce. A recursive process is required, which biologically means the necessity of reproduction and death, and in SES, means communication and social change. Moreover, reproduction and communication require indirect² emergence through use of code to provide a pattern to follow (Sharpe, 2003). Furthermore, diverse adaptations are necessary, and therefore redundancy and wastage are inevitable, and hence maladaptation co-exists alongside adaptation.

Diversity is achieved by random reassembling of blocks of code (genes in biology, symbolic language constructs in SES). This is because the essential features of an adaptation are reproduced with varying non-essential features piggybacked on, forming the block of code. There is therefore an intrinsic increase in diversity in each generation and in each communication. Evolutionary pressure however removes the least functional adaptive variations, to maintain a requisite level of diversity each

¹ The name for Aotearoa-New Zealand Maori language.

² Indirect emergence occurs when the emergence is the manifestation of following a pattern or map. Biologically the pattern is held by the genome, and in SES it is held by rules, protocols, and policies.

generation and in each communication. This ensures the indirect emergent evolutionary adaptation of biological species track the direct³ emergence of the one *mauri* or life force, to maximise ecosystem health.

For human beings comprised of both material and noetic nature, the indirect emergence of social organisation uses symbolic language to produce blocks of code to indirectly create emergent social ecological system (SES) structures that fine-tune the evolutionary adaptation of human biological populations. Hence there emerges requisite diversity of SES structures to ensure that human populations attune to the one *mauri* or life force. The blocks of symbolic language produce feedforward within SES, as laws, policies, programmes, and designs, whereupon feedback is obtained through maintenance of monitoring regimes. The blocks of symbolic language necessary to ensure requisite diversity are created when seeking to produce integrated laws, policies, programmes, and designs, of which there are diverse possibilities as the system is over-determined. What is essential is defined and included, with everything else piggybacked into the integration in various ways. The methodology defines what is essential by talismanic features, also termed *mauri*, and moreover, perceived by the *mauli*, centremost part of the being of those creating the blocks of symbolic language. The process creates innovative opportunity, flexibility and redundancy, with evolutionary pressure trading off flexibility and efficiency.

Intrinsic to the methodology are cultural practices that repeatedly revisit and continually recreate the talismanic foundations, *mauri*. The cultural practices facilitate repeated regular participation in creative liminal states and *communitas*⁴ or *whanaungatanga*,⁵ in keeping with what some anthropologists argue is intrinsic to indigenous culture (Turner, 1969). *Mauri*, as talismanic foundations, are repeatedly recreated in *whanaungatanga* to reframe the process developing integrated laws, policies, programmes, and designs, by continually adapting the worldview, which is also argued by some anthropologists to be a characteristic intrinsic of indigenous cultures (Rappaport, 1999).

2.3 Unity of Noetic Reality

The characteristic of unity found in noetic reality is that there is co-presence or community in the same space–time, which is to co-exist as community in the same place. Place is enriched by community engaged in dialogue emerging through time

³ Direct emergence occurs without being based on a pattern or map. Ecological processes and social movements and transformations are examples.

⁴ *Communitas* is a Latin term chosen by Turner to refer to what he considered to be a universal feature of traditional cultures. It is the experience of what forms personal relationships making community.

⁵ *Whanaungatanga* is the Aotearoa-New Zealand Maori term for the universal feature Turner referred to as *communitas*. *Whanaungatanga* alludes strongly to the personal relationships found in family and among relations, which are extended to welcome all into the family feeling, respect, and acceptance.

and space to continually adapt to remain attuned to the one *mauri* life force and flow. This is the experience of *whanaungatanga* nurtured by cultural practices. Noetic reality is manifest in higher dimensions than four-dimensional space–time of material reality. This is explicitly recognised in the ontology, by the term *va* in Samoan (Aiono-Le Tagaloa, 2003). The Samoan concept of *va* includes the dimensions of both noetic and material reality, as well as the divine. *Va* is the co-creative space in between persons, out of which innovation and adaptation emerge. This points to two higher dimensions in *va* beyond four-dimensional space–time.

There is a fifth dimension where dialogue creates possible integrated adaptations, some of which are found to be maladaptive and some viable. One form of maladaptation is manifest by impulsive responses, due to trauma being triggered, which disengages rational decision-making in the fifth dimension (Morrison, 2019, 2021) (see Fig. 1).

There is also a sixth dimension where there is liminal insight into the one *mauri* life force, and where personal interpenetration as *whanaungatanga* occurs. The sixth dimension of *va* is where the unity of the material reality and the unity of the noetic reality are experienced as a higher unity. The sixth dimension of *va* is experienced in the centre of the being of a person, which is the *mauli*, that intuits the *mauri* as one life force, and what inspires the creation of *mauri*, as talisman, to guide and frame social organisation to attune to *mauri*, as life force.

When the sixth dimension is not manifest, the necessary flexibility for adaption is absent due to compulsion to maintain social norms and identities. To avoid such maladaptive compulsion requires openness to the fourth and highest level of cultural

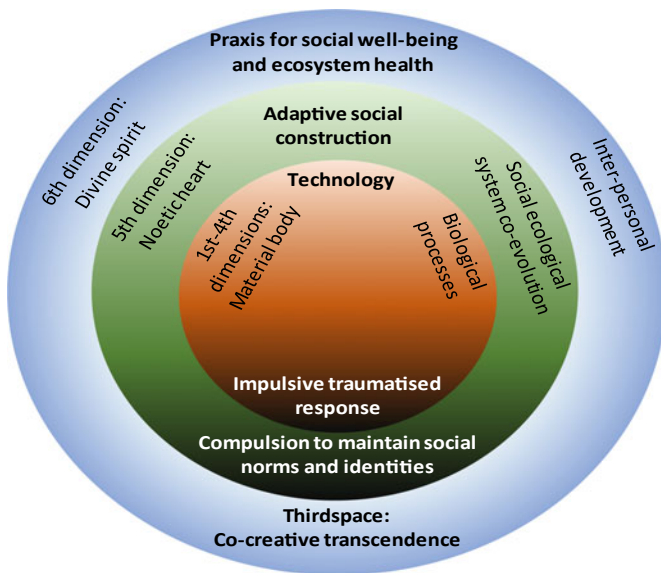


Fig. 1 Multi-dimensional *va*

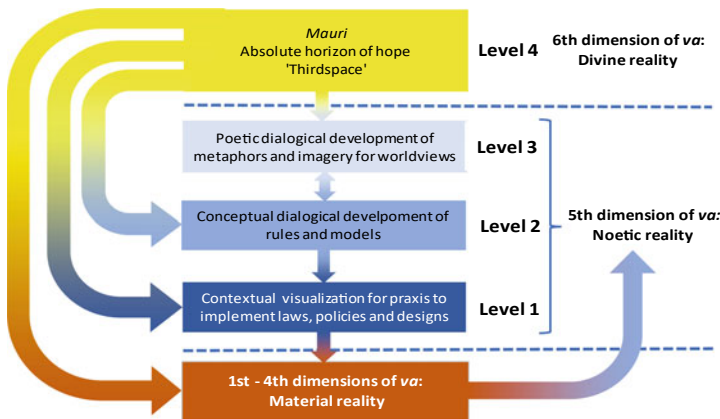


Fig. 2 The dimensions of *va*, *mauri*, and the levels of cultural knowledge

knowledge defined by Rappaport (1999), namely the transcendence of conceptual symbols to a horizon of possibility (Morrison, 2016, 2019, 2021) (see Figs. 1 and 2).

The fifth dimension of *va* is manifest through use of metaphors, concepts, and visualisation. They are manifest as the lowest three levels of cultural knowledge defined by Rappaport (1999). At the lowest level there is contextual visualisation of the implementation of laws, policies, programmes, and designs. The praxis implements rules or models co-created by dialogue with concepts at the second level. The conceptual rules or models are framed by worldviews at the third level, which are explored through poetic dialogue creating metaphors. All three levels of activities in the fifth dimension also however manifest the sixth dimension of *va* (see Fig. 2).

At the first level of Rappaport’s (1999) model of the levels of cultural knowledge, laws, policies, programmes, and designs are implemented with emotional intelligence through attentiveness to what maintains community relationships. They are implemented with their purpose in mind, which is to enhance social well-being and ecosystem health: rules or models are modified by intuition of *mauri* in the sixth dimension of *va*. At the second level, plausible integrated adaptations of rules or models are created through dialogue and compromises to accommodate differences. What are allowable compromises do not contravene social well-being and ecosystem health. They are also discerned through intuition of *mauri* in the sixth dimension of *va*. At the third level, there is creative exploration through poetic dialogue of new ways to frame situations. Poetic creativity is expression of liminal awareness of *mauri* to maintain *whanaungatanga* in the sixth dimension of *va*. Shining through all these manifestations of the sixth dimension of *va* is what the fourth and highest level in Rappaport’s (1999) model alludes to. This is a horizon that inspires metaphors to guide the creative framing of paradigms and worldviews (Morrison, 2016, 2019, 2021; Morrison & Singh, 2009). This is where hope is experienced. Rappaport (1999) emphasized that there are principles that encapsulate the horizon, but such principles only allude to it. The methodology requires the experience of the horizon, which is

the sixth dimension of *va*, through participation in cultural practices that nurture liminality and *whanaungatanga* (Morrison, 2016, 2019, 2021). It is an eternal horizon and so inspires absolute hope. It transcends the horizon of mortality that is intrinsic to the material reality of life and connects to the divine. One reason why experience of the absolute horizon of eternal and infinite hope is necessary, is because otherwise it is difficult to avoid denial of the horizon of mortality intrinsic to material life, which includes perpetual change in the reality of human social organisation. The methodology recognises that attempts to discover and maintain permanence in natural life and social organisation, including cultural traditions, are maladaptive.

There is an implicit fullness of the juxtaposed multi-vocal polysemy of *mauri*, discovered and explored poetically at the third level of cultural knowledge. In Samoa, this is still carried out using a chiefly (decision-making) dialect focused on use of creative imagery (Morrison & Singh, 2009). The meaning discovered is of divine interpersonal unity experienced as flowing out of the sixth dimension of *va* to constitute both the unity found in the fifth dimension of noetic reality, and the unity of material unity in four-dimensional space–time. The implicit fullness of the meaning of *mauri* is that it is both the one direct emergence of the life force in material reality, and the one direct emergence creating multi-vocal polysemy to provide rational coherence of socially constructed symbols constituting the indirect emergence of SES. This experience is encapsulated by further multivocal polysemy, for example by the terms *hapu* and *whanau* in Aotearoa-New Zealand *te reo* Maori. *Hapu* refers to the basic social unit, but also womb. *Whanau* refers to a family of interpersonal relationships, but also birth. The implicit fullness of the meaning of *hapu* is that a society dwells in the fifth dimension of *va* in an ecological place as in a womb; giving birth to *whanau* or families of interpersonal relationships, of *whanaungatanga*, which transcend the fifth dimension of *va* to be reborn, co-creatively transcending, roles and identities into the sixth dimension of *va*; that of absolute hope transcending the adaptive social ecological womb, as community—sustainable community development.

The implicit fullness of the meaning of *mauri* is focused upon in *va*, whereupon what is essential is held onto. This focus on what is essential, and the creating of integrated adaptations that hold onto it, are what paradoxically drives transformational change (Morrison, 2019, 2021). But the non-essential features, piggybacked onto essential features, are what produce transformational change. The non-essential is what can transform. Discernment therefore between what is essential and non-essential is a pre-requisite for pro-active transformative adaptation. It is at the essence of the methodology. Delusory fixation on what is merely projected to be permanent, is unmasked as not truly essential. This is extremely pertinent because trust and reliance on capital by Western development is questioned by the methodology, and the socially constructed framing of capital is critiqued as ideology. Capital is emphasized to be impermanent, and moreover, not the basis for adaptive capacity.

2.4 *Sovereignty and Leadership*

The foundation for focusing on what is essential, namely social well-being and ecosystem health, is the experience of *whanaungatanga*. Creatively exploring ways to practically maintain *whanaungatanga* is the key feature of the methodology. It involves liminal experience of *mauri* in openness to *va*, facilitated by protocols and cultural practices. The experience is also, to use the Aotearoa-New Zealand *te reo* Maori term, the source of *rangatiratanga*, or sovereignty. Every person has *rangatiratanga*. All are potentially *rangatira*, or leaders. Leadership is manifest through the *mauli* being attuned to the *mauri* and expressing *mauri*. The leadership manifest by *mauri* is transformative leadership (Montuori & Donnelley, 2018; Morrison, 2019, 2021). The protocols and cultural practices aim to empower the leadership potential in all, along with the unique contribution each can make.

As well as ensuring inclusivity of all potential leadership, the protocols of the methodology facilitate engagement by leaders with all three lower levels of knowledge. There is a vertical dimension to use of language, simultaneously rising above rules or models to critically reframe them, as well as relativising them through concern for their appropriate contextual implementation. Moreover, transcending symbolic content, nurtured by dance and music, the highest level of the horizon of absolute hope in *va* is opened to.

Potential leadership operates at every level of social organisation. It is manifest within families, in village communities, and in nations, and higher. For example, traditionally, Samoan families have inclusive meditative protocols each evening, before eating, with discussion of issues following if necessary. Also, every Samoan village has a *fono* or council where representatives of every family meet weekly to critically maintain the rules of the village (Morrison & Singh, 2009). Likewise in Kiribati, every village has a *mwaneaba*, which is a dedicated house where free expression to raise issues concerning the village is facilitated, including the meeting of visitors (Morrison, 2021). It also occurs at the national level. A current national Samoan leader, the prime minister, Fiame Naomi Mata'afa, has termed it a whole-of-society approach, and has pointed out that it enables responsiveness to feedback, for example from the UN about how to overcome limitations found in provision of human rights (RNZ, 2021b, Mata'afa, 2020).

The transformative leadership approach also makes nations very open to and capable of participating in regional and global forums, and to learn from their feedback. There have emerged very effective South Pacific multi-national regional organisations for scientific, environmental, and tertiary education collaboration. Moreover, South Pacific leaders, including youth, are proving themselves to be capable global leaders in relation to climate change (Membere, 2021a, 2021c, 2021d). Another clear example of the methodology in response to climate change was expressed by the Samoan minister for Commerce, Industry and Labour, Leatinu'u Wayne So'oialo, at a COP26 side event, stating that people's jobs and well-being are central to a transition to a carbon neutral and climate resilient economy (Membere, 2021b).

3 Disaster Risk Reduction (DRR) for Sustainable Development

Disasters are socially constructed. Disasters can be avoided, by avoiding making them. The methodology enables disasters to be avoided. In doing so the methodology enables a cross-cutting integrative means to help achieve multiple sustainable development goals (SDGs). The SDGs the methodology particularly contributes to enhancing when applied to DRR are: Goal 9 *Industry, Innovation and Infrastructure*; Goal 11 *Sustainable Cities and Communities*; Goal 13 *Climate Action*, and Goal 16 *Peace and Justice Strong Institutions*. The methodology does so by understanding what is natural. Unlike disasters, catastrophes are natural and inevitable. Catastrophe theory proves that whenever there is maximization of a state described by more than two variables, catastrophic pathways become possible, either as collapses or unsurmountable walls (Morrison, 2021; Thom, 1989). Given that the one *mauri*, life force, can be characterised by the maximising of the rate of energy dissipation across the biosphere, natural catastrophes are intrinsic throughout life. The methodology realistically recognizes this, which makes it possible to plot pathways that avoid disastrous participation in natural catastrophic changes. Ironically, it is failure to recognize this, as found in the presumption that control of nature is possible and that development requires liberation from traditional cultures embedded in nature, that creates disasters.

The methodology intuits a topology of natural catastrophe surfaces, to determine pathways of adaptation that avoid disastrous participation in naturally occurring catastrophic changes. The methodology does so by avoiding both naive naturalism and presumptive ability to control nature, through a nuanced understanding of what is natural. What is natural wilderness, is different to human nature. Human nature does attune to the *mauri* of natural wilderness through SES that utilize ecosystem services to fulfil the needs necessary for social well-being, but is simultaneously aware that ecosystems naturally manifest catastrophic changes, and so requisite diversity of SES adaptations is necessary to sidestep creating disasters. Human nature can do so because it creates talismanic *mauri* to guide maintenance of social well-being and ecosystem health, through attentiveness by the noetic *mauli* centre of a person. The result is dialogue and collaboration to co-create requisite diversity of integrated structures in SES, so that what is essential, social well-being and ecosystem health, are maintained, and hence disasters are avoided.

To be able to choose paths of adaptation avoiding naturally catastrophic changes however also requires the flexibility to be able to change the direction of pathways. This requires continuous recursive adaptation, to update discernment of what directions to avoid. Continuous recursive adaptation come from the nested dialogue, planning, and monitoring of consequences, from families to villages, to nation, and higher. Discernment comes from transformative leadership similarly nested, where every person is contributing to DRR by producing potentially useful feedforward, and by providing feedback through engagement in monitoring of the consequences of previous decisions.

Through monitoring of ecosystem services, regeneration of ecosystem health is nurtured, and ecological resilience is maintained by helping maintain diverse and redundant ecosystem services. Through participation in cultural practices that nurture liminality and *whanaungatanga*, psychological resilience is nurtured, which then provides the emotional intelligence to maintain social resilience for a coherent and flexible SES.

The processes in the methodology that maintain psychological and social resilience for DRR are sophisticated. Firstly, given that maximisation naturally results in catastrophic change, maintaining psychological and social resilience focuses on moderation coupled with careful and cautious recursive creation of feedforward and monitoring of feedback. Then the instability and impermanence of the natural world exhibiting intrinsic catastrophic change, are seen in the context of the horizon of absolute hope, and so the compromises and sacrifices necessary for social well-being can emotionally be chosen.

Furthermore, the methodology ensures that the ability to choose the compromises, sacrifices and moderation carefully and cautiously is not drudgery. It certainly involves discipline and perseverance, but the methodology also nurtures hope in an extremely resilient SES that resonates joyfully into existence when these choices are made. It is also the optimal sustainable state. As psychotherapy recognises, moderation facilitated by cultural constraints produces optimal sustainable pleasure and freedom (Morrison, 2019, 2021; Santner, 2001; Verhaeghe, 2014). Maximum positive feedback is achieved through careful and cautious perpetual learning to be moderate. But what most reinforces the character of such recursively made choices is noetic consolation from the horizon of absolute hope. It enables the inevitable pain of natural life to be tolerated. It transfigures the horizon of mortality, inevitability of biological death, and impermanence of all human creativity, to become a means by which to participate most fully into the sixth dimension of *va*, through self-sacrificial giving of self for *whanaungatanga*. At this point the methodology nurtures absolute psychological resilience. Such persons are very powerful leaders, maintaining social resilience by their very presence. The methodology even empowers youth into such leadership. As a young Samoan spokesperson, Brianna Fruean, at COP26 stated, the South Pacific youth are “resilient beacons of hope” (Membere, 2021a). This understanding implicit in the methodology is very pertinent to help achieve three further SDGs, namely: Goal 4 *Quality Education*, Goal 5 *Gender Equality*, and Goal 12 *Responsible Consumption and Production*.

The methodology also deals successfully with worst-case scenarios carefully and cautiously, to avoid disasters. In the South Pacific facing climate change this is migration. Perhaps surprisingly, given the strong cultural link to geographical place, even though migration is still considered the worst-case scenario, it is nevertheless accepted as an adaptation option. It already has occurred in several coastal villages in Fiji, and the entire country is being continually assessed to plan for internal migration that may become necessary due to climate change (Morrison, 2016, 2021). The reason why it is accepted is due to migration being constructed as an adaptation option to ensure that what is essential and most important is maintained. There are instances where relocated villages are grateful as their situation has improved. The point is that

their village SES was adapted to ensure their social well-being was enhanced. The same reluctantly positive acceptance of international migration occurs if communities can continue to maintain and enhance their cultural life and communities in their new homes (Morrison, 2016). What is the most serious challenge in relation to international migration is unwillingness of host countries to accept the communities and cultures, by refusing them environmental refugee status. The methodology needs to also be implemented by potential host countries. There is need for leadership from potential host countries to ensure that forced international migration does not become a socially constructed disaster. The disaster can be avoided by implementation of the methodology, to ensure environmental refugees are treated humanely, and their psychological resilience, social resilience and ecological resilience are maintained. This feature of the methodology therefore also directly enhances the achieving of the SDGs Goal 11 *Sustainable Cities and Communities*, and Goal 16 *Peace and Justice Strong Institutions*.

4 Ecological Engineering

The methodology enhances the design process by clarifying the goals of engineering design. Ecological engineering focuses upon utilisation of biological structures providing ecosystem services and combines them with physical structures. Whereas ecological engineering adds biological structures to material and digital construction carried out by other forms of engineering, the methodology adds social-ecological structures as well. The methodology ensures that engineering construction is a nested feature of SES. Ironically this emphasizes the universal importance of engineering. But it also emphasizes it is continually evaluated and socially reconstructed. This ensures the potential adaptive capacity of engineering and avoids delusory ideological belief in permanent technological solutions. The adaptive approach of the methodology enhances multiple SDGs. How the methodology inspires ecological engineering provides a particular type of innovation to Goal 9 *Industry, Innovation and Infrastructure*, Goal 6 *Clean Water and Sanitation*, and Goal 7 *Affordable and Clean Energy*, as well as having a direct bearing on Goal 13 *Climate Action*.

The methodology also ensures the goals of engineering design are recognised as feedforward, which are recursively evaluated through feedback from monitoring its implementation, as praxis of continuous adaptive learning. Engineering goals are recognised as intrinsically impermanent and in need of continual assessment to avoid disasters, through focusing on what is essential, namely social well-being and ecosystem health. But what is essential is intangible, and so new representations of social well-being and ecosystem health are also continually required at all levels. For example, the methodology guides national and regional community-based approaches in the South Pacific, both in the development of multi-sectorial integrative approaches, as well as adaptive community-based development of indicators and monitoring regimes (Morrison, 2021). Max-Neef et al. (1991) distinction between

the multiple possible ‘satisfiers’ that fulfil universal needs, and Bossel’s (1998) analysis of generic system ‘orientors’, are similar approaches (Morrison, 2019, 2021; Morrison & Singh, 2009).

The methodology nests engineering design, including coordinated utilisation of ecosystem services, in a decentralised manner throughout the whole community, at multiple levels. The methodology ensures recursive dialogue and transformative leadership guide engineering. The methodology ensures the features of adaptations carried out by ecological engineering are revisited and redesigned at each recursion, whenever and wherever transformative leadership is expressed, in families, villages, the nation, and higher. But the horizon of *va* in which it is carried out, and the principles of social-well-being and ecosystem health remain the same to guide the process in *whanaungatanga*.

The methodology ensures that ecological engineering is an adaptive process, and by doing so reframes how adaptive capacity is usually understood. Generally, adaptive capacity is presumed to be provided by access to capital. Even though capital can be of different types, what is common is that it is something available at hand and kept in some sort of storage. For example, ecosystem services are natural capital that is waiting to be used when required. Capital therefore provides options, and hence adaptive capacity is enhanced by having access to the available storage. The methodology however critically reframes this view of capital and adaptive capacity.

In the methodology, adaptive capacity is understood to be a focus on what is essential, which frees up unnecessary concern for what is not essential. Even though what is non-essential is still addressed, it is done so by maintaining requisite diversity of adaptation options. It is not sought to be addressed by ensuring there is adequate capital. Rather, adaptive capacity is understood to derive from continually re-creating requisite diversity of adaptive SES structures, which is, as already pointed out, a process that is very resilient. The usual relationship between capital and adaptive capacity are therefore reversed by the methodology. Capital is framed rather as consequent on adaptive capacity. Adaptive capacity that is gained from capital is seen in the methodology as a secondary and derived adaptive capacity, and potentially a delusory maladaptive fixation that obscures what is truly essential.

An example of the methodology is the planned ‘public model’ for provision of potable water, stormwater services and wastewater treatment in Aotearoa-New Zealand (RNZ, 2021a). It has been driven in partnership between the government and Aotearoa-New Zealand Maori communities insisting that all communities in the nation have access to and equal quality of service. Infrastructure is planned to be removed as a capital asset used exclusively to benefit those who own the capital. Through the infrastructure becoming a public asset it is planned to be continually reconstructed and adapted to ensure social well-being and ecosystem health are maintained. Even though the planned transformation of services has been criticised as centralisation and robbery from local ownership, the reliance on transformative leadership will paradoxically ensure that local councils and communities remain the operators of the services, and moreover will be empowered to do so in a way that is

neither constrained by access to capital, nor forced to lose focus on social-well-being and ecosystem health because of pressures to obtain capital and bring a return on invested capital.

5 Ecological Economics

The fields of both microeconomics and macroeconomics are implicated in the methodology. The methodology contributes to both fields, in ways that help integrate the two fields. The contributions come from the focus on what is essential, namely social well-being and ecosystem health. Firstly, because participation in cultural practices and protocols to nurture inclusive transformative leadership operate by establishing, nurturing, and affirming continual recursive careful and cautious moderation, maximization of consumption is avoided. Moreover, maximization of self-interest, even in relation to essential needs, is tempered by the focus on social well-being and ecosystem health. Guidance is provided to help achieve SDG Goal 12 *Responsible Consumption and Production*.

In terms of microeconomics, a nuanced understanding of economic agency is maintained. The economic agent is the extended family. It is an economic agent that has secure capability to maintain its well-being because families are intrinsic to a SES and a place. Families are agents in *va*. In short, access to resources is a birth right, and still maintained in many South Pacific islands. It does not need to be bought. The effect of this is to make the interaction between families creatively competitive, but without desperation. More often, collaboration is the norm, and paradoxically facilitated through a strong cultural imperative to give whatever is being asked for, along with an equally strong imperative of reciprocity. The result is that families proactively seek to assist all families to become successful independent economic agents (Morrison, 2008; Morrison & Singh, 2009). Due to the use of emotional intelligence to respect how others are feeling, along with regular village community discussions with representatives from each family, the concern for others is sincere. The noetic consolation of social well-being in absolute hope is maintained, and hence strong social resilience and ecological resilience of the village community resonates. The strength of a village is recognised by its ability to maintain its adaptive integrity and sovereignty in this way. Once again, seeking the SDG Goal 11 *Sustainable Cities and Communities* is enhanced.

In terms of macroeconomics, the methodology gives hope that there is freedom from a supposed inexorable law demanding economic growth. The methodology gives an alternative to progressive taxation redistributing inequitable flows of capital (Piketty, 2014), and to supposed 'green' growth that would make it possible to sustainably avoid reliance on progressive taxation, through an ever-increasing pool of capital (Jackson, 2016). The methodology cuts at the core of the problem, by framing SES as continually socially reconstructing capital. Capital is seen as a mutable feature of a SES that is made temporarily available for the community, and the availability is continually re-evaluated. The methodology assures access to ecosystem services

for all families, but the degree of access is determined by what maintains social well-being and ecosystem health. It means that progressive taxation is helpful to enforce the cultural mandates in the methodology, but it rejects, in keeping with overwhelming evidence, that sustained growth is possible (Jackson, 2016). The methodology counters the cause of the supposed inexorable inequitable flow of capital, green or otherwise, by not socially constructing capital in a way that enables it to accumulate into a store for those who own it. The methodology shows how it is possible to decrease consumption, resulting in not only short-term economic recession but even sustained economic depression, to enhance ecosystem health as well as social well-being. This feature of the methodology is very pertinent to achieving the SDG Goal 8 *Decent Work and Economic Growth*.

Where microeconomic concerns and macroeconomic concerns meet, the methodology can help transform global crises. COP26 in Glasgow saw least developed countries in the South Pacific, who are the most vulnerable to climate change, arguing for compensation for climate change loss and damage from the countries who have caused climate change (Membere, 2021b, 2021d). The call was not heeded, but the methodology shows why it would have been wise to do so. The methodology at the microeconomic scale ensures village resilience through facilitating economic independence and well-being of each family. This can also be applied to economically struggling nations. Not only compensation for loss and damage from climate change, but also global restructuring of SES to remove debt that is destructive of social well-being and ecosystem health, would benefit the global community and its resilience. The SDG Goal 16 *Peace and Justice Strong Institutions* can be enhanced by use of the methodology, to ensure every country is able to prosper.

Maladaptive social construction of capital is part of the global SES in need of transformation. The methodology gives hope that it is possible and shows how. It is not through dialectical revolution, using power, but rather through democratic transformative leadership spread throughout the whole community. It occurs through respecting universal human rights, and through facilitating the integrity of families, villages, and nations to be able to continually adapt within *va*, attuned to *mauri*. As already outlined, this continual decentralised transformative leadership facilitates SES transformation through recursive incremental evolutionary adaptation focusing on what is essential, namely ecosystem health and social well-being. It can ensure the supposed inexorable flow of capital from the poorest most vulnerable developing countries to the wealthiest is stopped, as well as stopping it within villages and nations, through persons, families, villages, and nations choosing to live within the capacity of their ecosystems and to enhance their health, through careful and cautious moderate use of capital that ecosystems can provide. The methodology indicates that surpluses can and should still be traded, if not gifted, to assist others in need of capital, but it is maladaptive to do so if it compromises ecosystem health and social well-being. This transformative leadership nurtured by the methodology helps achieve the SDG Goal 17 *Partnerships to Achieve*.

Moreover, as also already outlined, adaptive SES are very resilient and are maintained by strongly reinforcing systems. Such SES are therefore possible alternative states that could be chosen to be tipped over into as the current storm of crises begins

to destabilize existing maladaptive SES. It does not need to be falsely assumed that the already existing crises will inevitably lead to worse states. The methodology gives hope and shows how to transform maladaptive pathways into adaptive ones that are very resilient and avoid disasters. Co-evolutionary selection is also likely to ensure such adaptive pathways resonate, as spirits, to influence persons, families, villages, and nations globally, as they have already done so within and between indigenous communities for millennia in the South Pacific. For millennia indigenous communities in the South Pacific have been adapting to ever seek better means to achieve what are now framed as the SDGs Goal 1 *No Poverty*, Goal 2 *Zero Hunger*, and Goal 3 *Good Health and Well-Being*. The methodology shows how this can be done.

6 Conclusion

The South Pacific Indigenous methodology outlined here is very pertinent for the SDGs because it opens pathways for collaborative and integrative transformative adaptations to achieve them. Even this briefest of outlines emphasizes how the methodology enables emergence of self-reinforcing very resilient, flexible, and continually transforming SES. The methodology facilitates the possibility for societies to reframe themselves as adaptive SES to achieve the SDGs. Even though the ontology underpinning the praxis of the methodology provides a necessary guiding worldview in the South Pacific indigenous communities, equivalent adaptations can be recovered and developed elsewhere. Also, to have this South Pacific Indigenous methodology already operating, and increasingly globally available to influence and to be learnt from, helps make it possible.

The universal hope the methodology provides is that continuous incremental adaptation with a correct focus on what is essential, can facilitate transformative change to emerge, and moreover gives everyone a meaningful role to play to help. The whole-of-society approach of the methodology provides an authentic postcolonial expression of sovereignty and leadership, which respects universal human rights and is empowering of every person, community, and nation. This methodology nurtures hope and resilience to dwell within the whole society. This is well symbolized by South Pacific youth leaders who, instead of allowing themselves to be framed as vulnerable victims, showcase themselves as global resilient beacons of hope. Everyone, in their family and village, as well as if they have a national role, and regional, or United Nations role, know that they are making a difference to enhance social well-being and ecosystem health to avoid disasters. There is no better way to support the SDGs.

The methodology does however seriously challenge the still dominant Eurocentric and neo-colonial models of development (Morrison, 2008, 2019). The methodology is firmly postcolonial, post-capitalist and post-growth. But it is inevitable that there will come a time when this sort of transformation will be sought as a catalyst, as tipping points in the current storm of crises are reached. What is especially pertinent about the methodology is that the means for transformation through democratic evolutionary adaptation is not inherently threatening to even dominant

nations. Power to overthrow is not part of the methodology. Rather the methodology proactively seeks to integrate with useful methodologies within the current dominant development models (Morrison, 2019, 2021), and to seek collaboration and partnerships. The centrality of recursive adaptation in the methodology, means that monitoring is intrinsic to the operation of the methodology, and so is fully compatible with United Nations evidence-based research and outcome-based management, albeit of community-based forms, to monitor indicators for the SDGs. Moreover, the understanding of sovereignty at all levels, affirms rights-based approaches, as well as sectors targeted by the SDGs. What the methodology however adds to the dominant discourse associated with the SDGs, is the need for integration of the wisdom found and continuing to be discovered and expressed by the humanities, with that found in the continually developing scientific and engineering disciplines. The methodology facilitates dialogue by scientists and engineers with their fellow citizen artists, poets and religious, to ensure that diverse plausible adaptive solutions are continually recreated in the spirit of *whanaungatanga*. Leadership of all sectors of society, with the full range of talents, is required to provide the necessary insight to stay on an adaptive pathway of sustainable development free of disasters.

References

- Aiono-Le Tagaloa, F. (2003). *Tapuai: Samoan worship*. Malua Printing Press.
- Bossel, H. (1998). *Earth at a crossroad: Paths to a sustainable future*. Cambridge University Press.
- Brundtland, G. (1987). *Our common future: The world commission on environment and development report*. Oxford University Press.
- Freire, P. (1972). *Pedagogy of the oppressed*. Penguin.
- Hooks, H. (2009). *Belonging: A culture of place*. Routledge.
- Jackson, T. (2016). *Prosperity without growth: Foundation for the economy of tomorrow* (2nd ed.). Routledge.
- Mata'afa, F. N. (2020). Prime Minister's New Years Message. *Samoa Observer*, January 1, 2022. <http://www.samoaoobserver.ws/category/columns/96577>
- Max-Neef, M. A., Elizalde, A., & Hopenhayn, M. (1991). *Human scale development: Conception, application and further reflections*. The Apex Press.
- Membere, M. (2021a). "We are not drowning, we are fighting": Brianna Fruean tells world leaders. *Samoa Observer*, November 2, 2021a. <http://www.samoaoobserver.ws/category/samoa/94000>
- Membere, M. (2021b). Bigger nations not walking the talk: Fruean. *Samoa Observer*, November 4, 2021b. <http://www.samoaoobserver.ws/category/samoa/94134>
- Membere, M. (2021c). Climate dialogue focuses on people's wellbeing. *Samoa Observer*, November 4, 2021c. <http://www.samoaoobserver.ws/category/samoa/94138>
- Membere, M. (2021d). Climate fight to march on: Brianna Fruean. *Samoa Observer*, November 6, 2021d. <http://www.samoaoobserver.ws/category/samoa/94240>
- Montuori A., & Donnelley, G. (2018). Transformative leadership. In J. Neal, (Ed.) *Handbook of personal and organisational transformation*. Springer. https://doi.org/10.1007/978-3-319-66893_59
- Morrison, K. D. (2008). indigenous entrepreneurship in Samoa in face of neo-colonialism and globalization. *Journal of Enterprising Communities: People and Places in Global Economy*, 2(3), 240–253.

- Morrison, K. D. (2016). The role of traditional knowledge to frame understanding of migration as adaptation to the “slow disaster” of sea level rise in the South Pacific. In K. Sudmeier-Rieux, M. Jaboyedoff, M. Fernandez, I. Penna, & J. C. Gaillard (Eds.) *Identifying emerging issues in disaster risk reduction, migration, climate change and sustainable development* (pp. 249–266). Springer.
- Morrison, K. D. (2019). A model to integrate university education within cultural traditions for climate change resilience. In W. L. Filho, & S. L. Hemstock (Eds.) *Climate change and the role of education* (pp. 457–479). Springer Nature.
- Morrison, K. D. (2021). Community-based human ecological research for climate change management: Taking faith and culture seriously. In: W. Leal Filho, J. Luetz, & D. Ayal (Eds.) *Handbook of climate change management*. Springer. https://doi.org/10.1007/978-3-030-22759-3_272-1
- Morrison, K. D., & Singh, S. J. (2009). Adaptation and indigenous knowledge as a bridge to sustainability. In P. Lopes & A. Begossi (Eds.), *Current trends in human ecology* (pp. 125–155). Cambridge Scholars Publishing.
- Piketty, T. (2014). *Capital in the twenty-first century*. The Belknap Press of Harvard University.
- Rappaport, R. A. (1999). *Ritual and religion in the making of humanity*. Cambridge University Press.
- RNZ. (2020). Pacific climate warriors call for a ‘just recovery’. *RNZ* 5.55 am on August 11, 2020. <http://www.rnz.co.nz/international/pacific-news/423210/pacific-climate-warriors-call-for-a-just-recovery>
- RNZ. (2021a). Three waters reforms to be made mandatory for councils—Mahuta. *RNZ* 1.28 pm on October 27, 2021a. <http://www.rnz.co.nz/news/political/454334/three-waters-reforms-to-be-mandatory-for-councils-nania-mahuta>
- RNZ. (2021b). Samoa’s gender-based violence still a concern at UN rights council. *RNZ* 12.43 pm on November 5, 2021b. <http://www.rnz.co.nz/international/pacific-news/454831/samoa-s-gender-based-violence-still-a-concern-at-un-rights-council>
- Santner, E. (2001). *On the psychotheology of everyday life: Reflections on freud and Rosenzweig*. The University of Chicago Press.
- Sharpe, K. (2003). *The emergent order*. Wiley.
- Swenson, R. (1997). Autocatakinetics, evolution and the law of maximum entropy production: A principled foundation toward the study of human ecology. *Advances in Human Ecology*, 6, 1–46.
- Thom, R. (1989). *Structural stability and morphogenesis: An outline of a general theory of model*. Addison Wesley.
- Turner, V. W. (1969). *The ritual process: Structure and anti-structure*. Routledge.
- Verhaeghe, P. (2014). *What about me? The struggle for identity in a market-based society*. Scribe.
- Weil, S. (1952). *The need for roots*. Routledge Classics.
- Wengrow, D., & Graeber, D. (2021). *The dawn of everything: A new history of humanity*. Farrer, Straus and Giroux.

Tribal Collaborations and Indigenous Representation in Higher Education: Challenges, Successes, and Suggestions for Attaining the SDGs



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Abstract The earth is amid a global environmental and humanitarian crisis. To meet the United Nations 2030 Agenda for Sustainable Development, we must consider Indigenous ontologies and epistemologies that are framed by the interconnectedness and equanimity of all life on Earth and a deep attachment to place. However, given our colonial histories and their harmful effects on Indigenous communities, it is a very real challenge to center Indigenous people and their perspectives in meaningful ways that support the attainment of the SDGs. In this chapter, we share findings from our self-study on the Maryland Indigenous Higher Education Alliance (MIHEA), a grassroots alliance co-created by Maryland tribal community members and a Maryland Higher Education Institution (IHE). This study organically employed participatory action research, conversational data collection, and qualitative data analysis to feature the voices of some of Maryland's Indigenous people who have collaborated

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with faculty and staff through MIHEA over the past 15 months. Our locally derived findings suggest challenges and promising practices that support Indigenous/Higher Education collaborations to achieve the SDGs more broadly.

Keywords Sustainability · Indigenous · Collaboration · Institutes of higher education

1 Introduction

The earth is amid a global environmental and humanitarian crisis. As a policy response, the United Nations published the 2030 Agenda for Sustainable Development (2015) which directs us to consider Indigenous ontologies and epistemologies that are framed by the interconnectedness and equanimity of all life on Earth and a deep attachment to place. Although Indigenous communities are diverse and each are unique, at a global scale, they have created some of the most biodiverse ecosystems. Indigenous peoples and local community's (IPLC) lands cover up to 50% of the Earth's lands and represent "over a third of the world's most important places for biodiversity" (WWF et al., 2021, p. 31). The condition of IPLC lands is "good" because of traditional perspectives on land management that encourage symbiotic relationships among the people, land, and ecosystems. In addition, IPLC lands, "maintain ecosystem services of importance to people living far beyond the borders of their lands" (WWF et al., 2021, p. 33). Therefore, "supporting Indigenous and local knowledge, and investing in Indigenous communities is absolutely critical to protecting Earth's remaining intact ecosystems and to addressing the climate crisis" (Kerry, 2021). In this chapter, we present findings from our self-study on our Maryland Indigenous Higher Education Alliance (MIHEA) efforts to centralize Maryland's Indigenous people and their perspectives in higher education and support Indigenous/IHE collaborations to meet the 2030 Agenda for Sustainable Development.

2 Research Objective and Conceptual Framework

The 2030 Agenda for Sustainable Development calls us to challenge the colonial paradigms that have led us to our current humanitarian and climate crisis. However, given the colonial history of the United States and its harmful effects on Indigenous communities, it is a very real challenge to center Indigenous people and their traditional perspectives in meaningful ways that support its attainment. As Rico Newman, a Piscataway Conoy-Choptico Band elder and MIHEA participant, notes:

In the United States, we downplay the first three hundred years of a dark history of European-Indigenous relations with brevity and then dismissal. In doing so, the substance of Indigenous culture is rendered invisible. That dismissiveness and invisibility is continual and pervasive in all aspects of our social, political, and educational systems across the U.S. The absence of the

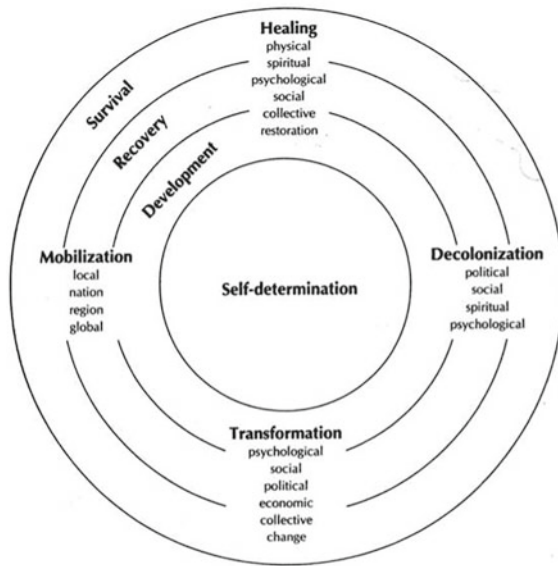
Indigenous story perpetuates ignorance about history, economics, spirituality, technology, and lifeways, shaping the way non-Indigenous people think about and act toward Indigenous peoples when their presence becomes known.

In this chapter, we center the voices of Indigenous community members who have partnered with university faculty in developing a grassroots collaborative, the Maryland Indigenous Higher Education Alliance (MIHEA) to answer the research question: “What are challenges and promising practices for the inclusion of Indigenous people and their perspectives within higher education institutions (IHEs) as we pursue the Sustainable Development Goals (SDGs) outlined in the 2030 Agenda for Sustainable Development?”.

Our research is grounded in the concept of self-determination of Indigenous peoples “which necessarily involves the processes of transformation, of decolonization, of healing and of mobilization as peoples” (Smith, 2021, p. 120; Fig. 1).

Fulfilling the SDGs requires transformation of our societies, including IHEs, through the decolonization of our socio-economic paradigms, the healing of communities and relationships damaged by colonization, and local mobilization to achieve global sustainable development goals. The relational framing of decolonization, healing, mobilization, and transformation outlined in Smith’s Indigenous Research Agenda (2021) are well-aligned with MIHEA endeavors and outcomes.

Fig. 1 Indigenous research agenda conceptualized by Smith (2021, p. 121)



3 Research Methodology

3.1 *Research Focus: Centering the Voices of Indigenous People*

In *Decolonizing Methodologies* (2021), Smith describes the effects of imperialism and colonization on Indigenous people. These oppressive practices have shaped historical research on Indigenous people in ways that are misaligned with Indigenous beliefs, values, and practices. These traditional research methods harm Indigenous communities by framing them as “others” and misinterpreting their beliefs and practices through Eurocentric lenses. In contrast, Smith (2021), Wilson (2008), Braun et al. (2014) and many others have called for decolonizing research methodologies where Indigenous researchers are active participants, Indigenous perspectives are provided directly by Indigenous people, research questions are framed through Indigenous theories on knowledge and knowledge transfer, and the research conducted seeks to serve needs identified by Indigenous communities in meaningful ways.

Research methods aligned with decolonizing methodologies center Indigenous people and their perspectives and are often qualitative in nature. Participatory action research (PAR) and community-based participatory research (CBPR) are relational and aligned with Indigenous ways of knowing (Wilson, 2008). Thus, PAR and CBPR methods have the potential to be transformative (Kovach, 2009) by shifting away from traditional researcher/subject relationships to research partnerships, where power is shared, and collaboration and co-learning are critical. Blair and Minkler (2009) reported that findings from PAR studies are more likely to be action oriented, and PAR studies inclusive of Indigenous practices, such as storytelling and discourse, are well-aligned with decolonization frameworks (Kovach, 2010).

3.2 *Research Setting: Indigenous Maryland*

The region where this research was conducted is commonly referred to as the Mid-Atlantic region. Indigenous communities, who have inhabited this region for thousands of years, refer to this region as the Chesapeake region, due to their significant relationships with the Chesapeake Bay and its watersheds [National Museum of the American Indian (NMAI), Smithsonian Institution, 2006]. Prior to colonization, Indigenous people of this region “practiced diplomacy and developed political and military alliances. They were deeply spiritual and expressed their religious values and beliefs in cyclical ceremonies and rituals that kept their world in balance” (NMAI, Smithsonian Institution, 2006, p. 2). While European contact and colonization caused “devastating losses” (NMAI, Smithsonian Institution, 2006, p. 2) for the Indigenous communities in this region, many Indigenous people belonging to these communities remain connected to their ancestral lands and this region.

3.2.1 The Piscataway

Rico Newman, Piscataway elder and MIHEA participant, relays some history of the Piscataway people:

The Piscataway-Kanawha (Piscataway) are the “People Who Live Where Waters Blend Below Rapids.” Prior to colonization, the Piscataway developed well-orchestrated lifeways that sustained them for centuries. The traditional economy was based on subsistence practices that provided for the needs of the community, and traditional technologies sustained local resources and ecosystems. During colonization, Piscataway men transitioned into fur trading, crop production, and hunting to obtain colonial goods, and Piscataway women took on domestic roles in colonist’s homes, when they found their traditional skills unneeded in a Eurocentric market economy. The Piscataway were pressured to use the English language when conducting affairs with the settler-colonial government and its people, which threatened the survivability of the language.

The social fabric and leadership roles of Piscataway communities were dismantled by encroachment of colonists and northern tribes who sought lucrative fur bearing animals, massive population loss due to wars, the assignment to designated land areas (reservations), and the dismissal of Clan Mothers and village leaders. Colonization interrupted the Piscataway’s traditional seasonal migrations from permanent villages located along major waterways to their winter encampments. Upon returning to their established villages in the spring, they found colonial squatters who made claims, under rules set forth by the colonial government, that marking off and making “improvements” to Piscataway lands gave them title to village sites. The displacement of the Piscataway from their traditional lands and waterways continues to deny them access to resources required to maintain their traditions and subsistence.

In 1700, after signing a treaty of friendship and amity with the colonial regime, the Tayac (hereditary chief), along with many Piscataway tribal members left their homelands. Many remained, and others later returned to find their lands usurped. They faced threats of violence when asserting claims to their homelands but have proven to be resilient. They reframed their lives as tenant farmers/sharecroppers, and a few became landowners of small farms. Despite ongoing exclusion and erasure from most public discourse, histories, and education, the “People Who Live Where Water Blends Below the Rapids,” have sustained their identities and are tenacious in restoring their place in their homelands.

3.2.2 The Nanticoke¹

Kyle Harmon, member of the Nanticoke Indian Nation and MIHEA participant, shares some of the Nanticoke story:

The Nanticoke traditionally occupied the lands between the Chesapeake Bay and the Atlantic Ocean. The word “Nanticoke” is derived from an Algonquian word “Nentego” meaning “People of the Tidewater.” The Delaware and Hudson River relations also referred to us as

¹ We want to acknowledge the other Indigenous communities native to what is now Maryland who were displaced or extinguished by colonization. They include the: Annemessex, Assateague, Choptank, Delaware, Doeg, Massawomeck, Mattapanient, Matapeake, Mattawomen, Nacotchank, Ozinie, Pamunkey, Patuxent, Pocomoke, Shawnee, Susquehannock, Tockwogh, Transquaking, and Yoacomaco, as well as the Accohonnack, who remain in Maryland, but are not current participants of MIHEA.

“Tiawco” and “Tawachguano” meaning bridge builders. This was a term used to signify our ability to build positive relationships through inclusiveness and sharing.

Nanticoke customs and practices were very similar to our neighboring Nations. One custom that stood out was the amount of respect given to the bones of our ancestors. Special ceremonies were held to honor those who transitioned into the spirit world. Bones of the dead were sacred and cherished. When one traveled into a new region, they would bring the bones of their ancestors with them and bury them in the new ground they inhabited.

The Nanticoke made treaties with the colonies of Maryland starting in 1668. Each treaty was broken, and the land that was deeded to the Nanticoke was encroached upon by colonists, forcing the Nanticoke to divide and relocate. Some went north along the Susquehanna River and lived among the Haudenosaunee people. Others moved west to join other Nations in Oklahoma and Ohio. Some remained on their traditional homelands and created their own blended community of other displaced Indigenous people of the Delmarva Peninsula. This community lived alongside the colonists and adapted to their newly imposed way of life. They purchased land, built their own schools, and created a new community centered around their principles. In 1881, they created the Incorporated Body that was recognized by the state of Delaware, and “in 1921, the Nanticoke Indian Association was established and granted nonprofit status” (The Nanticoke Indian Tribe, 2011). The Nanticoke experienced segregation and many attended the Haskell Indian Boarding School in Lawrence, Kansas. Today, Nanticoke families do not live on reservations. They own property much like their non-Indigenous neighbors and attend non-Indigenous public schools and institutions.

3.2.3 The Lumbee

Sherry Ayers, member of the Lumbee and Coharie Tribes of North Carolina and MIHEA participant, shares some of the history of the Lumbee:

The Lumbee “are the amalgamation of Siouan, Algonquian, and Iroquoian speaking tribes” (Lumbee tribe, 2021) whose name is associated with the Lumbee River. Although “Pembroke, North Carolina is the economic, cultural, and political center of the tribe” (Lumbee tribe, 2021), a large population of Lumbee have also been in Baltimore, Maryland for over a hundred years. They came en masse to Baltimore after World War II to find jobs, and today, roughly “2,000 Lumbee reside in Baltimore” (Garcia, 2020).

3.2.4 Research Setting: The IHE

The IHE resides on the unceded ancestral lands of the Piscataway. In 1859, it was established as an Agricultural College through the purchase of a slave plantation (University of Maryland, 2021). Three years later, the Morrill Act of 1862 authorized the seizure of nearly 11 million acres of land from nearly 250 Indigenous tribes, bands, and tribal communities to raise the endowment principle for 52 land grant institutions located across the United States (Lee & Ahtone, 2020). The IHE involved in this study is one of those land grant institutions.

Although the IHE has identified diversity, equity, and inclusion goals and has an Office of Diversity and Inclusion to achieve them, there is little evidence that the institution has historically considered Maryland’s Indigenous people or their

inclusion in its efforts. Recent shifts in the IHE toward Indigenous acknowledgement and inclusion have begun with the inauguration of a new IHE President. The new IHE President initiated a campus onboarding system that introduces incoming campus community members to the IHE's leadership, history, commitment to diversity, equity, and inclusion, and shared traditions (Office of Diversity and Inclusion, 2021). The initiative includes an institutional level land acknowledgement recognizing the Piscataway as the original stewards of the IHE lands and is related to the development of a Heritage Community composed of two residence halls and a dining hall. On November 1, 2021, the 1st day of Maryland's Native American Heritage Month, the IHE President dedicated the dining hall to honor the Piscataway. The dining hall's name, *Yahentimitsi* (a place to go to eat), land blessing, and ceremony were orchestrated through IHE and Maryland Commission on Indian Affairs (MCIA) collaborations, as well as MIHEA networking. In alignment with these initiatives, the IHE President recently announced the development of five new cultural centers, including one specifically designed for Indigenous students.

The IHE has a series of sustainability goals to become a net-carbon neutral campus. Through campus-wide implementations of interdisciplinary sustainability education and innovation initiatives, the institution hopes to become a "living laboratory" that serves as a model of sustainability in higher education. As with many IHEs, there are mismatches between institutional practices and the SDGs. One important disconnect is the lack of Indigenous/IHE collaboration to meet the IHE's sustainability goals which are necessary to achieve the 2030 Agenda for Sustainable Development.

3.3 Research Participants

The research participants of this study belong to the Maryland Indigenous and Higher Education Alliance (MIHEA) which was cocreated by Indigenous community leaders and IHE faculty. MIHEA was created and is sustained by a number of IHE and Indigenous networks and proactive networking. Although she is a representative of the IHE, Angela has children who are members of the Nanticoke Indian Nation and has had close ties with Nanticoke community members since she was a young child. As a doctoral student, she pursued individual research efforts to bring Nanticoke people and their perspectives into the IHE, including in 2017, when she met with the Nanticoke tribal council to discuss the IHE's participation in a Solar Decathlon competition. This meeting connected her with Kyle, who was a Nanticoke tribal council member at the time. Kyle lived in Maryland and had Indigenous networks in Maryland. As a result of their combined networking, the Administrative Director of the Maryland Commission on Indian Affairs (MCIA) and Nanticoke tribal leaders participated in the IHE's 2017 Solar Decathlon Competition as consultants (U.S. Department of Energy, 2021).

About a year later, Jing Lin and Angela (both IHE faculty) met on campus to discuss an Ecological Ethics and Education course which included Indigenous perspectives on sustainability. After multiple conversations, they applied for and

received two small grants to fund an Earth Day Indigenous Panel Event. This event gave IHE staff, faculty, and students the opportunity to broaden Indigenous/IHE networks and develop an understanding of current issues faced by Maryland's Indigenous people. Many current MIHEA participants collaborated on this event. Over the past 15 months of ongoing collaborations, MIHEA participation has continued to broaden through individual and collective social networking that intersects with MCIA and Indigenous/IHE leadership.

For example, one of the panelists on the Indigenous People's Day panel was the Administrative Director of MCIA. After the event, the Administrative Director of MCIA invited Angela to give a "Pathways to Partnerships" presentation to Maryland's Indigenous communities at the MCIA 2020 Native American Heritage Month Kickoff. This invitation led her to meet with her department chair and college dean to discuss viable pathways to partnerships and potential barriers to collaboration. The college dean advised that MIHEA coordinate meetings with unit leadership across campus to discuss Indigenous issues pertinent to their roles and responsibilities. This guidance informed MIHEA's strategies for presenting Indigenous issues to stakeholders across the IHE.

By involving the college dean in the question of viable pathways and barriers to collaborations, this initial meeting moved Indigenous issues forward to other unit deans and administrative leadership across campus. MIHEA's simultaneous faculty/staff/student networking within the IHE and Indigenous networking through MCIA and tribal leadership disseminated information so broadly across these individual streams that they intersect at multiple points and levels, including the IHE's Office of the President and Maryland's Governor's Office, where policies can be challenged and created to support meaningful change.

3.4 Data Collection and Analysis

This research is a self-study of MIHEA, a grassroots Indigenous/Higher Education collaborative. PAR methods organically developed as the methods employed in this study. Data was collected using conversational methods (Kovach, 2010). Conversational data was captured during weekly, two-hour, research team meetings which occurred over a three-month period of time through verbatim notetaking. Between research meetings, research team members added written commentaries, questions, and comments to the conversational data. This commentary was addressed at the following two-hour team meetings to achieve clarity and consensus around the data and preliminary findings. Conclusive findings emerged from these iterative cycles of research team conversations, independent and collective review of conversational data, and consensus seeking.

In terms of data analysis, first, conversational data was used to identify key topics. The topics that emerged from our conversational methods were the impacts of colonization and colonial paradigms on Maryland's Indigenous communities; the importance of Indigenous perspectives in meeting the SDGs; barriers to Indigenous/IHE

collaborations, and promising practices that support Indigenous/IHE collaborations and the achievement of the SDGs. The conversational data within each topic was then developed into narratives. Narratives were manually coded to identify themes within the key topics (Saldaña, 2013). Themes identified through thematic analysis of the narratives were also validated using NVivo software (QSR International, 2021).

4 Research Results and Discussion

4.1 *Impacts of Colonization and Colonial Paradigms on Indigenous Communities Must Be Acknowledged and Deconstructed*

MIHEA participants concur that naming the atrocities and enduring impacts brought about by colonialism and capitalism is the first step toward demonstrating care and respect for Maryland's Indigenous communities. Maryland was ground zero for colonization of the United States, which officially began in 1632, and Maryland's tribal histories are convoluted because of colonialism and its pervasive effects. As Tiara Thomas, member of the Piscataway Conoy Tribe and MIHEA participant, points out, "These complexities need to be acknowledged and deconstructed and not used as an excuse to disengage with Maryland's Indigenous communities."

Colonial paradigms have had detrimental impacts on maintaining Indigenous traditions:

Today, Maryland's Indigenous communities live predominantly urban lives. Access to traditional foods, participation in traditional methods of food production and preservation, and the relationships between the people and the land have been disrupted. From an urban Indigenous peoples' perspective, I did not have access to fresh vegetables and fruits on a regular basis. My diet consisted mainly of processed foods and fast-food restaurants. Most of us have no idea how our food ends up on our table (Kyle Harmon).

Capitalism has damaged traditional relationships between the land and the people. Through capitalism, all of nature is commodified and all of Earth's "resources" are considered in terms of finite consumptions, versus cyclical relationships involving stewardship and reciprocity. As Peter Brooks, Piscataway Conoy-Choptico Band Affiliate and MIHEA participant, remarks:

Nature [in our current society] is used to manufacture money. Everything that is natural to us and everything from the Earth is somehow turned into an opportunity to make money. Money is even the tool of sustainability for this civilization, and so, it is incompatible with what we think of as sustainability, if we had a word for that in the first place. Money keeps us from loving one another as people. It is not sustainable; it is the enemy of sustainability.

Maryland's Indigenous people experience ongoing trauma and dissonance as they struggle to maintain traditions and core values in the midst of colonialism and capitalism. As Peter Brooks shares: "There is a real sense of people not thriving because

they lack role models or even a visible, viable path to be both traditional and capitalist.” As Kyle Harmon states, communities able to maintain relationships with traditional homelands, “have seen those lands sold and dispersed with each passing generation, and families increasingly move to urban areas for employment. Communities who once solely relied on the resources that nature provided have succumbed to participating in the exploitation of those resources for profit.” This misalignment of core values and traditions with colonial and capitalistic paradigms leads to disease such as Type II Diabetes, high cholesterol, obesity, mental health issues, and heart problems. It “has also led to a more sedentary lifestyle, which compounds our health crisis” (Kyle Harmon).

Maryland’s educational systems reinforce colonial and capitalist ideologies. Our children predominantly, “learn knowledge in abstract terms and use their minds mostly-neglecting their hands, hearts and spirits, and nature is referred to as objects and things, with no life or intelligence” (Jing Lin). Maryland’s K12 and IHE curricula are devoid of Indigenous ways of teaching and learning. Thus, Indigenous students in Maryland are limited to culturally relevant and restorative learning experiences (McCarty & Lee, 2014) through after school programs, and non-Indigenous students gain little to no exposure to non-Eurocentric perspectives. Even then, only 3 of the 18 public school districts in Maryland eligible for federal funding to support Indigenous students in such programs have pursued them. The exclusion of Indigenous people and perspectives in formal educational spaces limits future generations from access to alternative views on how to live in ways that align with the 2030 Agenda for Sustainable Development. As Rico Newman argues, “If we accept the premise that there is power in education, we must also accept that excluding education relevant to Indigenous peoples, can and has a known impact, not just on Indigenous people, but on every student and community.”

4.2 Indigenous Perspectives Are Critical to Meeting the SDGs

Indigenous people understand that there is a way to live in harmony with our non-human relatives and to sustain life for all through diversifying what we consume, practicing restraint, and engaging in reciprocity with the land. Indigenous agricultural practices such as, “crop rotation, permaculture, aquaponics, hydroponics, forest gardens, and urban gardening techniques practiced for thousands of years are models that can help us reconnect with the Earth and our non-human relatives and teach others how to grow their own food, no matter the setting” (Kyle Harmon). When combined with the core value of “the honorable harvest,” (Kimmerer, 2021), these practices represent and reinforce symbiotic relationships between humans and the ecosystems that sustain them.

The Algonquin people and Eastern Woodland Tribes traditionally operated under the “Great Law of Peace” codified by Hiawatha. This law outlined social, political, and ceremonial practices which were based on the principle that all decisions must be made on behalf of the seventh generation to come. Sustainability, is not an Indigenous

word, but the concepts that support sustainability are core values that are tacitly understood within the code of conduct of Indigenous communities:

That the dominant society's current way of life is not sustainable simply proves our ancestors were correct, that one must be a part of nature and not above it or exploitative of it. The Seventh Generation Principle intensifies the bond of community, promotes stability, and provides concrete values with which each person can test his or her everyday actions. Although Indigenous people practice ancient traditions, their culture is not frozen in the past. Their ability to adapt to dramatic change and survive on their own terms is historically proven, but they are equally focused on the security of future generations (Peter Brooks).

Indigenous MIHEA participants emphasize that Indigenous values are not capitalistic or based on consumerism but rooted in the interconnectedness of humans with the natural world. In contrast to colonial perspectives that present land as a commodity and our non-human relatives as resources for our consumption, Indigenous people view land as their identity, their connection to their ancestors, the home for their families and their non-human relatives, a healer, a teacher, and a sacred entity (Kimmerer, 2021). Matt Aruch, an IHE MIHEA participant who has worked extensively with Indigenous communities in Latin America, shares that the Mēbêngôkre-Kayapó of Brazil refer to money as pi'ôk kaprī which literally translates to "sad leaf." This translation, "that money is really about sadness, having and not having, hoarding and not sharing is fundamental when considering our attainment of the SDGs" (Peter Brooks).

Alignment with natural cycles are core values of Indigenous people. This includes the cycle of reciprocity which involves generosity: "If I want to help someone, it's because my heart tells me so, not because there is money involved, and that is very important because we have a heart-oriented spirituality-not a head or book or pleasure-oriented mentality, or even one that dwells on suffering" (Peter Brooks). It also includes the optimization of resources to minimize waste. As Kyle Harmon shares:

In the natural world and Indigenous traditions, nothing is ever wasted. Today, our societies need to rethink how we conceptualize products and waste to function more like the natural world. Using materials that are natural and determining how by-products can be used to serve other functions after their primary intended use are strategies for rethinking the concept of "waste" in ways that align with the cyclic patterns found in nature and Indigenous traditions.

4.3 Barriers to Successful Indigenous/IHE Collaborations

Ignorance of the histories and current state of local Indigenous people is a tremendous barrier to successful Indigenous/IHE collaborations which could move us toward meeting the U.N.'s Sustainable Development Goals. As Rico Newman remarks, "IHEs generally don't appreciate getting a history lesson on Indigenous communities." Yet, "IHEs do not understand their complexity well enough to forge ethical

collaborations broadly across their institutions” (Angela Stoltz). IHE’s are also typically decentralized. This means Indigenous/IHE collaboration protocols, expectations, and cultural competency training must be taken up by each unit independently, with little to no background knowledge or connections to Indigenous communities.

There is “an intended, or unintended invisibility of Indigenous people on IHE campuses” (Rico Newman) which is fueled by colonial histories and infrastructures. IHEs don’t typically understand the value of increasing the visibility and presence of Indigenous people across their institutions due to broad and institutional level colonial norms. This makes Indigenous people who do end up in IHEs feel like they don’t belong. For many, “the addition of an Indigenous person or land acknowledgement to certain meetings and agendas to check it off on a diversity, equity, inclusion, and accessibility checklist feels like tokenism” (Kyle Harmon). For Indigenous leaders, this tokenism demonstrates a lack of IHE commitment to meaningful Indigenous representation and collaboration. For example, “while the IHE has a land acknowledgement, there is no urgent plan of action to address the gross underrepresentation of students (32) and tenure track faculty (1) who self-identify as Indigenous at a university with a population of roughly 40,000 people” (Kyle Harmon).

The lack of Indigenous representation in IHEs perpetuates the acceptability of systemic ignorance about local Indigenous communities: “It is common for students in higher education to have no exposure to Indigenous people or their perspectives in their courses” (Jing Lin). It is also common for faculty and staff to have no understanding of or interactions with local Indigenous communities across campus units. Sadly, this includes units responsible for recruiting and retaining students and faculty. It also includes units responsible for training K12 teachers. Thus, “most teacher candidates graduate with no knowledge of the Indigenous K12 students they will be teaching, let alone how to teach Indigenous students in ways that are culturally responsive, relevant, and restorative” (Angela Stoltz). Beginning teachers bring this ignorance to their K12 curriculum and instruction when serving Indigenous children and families, thus “maintaining the cycle of invisibility and exclusion of Indigenous people and their perspectives, including those pertaining to sustainability perspectives and practices that support our collective attainment of the SDGs (Angela Stoltz).

Through MIHEA, we have found little IHE infrastructure that supports Indigenous recruitment and retention, program development, or collaborations. Absent the institutionalization of such infrastructures and targeted capacity building, we have found Indigenous/IHE collaborations severely limited by volunteer efforts that carry little weight in terms of institutional level change. As volunteers, each of us is pulled toward our work and family obligations before we can take on our MIHEA efforts. In addition to the significant amount of time it takes to move our efforts forward, we have low power and little influence to create the significant changes needed to support and sustain Indigenous/IHE collaborations to achieve the SDGs. Thus, we have witnessed some unit specific MIHEA suggestions not getting taken up by those with the ability to respond to them. Due to a lack of institutional level policies and protocols for ethical Indigenous/IHE collaborations, we have observed IHE representatives tend to have superficial discussions of Indigenous communities in their

absence, superficial recognition and valuation of their communities and perspectives in their presence, and deficit/colonial narratives and language.

4.4 Promising Practices that Support Successful Indigenous/IHE Collaborations to Attain the SDGs

The structure of MIHEA holds promise for successful Indigenous/IHE collaborations that support the attainment of the SDGs. MIHEA is equally composed of IHE and Indigenous participants from diverse tribal communities and IHE units and is balanced in nature. This balanced design has fostered an increased understanding of and appreciation for Maryland's Indigenous people and their perspectives among IHE representatives, as Jing Lin shares:

I sense a deep sense of humility and respect for people and nature when interacting with Indigenous people, which is what I believe to be the utmost required trait we need to have in our world. I learn about Maryland's Indigenous peoples' histories and present situations, including their educational experiences firsthand. This helps to make my teaching more effective and impactful. I have since centered Indigenous people and their perspectives in all of the courses I am teaching. I have had Kyle present to my class. My students are highly interested in Indigenous perspectives and engaged. I have also gained opportunities to research with wonderful people and to collaborate in publications. Through MIHEA participation, I have realized that we need to recover Indigenous ways of knowing and living, and we need to build intimate relationships with nature.

MIHEA's balanced design also supports broader input from Maryland's Indigenous communities and broad dissemination of our activities across them. MIHEA was formed and is governed by Indigenous community members and IHE representatives as a collective.

MIHEA has empowered each of its participants. Through our collective transformative effort, we have taken that confidence into our individual professional and social spaces to push our collaborative efforts forward in order to create positive systemic level changes. We have found that infrastructures that support Indigenous/IHE collaborations and networking are critical to the success of such efforts. The Indigenous leadership role of the Maryland Commission on Indian Affairs (MCIA) in the Governor's Office and the IHE leadership's shift toward institutional level efforts that necessitate and rely on MIHEA networking have been key to successful outcomes, such as the IHE adopting the name *Yahentimitsi* for its new dining hall. This name was put forward by three generations of Piscataway, as well as tribal leadership, and the IHE's Native American Student Union.

While the direct English translation of *Yahentimitsi* is simply, "A place to go to eat," the worldview expressed by the Algonquin word *Yahentimitsi* is much more reflective of Piscataway traditions IHEs need to consider and adopt in order to collectively attain the SDGs. Rico Newman offered the following to the IHE as it considered honoring the Piscataway through the dining hall naming:

Piscataway traditions assure that food is shared via “Equitable Distribution.” During times of drought, insect infestation, and poor crop production or failure, food was held in storage by the Village Werowance and/or the Tayac who would ensure that all would have ample food, especially during non-growing seasons, when foraging and low supplies presented possible “food insecurity” for villages comprising the Piscataway Polity.

These Piscataway traditions align with the Seven Pillars of Food Sovereignty (Sherry Ayers). Particularly, that the people’s need for food is at the center of policies and food is the Earth’s sacred gift to us all (MIHEA). The naming of the IHE dining hall captures the Piscataway worldview “that assures we will be fed when we are hungry and that we will have a place to eat in community” (Rico Newman). When providing the suggested dining hall name to IHE leadership, MIHEA offered the following additional considerations which were brought forward by Indigenous MIHEA participants and local tribal networks:

1. How does the university reflect the Piscataway commitment to food security and food sovereignty for the IHE and broader community?
2. How does the university reflect the Piscataway perspective that food is sacred and central to the sustainability of a community?
3. How does the university reflect the Piscataway tradition that teaches the sacredness and inherent value of the flora and fauna who provide the people with food/nourishment and the practice of actively working to sustain their ecosystems/reciprocity with the land?

MIHEA also suggested to the IHE that: “Honoring the Piscataway means that Piscataway traditions and ideas in and of themselves have value that supersedes our individual desires. In addition, honoring the Piscataway requires more than a name. It requires thoughtful considerations on how the university is aligned or misaligned with Piscataway traditions and how the university disrupts or sustains them.” Through these efforts, MIHEA has planted seeds of change which we hope will grow into a paradigm that aligns with *Etuaptmumk*, Two-Eyed Seeing (Bartlett et al., 2012). Two-Eyed Seeing, according to Mi’kmaw Elder Albert Marshall, “refers to learning to see from one eye with the strengths of Indigenous knowledges and ways of knowing, and from the other eye with the strengths of Western knowledges and ways of knowing, and learning to use both these eyes together, for the benefit of all (Institute for Integrative Science and Health, 2021). This is the path to achieving the SDGs.

Over the past year, we have observed that the dissemination of our MIHEA efforts at IHE and publicly held MCIA meetings has increased IHE interest in collaborating with Maryland’s Indigenous communities and has led other state agencies to acknowledge their organizations’ failure to include or attend to the needs of Maryland’s Indigenous communities. Thus, MIHEA has helped to mobilize and plant seeds of change within our respective Indigenous/IHE communities and to cast stones that have ripple effects across the state.

5 Conclusion

Our MIHEA findings reinforce that fulfilling the SDGs is a complex matter that requires “mutually reinforcing and beneficial” (Sanger et al., 2006, p. 327) Indigenous/IHE partnerships. In alignment with Smith’s Indigenous Research Agenda Framework (2021), MIHEA’s Indigenous/IHE networks and networking confirm that IHEs, “who learn and embody Indigenous understandings of relationality can aid in fostering authentic relationships with Native nations” (Stewart-Ambo & Yang, 2021, p. 35). Further, results of MIHEA networking strengthen the argument that “we are the relationships that we hold and are part of” (Wilson, 2008, p. 80), and that the embodiment of this perspective is critical to sustaining Indigenous/IHE relationships over time. MIHEA successes are rooted in our genuine respect, trust, and care for each member of our co-created community.

The cocreation of MIHEA and its shared leadership structure support collective movement toward Two-Eyed Seeing which fosters Indigenous healing and restoration. For such a path to manifest, acknowledgement of the long-term impacts of colonial paradigms on local Indigenous communities is a necessary first step. Pathways to local Indigenous healing and restoration organically arise from discussions where Indigenous/IHE communities are equally represented, an ethic of care and trust has been established, and IHE representatives engage in deep listening with the intention of understanding how to collectively mobilize, support Indigenous healing and restoration, and cocreate mutually beneficial change.

Rossen (2006) argued that Indigenous collaborations must be “incorporated into broader activism that advocates friendship, mutual respect, communication, and cooperation with Native people” (p. 262). As our findings suggest, this path requires broad Indigenous and IHE representation, Indigenous and IHE leadership support, and a shared desire to mobilize both communities to serve common interests. Our self-study of MIHEA indicates that such structures and mobilization can lead to transformative changes that serve our collective attainment of the SDGs. While our self-study of MIHEA is locally contextualized, our findings align well with research across a variety of differing contexts. Thus, while our self-study is limited by its scale and study design, we argue that our findings have broad applicability for Indigenous/IHE collaborative efforts to meet the SDGs.

Future Prospects

MIHEA efforts are ongoing, and we continue to push for changes that center Maryland’s Indigenous people and their perspectives within the IHE and across the state. We are currently supporting the IHE’s efforts to increase Piscataway and Indigenous student visibility and sense of belonging on campus by participating in the planning of Yahentimitsi and the Indigenous Student Cultural Center. In the future, we plan to develop Indigenous/IHE collaboration protocols to reduce the risk of furthering harm to Indigenous communities and undermining Indigenous/IHE collaboration efforts. We will continue advocating for an Indigenous/IHE collaborative unit within the IHE that is modeled after MIHEA and for Indigenous/IHE leadership support for such a

unit to ensure collaborations can be sustained over time. Finally, we will continue to advocate for broad Indigenous student, staff, and faculty representation across the IHE. This will include pushing for IHE instructor and staff trainings on local Indigenous histories and communities by local Indigenous people and the integration of that information into IHE curricula, programs of study (such as educator preparation programs), and unit policies (such as the office of admissions). Finally, we will continue to collaborate with other state agencies, such as the Maryland Department of Education to support Maryland's K12 school districts and educators' ability to incorporate culturally responsive, relevant, and restorative materials and instruction into their programs. These efforts will continue our effort to promote, "the appreciation of cultural diversity and of culture's contribution to sustainable development" (SDG4.7, United Nations, 2015, p.19).

References

- Bartlett, C., Marshall, M., & Marshall, A. (2012). Two-eyed seeing and other lessons learned within a co-learning journey of bringing together indigenous and mainstream knowledges and ways of knowing. *Journal of Environmental Studies and Sciences*, 2(4), 331–340.
- Blair, T., & Minkler, M. (2009). Participatory action research with older adults: Key principles in practice. *The Gerontologist*, 49, 651–662. <https://doi.org/10.1093/geront/gnp049>
- Braun, K. L., Browne, C. V., Ka'opua, L. S., Kim, B. J., & Mokuau, N. (2014). Research on indigenous elders: From positivistic to decolonizing methodologies. *The Gerontologist*, 54(1), 117–126.
- Garcia, S. (2020, December 7th). UMBC professor uncovers, documents history of East Baltimore's Lumbee Indian community. *The Baltimore Sun*. Retrieved from https://www.baltimore-sun.com/features/newsmaker/bs-fe-md-newsmaker-ashley-minner-20201207-fuorycert5dqbjv_gk6rh4zxp4-story.html
- Institute for Integrative Science and Health. (2021). Two-eyed seeing. Retrieved from <http://www.integrativescience.ca/Principles/TwoEyedSeeing/>
- Kerry, J. (2021, October 13). National Congress of the American Indian Conference. Retrieved from <https://www.youtube.com/watch?v=0V74zoB9jwU>
- Kimmerer, R. (2021, November 10). *Braiding sweetgrass: Indigenous wisdom, scientific knowledge, and the teachings of plants*. [Virtual Book Talk]. Hall Center for the Humanities, Kansas University.
- Kovach, M. (2009). *Indigenous methodologies: Characteristics, conversations, and context*. University of Toronto Press.
- Kovach, M. (2010). Conversational method in Indigenous research. *First Peoples Child & Family Review*, 5(1), 40–48. Retrieved from <http://journals.sfu.ca/>
- Lee, R., & Ahtone, T. (2020). Land-grab universities: Expropriated Indigenous land is the foundation of the land-grant university system. *High Country News*, 30.
- Lumbee Tribe. (2021). History. Retrieved from <https://www.lumbee-tribe.com/history--culture>
- McCarty, T., & Lee, T. (2014). Critical culturally sustaining/revitalizing pedagogy and Indigenous education sovereignty. *Harvard Educational Review*, 84(1), 101–124.
- National Museum of the American Indian, Smithsonian Institution. (2006). *We have a story to tell: Native people of the Chesapeake region*. Education Office of the National Museum of the American Indian. Retrieved from: <https://americanindian.si.edu/sites/1/files/pdf/education/chesapeake.pdf>

- QSR International. (2021). *NVivo qualitative analysis software*. Retrieved from <https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home/>
- Rossen, J. (2006). Research and dialogue: new vision archaeology in the Cayuga heartland of central New York. In *Cross-cultural collaboration: Native peoples and archaeology in the northeastern United States* (p. 250). University of Nebraska Press.
- Saldaña, J. (2013). *The coding manual for qualitative researchers*. Sage.
- Sanger, D., Pawling, M. A., & Donald, G. S. (2006). Passamaquoddy homeland and language: The importance of place. In *Cross-cultural collaboration: Native peoples and archaeology in the northeastern United States* (pp. 314–359). University of Nebraska Press.
- Smith, L. T. (2021). *Decolonizing methodologies: Research and indigenous peoples*. Zed Books Ltd.
- Stewart-Aambo, T., & Yang, K. W. (2021). Beyond land acknowledgment in settler institutions. *Social Text*, 39(1), 21–46.
- The Naticoke Indian Tribe. (2011). History. Retrieved from <http://www.naticokeindians.org/page/history>
- U.S. Department of Energy. (2021). *Solar Decathlon 2017*. University of Maryland. Retrieved from <https://www.solardecathlon.gov/2017/competition-team-maryland.html>
- United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. Department of Economic and Social Affairs. Retrieved from <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>
- University of Maryland. (2021). Timeline. Retrieved from <https://www.umd.edu/history-and-mission/timeline>
- Wilson, S. (2008). *Research is ceremony. Indigenous research methods*. Fernwood.
- WWF[1], UNEP-WCMC[2], SGP/ICCA-GSI[3], LM[4], TNC [5], CI[6], WCS[7], EP[8], ILC-S[9], CM[10], IUCN[11]. (2021). The State of Indigenous Peoples' and Local Communities' Lands and Territories: A technical review of the state of Indigenous Peoples' and Local Communities' lands, their contributions to global biodiversity conservation and ecosystem services, the pressures they face, and recommendations for actions Gland, Switzerland. Retrieved from https://wwfint.awsassets.panda.org/downloads/report_the_state_of_the_indigenous_peoples_and_local_communities_lands_and_territories.pdf

Rethinking the Design and Implementation of Sustainable Development Under the Prism of Indigenous Knowledge in Africa



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Abstract The unpredictable implications of climate change militating against the welfare of humanity prompted the concept of sustainable development to be vaulted as the basis for a remediation mechanism. For this to be feasible, the Bruntland Report was set in motion as the engine of Western thinking as to what constitute sustainable development which however, does not take into consideration indigenous, cultural and traditional norms in different parts of the world. This therefore, set a divide with regards to perception and conceptualisation of development which act as a setback for the realisation of the Sustainable Development Goals. It is on this premise that this paper has as objective to examine the place given to tools for dialogue and decision-making to integrate the customs, cultural and traditional aspirations, values and motivations of African stakeholders into public policies to enhance development. Equally, to identify Black African indigenous tools used to understand the environment and the way it functions in enhancing efficiency in mitigating the effects of climate change. In order to achieve these objectives, the paper made use of desk reviews, online publications and learned experiences. Findings indicate that the notion of development has a different perception and conceptualisation in Africa. The Black African indigenous knowledge, customs, traditions and belief systems presents development as a descriptive concept of community dynamics and solidarity that takes place within a geographical framework for social well-being. This therefore gave rise to the elaboration of Agenda 21 for culture which leveraged culture as a component for human development. This negates the western

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notion of development as a question of conceiving well-being and needs solely on economic and production variables, but equally in terms of the cultural affiliation of the populations concerned. Considering the current global village under construction in which cultures are called to interact for a common destiny, there is need for local communities to have Access to decision-making platforms at all levels of the society. This will enrich the heritage of local knowledge and cultural experiences to enhance development.

Keywords Cultural heritage · Sustainability · Participation · Resilience · Mitigation

1 Introduction

According to the Brundtland report (1987, p. 37), sustainable development is defined as striving to meet the needs of the present without compromising the ability of future generations to meet their own needs. This definition highlights the current need for rational management of natural resources to ensure intra-generational and intergenerational equity (Smouts, 2008, p. 13). On this premise, Sustainable Development has taken on different aspects depending on the priority and cultural needs of the actors (Munongo & Dzesseu, 2016, pp. 10–13). It is therefore, a question of developing programmes and strategies aimed at economic sustainability through the maintenance of productive capacity; ecological sustainability through the preservation of the reproductive capacity of natural resources essential to human life; social sustainability through mechanisms guaranteeing access to market and non-market goods (Smouts, 2008, p. 16). Bernard (2006, p. 66.) thus perceives a Sustainable Development with four dimensions: environment, economy, society and culture. According to studies by Jacques Weber (cited by Smouts, 2008, p. 17.), sustainable development introduces a new vision of value and hence, a civilisation project. This implies a progression in morals towards the integration of new actors, new variants in the operationalisation of the concept of development (Smouts, 2008, p. 15.). Jacques Testant (cited by Bernard 2006, p. 68.) equally notes that development goes far beyond the sole economic dimension to include the cultural aspect, which is a dynamic of exchanges that allows each human to contribute his knowledge. Equally, Pondi (2011, p. 469) holds that development in this sense refers to a descriptive concept of community dynamics and solidarity that takes place within a geographical framework for social well-being. This definition refers to the purpose of development in Black African culture and the means by which this purpose is achieved. It is thus a question of adopting a way of life, a way of living together that promotes social well-being, in accordance with the Black African value systems, traditions, aspirations and beliefs through community dynamism and solidarity. This is in contravention with the status quo in Black Africa. As a result of her colonial heritage, Africa has adhered to what Rist (2007) described as a modern religion. This is the Western perception of development; whose major foundation is economic growth. A cultural substitution

has thus taken place: from community dynamism and solidarity to the accumulation of wealth and individualism advocated by the capitalist school of thought.

It is on this premise that this paper has as objective to examine the place given to tools for dialogue and decision-making to integrate the customs, cultural and traditional aspirations, values and motivations of African stakeholders into public policies to enhance development. Equally, to identify Black African indigenous tools used to understand the environment and the way it functions in enhancing efficiency in mitigating the effects of climate change.

2 Research Methods

Faced with the discrepancy between the promises made by the theorists of capitalism and the socio-economic realities, the Brundtland Report (1987) was setup as a sign post while proposing a conceptual alternative to development. The challenge therefore, is to integrate the notion of sustainability into development theories while taking into account economic, social, environmental and cultural aspects. In these circumstances, a development model initiated by local communities is advocated, with the promotion of development based on culture as a leitmotiv.

A significant place is thus attributed to culture, which is presented as being necessary for the human race as biodiversity is for the living world (Agenda 21 of culture). This includes:

- promotion of a more satisfying intellectual, emotional, moral and spiritual existence for all;
- promotion of social inclusion and cohesion, human dignity, local identity through the legitimacy of cultural policies and their interweaving with other public policies;
- a wealth-generating factor (Agenda 21 of culture).

The method used for this study is based on the view of Smith (2012, p. ix) who noted that generating information for indigenous studies do not much pay attention to “actual technique of selecting a method but much more with the context in which research problems are conceptualized and designed, and with the implications of research for its participants and their communities.” In order to achieve the objectives of this paper, we made use of desk reviews, online publications and learned experiences.

3 Results and Discussions

(a) The ‘culturisation’ of development

An extensive definitional approach, defended by Alterglobalists and cultural organisations such as the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Francophonie consider culture as the fourth pillar of Sustainable Development. It is worth noting that culture is understood at least as the set of distinctive spiritual and material, intellectual and emotional feature that characterise a society or social group. It includes, in addition to the arts and letters, ways of life, ways of seeing together, value systems, traditions and beliefs (See Preamble of the UNESCO Declaration on Cultural Diversity). The idea defended is as follows: the respect for cultural diversity is a prerequisite for any development process in as much as development, whose primary aim is to improve the standard of living of individuals, cannot be implemented in the long term in disregard of the culture of the populations concerned. That is, their practices, traditions, rituals, languages, institutions or capacities. As such, Sustainable Development also means inclusive, ‘integrated’ development adapted to the needs and realities of a region. On the basis of this principle, culture extends its tentacles into the economic dimension of Sustainable Development: through the emergence of the cultural industry. The cultural tourism extends its frontiers into the social dimension through the sense of individual and collective well-being. It is also noted, the inclusion of cultural realities in educational programmes designed by public authorities. Culture is included into the environmental dimension through the protection of minorities and indigenous peoples in the realisation of activities with a high environmental impact, the prerequisite of indigenous knowledge and environmental management, tradition-based environmental knowledge amongst other variables.

The views of Songue (2011, p. 169) noted that development does not only refer to elements with measurable and traceable results in the social, economic, political and cultural transformation in societies. It is also an ideological construct combined with the worldview. In the African context, this dynamic is built on the conceptual pillars conceived by the current school of thought known as Pan-Africanism that emphasises the need for an awakening of consciousness in Africa for the purpose of political and economic self-determination, regional integration and an improvement in the living conditions of the population through an ‘African renaissance’ (Munongo & Tadjadjeu, 2016, pp. 34–51). Like the European renaissance and the Southeast Asian renaissance, the African renaissance is in line with the will of the peoples to forge a destiny for themselves in accordance with their legitimate aspiration (Ndongo, 2006, p. 12.). The concept of ‘African renaissance’, according to Diop (1948, pp. 57–65.) refers to the restoration of the place of Africa and the African man in the evolutionary history of the world, both in terms of the origin of humanity and in terms of civilisation, thus stating Pharaonic Egypt, the oldest civilisation (The Negroid civilisation). The knowledge that was the pride of ancient Greece and the West today, and whose roots lie in African civilisations (Ndongo, 2006), must be recognised, restored and brought up to date. The main objective of the African renaissance is the restoration

of Africa's fundamental values, among which is the updating of the criteria for the valorisation of social and material capital drawn from the ancestral heritage. It is this renaissance that leads to what Ki-Zerbo (2013, p. 84) called turnkey development (Développement clé en tête).

(b) The revalorisation of the social and solidarity economy

The quintessence of the values advocated by the African renaissance is based on beliefs that have been built up through exchanges within communities throughout history. Thus, these beliefs reflect the identity logic of the African society and hence, of the individuals who constitute it. According to Smith (1949, p. 23), human societies are essentially consolidated by commercial ties, be they sales, leases or barter. Therefore, it is up to each society to set its own scale or criterion for valuing goods and services in order to ensure collective well-being. In the same vein, Marx (1965) considers that in any human community, the economic structure serves as the societal foundation. Thus, the strength of the latter is decisive for the prosperity of other institutions, including politics, law, religion, arts and sciences. Through the introduction of the wage system, the monetisation of services and the valorisation of services on an upward scale, Western societies value well-being on the basis of the acquisition of academic or professional degrees, a high income and a luxurious lifestyle signified by a high accumulation of individual wealth. Hence, the capitalist system that sets up a vicious circle in which competitiveness is the norm and social strata are stratified. In African societies, the assumption of exchange is that services are equal. According to Fofi Asare Opoku (cited by Pondi, 2011, p. 470.), development from an African perspective is dynamic and aimed at raising the standard of living of the entire social system, which includes at its heart the community composed of the different families of one or more villages. Thus, the social economy is presented as a common practice. According to Peemans (1997, p. 109), the social economy belongs to a fabric of production that existed before colonisation, but which was both marginalised and diversified by the latter and during a good part of the post-colony period. As a result of this marginalisation, it is currently practised by small-scale producers who represent two-thirds of the world's production system (Laurent & Peemans, 1997, pp. 945–946) and feed 70% of the African population (Songue, 2011, p. 189). Contrary to Western practice, which places the market at the centre of exchanges, this system of flow of goods and services places people and therefore social relationships at the centre of exchanges. This is illustrated by the fact that the criteria for valuation are based on links of solidarity, kinship, neighbourhood or community. According to Laurent and Peemans (1997, pp. 945–946), it is a question of valuing networks which, through their complexity and flexibility, support the permanence and recreation of social links, and therefore a real social economy system. His approach also has the advantage of recalling the truth of the African historian Ki-Zerbo (2013): one does not develop, one develops himself. According to Boubacar Diop (cited by Laurent and Peemans 1997), the confrontation of these two concepts of development is a cultural struggle that is inseparable from the political and scientific struggle. According to the principles advocated by Agenda 21, cultural diversity is the main heritage of humanity and its development relies on the

municipality of social actors and local governments (Agenda 21 of culture). Thus, attention is focused on decentralised cooperation (Songue, 2011, p. 191). It is a question of setting up a participatory system in which the African populations in their entirety and in their particularity take part in the development process. Hence, the need for the African state authority to position itself as a stimulator by instituting avenues that encourage social and societal development:

- an intellectual and cultural elite with the task of propagating local knowledge in view of popularising African cultural references, enhancing African identity and history and its values;
- a political and administrative elite with a mandate to exercise leadership in accordance with the rules of traditional African societies, in particular, a leadership of service whose wealth is measured not in terms of accumulated assets but in terms of unequalled networks of social, family and spiritual contacts;
- an economic-technical and scientific elite whose functionality is to increase the production of wealth and propel African countries (Pondi, 2011, pp. 478–480).

The issue at stake in the institution of these different avenues is that of valuing the different social strata not on the basis of the market value advocated by the capitalist vision but on the basis of the non-market value advocated by African culture or the Pan-African school of thought.

(c) **Indigenous knowledge and culture as a basis for local development in Africa**

According to Paulin Jidenu Houtondji (cited by Youssouf, 2013), the notion of indigenous knowledge implies the body of knowledge whose origin in itself is to be found in the background of a body of cultural data which is its fuel, that is, it emerges from itself and is based on the empirical and intellectual data of a culture. In this respect, the challenge for Africa is double fold: to use its artistic and cultural wealth to underpin the development of the identity and collective identity of the populations on the one hand, and the development of the cultural sector on the other. Thus, to serve as an impetus for the socio-economic and political development of the entire community and strengthen democratic governance. The effectiveness of such a development project in Africa will rely mainly on decentralisation as a tool for implementation and on the African cultural renaissance. This developmental approach assigns to local authority, responsibilities in the management of sustainable development. It postulates that the sustainability of development depends on the dynamism and involvement of local populations. The aim is to enable local people to lift themselves out of poverty and to expand their capacity for initiative. Muiu and Martin (2011, pp. 127–134) conceptualize a new paradigm called ‘Fundi wa Afrika’ which refers to a system of governance in which Africans borrow from the functional survivals of traditional political systems to merge with modern political institutions. In other words, it is a question of involving traditional authorities in public policies; not as a relay of the administration but as a link taking part in decision-making. The case of the State of Botswana is cited as a reference. Botswana established the *Kgotla* as a state institution in which traditional leaders and ministers of the Republic sit as a college and whose deliberations have decision-making powers. For example, in

1991 the *Kgotla* vetoed the construction of an irrigation infrastructure on the Okavago River.

At the local level, in cities or districts, culture appears as a resource for sustainable development. The organizations of the civil society are thus called to bring their contribution there by concrete actions in the form of development project. In concrete terms, it is about restructuring the African civil society. The latter must leave the stage of an organization whose essential function is that of “alarm bell”, to be an agent of societal transformation as well on the economic as social level (Songue, 2011, p. 196). Hence, the need for an environment conducive to the emergence of business incubators or start-ups. That which is at stake is setting up a local development process that highlights the strategic moments when public, private and social organizations must intervene in order to support this process (Klein, 2008, p. 66). These business incubator and start-up initiatives are emerging in underdeveloped countries in a context that illustrates the inability of these countries to launch profitable investment projects that can trigger the development process (Nanfosso & Tchouassi, 2011, p. 330.) due to their low income levels. Considering the need for business development in Africa in terms of goods, services, technology and even economic model, the objective would be to encourage and promote start-ups not of Western borrowing but of social and solidarity economy whose priority would be to meet the needs of its members and the population. Klein (2008) sees an opportunity to promote individual or collective projects related to the valorisation of cultural resources, protection of the collective heritage or the creation of employment in the community, etc. A promotion of these projects with the aim of transposing them into social objectives driven by actors and social groups constituting the local community. Thus, creating a community dynamism that gives rise not only to the viability of the said projects, but also to the birth of a solidarity and collective consciousness within the host community. This would allow, on the one hand, to nourish a source of collective entrepreneurship and connection with efficient economic networks conducive to innovation and, on the other hand, to implement an economic model that advocates, beyond the production of wealth, both the well-being of the majority strata and the fulfilment of a social projects.

According to Nanfosso and Tchouassi (2011, p. 343.), Africa’s development prospects by 2060 are based on the social and solidarity economy, given the flexibility of its characteristics and the hope it inspires. According to figures from the investment fund Partech Ventures, African start-ups have attracted in the year 2016, about 367 million dollars, an increase of 33% compared to 2015 (Abdelkrim, 2017); Despite Covid-19 and its deleterious effects on economies around the world, tech start-ups on the continent raised more funds than the previous years, with a 44% growth in 2020 (Abdelkrim, 2021). The first three months of the year 2021 recorded a raised of \$231.7 million, a significant increase on the \$62.2 million raised in the fourth quarter of 2020 (Moko, 2021). These figures illustrate an opportunity for Africans not only to mobilize local resources but also a strategic connection between the local and the global. This is an entrepreneurial venture that impacts various sectors of society, including agriculture, trade, IT, health, education, etc.

(d) Cultural education policy as a tool for promoting indigenous sustainable development

According to Diénaba Doumbia (cited par Pondi, 2011, p. 472), there is an interdependence between cultural policy and educational policy. The main challenge of linking these two sectors, notably culture and education, is to remember where we have come from in order to discern where we are going. Equally, to learn in this regard the lessons of recent or ancient history in order to build an African cultural and political model in all channels of exchange with the outside world. Also, to visibly add a new touch to the world's inheritance (Mbassi, 2011, p. 14, 163). Songue (2011) sees this construction in two phases: assimilation and accommodation. Assimilation, referring to the need to return to the ancestral heritage. The objective of this retrospection would be to push the African populations to appropriate the sacred concepts and values that serve as an agent of consolidation and thus transform a people living on a given territory into a nation with a common destiny. In the same vein, Cheikh Anta Diop (cited by Boris Bertolt, 2011, p. 437) affirmed that for us, the return to Egypt in all domains is the necessary condition for reconciling African civilisations with history; for building a body of modern human sciences, for renovating African culture. Egypt will play the same role in a rethought and renovated African culture as Greco-Latin antiquities do in Western society. As far as accommodation is concerned, it is the logical continuation of assimilation. Once the assimilation process has been completed, it is a question of reorganising ancestral knowledge in order to adapt it to the contemporary context imposed by globalisation and thus, establish a balanced order in which Africa can define itself and flourish. This is a process of modernisation that Songue (2011, p. 193) presents as a profound movement ensuring the transition from an old predominant mode of production to another new mode of production allowing the construction of popular and national or pan-African sovereignty and the real participation of the popular strata in political and economic life. This therefore raises the need for Africans to build a strategic vision of the relationship they intend to maintain both intrinsically and with the exogenous world. According to Philippe Moreau-Defarges (cited by Ella 2011, p. 317.), any approach to space is historical. Every man and every group perceives the world through its culture. Considering that the expression of this perception of the world is preserved over time in the linguistic heritage, the latter thus represents the trait of cultural identity, integration, unity and the vehicle of an intergenerational heritage. As noted by Montesquieu (cited by Kake 1985), as long as a people has not lost its language, it can keep hope. The linguistic heritage, as Cheikh Anta Diop (cited by Kana 2011) confided, even if unwritten, is considered to be the crystallisation in enigmas that are more or less difficult to decipher of the history of a people. It necessarily contains traces of the entire past of the people who speak it, that is, their cultural heritage.

4 Conclusion

This paper has examined the place given to tools for dialogue and decision-making to integrate the customs, cultural and traditional aspirations, values and motivations of African stakeholders into public policies to enhance development. It equally identifies Black African indigenous tools used to understand the environment and the way it functions in enhancing efficiency in mitigating the effects of climate change. This is in line with the 1992 Rio Declaration in Principle 22, that emphasises indigenous peoples and communities and other local communities have a vital role to play in environmental management and development because of their environmental knowledge and traditional practices.

The paper notes that Black African indigenous knowledge, customs, traditions and belief systems presents development as a descriptive concept of community dynamics and solidarity that takes place within a geographical framework for social well-being. This gave rise to the elaboration of Agenda 21 for culture which leveraged culture as a component for human development. Thus negating the western notion of development as a question of conceiving well-being and needs solely on economic and production variables, but equally in terms of the cultural affiliation of the populations concerned.

States should therefore recognise their identity, culture and interests, that gives them all necessary support and enable them to participate effectively in achieving sustainable development. In order to realise these missions attributed to both populations and states, a territorial and local approach to development is advocated.

References

- Abdelkrim, S. (2017). *Les start-up africaines battent des records de levées de fonds*. http://www.lemonde.fr/afrique/article/2017/03/07/les-start-up-africaines-battent-des-records-de-levees-de-fonds_5090537_3212.html
- Abdelkrim, S. (2021). *Les start-up africaines battent des records de levées de fonds*. <https://www.archyde.com/african-tech-44-more-fundraising-in-2020/>
- Agenda 21 of culture.
- Bernard, L. (2006). *Balthazard*. Le développement durable face à la puissance publique.
- Bertolt, B. (2011). Jeunesse africaine et développement de l'africanisme eurocentriste à l'afrocentricité, in Pondi, J.-E. (dir), *Repenser le développement à partir de l'Afrique*. Afrédit.
- Brundtland Report. (1987).
- Diop, C. A. (1948). Quand pourra-t-on parler d'une Renaissance Africaine? in *Le Musée Vivant*, n° spécial 36–37.
- Ella, W. M. (2011). Le concept de 'mise en valeur' dans la politique de développement colonial de la France. Le cas du Cameroun. In J.-E. Pondi (dir), *Repenser le développement à partir de l'Afrique*. Afrédit.
- Kana, C. C. F. (2011). Cheikh Anta Diop le panafricaniste: un repère pour l'Afrique et sa jeunesse? In *Ethiopiennes* n°87. Littérature, philosophie et art 2ème semestre.
- Take, I. B. (1985). Culture africaine, identité culturelle, développement, dialogue des cultures. *Ethiopiennes* numéros 40–41, Revue trimestrielle de culture négro-africaine. Nouvelle série - 1er trimestre - volume III n°1–2.

- Klein, J.-L. (2008). Les jalons d'une vision alternative: du développement centralisé descendant au développement local ascendant. In Pierre Beaudet, Jessica Schafer et Paul Haslam. Introduction au développement international. Approches, acteurs et enjeux, University of Ottawa Press, Series: Études en développement international et mondialisation.
- KI-Zerbo, J. (2013). A quand l'Afrique ? Entretien avec René Holentein: D'en bas Lausanne.
- Laurent P.-J., & Peemans, J.-P. (1997). Crise de la modernisation et pratiques populaires au Zaïre et en Afrique. In *TiersMonde*, tome 38, n°152. http://www.persee.fr/doc/tiers_1293-8882_1997_num_38_152_5210_t1_0945_0000_1
- Marx, K. (1965). *Le Capital*. Edition électronique, Presses Universitaires de France.
- Mbassi, L. (2011). Les temps sont-ils accomplis? De l'idée et de l'usage du pouvoir politique en contexte africain. In J.-E. Pondi (dir) *Repenser le développement à partir de l'Afrique*. Yaoundé, Afrédit.
- Moko, C. (2021). Les start-up ouest-africaines ont levé 1, 34 milliard \$ à fin septembre (Baobab, <https://www.agenceecofin.com/next-tech/2909-91957-les-start-up-ouest-africaines-ont-leve-1-34-milliard-a-fin-septembre-2021-baobab-insights>)
- Muii, M. W., & Martin, G. (2011). Repenser l'Etat, la démocratie et le développement en Afrique: Fundi wa Afrika. In J.-E. Pondi (dir), *Repenser le développement à partir de l'Afrique*. Yaoundé: Afrédit. nations. Les grands thèmes. Edition électronique, Collections Les classiques des sciences sociales: Québec. <https://doi.org/10.1522/cla.sif.sma.rec6>
- Munongo, V. G. N., & Dzesseu, S. F. M. (2016). Repenser le concept de développement durable. Digressions sur le développement durable. Revue Francophone du Développement Durable. Hors-série n°4.
- Munongo, V. G. N. & Tadjadjeu, J. M. (2016). African Renaissance in the United States of Africa: A historical and political approach of a Panafricanist vision of Africa, *Africology. The Journal of Pan African Studies*, 9(2). California Institute of Pan African Studies. (<http://www.jpnafrican.org/docs/vol9no3/9.3-4-Tadjadjeu.pdf>)
- Nanfosso, R. A. T. & Tchouassi, G. (2011). Quel modèle de développement en Afrique cinquante ans après les indépendances? In J.-E. Pondi (dir), *Repenser le développement à partir de l'Afrique*. Afrédit.
- Ndongo, N. (2006). *Théories sur la Renaissance Africaine: Ensemble changeons l'Afrique*. Edition menaibuc.
- Peemans, J.-P. (1997). *Crise de la modernisation et des pratiques populaires au Zaïre et en Afrique*. L'Harmattan.
- Pondi, J.-E. (2011). Repenser le développement à partir des spécificités africaines. Quelques balises. In J.-E. Pondi (dir), *Repenser le développement à partir de l'Afrique*. Afrédit.
- Rist, G. (2007). *Le développement: Histoire d'une croyance occidentale.*: Presses de Sciences Po (P.F.N.S.P.), Collection références.
- Smith, L. T. (2012). *Decolonizing methodologies: Research and indigenous peoples*. Ebooks Corporation.
- Smith, A. (Trad. Française 1949). Recherches sur la nature et les causes de la richesse des.
- Smouts, M.-C. (2008). Le développement durable: valeurs et pratiques. In M.-C. Smouts (dir), *Le développement durable. Les termes du débat*. Armand Colin, Collection Cursus.
- Songue, G. P. (2011). L'imposture des politiques de développement en Afrique: entre illusions, faillite et besoin de refondation, in Pondi, J.-E. (dir), *Repenser le développement à partir de l'Afrique*. Afrédit.
- UNESCO Declaration on Cultural Diversité
- Youssef, K. (2013). Des savoirs endogènes au développement endogène: le Pari de l'intégration africaine, www.gereaphilo.over-blog.com

Indigenous Knowledge and Community Development in Africa: A Framework to Explore the Approaches, Philosophies and Practices in Ghana



Evans Sakyi Boadu

Abstract Indigenous knowledge (IK) and contemporary development approaches, philosophies and practice are often weaved together in indigenously-driven development programmes in Africa and Ghana is no exception. IK ideals are deeply rooted in informal governance and relational structures, norms, values and other cultural realities in most indigenous societies. IK is often unfolded within the indigenous settings but is not fully operationalised, understood and constructed. Nonetheless, the scope of IK values in community-based development activities are often vague and remain contested. Thus, it is appropriate to have a broader understanding of the approaches, philosophies and practices used in community development activities in Ghana. Employing a qualitative analysis approach, 31 traditional and community development leaders were interviewed through in-depth and semi-structured interviews to examine the indigenous epistemological values of community development activities. The efficacy of indigenous knowledge was established as an opportunity after several tangible and intangible indigenous values, methods and practices including consensus building, collective decision making, dialogues, relational stakeholders, social accountability, transparency, and other cultural realities were proved to be useful in community-based development. The study concludes that without a shared construct of what truly constitute the methods, concepts and practices, there can be no shared commitment towards the utility of cultural values in community-based development.

Keywords Africa · Culture · Ghana · Indigenous knowledge · Community development

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1 Introduction

The term ‘indigenous’ is often misconstrued in the western context to be mean primitive and rudimentary (Boadu et al., 2020). Nonetheless, within the indigenous societies, indigenous knowledge (IK) describes the everyday relational veracities, activities and patterns that serve as the basis for initiating social, political and economic philosophies that are rooted in unique cultural views (Boadu et al., 2020; Ewane & Ajagbe, 2018; Naamwintome & Millar, 2015). IK is often used interchangeably with traditional knowledge (TK) and in this chapter, the author will use them accordingly. The immediate denotes cultural values, norms and other social authenticities that have been passed on from past generations to the other intended to shape the present experiences (Reyes-garcía et al., 2018). The indigenesness within an African society emanates locally and it is context-specific. It is the dynamic ways of doing things through the utility of folk knowledge to enhance the lives of the people (Ewane & Ajagbe, 2018; Odora-Hoppers, 2002).

The notions of indigenous knowledge competence in development and pathways for attaining it have become a pursuit not only in the humanities but in other fields of studies in Africa (Domfeh, 2007; Naamwintome & Millar, 2015; Odora-Hoppers, 2002), Ghana is no exception (Boadu et al., 2020). Professed to be far from the immediate concerns, there is a growing quest among indigenous researchers to unravel the philosophies, approaches and practices embedded in traditional knowledge that could curb the social, political and economic impasses within the indigenous societies (Briggs, 2005; Fernández-Llamazares & Cabeza, 2018; Odora-Hoppers, 2002).

While the relevance of TK in community development is not in doubt (Breidlid, 2009; Ewane & Ajagbe, 2018; Naamwintome & Millar, 2015), yet, it is often considered secondary to contemporary development paradigms (Boadu et al., 2020). Moreover, it appears that the contemporary development concepts are not naturally fit within the indigenous context (Boadu et al., 2020; Ewane & Ajagbe, 2018), thus, the chapter will outline innovative indigenous development perspectives that can shape the emerging relationship between Afrocentric and Eurocentric development viewpoints.

There are evidence of an increasing demand among indigenous scholars in Africa to incorporate indigenous values in development (Domfeh, 2007; Odora-Hoppers, 2002), tourism (Guri et al., 2020) and evaluation theories, methods and practices (Chilisa et al., 2016; Cloete, 2016). Supplementary to this demand is a consistent quest among scholars, policymakers and local development experts to lend support to indigenous community-based development initiatives (Han & Gao, 2019; Haren et al., 2019; Patel et al., 2012). However, while the pursuit for indigenous knowledge among scholars has been high, the utility of indigenous values in development among contemporary experts is yet to receive equal support, thus, its neglect in mainstream development concepts (Khumalo & Baloyi, 2017). Diagnosing ways of determining the nature and scope of indigenous values and their efficacy in community development actions could prove to be useful in addressing the development impasse in Ghana and Africa at large.

2 The Dilemma of Indigenous Knowledge and Development

African indigenous knowledge is generally underutilised, at best, it is modified and adapted in community development activities (Boadu et al., 2020). The World Bank Group (2004) observed that IK systems are great development ideals, however, IK has not properly been integrated into the mainstream development process. Nonetheless, there are no disputes about indigenous development ideals rooted in the fabrics of indigenous settings and other indigenous relational structures of governance and management (Domfeh, 2007). The problem is that, despite the potential benefits of TK in development, indigenous development scholars and researchers are yet to adequately harvest the possible development instincts embedded in IK. Besides, there is growing emphasis on building a synergy between indigenous and modern sustainable development notions, yet, the idea of indigenous knowledge has greatly been deserted in mainstream development literature and such an omission is unfortunate.

It is within the indigenous settings where indigenous development values and philosophies are unfolded though often not fully operationalised. The revered knowledge system has existed in indigenous societies in Africa including Ghana in the face of contemporary development approaches and has been applied through its approaches, values and practices (Naamwintome & Millar, 2015). This knowledge has remained and sustained local communities although it is often considered subordinate to western development knowledge systems and least analysed (Wane, 2020). Indeed, the contextual relevance of development approaches among scholars continuous to increase the demand for the integration of folk knowledge and ideals in development theories, methods and practices (Boadu et al., 2020; Domfeh, 2007; Naamwintome & Millar, 2015).

Indigenous communities are the custodians of IK, thus the need for the scientific community to lend an ear to these communities when it comes to community development. However, it appears that there is a highly acquired taste for importation and modification of western development approaches to the detriment of IK, especially in Africa. This has the potential to diminish the continent knowledge base and context-specific remedies that could help curb the continent development issues. Compared to other bodies of knowledge in development, IK is underutilised, and in instances where that component of knowledge is applied, it is often adapted or misappropriated (Ewane & Ajagbe, 2018; Wane, 2020). The onus, therefore, is on African scientists, researchers, scholars to harness IK developmental impulses for the benefit of the indigenous societies. However, there is continuous knowledge bias towards IK which is engrained in colonial hangovers that makes it difficult to be accepted by those who were once perceived to be rudimentary in development.

3 Contextualizing the Indigenous Knowledge in Sustainable Development

Indigenous knowledge systems are rooted in myriad complex structures of social, governance, economic and other cultural realities. It is local knowledge that is unique to a specific indigenous society. In indigenous societies, cultural values, beliefs, norms, rules, taboos inter alia are embedded in indigenous knowledge which is the viewpoint of the local people in their social, political endeavours (Boadu et al., 2020). Thus, to utilise it holistically in development will require both non-indigenous and indigenous people to properly bring together the various tenets that could ensure socio-economic development (Domfeh, 2007).

It is worthy to note that indigenous knowledge and cultural values are gradually becoming concepts in the community-based development literature (Carson et al., 2018; Mbah, 2019; Reyes-garcía et al., 2018). The relevance of indigenous knowledge and culture in the development literature are not in doubt (Bredlid, 2009). Moreover, in Africa, IK could sometimes be a difficult construct due to the diverse socio-cultural contexts (Sillitoe, 2016). Nonetheless, the ontological philosophies in most African societies are in part entangled in relational structures and patterns that professes informal collectiveness between nature, culture and society (Ewane & Ajagbe, 2018).

Indigenous knowledge systems are basically indigenous socio-cultural values and norms (Bredlid, 2009; Odora-Hoppers, 2002). These sociocultural values and systems work within the various relational framework of collectiveness interacting together as opposed to isolationism (Odora-Hoppers, 2002; Boadu et al., 2020). Indigenous knowledge coupled with other folk arts, norms, and belief systems has been used in various community sustainable endeavours. The effect of indigenous knowledge on local innovations have been emphasized due to its influence on how people think, act, and behave in such societies (Bredlid, 2009; Masoga, 2019). Besides, there is a positive relationship between indigenous knowledge and community development (Boadu et al., 2020; Bredlid, 2009; Domfeh, 2007). Thus, indigenous knowledge in this respect could provide an added value to the notion of sustainable development.

The notion of sustainable development which was initially put forward and explained by the World Conservation Strategy champions the utility of social factors (IUCN, 1980). They observed that “for development to be sustainable it must take account of social and ecological factors, as well as economic ones; of the living and non-living resource-base; and of the long term as well as the short-term advantages and disadvantages of alternative actions” (IUCN, 1980, p. 23). The definition affirmed that for development to be sustainable, there is the need to consider social and communal factors. IK is the basis upon which the social, economic, scientific, and political identities of the indigenous societies *are repose-on* (Odora-Hoppers, 2002). UNESCO (2009) argued that for a better understanding and have meaning, indigenous knowledge must be incorporated into a given socio-cultural context. These social aspects are embedded in local knowledge that has been sustained and passed onto several generations living in a particular cultural community.

While indigenous knowledge was not explicitly mentioned in the United Nations Sustainable Development Goals (SDG's), social inclusiveness and representative decision making (SDG 16) were keenly represented (UN General Assembly, 2015). Besides, the extensive literature on indigenous knowledge and sustainable development in recent time attest to the relevance of IK in the development process (Bardy et al., 2018; Stump & Isendahl, 2019). Besides, the integration of indigenous knowledge in the development process has become a mantra in the current scholarship (Agyemang et al., 2019.; Hlalele, 2019). The narrative among some African scholars is that the surest way to negotiate the present development impasse in indigenous communities is to integrate indigenous knowledge into the design, implementation and evaluation of community-driven development activities (Bardy et al., 2018; Boadu et al., 2020; Domfeh, 2007).

Generally, indigenous communities in continue to use various traditional knowledge systems in their everyday lives; for instance, in natural resource management (Guri et al., 2020), traditional medicine, (Domfeh, 2007) selection and nomination of heirs to traditional thrones (governance) (Odotei & Awedoba, 2006), communal labour/community engagement (Boadu et al., 2020), herbal medicine (Hens, 2006), community biodiversity and conservation (Hens, 2006), as well as other social activities. Whilst some indigenous practices are deemed rudimentary, there are several best indigenous values that have the potential to complement community-based development activities. Every society at some point have had to rely on indigenous knowledge values and ideas, however, the integration of traditional ideas into development concepts are at an emergent stage in Africa.

African cultural diversities and traditional knowledge systems should be explored in its pursuit of socio-economic development (Bardy et al., 2018; Boadu et al., 2020). Traditional values (both instrumental and intrinsic) are essential for community-based social development (Patel et al., 2012). However, contemporary development scholarships have failed to conceptualized indigenous ideals in analysing community-based development activities.

4 Design and Methodology

Given the study objectives, the researcher adopted a qualitative descriptive and exploratory analysis approach (Creswell, 2017). The approach allowed for a thorough examination of indigenous knowledge philosophies, values and practices and community development approaches using several qualitative data collection tools and analysis approaches.

4.1 Case Study Country and Districts

Ghana is located on the coast of West Africa with a total land area of 238,537 square kilometres with a GDP of \$65,518 million in 2018. The country is bordered on the east by Togo, Burkina Faso on the north and northwest, Côte d'Ivoire on the west and the Gulf of Guinea on the south. For administrative purposes, Ghana is divided into sixteen (16) regions with 216 municipal and districts assemblies. The Eastern region has 26 districts and Akuapim South and Akuapim North are the two case study districts. Akuapim South has a total land size of 224.13 sq km with a population of 37,501 persons while Akuapim North covers a land area of about 450 sq. km with 136,483 inhabitants (GSS, 2012). Traditionally, the Akuapim South district is under the Okuapeman Traditional Council (OTC) while Akuapim North is situated within Akuapim Traditional Area (ATA). Adherence to traditional knowledge systems and values in these traditional areas is of great importance to the people. Thus, the choice of the study areas was based on the existence of indigenous governance and administrative structures, the rich insights of indigenous knowledge, and other cultural practices pertinent for indigenous community development.

4.2 Data Collection Tools

Data for this paper were collected during the periods of February–August 2019 and May–June 2021. This paper is part of an ongoing study on indigenous knowledge systems, culture, community-based development and evaluation in traditional communities within *two* local government areas in the Eastern Region, Ghana. Thus, data were generated through a portfolio of data collection instruments as guided by the study objectives.

4.2.1 Key Informant Interviews (KII)

Several in-depth interviews were conducted with indigenous key informants from the case study areas. The study employed an interviewer's guide approach through face-to-face interviews with 12 opinion or community development leaders and traditional leaders from 3 out of 26 districts in the Eastern region of Ghana.

4.2.2 Semi-Structured Interviews

For a robust analysis and rich data, the researcher employed semi-structured interviews using thorough field notetaking. The approach provides the opportunity for

dialogue or two-way communication (Creswell, 2017), which allowed the respondents to express their perspectives on indigenous knowledge and community development. Using a face-to-face interviews approach, 19 interviews were conducted with community development leaders and other traditional leaders in the case study districts.

4.2.3 Documentary Evidence

The analysis was further shaped by other documentary evidence that was deemed relevant in the study. The local government act and chieftaincy act as well as other secondary literature were analysed. Using the triangulation approach the documentary evidence pertinent to the study were further reviewed and analysed.

4.2.4 Direct and Participant Observation

To supplement the field data, aspects of the data collected were obtained through direct and participant observation approaches. This was done through a well-thought-out methodical approach of noting and recording the flow of events, the interactions, relational patterns and networks within and among the indigenous people and communities. It offered the researcher the chance to observe community self-organised meetings, durbars, festivals, community engagement activities among others within the indigenous settings during different socio-cultural activities.

4.3 Sampling Process

The research used a single sampling procedure to select sampled participants out of the population. Purposive sampling was utilized in both in-depth and semi-structured interviews with community development leaders and traditional leaders. The study objective demanded a convenient sampling technique.

4.4 Data Analysis Approach

The study employed a portfolio of data analysis approaches. Thematic and content techniques were utilised to analyse the in-depth and semi-structured interviews after themes were developed from the transcripts through critical reading of all the transcripts and coding. Several themes and patterns were noted and analysed. The analysis focused on building an indigenous development knowledge narrative by

highlighting the identified indigenous philosophies, approaches and practices in the themes. Moreover, a triangulation approach was used to ensure data accuracy and consistency.

5 Findings and Discussion

The study identified several indigenous stakeholders, approaches, philosophies and practices that could be crucial for indigenous community development within the cases study areas. These include communal ‘ubuntu’ socio-cultural idea, illustrative maxim idea, relational stakeholder, community spirit, consensus building, collectiveness inter alia as some of the indigenous approaches, philosophies and practices for the design, implementation and evaluation of community development programmes. The indigenous governance systems coupled with indigenous relational patterns were identified to be the basis upon which community development programmes are designed and executed as illustrated in Fig. 1. The inclusion of indigenous people and their philosophies in the development knowledge acquisition could augment the design, implementation and sustainability of indigenous development programmes within the case study areas in Ghana. The following sections will unravel the connection between indigenous knowledge and community-based development and the indigenous relational philosophies, approaches and practices.

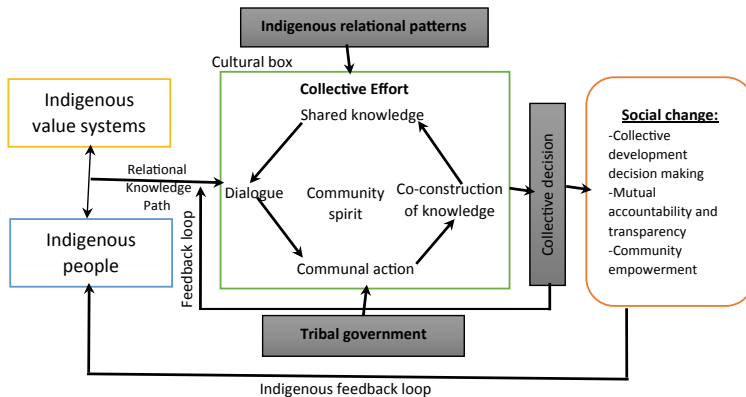


Fig. 1 Indigenous relational networks systems for community development. *Source* Author’s construct deduced from the field study

5.1 *Community-Based Development and Indigenous Relational Philosophies*

Generally, community-based development within the indigenous societies is rooted in multifaceted activities and values systems and the case study areas were no different. Socio-economic activities in indigenous communities tend to be embedded in relational patterns and knowledge systems owned by the indigenous people. The indigenous socio-cultural and socio-economic contexts are crucial when it comes to indigenous community development activities. Indigenous governance structures, social networks and relational patterns are the basis upon which essentially indigenous societal issues are resolved. These core values, philosophies and practices are specific to a particular indigenous community. The indigenous approaches, concepts, and practices coupled with other community-based development ideals have always sought to resolve, explain, understand and appreciate social, political and economic issues confronting local communities. Community-based development within the indigenous societies is everyday collective activities. There are multiplicity actors and factors working together in socially connected systems and networks as illustrated in Fig. 1.

The framework illustrates the indigenous elements that are embedded in the “cultural box” which can empower the individual indigenous member or groupings in the development knowledge acquisition process. The box entails some of the identified indigenous values such as shared knowledge, collaboration, communal action, dialogues, community spirit among others in the co-construction of indigenous development knowledge which could lead to social change such as collective community development, communal/social accountability and indigenous community empowerment as illustrated in Fig. 2. Besides, dialogues and consensus-building are crucial values within the indigenous settings. *‘Not leaving anyone behind’ could also imply the incorporation of these key indigenous development and cultural ideas by rethinking how indigenous concepts, methods and practices could be used to supplement modern development models to ensure sustainable development. Moreover, SDG goal 11.4 encourages the need to strengthen, protect and safeguard the cultural and natural heritage and these indigenous values when adopted could ensure that the said target is achieved.* The indigenous feedback loop could further help the indigenous development decision-makers as well as mainstream development partners to make culturally informed development choices that could be fed back into the indigenous relational development network model to advance several social changes as depicted in Fig. 1.

Several of the interviewees acknowledge the relevance of indigenous people and their knowledge system within the indigenous setting when it comes to community development projects. The study observed that indigenously driven development activities are designed utilizing several cultural norms, values ideas, social networks, relational patterns that are linked with a range of indigenous beliefs, practices and philosophies (as depicted within the cultural box) through a knowledge relation path. The incorporation of the indigenous relational structures as well as

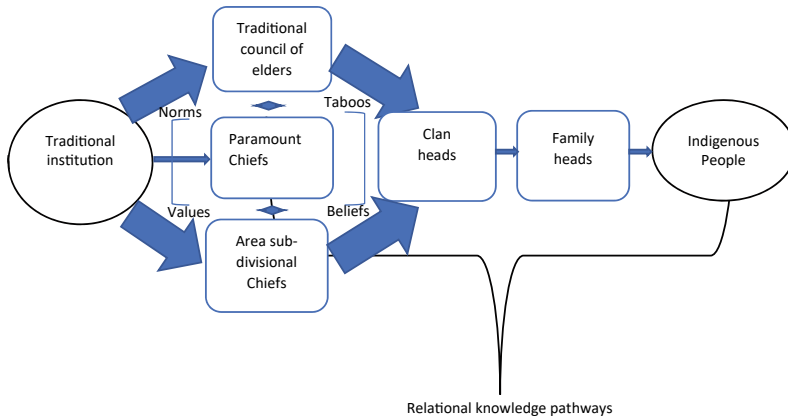


Fig. 2 Indigenous relational knowledge pathway. *Source* Author's construct from the field study

the tribal governments in community-based development programmes as illustrated in Fig. 1 attest to the weaving nature of designing indigenous development activities. Thus, designing an indigenously driven development framework will require a multi-dimensional approach. The concept of informal collectiveness was identified to be key since what is within the cultural box could only be achieved when there is a collaboration between the relational networks, tribal *administrative structures and local government institutions*.

5.2 Indigenous Governance Systems and Social Patterns

The study observed that within the case study areas, there are revered indigenous governance systems and relational structures. These indigenous institutions personify the cultural realities existing within these indigenous communities. The role of the tribal government which constitute the indigenous political, social and governance institutions (chieftaincy institution), is crucial in indigenous development. The indigenous governance structures and traditional authorities are vital indigenous structures that play important role in community development decision making and other development activities. A traditional leader pointed out that:

Indigenous territories and administrative institutions have existed in Ghana before the modern central government. Indigenous areas are under the leadership of tribal governments and previously use to have a lot of powers but currently have some quasi authorities invested in the paramountcy and divisional leaders. The constitution recognizes these traditional institutions and leaders and they play a key role in community development activities. They also work hand in hand with sub-national development authorities, local government and even central government in some instances.¹

¹ Interview with a Traditional Leader from ATA.

This is further emphasised by a community development leader:

The indigenous territorial areas makes social, political, and economic decisions for their people... but with the advent of democracy where government institutions have been well established, from the minister of local government to the district assemblies, their powers are limited. However, within the indigenous societies, the traditional institution is prominent in the community development activities, from consensus decision making to implementation and evaluation²

The study observed that in the indigenous setting there are tangible and intangible relational patterns between the indigenous authorities (tribal governments) and the individual (indigenous people). Thus, community development activities tend to run through various social relations and networks that could augment or hinder community development programmes. It was revealed that community-based development activities are nonlinear but go through the complex cultural box (values, norms, taboos, beliefs inter alia). These are rooted in several indigenous relational structures and other collective activities as depicted in Fig. 1. Fundamentally, community development within the indigenous setting is highly rooted in collaboration as observed by Boadu et al. (2020) in their study in Ghana.

5.3 Indigenous People and Relational Knowledge Path

There is a relational knowledge acquisition path that is generated due to the existing communal relations between the indigenous people and their culture which enhances accountability and transparency. It was revealed that community-based development activities tend to thrive within the indigenous setting because of consensus building, collaboration, community spirit and other ‘ubuntu’ ideals. It is anticipated that these intangible values coupled with collective decision making could bring about communal development, community empowerment, social change, accountability, transparency, and collective evaluation and reporting. Boadu et al. (2020) in their study maintained that indigenous people and cultural values need to be considered when designing a community-based development programme to ensure sustainability.

The indigenous governance structures serve as the custodians of the cultural ideals and knowledge systems that are necessary for social, political and development advancement. The study identified that the indigenous relational paths have several nodes for the acquisition and transfer of knowledge regarding community development from the traditional structures. The study established that, hierarchically, the traditional leader (chiefs) coupled with the traditional council of elders within the traditional areas are the embodiment of cultural knowledge. Nonetheless, there are several indigenous authorities such as the sub-divisional chiefs (who are heads of a

² Interview with Community Development Leader from OTC.

small traditional area), clan heads and family heads tend to be the conduit for gathering and dissemination of cultural values, norms, beliefs, taboos inter alia to the individual indigenous.

The relational knowledge pathways as depicted in Fig. 2 indicate that at every stage of the indigenous development process, there are various indigenous leaders and indigenous people who relay cultural values, norms, beliefs, taboos and other cultural realities (value systems) on development activities. The study established that within the indigenous setting knowledge regarding every social activity are deeply rooted in these various traditional leaders. While these knowledge acquisition patterns may prolong consensus building and delay indigenous information gathering and development decision making as illustrated it enhances community development sustainability.

It was established that community development activities within the indigenous setting are culturally sensitive due to the existing relational knowledge patterns between the traditional authorities and indigenous people. It was observed that within the indigenous communities, development activities are rooted in everyday realities and other cultural truths among individuals as well as the indigenous social networks as depicted in Fig. 2. A community development committee member pointed out that:

Traditional societies have their development programmes ... these are either initiated by the indigenous authorities' or the indigenous people with support from the entire indigenous governance structures. Various indigenous knowledge gathering activities are put together by the traditional leaders within the communities such as festivals, durbars, community gatherings to solicit information from the various relational stakeholders. In the indigenous communities, everything is done through relational knowledge structures and other social networks including community development.³

The study revealed that indigenous development knowledge and information are inherently rooted in the indigenous relational knowledge patterns.

5.4 Consensus Building and Communal Action

Indigenous collectiveness is key to community development in decision makings within the indigenous societies. The study observed that the indigenous value of collectivism is a crucial indigenous philosophy upon which the indigenous people co-identify their development impasses and find solutions within a traditional area. In the indigenous societies, development decisions are made through a collective process embedded in dialogue, shared goals, consensus building and another communal system that are accessible to many of the indigenous people within the traditional enclave. A point elaborated on by a community development leader:

Communal decision making is often used in community development activities. The process requires community self-organisation, consensus building and dialogue between traditional authorities and the indigenous people. Several indigenous social ethics within the indigenous

³ Interview with a community development leader from ATC.

context based on oneness and togetherness are the basis upon which community-based development activities are designed, implemented and monitored. Indigenous decision making is achieved through relational and collective social structures.⁴

The quote above is evident that within the indigenous societies there are several cultural and contextual ideals through which development decisions are taken which allow for indigenous people to actively participate in the community development activities. The study observed that the use of consensus building help to collectively identify community issues, generate accurate and appropriate information to resolve such indigenous community matters. The study outcome is consistent with evaluation studies conducted by Naamwintome and Millar (2015) in Africa where the indigenous collective philosophies are perceived to be key when designing a community-based development programme. *The study established that indigenous knowledge and other cultural philosophies passed on from several generations through oral traditions and other cultural rites have been the basis for indigenous political, socio-cultural, environmental and other wide range of development activities that have sustained the indigenous societies.*

The study further revealed that despite the power dynamics within the indigenous settings between traditional authorities and people, the entire community at some stage are greatly involved in the design, implementation and evaluation of any community development programme. *The SDG 16 which in part focuses on inclusive societies for sustainable development could be better enhanced when indigenous communities' values of collectiveness and collaboration are espoused. Besides, target 7 of goal 16 further encourages responsiveness, inclusivity, collaboration and representation when it comes to decision-making at all levels including indigenous societies.* The indigenous people do these through community durbars, festivals, community gatherings, social networks and other relational engagements. The communal development patterns within the indigenous societies are based on the logic of collectiveness and consensus-building which is far from been linear in its approach. One traditional leader pointed out that:

Community development activities within the traditional areas progress through consensus, first, between traditional leaders, the council of elders and sub-divisional leaders. Second, there is a continuous collaboration and negotiation between and among the indigenous governance structures and the indigenous people. You cannot do anything with the people. The consensus system has been practised for centuries although it could sometimes delay decision making because of the long consultations it ensures communal accountability and transparency.⁵

The notion of consensus building, interconnectedness, community spirits, social networking, dialogues inter alia within the indigenous societies revealed the nature, form and approach of the indigenous development decision making. These notions were identified to be rooted participatory community development approach.

⁴ Interview with a community development leader from OTC.

⁵ Interview with a Traditional development leader from OTC.

5.5 *Indigenous Relational Stakeholders*

The indigenous communities have several groupings that hold various cultural knowledge philosophies and innovations that are good for indigenous development activities that are mostly not privy to local and national development agencies. It was evident during the field study that there are multiple relational structures with embedded stakeholders that utilised indigenous philosophies and ideals in the design and implementation of community development programmes which is accorded with Mapitsa and Ngwato (2020) study. It was further observed that the various stakeholders from the traditional authorities to the individual indigenous people participate in the relational knowledge pathways as demonstrated in Fig. 1.

The study identified relational stakeholders both dormant and dominant who are actively involved in the community development activities. Several indigenous stakeholders comprising of traditional leaders (chiefs), sub-divisional chiefs, clan heads, ethic leaders, youth groupings, women groupings, family heads, community development leaders, individual indigenous members and other indigenous groupings such as farmers association. These groupings constitute the relational stakeholders and other social networks within the indigenous communities as illustrated in the framework below.

The study acknowledged that strict adherence to cultural values and norms by the indigenous stakeholder's tends to delay development decision making, which could hinder several of the SDG goals and targets including goals 1, 11.4 and 16.7. However, in order to address the development impasses within the indigenous settings, it may be vital to re-examine issues surrounding indigenous people:

- *empowerment,*
- *ownership,*
- *socio-cultural, political and economic inclusivity.*

The study observed that three main indigenous relational stakeholders actively participate in the community development activities at the various stages, from the design, through implementation and evaluation. The various groupings are interconnected and constitute the community stakeholder networks. The individual indigenous people voluntarily participate in the indigenous community gathering, decision making, communal labours (activities) and other social networks. These stakeholders are deeply rooted in indigenous camaraderie. It was evident that the individual indigenous stakeholders as illustrated in Fig. 3 are actively involved in the design of indigenous initiatives, assessment and delivery of community services. In terms of hierarchy, the individual stakeholders are at the lower end of the indigenous power relation. Nonetheless, the study revealed that the individual stakeholders can influence the final community development decision.

Indigenous communities have several stakeholders and as such development initiatives that aimed to advance the community needs all the stakeholders. There are multiple indigenous development role-players within the indigenous setting from the individual member, sub-divisional leaders through to the paramountcy. Despite the

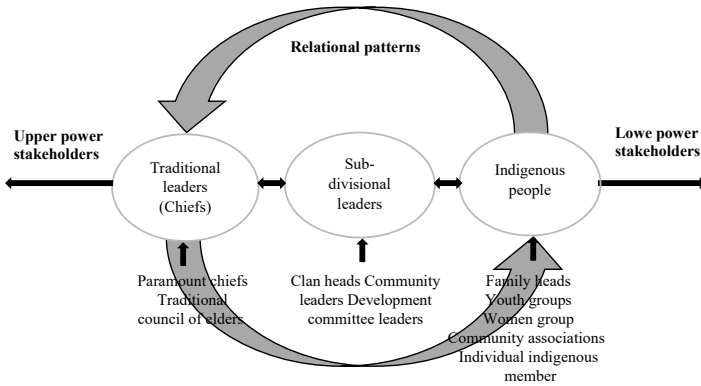


Fig. 3 Indigenous relational stakeholders. Source Author’s construct from the field study

power dynamics, the study realised that in some instances there is communal participation in the design, implementation and evaluation of the community development initiative, the individual members influencing the higher decision authorities and vice versa (see Fig. 3). The importance of community engagement was observed as cited in the interview extract below regarding community stakeholder’s participation and diversity:

We have various groupings from the individual community member, family leaders, clan heads, sub-divisional leaders the traditional council of elders. These groupings serve the interest of their people and represent them in the development decision-making process... But the individual indigenous people get to participate in community gatherings and engagement which also enhance their level of participation in the development decision-making process within the indigenous communities.⁶

The study revealed that indigenous community decision making and reporting tends to follow similar relational patterns whether from the lower power stakeholders within the indigenous society and vice versa. The study observed that while there is some level of communal participation in theory, in practice it is difficult to have active participation from all the community stakeholders. Nonetheless, the array of stakeholders in indigenous community social intervention initiatives was not in doubt although it was observed that between lower power members and the upper power stakeholders there are several participatory disconnects.

It is also evident that several of the community development programmes designed and implemented are not without the knowledge of the indigenous people. The study, however, realised the upper power stakeholders comprising of chiefs, traditional council of elders are pivotal in the final development decisions making and implementation and evaluation of community programmes. The traditional authorities appoint individuals and development committees to ensure that the indigenous development programmes are executed.

⁶ Interview with a Traditional Development Leaders from ATC.

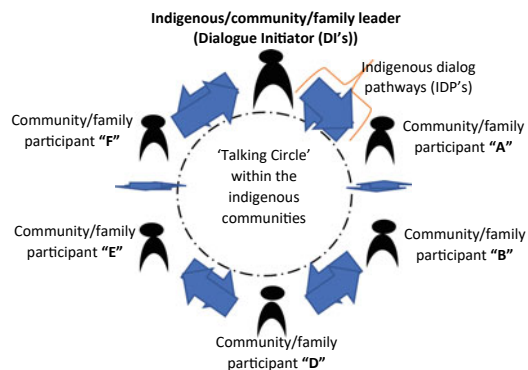
5.6 Talking Circles, Community Spirit and Inclusiveness

‘Talking circle’ (TC) was identified as an indigenous development concept that has the potential to safeguard the good of the indigenous community, empower the indigenous people, incorporate their cultural values, restructure the community development activities, promote community spirit as well as community healing. The study established that within the indigenous case study communities, TC is practised at the individual, family, and community levels as depicted in Fig. 4.

The study observed that within the indigenous societies key community development decisions are taken through a consensus-building rooted in TC. This involves the five levels of relational systems and indigenous stakeholders as identified in Fig. 2. Within each level, the indigenous leaders tend to serve as the dialogue initiators by gathering their people for various discussions including community development activities using TC as an indigenous concept of inclusivity. The study established that the concept involves family, clan, sub-divisional and community heads who serve as dialogues initiators (DI’s) within the TC (see Fig. 4). Through the indigenous dialogue pathways (IDP’s), indigenous participants (at the family or community level as denoted in the diagram with alphabets “A” to “F”), first listen to the dialogue initiator with keen interest; second, they participate in the conversation; third, share their perspectives on a particular community/family issues on discussion; fourth, work in partnership to arrive at a final decision-making outcome. Besides, the TC is also characterised by family or community dialogue, learning, sharing, participation, collaboration, consensus building inter alia which are crucial for participatory community development. One traditional leader elaborated that:

We have several social engagement activities, some at the family level, clan, community and at the courts of the traditional council of elders. These engagements bring about community comraderies among the local people. The sense of being involved in a community good cause increases people participation and ownership. And through these engagements, the traditional governance structures and indigenous people can identify the community pressing issues,

Fig. 4 A depiction of a ‘talking circle (TC)’ from the field narratives. *Source* Author’s construct from the field study



initiate an intervention for the issues, manage and assess such indigenous development initiatives.⁷

The quote above is evidence of the existence of a spirit of ‘oneness’ among the indigenous people when it comes to community-based development activities. The term ‘communal labour’ or ‘collective labour’ was often referred to by most of the interviewees as one of the numerous indigenous philosophies used to organize the community members within the indigenous settings for a common cause. These values and philosophies when espoused could have great potential for developing an indigenous participatory framework for community-based development action.

The study established that indigenous community spirit and indigenous people participation is trapped within traditional ethos such as talking circles, sharing, learning and co-production of knowledge. The acquisition of development knowledge and other forms and ways of knowing and learning are rooted in the point of view of the indigenous people *which are realized using the TC approach*. The concept of inclusivity and community engagement were identified as key social values within the indigenous societies and when adopted could help both sub-national and local development agencies to garner indigenous people support for any development activity. A community development leader pointed out that:

There is a deep sense of eagerness among people to actively participate in the social development activities and service delivery in the indigenous communities. Often the indigenous administrative and other relational structures have the support of the people and are able to engage and encourage the various indigenous stakeholders within their traditional areas to actively participate in the community initiatives. This is usually done through community gatherings, durbars, communal labour, and festivals. Participation is often a social activity and voluntary in nature and form.⁸

The study established that various indigenous development ideals are embedded in cultural realities that encourage community spirit, participation and engagement. However, they exist in multifaceted indigenous relational structures and institutions. These include communal action, social networks, shared values, self-organization and other indigenous modes of government embedded in social patterns and tribal governance systems that could motivate community development.

6 Conclusion, Limitations and Recommendations

Cultural values and indigenous knowledge have been identified as pivotal for sustainable development and should be incorporated into contemporary every development framework. The challenge is how to foster, conceptually, an interaction between present development concepts and culture or indigenous knowledge systems. Despite the uncertainties surrounding the relevance of indigenous knowledge, the recent

⁷ Interview with a Traditional Leader from OTC.

⁸ Interview with a community development leader from OTC.

quest to integrate indigenous ideas into sustainable development concepts is a step in the right direction. Opportunities do exist. Several indigenous philosophies, approaches and practices were identified including collective community development, dialogues, relational stakeholders, social accountability, transparency, consensus building and other cultural realities that could prove to be useful in complementing contemporary development approaches to ensure sustainable development. The relationship between these cultural values and development have been observed in studies in parts of Africa. The quest for indigenous communities to capitalize on the creative and innovative aspects of their culture in a manner that could help to advance their development. *These questions may be worth considering: first, is it possible to decolonise the contemporary model and framework of development to integrate indigenous notions, methods and practices? Second, do indigenous knowledge systems have a place in the present global development ecosystems? And; third, are we leaving minorities societies (indigenous people) behind on the sustainable development ladder? Despite the several indigenous development values and concepts identified, it may be useful if future research could probe further into these questions.*

6.1 Limitations

Judging from the apparent study design, the study might not be a true representation of Ghana's indigenous population since the research design was mainly an in-depth interview with a few indigenous community members and traditional leaders within the two case study districts. Moreover, the study specifically focused on two traditional and local government areas in the Eastern region of Ghana, thus, the outcomes and discussions are specific to the two case study areas. Besides, despite assuring participants of confidentiality, there were constraints regarding the in-depth audio recording interviews with some of the participants due to the rampant doctored voice recordings of government officials in Ghana at the time of the field study.

6.2 Recommendations

The development impasse in Africa, Ghana is no exception has compelled both indigenous and non-indigenous to look for alternative 'new' knowledge, approaches and frameworks to ensure sustainable development. Culture and indigenous knowledge are key in this discourse. IK is embedded in cultural values that are unique to a traditional area. To appreciate the indigeneity within the indigenous community development activities will require a better understanding of the approaches, philosophies and practices through a well-thought-out conversation with traditional leaders, elders and other cultural custodians. Thus, the following recommendations:

- The unfolding indigenous development epitomes identified need to be conceptualised, operationalised, understood and constructed better in community-based development programmes in Ghana as well as similar indigenous settings in other parts of Africa.
- The informal collectiveness within the indigenous development structures and by extension the indigenous relational stakeholders require further studies to unpack the relevance of such in contemporary development literature.
- The established tangible and intangible indigenous relational pathways could be the starting point to outlining indigenous knowledge values (or lack thereof) in community development.
- The struggle to agree on what truly constitute the indigenous ideas and practices in development concepts will require a shared commitment from both indigenous and nonindigenous scholars to unravel the utility of indigenous knowledge in development.
- Finding ways to have a broader understanding of the indigenous approaches, philosophies and practices used in community development activities among the indigenous governance structures and sub-national or national development agencies could prove to be useful.

References

- Agyemang, B. K., Ngulube, P., & Dube, L. (2019). Utilising knowledge management methods to manage beads-making indigenous knowledge among the Krobo communities in Ghana. *South African Journal of Information Management*, 21(1), 1–9.
- Bardy, R., Arthur, R., & Helen, A. A. (2018). Combining indigenous wisdom and academic knowledge to build sustainable future: An example from rural Africa. *Journal of African Studies and Development*, 10(2), 8–18.
- Boadu, E. S., Ile, I., & Oduro, M. Y. (2020). Indigenizing participation for sustainable community-based development programmes in Ghana. *Journal of Asian and African Studies*, 00(0), 1–20.
- Breidlid, A. (2009). Culture, indigenous knowledge systems and sustainable development: A critical view of education in an African context. *International Journal of Educational Development*, 29(2), 140–148.
- Briggs, J. (2005). The use of indigenous knowledge in development: Problems and challenges. *Progress in Development Studies*, 5(2), 99–114.
- Carson, S. L., Kentatchime, F., Nana, E. D., Njabo, K. Y., Cole, B. L., & Godwin, H. A. (2018). Indigenous peoples' concerns about loss of forest knowledge: Implications for forest management. *Conservation and Society*, 16(4), 431–440.
- Chilisa, B., Major, T. E., Gaotlhogwe, M., & Mokgolodi, H. (2016). Decolonizing and indigenizing evaluation practice in Africa: Toward African relational evaluation approaches. *Canadian Journal of Program Evaluation*, 30(3), 313–328.
- Cloete, F. (2016). Developing an Africa-rooted programme evaluation approach. *African Journal of Public Affairs*, 9(4), 55–70.
- Creswell, J. W. (2017). Research design: Qualitative, quantitative, and mixed methods approaches. *SAGE Publications*, 203–224.
- Domfeh, K. A. (2007). Indigenous knowledge systems and the need for policy and institutional reforms. *Tribes and Tribals*, 1, 41–52.

- Ewane, F., & Ajagbe, S. (2018). Indigenous knowledge and the development debate in Africa. *International Journal of African Development*, 5(1), 7.
- Fernández-Llamazares, Á., & Cabeza, M. (2018). Rediscovering the Potential of indigenous storytelling for conservation practice. In *Conservation Letters* (vol. 11, Issue 3). Wiley-Blackwell.
- Guri, E. A., Osumanu, I. K., & Bonye, S. Z. (2020). Eco-cultural tourism development in Ghana: potentials and expected benefits in the Lawra Municipality. *Journal of Tourism and Cultural Change*, 0(0), 1–19.
- Han, H., & Gao, Q. (2019). Community-based welfare targeting and political elite capture: Evidence from rural China. *World Development*, 115, 145–159.
- Haren, N. V., Fleiner, R., Liniger, H., & Harari, N. (2019). Contribution of community-based initiatives to the sustainable development goal of Land Degradation Neutrality. *Environmental Science and Policy*, 94(February), 211–219.
- Hens, L. (2006). Indigenous knowledge and biodiversity conservation and management in Ghana. *Journal of Human Ecology*, 20(1), 21–30.
- Hlalele, D. J. (2019). Indigenous knowledge systems and sustainable learning in rural South Africa. *Australian and International Journal of Rural Education*, 29(1), 88.
- IUCN. 1980. *World conservation strategy: Living resource conservation for sustainable development*. International Union for the Conservation of Nature and Natural Resources—IUCN.
- Khumalo, N. B., & Baloyi, C. (2017). African Indigenous knowledge: An underutilised and neglected resource for development. *Library Philosophy and Practice (Ejournal)*, 1–15.
- Mapitsa, C. B., & Ngwato, T. P. (2020). Rooting evaluation guidelines in relational ethics: Lessons from Africa. *American Journal of Evaluation*, 41(3), 404–419.
- Masoga, A. M. (2019). Viewpoint: Indigenous knowledge systems and environmental social work education: Towards environmental sustainability. *Southern African Journal of Environmental Education*, 35.
- Mbah, M. (2019). Can local knowledge make the difference? Rethinking universities' community engagement and prospect for sustainable community development development. *The Journal of Environmental Education*, 50(1), 11–22.
- Naamwintome, B. A., & Millar, D. (2015). Indigenous knowledge and the African way forward: Challenges and opportunities. *Oalib*, 02(03), 1–9.
- Odora-Hoppers, C. (2002). Indigenous knowledge and the integration of knowledge systems: Towards a conceptual and methodological framework. In C. Odora Hoppers (Ed.), *Indigenous knowledge and the integration of knowledge systems: Towards a philosophy of articulation* (pp. 139–143).
- Odotei, I. K., & Awedoba, A. K. eds. (2006). Chieftaincy in Ghana: Culture, governance and development (Vol. 1). *Sub-Saharan Pub & Traders*. (Vol. 1).
- Patel, L., Kaseke, E., & Midgley, J. (2012). Indigenous welfare and community-based social development: Lessons from African innovations. *Journal of Community Practice*, 20(1–2), 12–31.
- Reyes-garcía, V., Fernández-Llamazares, Á., Mcelwee, P., Molnár, Z., Öllerer, K., Wilson, S. J., & Brondizio, E. S. (2018). The contributions of Indigenous Peoples and local communities to ecological restoration. *Restoration Ecology*, 27(1), 3–8.
- Sillitoe, P. 2016. The knowing in indigenous knowledge: Alternative ways to view development, largely from a New Guinea Highlands' perspective. In *Ethnic and cultural dimensions of knowledge* (pp. 129–163). Springer.
- Stump, D., & Isendahl, C. (2019). Digging for Indigenous knowledge. In *The oxford handbook of historical ecology and applied archaeology* (p. 137). Oxford University Press.
- United Nations (UN). (2015). United Nations (UN) General Assembly. *Transforming our world: the 2030 Agenda for Sustainable Development*, 21 October 2015, A/RES/70/1." Available at: <https://www.refworld.org/docid/57b6e3e44.html>. Accessed October 12, 2021.
- Wane, N. N. (2020). African Indigenous Knowledge: Claiming Writing, Storing, and Sharing the Discourse Linked References are Available on JSTOR for This Article. *African Indigenous Knowledge*, 40(2), 27–46.

Sustainable Development and Fight Against Poverty and Marginalization of Mexican Indigenous Peoples



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Abstract In Mexico, there are 68 indigenous peoples spread throughout the national territory. According to data from the 2020 census, the total population of self-declared indigenous people amounts to 23,229,088 inhabitants, representing 19.5% of the national population, most of whom are located in the south and southeast of the country. This chapter aims to assess the effectiveness of Mexican policies for ensuring sustainable development among indigenous peoples, thus enabling them to promote their own development agendas, based on their worldviews and priorities. In this chapter, the authors present an analysis of data from the Population and Housing Censuses and the reports offered by national and international organizations. Mexico has made important progress regarding its laws and policies concerning indigenous peoples. The data from the Population and Housing Censuses analyzed in this chapter reflect, in parts, the results of these advances in the legal field; since there is a reduction in the percentage of illiterate indigenous people, there are also advances regarding insurance in health and employment indicators. However, there is a persistent gap between the indigenous and non-indigenous populations in the country, more significant in indigenous women.

Keywords Indigenous population · Sustainable development · Gender inequalities · Social vulnerability · Development gaps

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1 Introduction

Mexican indigenous peoples are recognized for their unique culture and ways of relating to nature, which is directly reflected in how they live. Nevertheless, despite the importance of these groups in the conservation of the country's flora and fauna and the great richness of their cultures and forms of social organization, indigenous peoples live in conditions of great poverty, marginalization, and discrimination in all areas of everyday life. Data presented by the National Council for the Evaluation of Social Development Policy shows that in 2020 more than 70% of the Mexican population living in poverty and 28% in extreme poverty were indigenous people (Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL), 2021).

According to the 2030 Agenda of the United Nations, one of the first steps to achieve sustainable development is to fight poverty, which is, in turn, one of the main causes of environmental problems around the world. Mexico actively participated in the definition of the 2030 Agenda. It advocated the adoption of a multidimensional approach to poverty and sustainable development that, in addition to considering people's income, would take into account their effective access to other basic rights such as food, education, health, Social Security, and basic services.

At the national level, the commitment of the Mexican State was even more specific, permeating sustainable development at the local and community levels. According to article 2 of the Mexican Constitution (Cámara de Diputados del Honorable Congreso de la Unión, 2021), to reduce the deficiencies and lags that affect indigenous peoples and communities, the federation, states, and municipalities have an obligation to support productive activities and the sustainable development of indigenous communities, which contrasts sharply with the high rates of poverty and marginalization that these groups have historically faced.

This chapter aims to assess the effectiveness of Mexican policies for ensuring sustainable development among indigenous peoples, thus enabling them to promote their development agendas, based on their worldviews and priorities. This evaluation was done by analyzing selected dimensions of sustainable development with data from the Population and Housing Censuses and the reports offered by national and international organizations.

2 Panorama of the Indigenous Population in Latin America and Mexico

This section offers a literature review of the history and the situation of indigenous people in Latin America and Mexico.

At the global level, Latin America is one of the richest continents in terms of natural resources and cultural representation, being the second with the largest concentration of forest resources and home to diverse indigenous peoples. In this continent, and

specifically in 21 countries, there are more than 800 indigenous peoples with a population of close to 50 million people, characterized by their broad demographic, sociocultural, territorial, and political diversity (Banco Interamericano de Desarrollo (BID), 2018). In addition to being present in large urban settlements, they are found in rural communities with a long history and, in some cases, settled in inhospitable regions of voluntary isolation, places where they practice their different ways of life.

Resident populations in rural areas are mainly engaged in agriculture, animal herding, hunting, fishing, fruit gathering, and textile making, activities that have given them a cultural connotation throughout history due to their ancestral knowledge and approach to their areas of coexistence. The relationship of the indigenous people with the land is not reduced to strictly economic-productive factors because they preserve a holistic vision of the land and the environment that is combined with social, cultural, religious, and economic aspects. Due to these facts, the people made notable contributions to science, medicine, architecture, culture, education, and biodiversity conservation. However, despite this knowledge, their economic and social situation is unfavorable.¹

Various indigenous peoples, from the Mapuche in Chile to the Zoque (O' de püt) in Mexico, are part of the most disadvantaged social groups on the continent, a situation that is due to historical and colonial leftovers and complex social processes initiated more than 500 years ago. According to data published by the Inter-American Development Bank (Banco Interamericano de Desarrollo (BID), 2018), the continent's indigenous peoples make up 14% of the poor and 17% of the extremely poor. Bello and Rangel (2002), show that the cause of this situation is the result of a process of colonial domination and exclusion over a population subcategorized by ethnic factors, skin color, or culture, compromising their access to an educational system and adequate labor sources. In addition, the systematic dispossession of their ancestral territories, the disparities in education and employment, and the lack of natural resources, livelihoods, and areas of production of the indigenous people. All of this collectively caused a gradual impoverishment, seriously compromising their economy, welfare, and culture (Dávalos et al., 2021).

In several cases, the social imbalances resulting from the exclusion and marginalization of the continent's indigenous peoples are related to the deterioration of their natural resources and the reduction or loss of their ancestral territories, as a result of the denial or disregard of their rights over their territories promoted by governmental models of modern States (Bello & Rangel, 2002). This loss of subsistence resources led to forced rural–urban migration, placing indigenous people in precarious, poorly paid, low-quality jobs.

¹ Some indigenous peoples that still inhabit natural areas become agents of environmental conservation due to their worldview and respect for nature. In many cases, they are not interested in the accumulation of goods and wealth, basing their production on small-scale commercialization and self-consumption, accessing markets for the exchange of products through reciprocity (Sabourin, 2011). Many of the productive activities of these peoples are not very invasive to the environment, as a result of their respect for mother earth, which is why they prioritize the production of native species and the use of fertilizers and agrochemicals (Brighenti, 2005).

Traditional territories have been one of the main points of reference in terms of historical continuity, preservation of protected areas and natural resources, identity, and self-determination of indigenous people. Yet the World Bank (2015) data shows that 49% of indigenous people in Latin America currently live in urban areas. This transition is mainly due to the dispossession of their lands, environmental deterioration, displacement caused by conflicts and violence.

Poverty, marginalization, and exclusion have become structural characteristics for the indigenous peoples of this continent. Comparative studies disaggregated by ethno-racial origin show that poverty is concentrated in certain indigenous social groups, differentiated by several points concerning the rest of the population, mainly white. According to Psacharopoulos and Patrinos (1994), in the most extreme cases, such as Guatemala, Mexico, and Peru, this difference reaches 20–30% points, a figure that has increased in some countries in recent years.

These social and economic disparities in Latin America result from discrimination and racism, which have become a constituent part of the region's problems, amplifying the biases in terms of poverty, exclusion, and inequality of millions of people. According to Anderson et al. (2016), access to basic services for indigenous peoples is at a disadvantage compared to non-indigenous communities, causing impacts on the education, health, and life expectancy of the population. Infant malnutrition and maternal mortality are the most recurrent problems of these populations. In Colombia, for example, it is stated that 240 out of every 100,000 indigenous women die from complications associated with childbirth, compared to 66 cases occurring out of every 100,000 non-indigenous women (Anderson et al., 2016).

In Mexico, there are 68 indigenous peoples scattered throughout the national territory. According to data from the 2020 census, the total population of self-declared indigenous people amounts to 23,229,088 inhabitants, representing 19.5% of the national population, most of whom are located in the south and southeast of the country. This population inhabits more than 172 localities within the national territory, identified as concentrated areas of indigenous population (Fig. 1) (Instituto Nacional de Estadística Geografía e Informática INEGI, 2016) and areas rich in vegetation and natural resources. It is estimated that approximately 50% of the most important headwaters of the country's watersheds are in indigenous territory, areas from which 23.3% of the country's water is captured (Instituto Nacional de los Pueblos Indígenas, 2018; Villagómez Velázquez and Gómez Martínez, 2020).

Many of Mexico's indigenous peoples have a strong special relationship with their immediate environment, as their lands, territories, and natural resources are the means that have provided them with cultures, languages, arts, cosmologies, and forms of political, economic, and social organization (Dávalos et al., 2021; Stavenhagen, 2001). A large part of the indigenous population residing in their areas of origin have self-consumption agriculture as their main economic activity, carried out under a traditional agricultural and productive system made up of a polyculture called "milpa" (Carrera García et al., 2012). On the other hand, this population also engages in activities such as fishing and cattle raising, all of which are mediated by a spiritual relationship and respect for nature.

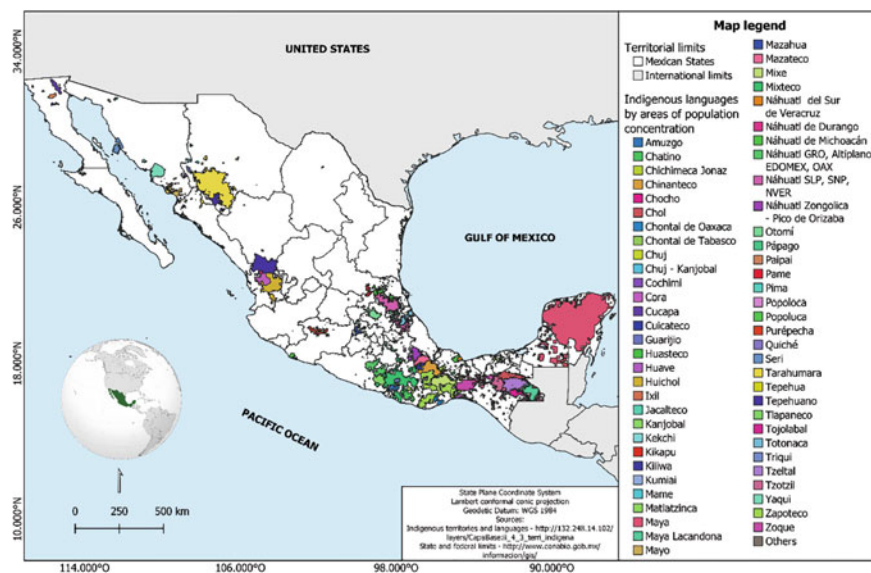


Fig. 1 Indigenous languages by areas of population concentration in México. *Sources* Elaborated by the authors based on data from GeoComunes (2015), Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO) (2021)

Like many people of Latin America, a large part of the Mexican indigenous peoples, despite the great cultural wealth and potential of their lands, territories, and natural resources, live in conditions of poverty, marginalization, and discrimination in all areas of daily life. This is the result of a historical colonial process of subjugation and abandonment perpetuated to this day. The exclusion of ethnic groups in Mexico dates back to the beginning of the republic and the process of military and spiritual conquest (Florescano, 1997), when, under a model of domination, Spaniards, Creoles, and their descendants dictated the characteristics of a nation, including language, religion and Roman law (Bastos & Camus, 2004; Rosas Vargas, 2007).

According to Bastos and Camus (2004), in Mexico, the indigenous people were seen as “inferior or backward,” excluding them from the nation and from progress, resulting in alarming social imbalances in various aspects. For example, according to the National Council for the Evaluation of Social Development Policy of Mexico (CONEVAL) (2021), by 2016, of the 100% of the population characterized as poor, 71.9% were indigenous, and 28% were in extreme poverty. This situation leads many of the members of these populations to live in a situation of alarming social, environmental, and health vulnerability, as they are limited to having adequate infrastructure and access to basic services.

This situation of marginalization has caused a large part of the population to have access to poorly paid jobs, working mainly in the primary sector and earning between one and two minimum wages (Guerra Manzo, 2005; UNDP, 2010). The same is true

for education and illiteracy; this group of Mexican society has significant lags in terms of access, school attendance, and illiteracy.

In addition to the marginalization, these populations experience denial, exclusion, abandonment, racism, and the remnants of internal colonialism generate this hurtful situation. Progress has been made with Mexico's political design, which, in line with cultural, social, and economic diversity, has modified important articles of its Political Constitution; however, much remains to be done to comply with its first article, which establishes the right to non-discrimination based on ethnic or national origin. This country is defined in its composition as pluricultural, originally sustained by its indigenous peoples, but actions must be taken to reduce these existing differences between the non-indigenous and indigenous population in order to establish greater equity and equality to guarantee the future of its peoples. This represents structural challenges in terms of democracy and the State and the formulation of consistent public policies in the search for equality and inclusion of the rights of their peoples. To this end, the analysis of data from the national population and housing censuses is fundamental since they reflect progress or setbacks in social and economic aspects.

3 Methods

For the purposes of this chapter, some indicators on the sustainable development of indigenous peoples were selected from the national population and housing censuses corresponding to the years 2010 and 2020, which, although not entirely compatible with the criteria proposed by the CDI, can provide clarity in relation to the progress achieved by the Special Program for Indigenous Peoples 2014–2018 (Comisión Nacional para el Desarrollo de Pueblos Indígenas (CDI), 2014) and indicate possible points to be strengthened or reevaluated in the strategies proposed by the National Program for Indigenous Peoples 2018–2024 (Instituto Nacional de los Pueblos Indígenas, 2018). The indicators selected are health security, illiteracy, employment status of the population and indigenous languages, which are related to the goals of (a) increasing access to food, health, and education for indigenous peoples; (b) improving the monetary and non-monetary income of the indigenous population through the promotion of productive projects; and (c) preserving and strengthening the culture of indigenous peoples, recognizing their national heritage.

To explore the selected indicators related to sustainable development in the indigenous population of Mexico, data from the national population and housing censuses of this country for the years 2010 and 2020 were used.

According to the United Nations Department of Economic and Social Affairs of Indigenous Peoples, the condition of belonging to an indigenous people can take into consideration two criteria (Departamento de Asuntos Económicos y Sociales-Secretaría de las Naciones Unidas, 2006). The first criterion refers to the condition of speaking an indigenous language, while the second is self-ascription.

Regarding the first criterion, the National Institute of Statistics and Geography (INEGI—by its acronym in Spanish) defines the status of speakers of an indigenous language as “*the population three years of age and older who declare that they speak an indigenous language*” (Instituto Nacional de Estadística Geografía e Informática, 2021). This is the criterion traditionally used; however, it excludes people of indigenous traditions whose language has been lost through generations. It is very relevant because only 44.5% of the entire population in Mexico that declares itself as indigenous can currently speak their mother tongue (Instituto Nacional de Estadística Geografía e Informática, 2021). So, here comes into play the second criterion, that of self-ascription. In this sense, Article 2 of the Political Constitution of the United Mexican States establishes that “*Awareness of their indigenous identity shall be a fundamental criterion for determining to whom the provisions on indigenous peoples apply*” (Cámara de Diputados del Honorable Congreso de la Unión 2021).). In this case, INEGI recognizes indigenous self-ascription based on “*Self-recognition as an indigenous person based on their own culture, traditions, and history*” (Instituto Nacional de Estadística Geografía e Informática, 2011, 2021).

In order to analyze the reality of the Mexican indigenous population in light of the SDGs, SDG 3 “*Health and well-being*”, SDG 4 “*Quality education*” and SDG 8 “*Decent work and economic growth*” were taken into account, and these three were analyzed in a cross-cutting manner incorporating a gender approach, consistent with SDG 5 “*Gender Equality*”. It is necessary to mention that the indicators analyzed were selected as proxies for their practicality for comparing indigenous and non-indigenous populations, between 2010 and 2020, and between sexes; but that, ultimately, they do not reflect the complexity of the dimensions involved in each of the SDGs referred to in this chapter.

Thus, SDG 3, “*Health and well-being*”, analyzed data on access to health security, SDG 4 “*Quality education*” shows data on illiteracy, and SDG 8 “*Decent work and economic growth*” shows data related to the employment status of the population.

In both censuses considered, illiteracy percentages were analyzed as the condition of reading and writing a message in the population aged 18 years or older.

4 Results

4.1 *Strategies and Policies that Seek to Guarantee the Development and Well-Being of Mexico’s Indigenous People*

In Mexico, the indigenous population makes up an important social group identified as native peoples. Among the different recognized groups, there are two main aspects, one with characteristics more closely linked to millenary traditions, which are reflected in their languages and customs, and the other whose practices derive from the relations of coexistence and domination of the colonial period (Comisión

Nacional para el Desarrollo de Pueblos Indígenas (CDI), 2014; Galván Martínez et al., 2016; Instituto Nacional de los Pueblos Indígenas, 2018). Despite these differences, all Mexican indigenous peoples share similar histories and relations of domination and exclusion, which shape their vision of the world and lead them to propose different development projects, which are often not completely aligned with government proposals.

An evaluation of the Mexican legal and political framework concerning these groups reveals diverse positions in the analysis and the construction of proposals to overcome the social and economic backwardness they have historically suffered. At the extremes, some approaches vindicate only the traditional approach as the way to overcome the economic and social backwardness, thus preserving their identity. At the same time, other positions advocate change and/or the assimilation of new development processes and visions, seeking to preserve their identity without rejecting integration and change (Organización Internacional del Trabajo, 2020).

Mexico currently has a vast body of federal legislation on indigenous peoples, as well as specific provisions in general regulations, which are derived from the Political Constitution of the United Mexican States (Table 1). At the state level, 26 states also have specific laws on the rights of traditional and indigenous peoples and communities: Aguascalientes; Baja California; Campeche; Chiapas; Chihuahua; Colima; Durango; Guanajuato; Guerrero; Hidalgo; Jalisco; Mexico; Morelos; Nayarit; Nuevo León; Oaxaca; Puebla; Querétaro; Quintana Roo; San Luis Potosí; Sinaloa; Sonora; Tabasco; Tlaxcala; Veracruz, and Yucatán (Organización Internacional del Trabajo, 2020).

Currently, the National Institute of Indigenous Peoples (INPI—by its acronym in Spanish), which replaced the National Commission for the Development of Indigenous Peoples (CDI—by its acronym in Spanish), is the state agency in charge of designing and promoting public policy for the indigenous and Afro-Mexican population in Mexico. With the aim of presenting proposals to address the issues that most directly affect these groups and as a synthesis of the existing legal framework, in December 2018, the entity approved the National Program for Indigenous Peoples 2018–2024. This program seeks to “*promote and guarantee the development and integral well-being of Indigenous and Afro-Mexican Peoples as subjects of public law, within the framework of a new relationship with the Mexican State, for the effective exercise of their rights, the sustainable use of their lands, territories and natural resources, as well as the strengthening of their autonomies, institutions, cultures, and identities, through the implementation of permanent processes of dialogue, participation, consultation, and agreement*” (Instituto Nacional de los Pueblos Indígenas, 2018).

This program’s principles are self-determination of peoples; integrality; social, economic, and cultural relevance; sustainability and territoriality; transversality; gender equality and participation and consultation, based on which various strategies and lines of action are determined to be implemented by 2024 (Instituto Nacional de los Pueblos Indígenas, 2018). However, despite appearing to be a fairly complete document, the lack of concrete proposals regarding implementing these strategies and

Table 1 Mexican regulatory framework regarding indigenous peoples

Law, program, or agreement	Year of enactment	Latest update
Constitución Política de los Estados Unidos Mexicanos	1917	2019
Código Penal Federal	1931	2019
Código de Procedimientos Civiles	1932	2018
Código Federal de Procedimientos Penales	1934	2014
Ley General del Equilibrio Ecológico y la Protección al Ambiente	1987	2015
Ley Agraria	1992	2018
Ley Minera	1992	2014
Ley Federal de Derechos de Autor	1996	2018
Ley del Instituto Mexicano de la Juventud	1999	2013
Ley de Desarrollo Rural Sustentable	2001	2019
Acuerdo A/067/03 del Procurador General de la República por el que se crea la Unidad Especializada para la Atención de Asuntos Indígenas	2003	–
Ley Federal para Prevenir y Eliminar la Discriminación	2003	2018
Ley General de Desarrollo Social	2004	2018
Ley de Bioseguridad de Organismos Genéticamente Modificados	2005	–
Ley de Planeación	2012	–
Ley General de Derechos Lingüísticos de los Pueblos Indígenas	2012	–
Ley de la Industria Eléctrica	2014	–
Ley de Energía Geotérmica	2014	–
Ley de Hidrocarburos	2016	–
Ley Federal de Zonas Económicas Especiales	2016	–
Ley General de Desarrollo Forestal Sustentable	2018	–
Ley Orgánica de la Procuraduría General de la República	2018	–
Ley del Instituto Nacional de los Pueblos Indígenas y que abroga la Ley de la Comisión Nacional para el Desarrollo de los Pueblos Indígenas	2018	–
Programa Nacional de los Pueblos Indígenas 2018–2024	2018	–
Ley General de Educación	2019	–
Ley de Derechos de los Pueblos y Barrios Originarios y Comunidades Indígenas Residentes en la Ciudad de México	2019	–

Source Elaborated by the authors based on data from Organización Internacional del Trabajo (2020)

instruments to measure their effectiveness, especially in terms of reducing poverty and the social backwardness of indigenous peoples, is striking.

On the other hand, upon analyzing the preceding document, called the Special Program for Indigenous Peoples 2014–2018 (Comisión Nacional para el Desarrollo de Pueblos Indígenas (CDI), 2014), which sets forth similar objectives and principles, greater clarity is observed in the strategies and cross-cutting lines of action, since they include, in addition to a detailed description of each point, also a proposal for their execution and eight indicators, which correspond to the objectives of the program, allowing their evaluation in periods of one or two years and an assessment of the progress achieved. Each of the indicators proposed in the program has its own calculation method, which is generally based on the data generated by the National Council for the Evaluation of Social Development Policy (CONEVAL—by its acronym in Spanish) and on the criteria determined by CDI.

4.2 The Indigenous Population in Mexico: Progress and Persistent Gaps in Sustainable Development

In Mexico, 364 languages or linguistic variants are spoken (including many regional variants), which are grouped into 18 linguistic groupings and 11 linguistic families of indigenous languages. Table 2 shows the 15 languages most widely spoken by the indigenous population of Mexico. These 15 indigenous languages are spoken by 85% of the total indigenous population of this country. It can be observed that the most representative languages are Nahuatl, Maya, Tzeltal, Mixteco, and Tzotzil (Table 2). Regarding the volume of the population speaking an indigenous language, in 2010, this was 6,986,404 inhabitants, which represented 6.2% of the total population. In 2020, the volume increased to 7,522,495 people, but this figure represents 6.0% of the total population. This implies that the absolute number of people speaking an indigenous language may have increased, but not in proportional terms relative to the total population. This is consistent with the current concerns of official agencies, which periodically measure through census sources, over time, the disuse of some languages, and the loss of cultural richness.

Now, taking into account the second criterion, that of self-ascription to an indigenous people, in 2010, 15,703,465 inhabitants of Mexico declared themselves to be indigenous, which corresponded to 14% of the total population censused in that year. In 2020, the self-declared indigenous population reached 23,229,088 inhabitants, which corresponded to 19.5% of the total population.

Figures 2 and 3 show the structure of the indigenous and non-indigenous population for the years 2010 and 2020. Both censuses show the structure of a young population. In the 0–4 age bracket, the effect of considering the indigenous population as of 3 years of age (still by self-ascription) is observed. But in the following age brackets, between 5 and 14 years of age, there is a decrease in fertility at the base of both pyramids.

Table 2 The 15 indigenous languages most spoken by the population in Mexico

1	Náhuatl	23.0
2	Maya	11.5
3	Tzeltal (Tseltal)	7.0
4	Mixteco	6.9
5	Tzotzil (Tsotsil)	6.5
6	Zapoteco	6.4
7	Otomí	4.2
8	Mazateco	3.5
9	Totonaca (Totonaco)	3.3
10	Chol (Ch'ol)	3.1
11	Huasteco	2.5
12	Chinanteco	2.1
13	Tlapaneco	1.9
14	Mazahua	1.9
15	Mixe	1.8
	Others	14.3

Source Elaborated by the authors based on data from the National Population and Housing Census. INEGI, 2010

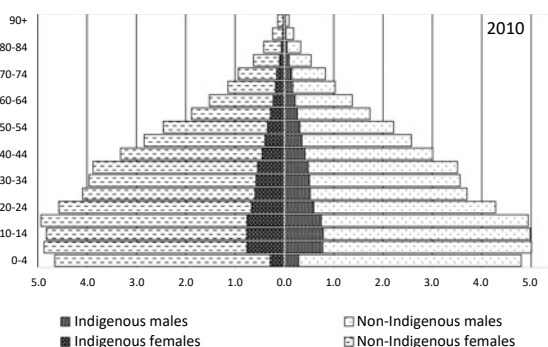


Fig. 2 Percentage distribution of the indigenous and non-indigenous population of Mexico, by sex and age groups. Year 2010. Source Elaborated by the authors based on data from the National Population and Housing Census. INEGI, 2010

In the younger age brackets, between 20 and 34 years of age, the effect of the migration of the indigenous population in search of better life opportunities can be observed. This is observed in both sexes but is stronger in males. In the year 2020, the volume of the “missing” population in these age groups seems to have increased.

At the top of the pyramid in 2020, an aging process begins to be observed in the indigenous population, which is slower than in the non-indigenous population.

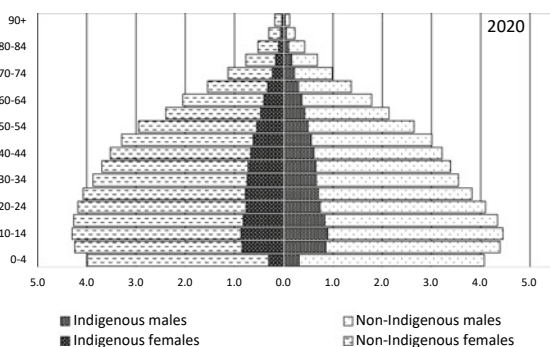


Fig. 3 Percentage distribution of the indigenous and non-indigenous population of Mexico, by sex and age groups. Year 2020. *Source* Elaborated by the authors based on data from the National Population and Housing Census. INEGI, 2020

Regarding the geographic distribution of the indigenous population in Mexico, the states with the highest percentage of indigenous inhabitants are Oaxaca (65.7%), Yucatan (62.4%), Campeche (44.9%), Chiapas (34.5%), Quintana Roo (31.7%) in the southern and Gulf of Mexico regions, and the states of Hidalgo (35.0%), Puebla (31.5%) and Guerrero (31.3%) in the central region of the country (Fig. 1).

The illiteracy percentages in the indigenous population are higher than in the non-indigenous population. Still, they are even higher in the female population (compared to the male population), so there is a double gap in access to education: because they are indigenous and are women. Although there was an improvement in the illiteracy situation in 2020 compared to 2010, this improvement did not follow the same pace for the indigenous population, and even less so for indigenous women compared to men (Table 1).

Regarding access to health, this dimension was analyzed with the ascription to health services from health insurance obtained through work, or from public Social Security, or by contracting private insurance, and the lack of health insurance. Here the effect of Social Security by the state is protective since it is observed that between 2010 and 2020, the gap of indigenous people without health insurance has been reduced significantly, and the gap that existed in 2010 between indigenous and non-indigenous populations has also been reduced. In these indicators of access to health services, a gender gap is observed, but it negatively affects the male population (Table 3). The effect of private security in all population groups is very low, but even so, it is lower in the indigenous population compared to the non-indigenous population. Although it should be taken into account that having health insurance does not imply effective access to health services in a timely manner.

Regarding employment indicators, it should be taken into account that population and housing censuses are not the most appropriate instruments for measuring the labor market, but rather the National Employment Surveys, which offer permanent estimates and are not as widely spaced as the censuses. However, censuses allow us

Table 3 Indicators of development in indigenous and non-indigenous population in Mexico, by sex, in 2010 and 2020

Indicators	2010				2020			
	Indigenous population (%)		Non-indigenous population (%)		Indigenous population (%)		Non-indigenous population (%)	
	Females	Males	Females	Males	Females	Males	Females	Males
Illiteracy	21.4	13.1	6.4	4.6	13.5	8.4	4.1	3.2
Health insurance from job or public insurance	60.2	57.2	64.1	61.2	77.9	74.6	74.4	71.9
Private health insurance	1.0	1.0	2.6	2.8	0.8	0.8	2.7	2.7
No health insurance	37.4	40.3	30.8	33.4	20.8	24.0	21.7	24.1
Employed	30.8	74.7	36.7	72.3	36.8	73.6	41.1	71.7
Unemployed	0.5	3.6	1.1	4.4	0.6	3.0	1.0	3.1
Unpaid work	56.0	1.2	46.3	1.0	48.0	2.0	39.3	1.6

Source Elaborated by the authors based on data from the National Population and Housing Census. INEGI, 2010 and 2020

to have some approximations of the labor market with an acceptable precision for the purposes of this chapter.

The employment figures for the indigenous population show different patterns by sex.

Indigenous men have a higher employment rate than non-indigenous men, and a drop of one percentage point is observed in both censuses for these two population groups.

On the other hand, indigenous women have a substantially lower inclusion in the labor market than men and lower than non-indigenous women. However, an improvement in this indicator was observed in 2020, compared to 2010. The other side of the coin of these indicators for the population of indigenous women is unpaid work, which has a higher incidence in indigenous women than in non-indigenous women. According to these data, one out of every two indigenous women performs unpaid work (Table 3).

5 Discussion

In terms of health, the legal advances in the Mexican legislation refer mainly to ensuring the right of indigenous peoples to make use of their traditional medicine,

but there are no clear strategies to guarantee access of these groups to health services in public and/or private medical centers. The indicators analyzed show a relevant increase in the percentage of indigenous people who have Social Security from the state between 2010 and 2020. However, as mentioned above, this does not ensure the effective access of these people to health services in a timely manner.

Although indigenous women in Mexico are covered by the Law of the National Institute of Indigenous People, which recognizes the need to incorporate a gender equality approach in policies on indigenous peoples, this has not been reflected in their daily lives. If we consider, for example, the indicators of illiteracy and unpaid work, indigenous women show a double gap because they are women and because they are indigenous. In this sense, gender gaps became narrower in 2020 compared to 2010. However, progress in the conditions of illiteracy and unpaid work did not occur at the same rate among indigenous women if we compare with the population of non-indigenous women or with any of the male populations (whether indigenous or not).

These gender differences can be analyzed in light of the contributions of Kimberle Crenshaw (1991), a U.S. law scholar who in the 1990s published one of her most important articles, entitled “Mapping the Margins: Intersectionality, identity politics, and violence against women of color.” In her contribution, Crenshaw defined a theoretical framework for exploring gender differences based on the assumption that not all women, solely being women, occupied the same position in power structures. Indeed, Crenshaw demonstrated that not all women occupy the same position in society by describing how class, race, disability, and many other factors intersect. To generate a structure of historical oppression of women, Crenshaw’s approach revolves around understanding that race, gender, social position intersect to violate women, as her study was based on the experiences of African American women who were violated [by men] and sought help in shelters. Many of the women seeking protection were unemployed or underemployed, and many of them were also poor, overburdened with childcare tasks, and with little job training. All this, as a consequence of gender and class oppression and differences that intersect with race oppressions.

Despite the enactment of laws and specific proposals, such as the Special Program for Indigenous Peoples 2014–2018 whose principles date back to the Federal Constitution of 1917 and seek to address the main problems affecting these populations, no substantial progress has been made in reducing the inequalities and social backwardness they have historically suffered.

Another important factor is that the right of indigenous peoples to their traditional lands is recognized and guaranteed by the Mexican Federal Constitution; however, the country does not have a specific regulation to put into effect demarcation and titling processes for these lands, which undermines the possibility of integral development of these groups, based on their own worldviews and priorities.

These facts force a large part of their members to make decisions that compromise and generate diverse impacts on the population and their culture, which are evidenced mainly due to the migration of the population, predominantly male, compromising the continuity of their languages and their cultural richness by the abandonment of their lands and the distancing of their cultural practices. On this point, policies of

cultural and language valuation, empowerment of indigenous women, and reduction of migration are promoted. However, an indigenous cultural decline is observed as a result of a search for the social development of these populations and their members in the face of existing disparities.

Certain advances in national policy regarding representation, promotion of equality and equity, are the result of the struggle of Mexican indigenous peoples and the establishment of some institutions. These include the National Indigenous Congress or the National Institute of Indigenous Peoples, which were established mainly to represent these populations before the state; regulating, designing, and evaluating policies and programs that guarantee the rights of indigenous peoples. The establishment of institutions of this size made possible the inclusion of indigenous people in certain areas. However, there is still a long way to go, as socioeconomic disparities are still significant.

Many of these disparities arise from the fundamental insecurity that many populations experience, in some cases due to existing deficiencies in the recognition and titling of their areas of origin. However, conflicts over the implementation of extractivist activities and land titling impact the development of populations, causing poverty, forcing their members to join an illegal labor market or to seek opportunities outside their areas of origin, and, in many cases, becoming victims of indirect labor exploitation due to the work they do (Bernal Dávalos, 2021).

This study presents some limitations. First, the indicators analyzed were selected as proxy variables given their practicality for comparing indigenous and non-indigenous populations, as well as their availability among the data sources; but they do not entirely reflect the complexity of the dimensions involved in each of the SDGs referred to in this chapter. Second, as mentioned in this chapter, in Mexico there are more than one criteria for considering a person as indigenous; so these different criteria can reflect differences in the SDGs indicators. Third, the analyzed databases probably could be including indigenous population who have immigrated from other countries (i.e. from Central and South America) to Mexico.

6 Conclusions

Based on the objective of this chapter, which sought to assess the effectiveness of Mexican policies to ensure the sustainable development of indigenous peoples and thus enable the promotion of their own development agendas, it is observed that, from the legal point of view, Mexico has made some progress regarding its laws and policies concerning indigenous peoples. For example, in the field of education, the country has constitutional provisions that promote multiculturalism and bilingualism at all levels of basic education, ensuring respect for the cultural identity of the different peoples. As a result, progress has also been made in preserving and recognizing indigenous languages, especially in the areas mainly inhabited by indigenous peoples in the south and southeast of Mexico.

The data from the Population and Housing Censuses, analyzed in this chapter, reflect, in part, the results of these advances in the legal sphere since a reduction in the percentage of illiterate indigenous people between 2010 and 2020 is noted. However, the data also reveals the persistence of a significant gap between the indigenous and non-indigenous population, which is even more accentuated in the population of indigenous women.

7 Future Prospects

Decision-makers must pay more attention to the situation of indigenous peoples in Mexico if the health, education, gender and labor goals envisioned under a macro SDG approach to reduce inequalities are to be achieved. This statement comes from the principle that the well-being of these populations must be guaranteed, on the one hand, because it is their right and a historical debt is owed, and on the other, because they are concentrators of history, culture, and knowledge. On this last point, their linguistic and knowledge systems are key to understanding biological, nutritional, medicinal, and cultural diversity, contributing to health issues, preservation of natural and water resources, and the fight against poverty and malnutrition, which leads us to achieve various objectives. In this sense, these groups should be better recognized and included, guaranteeing their participation in the different spheres of decision making, whether in planning or the elaboration of public policies and national action plans.

References

- Anderson, I., Robson, B., Connolly, M., et al. (2016). Indigenous and tribal peoples' health (The Lancet-Lowitja Institute Global Collaboration): A population study. *Lancet*, 388, 131–157. [https://doi.org/10.1016/S0140-6736\(16\)00345-7](https://doi.org/10.1016/S0140-6736(16)00345-7)
- Banco Interamericano de Desarrollo (BID). (2018). Desarrollo sostenible de los pueblos indígenas: con ellos, para ellos.
- Bastos, S., & Camus, M. (2004). Multiculturalismo y Pueblos Indígenas: reflexiones a partir del caso de Guatemala. *Rev Centroam Ciencias Soc* 1.
- Bello, Á., & Rangel, M. (2002). La equidad y la exclusión de los pueblos indígenas y afrodescendientes en América Latina y el Caribe. *Rev la CEPAL* 2002, 39–54. <https://doi.org/10.18356/61fc0d54-es>
- Bernal Dávalos, N. E. (2021). Consecuencias de la explotación amazónica. In L. Sablich (Ed.) *Amazonía y expansión mercantil capitalista. Nueva frontera de recursos en el siglo XXI*. CLACSO: Centro de Estudios para el Desarrollo Laboral y Agrario-CEDLA.
- Brighenti, C. A. (2005). Necessidade De Novos Paradigmas Ambientais Implicações E Contribuição Guarani. *Cad PROLAM/USP*, 4, 33. <https://doi.org/10.11606/issn.1676-6288.prolam.2005.81790>
- Carrera García, S., Navarro Garza, H., Pérez Olvera, M., & Mata García, B. (2012). Calendario agrícola Mazateco, milpa y estrategia alimentaria campesina en territorio de Huautepec, Oaxaca. *Agric Soc y Desarro*, 9, 455–475.

- Comisión Nacional para el Desarrollo de Pueblos Indígenas (CDI). (2014). Programa Especial de los Pueblos Indígenas 2014–2018. Gob México, 1–97
- Cámara de Diputados del Honorable Congreso de la Unión. (2021). Constitución Política de los Estados Unidos Mexicanos. Texto vigente. Mexico.
- Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL). (2021). Medición de pobreza 2016–2020. In Cons. Nac. Evaluación la Política Desarro. Soc. https://www.coneval.org.mx/Medicion/MP/Paginas/Pobreza_2020.aspx. Accessed November 19, 2021.
- Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO). (2021). Geoportal del Sistema Nacional de Información sobre Biodiversidad . In *CONABIO*. <http://www.conabio.gob.mx/informacion/gis/>. Accessed November 23, 2021.
- Crenshaw, K. (1991). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Law Rev*, 43, 1241. <https://doi.org/10.2307/1229039>
- Dávalos, N. B., Rodrigues-Filho, S., & Litre, G. (2021) The impacts of the construction of hydro-electrics on indigenous communities. Displacement, division and pilgrimage among The Tuxá peoples of Bahia state, Brazil. *Sustentabilidade em Debate*, 12, 220–235. <https://doi.org/10.18472/SustDeb.v12n1.2021.36587>
- Departamento de Asuntos Económicos y Sociales- Secretaría de las Naciones Unidas. (2006). Quinto Período de Sesiones del Foro Permanente de Pueblos Indígenas.
- Florescano, E. (1997). Etnia, estado y nación: ensayo sobre las identidades colectivas en México. Nuevo Siglo, Mexico City.
- Galván Martínez, D., Fermán Almada, J. L., & Espejel, I. (2016). Sustentabilidad comunitaria indígena? Un modelo integral. *Soc y Ambient*, 4–22. <https://doi.org/10.31840/sya.v0i11.1674>
- GeoComunes. (2015). Territorios de pueblos indígenas. In *GeoNode*. http://132.248.14.102/layers/CapaBase:ii_4_3_terri_indigena. Accessed November 23, 2021.
- Guerra Manzo, E. (2005). Los pueblos indígenas: entre la comunidad corporativa y el pluralismo, 1968–2001. In I. Bizberg, & L. Meyer, (Eds.) *Una historia contemporánea de México* (pp. 305–366). Editorial Océano.
- Instituto Nacional de Estadística Geografía e Informática. (2011). Censo de Población y Vivienda 2010.
- Instituto Nacional de Estadística Geografía e Informática. (2021). Censo Población y Vivienda 2020.
- Instituto Nacional de Estadística Geografía e Informática INEGI. (2016). Encuesta Intercensal 2015.
- Instituto Nacional de los Pueblos Indígenas. (2018). Programa Nacional de los Pueblos Indígenas 2018–2024. México.
- Organización Internacional del Trabajo. (2020). Leyes y políticas públicas al respecto de pueblos indígenas y tribales: Perfiles de países de América Latina que han ratificado el Convenio sobre pueblos indígenas y tribales, 1989.
- Psacharopoulos, G., & Patrinos, H. (1994). Pueblos indígenas y pobreza en América Latina: Un análisis empírico. In *Estudios Sociodemográficos de Pueblos Indígenas*. Centro Latinoamericano de Demografía (CELADE).
- Rosas Vargas, R. (2007). Exclusión, marginación y desarrollo de los pueblos indígenas. *Ra Ximhai*, 3, 693–705.
- Sabourin, E. (2011). Teoria da reciprocidade e sócio-antropologia do desenvolvimento. *Sociologias* 24–51. <https://doi.org/10.1590/S1517-45222011000200003>
- Stavenhagen, R. (2001). La cuestión étnica. El Colegio de Mexico, Mexico City.
- UNDP. (2010). *Informe sobre Desarrollo Humano de los Pueblos Indígenas en México* (1st edn). Programa de las Naciones Unidas para el Desarrollo (PNUD)
- Villagómez Velázquez, Y., & Gómez Martínez, E. (2020). Los recursos hídricos en las regiones indígenas de México. *Región y Soc*, 32, e1288. <https://doi.org/10.22198/rys2020/32/1288>

Indigenous Knowledge Systems and Methods Against Ignorance: Two Case Studies of Amakhuwa in Mozambique and Aymaras in Bolivia



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Abstract In the current debates on sustainable development, the methodological discussions of research techniques and traditions have recently opened the issue of indigenous research and methodologies on a wide and global scale. It is a welcome move, and much more remains to be done, especially outside of the realm of English-speaking countries. Therefore, the analysis extends research to new geographical areas and understudied cultures. Consequently, it proposes a reflection on indigenous methodologies based on the integration of indigenous knowledge systems (IKS) and local knowledge of populations impacted by climate change, resettlement policies, cooperation initiatives, indigenous institutions, and public policies. The research is based on the combination of two main approaches: a review of literature complemented by two case studies, one in Northern Mozambique with the Amakhuwa people and another in Aymara Andean societies in Bolivia. In this later case the results can be extended to the proximate culture of the Quichuan communities. The main conclusions are about the indigenous knowledge systems as well as the importance of indigenous methodologies both for research purpose and better policy analysis, implementation, and assessment.

Keywords Indigenous knowledge systems · Institutions · Amakhuwa · Aymara · Qualitative research method

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1 Introduction

The question of new ways of practicing research for sustainability is gaining traction, at least in two directions, one is interdisciplinarity (Frodeman et al., 2019) and the other is indigenous and local systems of knowledge and culture (Smith, 2021). Both are important for innovative research practice and dealing with issues such as epistemic injustice (Fricker, 2011), political economy of ignorance (McGoey, 2019), human rights, alternative paths to development, sustainability, climate change, and natural ecosystems (Claeys, 2015; Humphreys, 2011; Supiot & Delmas-Marty (2015); Tanner & Horn-Phathanothai, 2014; Williams, 2021). These aspects of human and sustainable development are crucial for research and policy purpose, namely regarding policies targeting sustainable development goals and dealing with indigenous knowledge and local social and political issues. All too often sustainable development goals (SDGs) and international cooperation focus on big actors like the central government, corporations and some international NGOs leaving aside local and indigenous communities and actors.

This chapter on indigenous methods starts with a clarification on what matters in terms of sustainable development, critical realism, institutions and the context of indigenous research and methodologies. Its aim is to show how a research methodology, which often assumes the perspective of the local or indigenous actors, transforms them into active subjects, setting up a permanent interaction and change with the researcher. As a result, the comprehension of the way of life, epistemology, values, and practices of indigenous people becomes clearer, giving context to the way researchers approach their work. The contribution combines field research broadly construed in two geographical settings with a review of the literature. More details will be given in the specific treatments of each country: Mozambique, and Bolivia.

Admittedly, this chapter reflects upon the methodological choices. The first section is dedicated to the criticism of economic development and the shortcomings of current social research that does not integrate local knowledge and participation with a focus on their relationships with the notion of institution. The second section deals with agency, participation, culture, and languages of local populations in the Global South to introduce two case studies developed in the third and fourth sections: the Andean notion of *Suma qamaña* or “*Buen vivir*” in South America (more specifically Aymara and Quichua language groups) and the traditional culture of the Amakhuwa in Mozambique. The final section of the paper is dedicated to a discussion of the deliberate ignorance of local knowledge as well as its use and abuse from scholars, consultants, and policymakers. The two case studies are based essentially on field research and interviews, complemented by the extensive review of the literature.

Hence, the overall approach in this chapter can be illustrated by a reflection that Maurice Merleau-Ponty made decades ago about philosophy and that could be extended to genuine (indigenous) research: “True philosophy consists in relearning to look at the world, and in this sense a historical account can give meaning to the world quite as “deeply” as a philosophical treatise. We take our fate in our hands, we become responsible for our history through reflection, but equally by a decision

on which we stake our life, and in both cases, what is involved is a violent act which is validated by being performed” (Merleau-Ponty 1981: xxiii).

2 Conceptual Issues

The present reflection tackles conceptual issues. The notions of sustainability and institutions are discussed to grasp better the relevance of local and indigenous knowledge. Institutions are not limited here to the notion of factors related to economic growth but integrates systems of norms and rules that are embedded in local cultures and not easily grasped by a utilitarian view of social science as enshrined in neoclassical economics. The perspective is one of critical realism and openness to new methodologies.

Moreover, to begin, it is crucial in the current debates to distinguish sustainable development from sustainability (Banerjee 2011). The former is a weak definition of sustainability, as the notion of sustainable development encapsulates the core idea of doing things according to the dominant capitalist and consumerist culture and maintain behaviors in a business-as-usual manner while slowly adjusting the overall trajectory of the economy within the growth ethos and without structural and meaningful changes. In contrast, sustainability is closer to what economists call strong sustainability, that is a more radical notion of what must be done both for society and the economy to manage climate and social crises beyond meek and mild adjustments and to integrate a radical political economy of change towards various dimensions of justice within the planetary boundaries and the indigenous knowledge systems. Our argument is like that of other authors (Gough, 2017; Kovach, 2021). Consequently, the notion of sustainability is closer to key features of the indigenous knowledge systems such as those studied in this chapter, and closer to many other ones in Africa, Asia, South America, and the rural areas in the Global North, at least in Europe (Ghosh, 2021).

The overall methodological approach adopted is fundamentally related to two meta-approaches: (1) critical realism philosophy and (2) a valuation of the concept of context for indigenous knowledge systems as highlighted below.

Firstly, critical realism is a philosophical approach to research that combines a realist ontology (the reality exists independently of the researcher) with an epistemology that recognizes the tricky issues of interpretation of social reality. It is also critical not just in terms of a critique of dominant discourse but also in considering that reality is also more complex than it is often assumed (Archer & Morgan, 2020). This means that reality is partly constructed, and this implies that several approaches are valuable and that several explanations and interpretations must be considered. It is open to indigenous research methodologies to improve our understanding of social phenomena. It is also adequate for studying indigenous cultures and relationships combining several research methods, including those focusing on local knowledge and interactions (Donati, 2016).

Secondly, another relevant epistemological and methodological consideration for indigenous knowledge methodologies is the centrality of the context of the object of research. First, it is important that the researcher knows their context of origin because this leads to specific ways of looking at the indigenous reality. Second, the context of the object of research per se is crucial to understand the way people behave, value, and consider things (Sawyer 2005; Tracy, 2019). Several aspects of the context are made of institutions (e.g., the indigenous institutions as developed in the next section) that are not always visible when focusing on individual cases or when doing interviews with individuals or even organizing focus groups (Aggarwal, 2008).

In this analysis, and for orienting research design and practice, we combine local knowledge and indigenous knowledge systems as relevant for policies aiming at authentic sustainability while coping with issues of injustice. It is with respect to research and policy that the role of institutions must be considered, as it is briefly treated below.

3 Institutions, IKS and Agency and Participation of Local Actors

Additionally, the second section relates to institutions, indigenous knowledge systems (IKS) and agency and participation of local actors in the consulting, knowledge producing and implementation of action (and policy action) in geographical areas of concern.

Accordingly, taken broadly, as practiced in sociology and development studies, institutions are considered here as ‘established and prevalent social rules that structure social interactions’ (Hodgson, 2006: 2) that vary according to place, language, and culture. For this reason, institutions can be organizations, firms, universities, but also law, rituals or systems of rules that organize collective life. This implies that indigenous research methods must adapt the tools of research to local context and adjust the whole research design to indigenous systems while taking on board questions of epistemic justice and blind spot of mainstream research techniques as ethical issues that must be part of the core research process. In theory, exploratory research would be particularly indicated before starting the fieldwork in contexts epistemologically and culturally different from those of the main researcher. Another important measure is to compose a team where local colleagues are fully involved, from the conception of the research to the analysis of the results.

Undoubtedly, the use of the conceptual framework of “indigenous institution” to characterize indigenous norms and value systems in a specific area can correct misinterpretation and ignorance, especially if related to dominant values of capitalism and national elites.

In this case, at least two pitfalls must be avoided: (1) the devaluation of local and indigenous agency and (2) the lack of attention to the direction mainstream research and political authorities, in the discourse on participation and empowerment, that

divert the research focus away from particular and more vulnerable groups that are silenced in the research process through the erasure of their perception of the world. The ignorance of IKS can be either deliberate i.e., based on willingness of the observer, designer, or funder of the research- or unconscious, usually through a system of biases (McGoey, 2019).

Admittedly, between individuals, groups, communities, IKS and agency, institutions are the elements holding things together in times of stability and instability, allowing the conditions for living together in a determinate place. In times of crisis, institutions can be both enabler of change as well as some of the features promoting resistance to change. Institutions are the normative constructs that orient behaviors at the individual and collective levels, all through the social structure (Descombes, 2014; Guala, 2016; Hodgson, 2006). A sequential discussion of IKS, agency and ignorance is worth the detour.

Furthermore, indigenous knowledge (systems) can be considered above all as language, culture, and systems of knowledge of the different indigenous people in any society under consideration with cultural diversity as an essential feature (Collot, 2007; Mbah et al., 2021a, 2021b).

Thereupon, to illustrate this point, we study two cases: one from the Aymara people in Bolivia and Peru and the Amakhuwa people in Northern Mozambique and neighboring regions. In both cases, the indigenous cultures share a language, traditions, and culture that are substantially different from the hegemonic national culture. It is also important to insist on local knowledge to avoid the situation that do not consider the knowledge of the local actors to the benefit of elites and established structures and bureaucracies (both public and private).

Otherwise, it is important to reflect on the IKS and the research problem and its pregnant context that predate historically the researcher interest and intent in the field. There is an ethical issue with the research results becoming part of the identity of the researcher and the community investigated. It can imply positive and negative consequences for the IKS, namely if the research characterization undervalues it to the point of giving the wrong perceptions and in orienting policy in the wrong direction. And this is exactly what happens in the cases of Amakhuwa and Aymaras (and to a certain extent Quichuas in Peru and Bolivia) that we focus here (Allen, 2002; Nhaueleque, 2021). In both cases, researchers and consulting firms frequently neglect the relevant indigenous context, approaching their object of research through preconceived convictions and imposing their point of view to local communities.

One additional aspect of IKS is the relation to agency, participation, and empowerment of marginalized groups. This is indeed the case in the two settings retained for this chapter. It will be discussed in the next two sections. The important point to make here is the relation of agency and the capacity of individuals, groups, and communities of indigenous people to act in the daily life as well as in the public sphere. Some crises revealed that agency of indigenous communities can be strong through such periods.

By the same token, it is important to reflect on quantitative and qualitative research and how and why data was conceived the way it was and try to ask question about the status of indigenous knowledge. Was it perceived, valorized, or even noticed? The

crucial point is to integrate indigenous and local knowledge systems and promote indigenous methods, and both must aim at not promoting ignorance and ignoring subaltern groups in society. It is also important to move beyond taken for granted divides such as the opposition between quantitative and qualitative research and find complementarities. Promoting indigenous research is a way to tackle these issues and move forward.

Before passing to the two case studies, it is also important to remember on our aims. The purpose here is to integrate or create indigenous institutions in the research activities and in social policy action. In both case studies, indigenous knowledge systems and institutions (Aggarwal, 2008) are important for research purpose and for environmental activism and public policies.

4 The “Suma Qamaña” (*Buen Vivir* or Living-Well in Aymara)

Furthermore, this third section is about the “suma qamaña” (*buen vivir* or living-well in Aymara) case study and the importance of this concept for sustainable development and its misuse in the characterization of some aspects of the Andean societies with respect to sustainability. The concept is more than a discussion of production and consumption systems of capitalist economies, it consists of a different worldview that is related to participatory decision-making processes and local consultation of populations (Guendel, 2012; Artaraz & Calestani, 2014).

The present consideration is limited to Bolivia (and to some extent Argentina and Chile) and could be extended further around the notions of communities, well-being, common good, and *buen vivir* which is largely ingrained in Southern America. Even though the Quichua language or culture is familiar, it has been less systematized by its indigenous intellectuals, and will be associated here with the Aymara culture. The same can be said of Guarani and other indigenous people in Latin America (Pereira & Trindade, 2021). All share a proximity with and respect for nature that contrast with what we can characterize as extractivist political economies from colonial times up to today (Allen, 2002; Guendel, 2012). This is evident in field research in El Alto, La Paz, Santa Cruz, and Cochabamba from 1997 to 2018 (Field Research notes and interviews from January 1997 to December 2002 and, more sparsely from 2005 to 2018). Most references on *buen vivir* are to the Aymara culture, with some other reference to Quichua and Guarani (Guendel, 2012; field research from 1997 to 2009). The reason for this difference has to do with the longer tradition of Aymara intellectuals in writing and discussing not just their indigenous knowledge system but the recurrent publication and its diffusion across frontiers in South America and beyond. In terms of way of life, *buen vivir* in all three cultures are very similar in their relation to nature and the preservation of sacred land (like mountains, rivers, and lakes) and all are preoccupied by the preservation of their environment, or in the broader sense, their milieu (Artaraz & Calestani, 2014).

Buen vivir, as an apt translation of *suma qamaña*, is a normative approach to social and communitarian livelihood and indigenous knowledge in Andean societies, which could be characterized as a specific political economy (Guendel, 2012). In Quichua *suma qamaña* can be translated as “sumak kawsay”, but it is less studied by scholars, however it is very close (Allen, 2002).¹ Its core element is the value of communitarian life and the flourishing of individuals, families, and groups around and within the life of the community. It is not restricted to individualistic normativities and logics of material accumulation as in capitalist societies. This does not mean that material life is not important, on the contrary, it is very important that the quality of life of Andean populations improve, as field research shows; but the material element is related to the community. A good example is the so-called water war in Bolivia in the years 2000, and this revealed some contradictions of the state policies of the government of Evo Morales, even though its mantra was the defense of Andean communities and peoples.

Admittedly, the water war is the result of the protracted privatization process of the water distribution in the city of Cochabamba, the third urban area of Bolivia, situated between La Paz and Santa Cruz, the two dominating hubs of the Bolivian economic and political elites (Assies, 2003; Nickson & Vargas, 2002). The network of pipe water was attributed to a private entity for a concession that included all the water resources in the area, including traditional and indigenous agreements. The conflict around the privatization of the water distribution entity of Cochabamba triggered social protests and unrest as well as an empowerment of indigenous organizations, indigenous communities, and associations in favor. After six months of conflicts in 1999, it finally led to the downfall of the Bolivian national government and open the way to the Evo Morales government and the policies that gave voice to indigenous communities (de la Fuente, 2003). As from an interview of an activist of the Foro Boliviano sobre el medio ambiente (Fobomade), in La Paz, “in both cities, Aymara communities were protesting against the privatization of water distribution but also to better considerations of the livelihood of Aymara and Quichua people and more respect for their knowledge of local problems” (Interview October 6, 2007, El Alto, Bolivia). The involvement of these communities and the empowerment of indigenous knowledge system and pride led to stronger consciousness of environmental problems and a harder stance for claims on local livelihood. As another Aymara woman interviewee in 2017 noted, from Cochabamba, “after the reforms of the 1990s aiming at popular participation and the strife against private water management, women have gained more respect and higher participation in the decision-making process, but environmental problems are still neglected, and

¹ The literature on *buen vivir* in Quichua language and culture is more limited than in Aymara. This is related to the existence of numerous scholars writing in Aymara or about the Aymara culture as a distinct system of values that can be thought of as an alternative to capitalist societies and on the other hand, important social movements in Bolivia, such as those involved in the so-called water war or the Cochabamba “guerra del agua” were Aymara groups. There is however in other Andean countries, such as Peru and Ecuador, important Quichua social movements and intellectuals that took part of the social changes in the last two decades. In this sense, the lesson made here can be extended to a much broader area. I will come back to this water war case briefly.

indigenous women are living closer to these issue, living either in rural or in urban areas or in both” (Interview January 16, 2018, Cochabamba, Bolivia). Ironically, the improved indigenous knowledge system, better integrated in national debates, led to criticism and contestation of the Evo Morales government by indigenous groups, unsatisfied with the extractivist policy in matters related to sacred places and natural resources.

Consequently, the nature of *buen vivir* (*suma qamaña*) is not limited to well-being or the good life in Western or Global North societies; it is rather a broader notion encompassing health as well as social aspects of health (in a similar way as the Amakhuwas’ in terms of wideness), family life, and community and spiritual life. It is also related to living in harmony with nature, preserving the sacred land, the landscape, and the wildlife, all connected to the traditional living in balance. If we look back at some Asian traditional way of life in China or even Japan, for example, it is not individualistic and in non-capitalist societies, natural life and human life are still intimately related (Berque, 2010). Something lost in the West and capitalist societies. A parallel can be drawn with the Amakhuwa culture.

In Bolivia, in relation to the so-called water wars—conflicts between the water company and government, on the one hand, and suburban and indigenous populations around the issue of access to and privatization and monopolization of the water distribution system. This conflict led to the fall of the government and the rise of Evo Morales candidacy for president and government.

Especially, the local communities, Quichua and Aymara and several other ones, were sidestepped by water companies and even the government and municipal officials. The livelihood of Aymara people dwelling in poor neighborhoods was not considered, not just in time of private management and neoliberal policies but also, and surprisingly, with public officials during the government of Evo Morales revindicating the *suma qamaña* principle for the good life or *buen vivir*. Local communities were ignored as it was evident in field research in 1997, 1999–2000 and subsequent interviews in 2010 and 2020. Several indigenous families in Cochabamba described the violence they face with the police and military forces in the urban area, especially in the last semester of 1999. This is consistent with the results of other researchers (Assies, 2003) and our later field research (see observation and interviews in Cochabamba and El Alto between 1999 and 2008 and later interviews in 2018). Consequently, after all these struggles, and up to now, the agency of indigenous communities as well as women has become part of the political debates and the use of indigenous knowledge and interests are considered more relevant. There are still worries of police violence and intimidation of protestors against the exploration of natural resources in rural communities from 2018 to now; but this needs further research given the late political changes in the country with the exit of Evo Morales and, after an interim government, the return of some members of his indigenous party. Empowerment of indigenous people and knowledge is one of the legacies of the last two decades.

5 The Amakhuwa Case

The fourth section develops the case of Amakhuwa people and focuses on how Western approach to traditional practices, namely initiation rites, enters in contradiction with local, collective mentalities. The tendency of this literature is to consider initiation rites as harmful practices, including them within the general category of violation of human rights, against young women. This approach is not shared by local communities, which yet consider initiation rites as a fundamental tool for their collective identities and principles, especially in the new forms of such practices which englobe the basic principles of the respect for human rights.

Accordingly, the process of Nation building in Mozambique has been carried out through a strategic alliance between two ethnic groups: the people of the South, belonging to Ronga-Changana groups, and the Makonde, living in Cabo Delgado (Bussotti, 2021). The first ones, from the struggle for liberation onward, represented the “intellectuals” who organized the ideology and the strategy of FRELIMO (the ruling party); the second ones were the warriors of the Mozambican liberation army. Since the phase of the struggle for independence these two ethnic groups tended to exclude all the others from the process of nation-building, and, in particular, the Ndaou and the Amakhuwa. After obtaining political independence, Portuguese was adopted as the only national, official language (De Melo Machado, 1970). It was a comprehensible option, due to the presence, in Mozambique, of more than 20 different idioms; nevertheless, Mozambican socialist government went further ahead: it prohibited the use of local language in all public places, including schools, where Portuguese was imposed brutally as the only permitted language. Ndaou and Amakhuwa were the two ethnic groups which represented the main basis for Renamo during the 16 years civil war. For, their cultural practices, particularly strong among Amakhuwa, were considered a legacy of an obscurantist tradition, and prohibited accordingly (Bussotti & Nhauelque, 2022; Fonseca & Tristoni, 2013; Martinez, 1989).

Subsequently, this situation did not change considerably after the process of democratization of Mozambique, in the 1990s (Bussotti, 2021; Ferraudy, 2002; Newitt, 2017). In this case, the ethnic question, which had been hidden by the socialist Frelimo, now met new allies: the international donors and researchers who intended to carry out their anthropological studies regarding Makhuwa culture and traditional practices. However, in general, their approach did not have the aim of knowing the epistemology which stayed behind traditional practices as initiation rites; they emphasized the violation for human rights through a Western feminism perspective, thinking that initiation rites favored premature marriage and early pregnancy. In this perspective, initiation rites of Amakhuwa (a matrilinear society) were considered as a clear example of violation of human right of the young women who had to pass through them, forcing them to leave school. This process of “epistemicide” (Bennett, 2007; Nhauelque, 2021) was extended to the cultural and artistic manifestation of Amakhuwa too, as shown by the fact that their musical and dancing performances,

like Tufo, Nakhula, Nsiripwiti and Rumba are, until today, almost unknown, differently from what occurred with the equivalent artistic manifestations of the people of the South (timbila, marrabenta, etc.) and Makonde (Mapiko).

As a matter of fact, deep research practices can help to represent the complex world of Amakhuwa are now compelling, adopting the point of view of Amakhuwa in relation to their epistemology, traditional practices and their evolution, moral values and relations with a modernity that also changed the Makhuwa society (Bussotti & Nhaueleque, 2022; Nhaueleque, 2021).

In particular, Amakhuwa developed an original cosmology based on the myth of foundation of Namuli Mountains, an ethics based on the respect for family, for the other and nature, and a traditional medicine embedded in local knowledge derived from empirical experiences. Initiation rites and other traditional practices must be framed inside this Weltanschauung, clearly removed from the Mozambican collective memory due to the abovementioned ethnic and political reasons (Bussotti et al., 2012). Interviews carried out in Nampula demonstrated that initiation rites represent, until today, the best way for young Amakhuwa to be initiated to adulthood in society. The respective ceremonies, especially for young women, are based on an intense activity of counseling, where the initiated learn to deal with their future husbands, family, to respect the others and in particular the elders.

Both societies value more nature and traditional medicine in indigenous settings if compared to major urban or Western cultures (Allen, 2002; Ayittey, 2006). Traditional medicine in both societies is a way of reproducing the social fabric of societies, creating, and reinforcing bonds, and transmitting traditional knowledge and values. It has also a complementary role in countries where medicine practiced in public and private hospitals or clinics is not available to the many.

6 Discussion

In this final part, the authors consider not just the deliberate ignorance of local knowledge and cultures but also its use and abuse by different actors and interest groups or entities of what matters to local people in terms of quality of life, livelihood, institutions, and sustainability.

In both case studies, indigenous knowledge systems and indigenous institutions are important for producing knowledge on environmental, health, social, and economic issues, that promote knowledge-based decisions in favor of sustainability. Moreover, indigenous knowledge systems and methods can help better prepare environmental activism and management of issues such as biodiversity, ecological services, poverty, health access, among others (Eisner et al., 2009).

Furthermore, indigenous institutions, if compatible with sustainability science, can be a significant contribution to both research and policy action (Hunt and ANU) 2008. Here, contradictory rules and values must be avoided and people knowledgeable with the indigenous context and institutions could enlighten the choice to be made, avoiding blunders and injustice.

Additionally, it is worth remembering that the approach towards indigenous knowledge has been in prevalence carried out two different approaches, according to different historical time: in the first case, the colonial anthropology reduced indigenous people and their knowledge to a mere object of folklore, hierarchically lower than the Western knowledge; in the second circumstance, a neo-colonial approach has tried to characterize all traditional practices (and their relative forms of knowledge) as violating human rights, thus to be condemned. The confluence of these two approaches, as explained before, consisted in the ignorance of such practice and philosophy of life, reducing the indigenous people to an object to be not only investigated, but also indoctrinated. The methodology of research adopted by these two approaches impeded to consider the indigenous people as active subjects who could build together with the researcher an epistemology different from that of Western matrix. To the contrary, the approach used by the three authors of this chapter in their fieldworks—and that we tried to explain—demonstrated that it is possible to realize empirical research using the categories of indigenous people, without having the pretention to impose them the point of view of the researcher or of supposed agents of development.

Furthermore, an integration through the phronetic approach can be a step towards furthering the issue of indigenous methodologies and the recognition of indigenous knowledge systems. Phronesis (usually translated from Greek as prudence or practical wisdom) is the prudential approach to action and in our case to research and the characterization of IKS. Phronesis can be considered as a protocol for research (Flyvbjerg, 2001), against arrogance of positivist and deterministic approach to local knowledge systems, and in favor of taking care of an adequate characterization of indigenous culture, knowledge, and institutions. This protocol is context sensitive and according to Flyvbjerg (2001: 140) and Tracy (2019: 4) it is a way “to clarify and deliberate about the problems and risks we face and to outline how things may be done differently in full knowledge that we cannot find ultimate answers to these questions or even a single version of what the questions are” whereas the historical context of a research endeavor precedes the inquirer in field research (Clegg et al., 2014). The implication of the research is about both the researched indigenous communities and the research community.

Moreover, another aspect that is also common to both studies is the relevance of gender issues in indigenous communities, indigenous institutions, and indigenous knowledge systems. It is also relevant for other geographical areas as well (Pereira & Trindade, 2021; Vintiadis, 2021). It is crucial that the gender perspective be practiced by researchers knowledgeable of the indigenous context. This is one additional feature of the complexity of indigenous research practice.

Additionally, the concept of phronetic research we referred to must be combined with an ethic of responsibility for both the researcher, the activists and the policy makers. We must take the concept of responsibility seriously and not like it has been in the domain of corporate social responsibility (Supiot & Delmas-Marty, 2015). This means that indigenous knowledge cannot be neglected by neither the researcher, the activist, and the decision maker.

Finally, we are expecting the construction of critical indigenous knowledge of indigenous institutions, integrating indigenous knowledge systems of a social and livelihood nature with traditional ecological knowledge (Yhdego, 2021).

7 Conclusions

One of the main conclusions is the inclusion in the design of the research of the specific and salient features of the IKS, and it is good practice to have recourse to indigenous researchers that master the local cultures and languages. It can at some point slow the research process, but it is worth it for the sake of the quality of the research and the quality of the knowledge created, reassessed, and communicated.

Moreover, the emergence of a point of view typical of the local and indigenous people would allow them to express their opinions, perspectives, and moral values (that is, an original and authentic epistemology), without the risk to subjugate such perceptions through a point of view completely external to their beliefs and, thus, Eurocentric. This can be inferred from both cases studied in this chapter.

Additionally, indigenous institutions are a valuable aspect both for research and activism (or policy) purpose (Ayttey, 2006). It must be integrated critically in the research design, combining critical indigenous knowledge of indigenous institutions. This integration is crucial for widening and improving the knowledgebase of traditional ecological knowledge (Whyte, 2013).

Finally, for promoting actions in sustainability measures, it is highly relevant to generate or access to indigenous knowledge for the very success of critical policies, increasing the precision and adequacy of the decision mix.

References

- Aggarwal, A. (2008). Indigenous institutions for natural resource management: Potential and threats. *Economic and Political Weekly*, 43(23), 21–24. <http://www.jstor.org/stable/40277538>
- Allen, C. J. (2002). *The hold life has. Coca and cultural identity in an Andean community*. Smithsonian Institution.
- Archer, M. S., & Morgan, J. (2020). Contributions to realist social theory: An interview with Margaret S. Archer. *Journal of Critical Realism*, 19(2), 179–200. <https://doi.org/10.1080/14767430.2020.1732760>
- Artaraz, K., & Calestani, M. (2014). Suma qamaña in Bolivia. *Latin American Perspectives*, 42(5), 216–233. <https://doi.org/10.1177/0094582x14547501>
- Assies, W. (2003). David versus Goliath in Cochabamba: Water Rights, Neoliberalism, and the Revival of Social Protest in Bolivia. *Latin American Perspectives*, 30(3), 14–36. <https://doi.org/10.1177/0094582X03030003003>
- Ayttey, G. (2006). *Indigenous African Institutions*. Brill | Nijhoff. <https://doi.org/10.1163/ej.9781571053374.i-586>
- Banerjee, S. B. (2011). Embedding sustainability across the organization: A critical perspective. *AMLE*, 10, 719–731. <https://doi.org/10.5465/amle.2010.0005>

- Bennett, K. (2007). Epistemicide! *The Translator*, 13(2), 151–169. <https://doi.org/10.1080/13556509.2007.10799236>
- Berque, A. (2010). *Écoumène. Introduction à l'étude des milieux humains*. Belin.
- Bussotti, L., & Nhaueleque, L. (2022). Abbandono scolastico e riti di iniziazione femminili: Antropologia dei Makhwa (Nord del Mozambico), *Nuova Secondaria* - n. 6 2022 - Anno XXXIX, pp. 20–25.
- Bussotti, L., Gatti, M., & Nhaueleque, L. A. (2012). *La religione nel Mozambico contemporaneo*. IBIS.
- Bussotti, L. (2021). Reescrevendo a história. A contranarrativa sobre Moçambique contemporâneo a partir do Macuablogs (2004–2018). *Tempo e Argumento*, 13(34), 1–37. <https://doi.org/10.5965/2175180313342021e0104>. <https://www.revistas.udesc.br/index.php/tempo/article/view/2175180313342021e0104>
- Claeys, P. (2015). Human rights and the food sovereignty movement: Reclaiming control (1st ed.). Routledge. <https://doi.org/10.4324/9781315761633>
- Clegg, S., Flyvbjerg, B., & Haugaard, M. (2014). Reflections on phronetic social science: A dialogue between Stewart Clegg, Bent Flyvbjerg and Mark Haugaard. *Journal of Political Power*, 7(2), 275–306.
- Collot, P. -A. (2007). La protection des savoirs traditionnels, du droit international de la propriété intellectuelle au système de protection sui generis, *Droit et cultures* [En ligne], 53 | 2007–1, mis en ligne le 31 mars 2009, consulté le 03 décembre 2021. <http://journals.openedition.org/droitcultures/502>
- de la Fuente, M. (2003). A personal view: The water war in Cochabamba, Bolivia: Privatization triggers an uprising. *Mountain Research and Development*, 23(1), 98–100. <http://www.jstor.org/stable/3674547>
- De Mello Machado, M. (1970). *Entre os macuas de Angoche*. Prelo.
- Descombes, V. (2014). *The institutions of meaning: A defense of anthropological holism*. Harvard University Press. <https://doi.org/10.4159/harvard.9780674419971>
- Donati, P. (2016). The 'relational subject' according to a critical realist relational sociology. *Journal of Critical Realism*, 15(4), 352–375.
- Eisner, W. R., Cuomo, C. J., Hinkel, K. M., Jones, B. M., Brower, S., & Ronald, H. (2009). Advancing landscape change research through the incorporation of Iñupiaq Knowledge. *Arctic*, 62(4), 429–442.
- Ferraudy, H. (2002). *Macua*. Manatí.
- Flyvbjerg, B. (2001) *Making social science matter: Why social inquiry fails and how it can succeed again*. Cambridge University Press.
- Fonseca, L., & Tristoni, R. H. (2013). Os desafios que o povo Makhua encontra para manter sua cultura diante do plurilinguismo na região de Cabo Delgado, Moçambique. *Travessias*, 7(1).
- Fricke, M. (2011). *Epistemic injustice: Power and the ethics of knowing*. Oxford University Press.
- Frodeman, R., Klein, J. T., & Pacheco, R. C. S. (2019). *The Oxford handbook of interdisciplinarity*. Oxford University Press.
- Ghosh, S. K., & Ghosh, S. K. (2021). Conceptualizing the circular economy. In: S. K. Ghosh (Eds.), *Circular economy: Recent trends in global perspective*. Springer. https://doi.org/10.1007/978-981-16-0913-8_1
- Gough, I. (2017). *Heat, greed and human need: climate change, capitalism and sustainable wellbeing*. Edward Elgar Publishing.
- Guala, F. (2016). *Understanding institutions: The science and philosophy of living together*. Princeton University Press.
- Guendel, L. (2012). Reflexiones sobre Vivir Bien y derechos humanos: Un punto de vista práctico. *Revista Integra Educativa*, 5(3), 133–156. http://www.scielo.org.bo/scielo.php?script=sci_arttext&pid=S1997-40432012000300007&lng=es&tlng=es
- Hodgson, G. M. (2006). What are institutions? *Journal of Economic Issues*, 40(1), 1–25.
- Humphreys, S. (2011). *Human rights and climate change*. Cambridge University Press.

- Hunt, J., & Australian National University. (2008). *Contested governance: Culture, power and institutions in Indigenous Australia*. Centre for Aboriginal Economic Policy Research, ANU.
- Kovach, M. (2021). *Indigenous methodologies: Characteristics, conversations, and contexts*. University of Toronto Press.
- Martinez, F. L. (1989). *O povo Macua e a sua Cultura*. Editora do Instituto de Investigação Científica Tropical.
- Mbah, M., Johnson, A. T., & Chipindi, F. (2021a). Institutionalizing the intangible through research and engagement: Indigenous knowledge and higher education for sustainable development in Zambia. *International Journal of Educational Development*, 82, 102355. <https://doi.org/10.1016/j.ijedudev.2021.102355>
- Mbah, M., Ajaps, S., & Molthan-Hill, P. (2021b). A systematic review of the deployment of indigenous knowledge systems towards climate change adaptation in developing world contexts: Implications for climate change education. *Sustainability*, 13(9), 4811. <https://doi.org/10.3390/su13094811>
- McGoey, L. (2019). *The unknowers: How strategic ignorance rules the world*. Zed Books.
- Merleau-Ponty, M. (1981). *The phenomenology of perception*. Routledge.
- Newitt, M. (2017). *A short history of Mozambique*. Hurst.
- Nhauueleque, L. A. (2021) Práticas Tradicionais e Direitos Humanos na Sociedade dos Amakhuwa: Estudo de caso da Cidade de Nampula. *Africa Development / Afrique et Développement*, XLVI(2), 71–92. <https://www.jstor.org/stable/48628294>
- Nickson, A., & Vargas, C. (2002). The limitations of water regulation: The failure of the Cochabamba concession in Bolivia. *Bulletin of Latin American Research*, 21(1), 99–120.
- Pereira, M. C., & Trindade, D. S. (2021) Mulheres Indígenas: saberes e fazeres na pandemia. *REVES - Revista Relações Sociais*, 4(3), 12781-01. <https://doi.org/10.18540/revesv14iss3pp12781-01-11e>
- Sawyer, R. (2005). *Social emergence: Societies as complex systems*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511734892>
- Smith, L. T. (2021). *Decolonizing methodologies: Research and indigenous peoples*. Zed Books.
- Supiot, A., & Delmas-Marty, M. (2015). *Prendre la responsabilité au sérieux*. Presses Universitaires de France.
- Tanner, T., & Horn-Phathanothai, L. (2014). *Climate change and development* (1st ed.). Routledge. <https://doi.org/10.4324/9780203818862>
- Tracy, S. J. (2019). *Qualitative research methods. Collecting evidence, crafting analysis, communicating impact*. Wiley-Blackwell.

- Vintiadis, E. (2021). *Philosophy by women: 22 philosophers reflect on philosophy and its value*. Routledge.
- Whyte, K. P. (2013). On the role of traditional ecological knowledge as a collaborative concept: A philosophical study. *Ecological Processes*, 2, 7.
- Williams, R. (2021). Crisis: the emergence of another hazardous concept. *Technology and Culture*, 62(2), 521–546.
- Yhdego, M. (2021). The circular economy in Tanzania: A self-referential system. In S. K. Ghosh & S. K. Ghosh (Eds.), *Circular economy: Recent trends in global perspective* (pp. 69–112). Springer.

**Case Studies and Initiatives That Illustrate
the Interplay Between Indigenous
Knowledge and Different Contexts That
Underpin Sustainable Development**

Integration of Indigenous Knowledge as Part of a One Health Research Toolkit to End Hunger and Improve Nutrition



Andrew Malata Phiri

Abstract One of the foundations of social value in transdisciplinary research is the employment of indigenous knowledge (IK) in the One Health concept. In understanding societal challenges involving adequate nutrition and abolishment of hunger and disease, linkages are being sought between a research agenda and sustainable development that promote the cooperation of communities. The small-scale live-stock producers have struggled with sustaining their productivity amidst food-borne neglected tropical diseases, poor husbandry systems, and modernization of traditional ways of rearing their livestock on one hand, and on the other, ensuring a sustainable livelihood and feeding people. While widespread traditional pig production continues to be the hallmark of resiliency in providing livelihoods of the rural population, existing production challenges require an improvement in ways of raising indigenous pigs in averting hunger, and where applicable, taking advantage of IK and associated methodologies. Efforts aimed at replacing indigenous breeds with unsuitable exotic breeds or crossbreeding have had mixed results as the farmers and their communities believe their indigenous ways still have a place in the sustainability of the enterprises. Striking a balance between the adoption of modernized animal livestock practices and its potential for increased productivity and disease control strategies, and taking into consideration experiences, and practices that, if desirable to fight hunger, can encourage communities to take research outcomes seriously. Such adoptions may lead to sustainable initiatives that are locally driven. While the fight against hunger may be the focus of SDG #2, the SDGs will remain integrated in terms of neglected tropical diseases. This is because any action done to achieve any of them, particularly SDG 1 “End poverty in all its forms everywhere” and SDG 6 “Ensure availability and sustainable management of water and sanitation for all” affects outcomes in others. To achieve any meaningful progress, any development

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must balance aspects of social, economic, and environmental sustainability. Considering the wealth of IK and the pursuit of the social value of research, approaches are being modified to improve a community-based inquiry and application.

Keywords Indigenous knowledge · Intangible cultural heritage · Sustainable development goals · One health · *Taenia solium*

1 Introduction

The fight against zero hunger (SDG #2) is not a linear and isolated undertaking by selected stakeholders. It may benefit from using Indigenous Knowledge (IK) as an unlikely of approaches. Considering the significance of attaining adequate and improved nutrition and associated benefits such as disease control, an attempt will be made to show the significance of the indigenous knowledge system in One Health (OH) Research involving neglected tropical diseases. The association between the two is key in addressing a multifaceted approach to societal livestock challenges that have an impact on nutrition, zoonotic diseases, and livelihoods. Unfortunately, hunger and geographical location are closely linked. Food insecurities and their related health outcomes are commonly encountered in rural environments, places where resilience and sustainability against hunger are best suited. This does not take away the many situations where urban hunger is rife (Davis et al., 2022).

Studies have looked at how IK is understood, its scope, how it is acquired, sustained, and most importantly, how it is applied in society (Keane, 2017; Wenger et al., 2011). Some have focused on its association with climate change (Phiri et al., 2013), water, and agriculture (Renaudeau et al., 2012; Willet et al., 2019). The society to which IK is applicable can be a localized environment but can also span vast geographical regions. This IK is usually identified with poor societies. However, with the urban migration of people, such knowledge may either be lost or transferred to impact the now growing urban agriculture whether for home growing or for the urban local markets.

As part of measures to achieve SDGs in communities where IK has thrived and conventional strategies have been applied before or are being developed, the call for integration of IK has taken a more urgent impetus. This is particularly so under the major theme of “Indigenous Contexts and Sustainable Development”. The integration is envisioned to be a bridge between what communities need as sustainable practices and solutions on one hand, and the external initiatives which include conventional research on the other.

The place for IK is being advanced from relegation to rural practice and a forgotten resource to it being an essential part of One Health research. While the focus of this initiative is to harness the interconnectivity between humans, animals, and the environment, its applicability has been on zoonotic diseases and public health. Consequently, transdisciplinarity is an expected standard in the establishment of research teams. Whether serendipitously or because the scientific approach fell short of a

robust understanding of why interventions were failing, a clear association between IK and One Health research was key to the understanding and resolving of many challenges occurring at the local sphere (Hobbs et al., 2019; Thys et al., 2015).

2 Interventions Targeting Hunger Alleviation and Improved Nutrition

With the complexities of factors affecting food production worldwide, viable solutions to promote adequate food production and an efficient food chain to deliver food to consumers are not straightforward. At the production level, issues of land use, agricultural practices that may not adapt to changing times and effects of climate change, factors relating to varieties of crops and appropriate animal breeds, and harnessing of interventions to promote improved productivity grapple the small-scale producer. Since the IK and majority of the food may be produced at the rural level, many policy interventions are better suited there. With many government programs, sustainability and resilience have ended soon after the project life (WFP, 2014; Mason et al., 2020; Andrews, 2021). There is definitely something that is lacking to ensure sustained resilience in the access to food, and provision of safe and nutritious food in adequate amounts despite years and huge amounts of external funding to these causes.

The major reason for the observed variable experiences has been attributed to the initial program establishment, with the creation, assumptions, and policy decisions made in a top-to-down approach. In that way, the consumers of the programs play along and are not committed to seeing them beyond the program life. It could be that the consumers do not get capacitated and involved at the top level and so do not have the skillset to continue. Furthermore, in cases where the capacitating is optimum, the bottleneck has been the sustenance of the funding aspect. As a stop-gap measure, some proposals have emphasized first exploring the knowledge level of the local communities. That knowledge audit can be tailored to a particular program outcome and will obviously be customized for a local context. Notably, aspects of how the community understands agriculture and its components can be improved from the baseline, prevailing healthcare aspects of the community, education on food security and how they manage their natural resources (e.g. drivers, mitigation measures) and a repertoire of any survival measures that the community promotes resilience in poverty alleviation and sustainable livelihoods.

3 Cultural Heritage: Skillset Composition, Application, and Conservation

Intangible Culture Heritage (ICH) refers to practices, presentations, representations, knowledge, and skills that a cultural grouping chooses to recognize as its cultural

heritage (Warbuton & Martin, 1999). The fact that ICH is dependent on the view of the practicing community shows that it cannot be divorced from it.

3.1 Domains of ICH

The Convention for the Safeguarding of Intangible Cultural Heritage (2003) (<https://ich.unesco.org/en/convention>) outlined the domains of ICH. The domains form a composite knowledge system that tackles the way of life including agricultural practices and potential ICH utilization as sustainable mechanisms. Acknowledging the existence of interlinked domains and how they can impact SDG 2 is important.

3.1.1 Oral Traditions

Oral traditions comprise language as a vehicle for the transmission of culture. Language becomes a useful identity mark as well as a rich source of history, a conducive environment of cultural heritage, and a route of engagement for various initiatives. That is why program planners, social scientists, and many other stakeholders are encouraged to learn the language or get the tools for use in such communities translated into the local language(s) and vice versa into a language used by the former. This domain includes spoken forms such as riddles, songs, and tales.

3.1.2 Performing Arts

These refer to performance activities such as songs, dances, and drama.

Please note that while the song as a product falls under the first domain, the song while being performed falls under the second domain (ICH expert).

3.1.3 Social Practices, Rituals, and Festive Events

These are a myriad of activities performed within a year or over a particular period of time. Some are one-off events while many are repetitive. These include practices such as marriage ceremonies, initiation ceremonies, rituals, and practices that people use to interpret and manifest their reality.

3.1.4 Knowledge and Practices Concerning Nature and the Universe

This domain is interested in man's interpretation of the natural world. It, therefore, includes knowledge and interpretation of the cosmos, trees, animals, rivers, and soils. Noteworthy is the traditional methods of keeping livestock including breeding.

This domain is used to expand man's exploration of the world and is closer to the third domain. Personally, I have taken this domain to be central to all other domains because of how much it helps link the other domains to the reality of man's world (An Academic, Literature and Languages).

3.1.5 Traditional Craftsmanship

It is focused on the knowledge and skills used in the production of crafts. The most interest is held in the knowledge and skills used in the production of tools and crafts. While the products can be masterpieces, the ICH creators believe that, without such knowledge and skills, these objects would never be reproduced once they are worn out. The transmission of such expertise must be protected. These tools and crafts are tangible while the production process itself is intangible. Both IK forms are critical to the success of the community.

.... ICH is central to helping people realize their fullest potential in not only defining their world but also providing for their world. Through ICH, people are able to take care of all their needs and lead successful lives. ICH provides people with entertainment, production of needed necessities such as shelter, food, medicine, tools, etc. In the absence of ICH, communities are unable to have whole lives. (ICH Expert).

3.2 ICH That has Direct Links to Averting Hunger and Poverty Reduction

While the ICH domains are discussed separately, their applicability can be inter-linked. For the fight against hunger and improvement of food security, the third domain of ICH encompasses food production and preservation methods, consumption practices, and interrelations among people. The fourth domain is central to health and spiritual relations among people.

All this is important for people to live successful lives. for development to be meaningful, it should be interpreted in relation to peoples' aspirations, beliefs, hopes, and fears among other things. This is because all these are embedded in their cultural heritage. For this reason, without heritage, one cannot talk about what development implies in the lives of a community (Academician, Literature, and Languages).

4 The Role of Research Institutions: IK and the Concept of Community of Practice

Higher education centers and research institutions remain the epitome of inquiry and critique. To fully explore the importance of having such institutions, several requirements are needed for the IK angle to be appreciated.

4.1 Raising Awareness of IK and Integrating It in Education and Research

IK can stir public debate, outcry, and full-blooded venom. Societal perceptions of IK elicit clear battle lines between its proponents and antagonists. The mainstream media and social media became weaponised fora of battle. One of the notable cases of raising awareness for the institutionalizing of IK was the plans by the University of Zambia with sponsorship from the United National Educational Social and Cultural Organisation (UNESCO) to introduce a degree program in Intangible Cultural Heritage (ICH) in 2018. The degree was a pioneering one in Sub-Saharan Africa and attracted students from the whole continent. While its core objective was to safeguard ICH and make it a critical part of national development, its grandiose development met a fierce pushback. Mbah et al. (2021) outlined the brief origins and sentiments that accompanied such a move. The public and laypersons believed that ICH was a way of promoting undesirable practices, leaning towards the occult. The university prevailed and put up a commendable effort at raising awareness and getting the programme to enrich the curriculum but also to institutionalize the IK and raise its profile among the different conventional knowledge. Not only did the public have misgivings, but within the university integrating IK on its own or in collaboration with conventional science and other disciplines had been slow or non-existent for community-based researchers. In the end, the rightful rolling out of such an initiative attracted students and their sponsors who foresaw the importance of ICH.

4.2 Documenting IK and Establishing Its Value

The written knowledge has been understood to be a true reflection of our societal capture of what is true and genuine, while the undocumented has been left to be discarded, often with the stigmatization of those who propagate and promote it. Mbah et al. (2021) acknowledged its role in the research sphere, and the deliberate actions to institutionalize it for sustainable development. IK must be treated not as an alternative form of knowledge but as an integral component of a combined knowledge system to be utilized for good of humanity (Thys et al., 2015, 2016). How such is utilized to tackle SDG2 and other related goals is a transdisciplinary effort that targets sector-wide research priorities (Magni, 2017; Ebi et al., 2020; Moore, 2014). Transdisciplinarity has a high likelihood in the identification of cross-cutting research gaps and more efficiently undertake design and implementation of research on the same. The inclusion of IK community participants not only in the design of research and interventions, but also to be promoted as indigenous authors, agents of change in community engagement, and as representatives at various points in the knowledge economy is less often proposed or followed through (Ninomiya

et al., 2017; Sillitoe & Marzano, 2009). This unconventional approach promotes the sharing of knowledge within the correct and appropriate context leading to an increased value of the IK.

4.3 Capacity Building of the Creators and Promoters of IK

Leadership roles and leverage points must include higher education institutions and research centers (Moore, 2014). Such leadership behavior is a drive of many stakeholders but universities take a pivotal role to drive such an agenda. One of the ways to follow would be the identification of IK specialists and propping them for their new roles. These specialists will form a nidus or bridge between IK and scientific knowledge. It can be argued that the creators need capacitation just as much as the promoters. The type and level of capacitating will vary but must target the weak aspects of their skillset, integration with other disciplines, identifying their roles, and how they can be ably executed within the community or within the education sector. The entities responsible for this capacitating can be the government, universities, local communities, creators of IK themselves, and other stakeholders depending on the niche of engagement. What must be critical would be for the government and/or its agents to have the local communities initiate or be helped to establish locally generated concepts of coping strategies as outlined above on interventions to alleviate hunger and improve nutrition. If the indigenous strategies may not conform to achieving the set goals, the stakeholders must emphasize the integration of the indigenous and the scientific knowledge, a hybrid, and perhaps move away from strategies that have worked elsewhere but do not suitably apply to the local context. If the modern coping strategies are not a close fit, there may be a need for adaptation to the local environment. Similarly, the custodian of IK must be promoted and their IK facilitated for onward efficient transmission to the younger generation. Since culturally that transmission has taken the route of oral communication and not documentation of the IK, adopting a formal training or a blended one to help these custodians achieve the preservation and transmission intergenerational or within a generation. Whichever methodologies are adopted, they must be centered on the local context and with a view of resilience and sustainability.

4.4 Creation of Partnerships That Work

The important creation that scientists have been utilizing to advance a similar integration as above is the concept of Community of practice (CoP) (CDC 2022; Ranmuthugala et al., 2011) or strengthening in those universities where it is weak, and maintaining where there are strong ones, is a potential route to use human and

other resources in an efficient manner. The theory of CoP has been utilized in organizations, among researchers, communities, the education sector, government, etc. (Wenger et al., 2002, 2011).

WHO (2012) shows the Water, Sanitation, and Hygiene (WASH) project smart partnerships with local communities. The project considered some of the major changes to do with climate, productivity, access to water, and improved sanitation and hygiene. Open air defecation has been linked to the perpetuation of the pork tapeworm (Thys et al., 2015). The link of the disease to SDG2 is outlined in Sect. 6. In eastern Zambia where WASH programs were being implemented by the government, noticeable infrastructure improvements in terms of sanitation and water access points were noted. The presence of improved latrines was a marvel, but this author observed that some of the toilets were in pristine condition, but remained unused and, if utilized, were used as storage spaces for farm produce. Upon inquiry, it was revealed that the facilities could not be used for both genders, in-laws, and the entire family because of taboos involving who can access communal sanitation facilities, usually at the exclusion of elderly men. It was a classical example of how a well-crafted project with mitigation measures against poor hygiene, lack of adequate sanitation facilities, and improvement in the provision of safe water was poorly accepted because of IK against communal usage of the provided interventions.

Another smart partnership is the World Bank and African nations' collaboration that birthed the Africa Centers of Excellence (ACE) initiatives (<https://ace.aau.org/>). This capacitating intervention was aimed at making higher education centers become relevant and enabling the faculty and their students to re-learn and adapt to emerging or reemerging matters affecting humans, the environment, and animals while focusing on resilience. Some of the ACE projects targeted reduced agricultural productivity leading to food insecurities and negative impact on any poverty reduction measures, and health challenges, taking stock of how traditional medicine and knowledge can be utilized as potential drugs and vaccine candidates; For agricultural and related thematic areas in Malawi, the African Center of Excellence for Public Health and Herbal Medicine; Kenya, the Center of Excellence in Sustainable Use of Insects as Food and Feeds, and Center of Excellence in Sustainable Agriculture and Agribusiness Management; in Tanzania, the African Center of Excellence for Innovative Rodent Pest Management & Biosensor Technology Development and in Uganda, Pharm-Biotechnology and Traditional Medicine Center.

IK-oriented research, whether basic or applied, is hoped to offer insights not appreciated before by those not actively involved in its creation and propagation. Understanding why certain perceptions and practices were held (Weber & Stern, 2011) has improved the adoption of newer interventions and e-health education applications for the pork tapeworm *Taenia solium*, schistosomiasis, and other related neglected zoonotic diseases (Butala et al., 2021; Hobbs et al., 2019) and depending on those perceptions and practices take action for or evasion of the consequences.

5 The Sustainable Development Goals and Their Interconnectivity

There are 17 interlinked SDGs with a combined aim of achieving by 2030 three major milestones, namely to end poverty, protect the planet, and enjoyment of peace and prosperity by all people. In order to achieve these lofty goals, the interconnectivity is expressed directly or in some instances by implication because of the spillover effects or consequences when one or more SDG is being implemented. The desired development must also have a delicate balance of environmental, social, and economic sustainability.

While the 17 SDGs are interconnected, this chapter will focus on SDG 2 (zero hunger) and link it to SDGs 1 (no poverty), 3 (good health and wellbeing), and 6 (clean water and sanitation). This is because the author's work has been focused on targeting *Taenia solium* firstly as a pig industry challenge. In attempting to understand the problem, its extent and factors affecting transmission, there were underpinning permutations that were only later established and identified. For example, the disease had taken a foothold in humans causing cysticercosis, neurocysticercosis, and associated epilepsy (Mwape et al., 2015). What started as a fight against hunger and rural poverty (SDG 1 and 2) in raising livestock that has quick turnover, affected their health (SDG 3). Because of poor or inadequate safe water and sanitation (SDG 6) and poor adherence to sanitation and husbandry standards (Thys et al., 2015, 2016), the *Taenia solium* complex can only be sustainably controlled (Gabriel et al., 2020).

To sustain any meaningful development, SDG3 is a precondition for the attainment of many other SDGs. For example, good health is needed to attain SDG 11 (Sustainable cities and communities). In contrast, SDG 13 (climate action) affects health, impacts livelihoods, agricultural yields, food security, poverty eradication, health, and many others. It is thus a vicious cycle of interdependence and interconnectivity.

6 Neglected Tropical Diseases as Threats to the Attainment of SDGs

Among many neglected tropical diseases is the taeniasis/cysticercosis complex. This is a zoonotic infection caused by the pork tapeworm, *Taenia solium*, leading to cysticercosis in pigs and taeniasis and neuro/cysticercosis in humans. The disease is a health, environmental and agricultural problem. In humans, it causes a worm infestation and is linked to epilepsy; is responsible for losses due to the reduced value of the meat and carcass condemnation; is known as a disease of poverty because it is rooted among poor pig-keeping communities that have challenges with sanitation and access to clean water.

Provision of clean and safe water, access to toilets, and the practice of improved hygiene habits have reduced or eliminated many water-, soil- or food-borne diseases. Improved husbandry practices like meat inspection leading to condemnation of

affected carcasses and better confinement and provision of feed can break the cycle of transmission of *Taenia solium*. However, pig confinement is not considered as a viable option to be fully followed by farmers (Thys et al., 2016) because of the sustainability of feed sources and reluctance to build kraals.

A case has been made for the critical role of health education to improve health outcomes, improved knowledge and knowledge retention, and adoption of the above-mentioned practices in sub-Saharan Africa by students (Hobbs et al., 2019) value-chain players (Vaernewyck et al., 2020) and health or agricultural professionals (Lauridsen et al., 2019). Community-led total sanitation initiatives which are anchored on participatory approaches to a common goal have had mixed impacts mostly of short-term success in geographically localized areas (Winters et al., 2016; Yeboah-Antwi 2019), with better prospects expected if they are practiced for longer. A similar outlook of longer than a modeled 4-year One Health approach is reported (Johansen et al., 2017) and if it is achieved, the pre-intervention status quickly returns at the end of the programme.

7 Applications of IK to End Hunger and Improve Nutrition and Sanitation

Traditional pig production is becoming one of the mainstays of agricultural enterprise of rural populations. Many of the farmers rear the indigenous pig breeds while others can have commercial ones. The preference of indigenous is attributable to their hardiness, and traits that enable their adaptation to local environments, disease occurrence and, nutritional stresses. How these pig breeds offer in terms of sustainable production and reproduction is unknown, but if they remain unimproved or do not take up modern reproduction initiatives, they may prove to be a hindrance in filling the gap between protein demands in the nation.

7.1 Construction of Pig Kraals, Bathrooms, Pit Latrines, and Other Associated Structures

Pit latrines (Fig. 1), kraals (Fig. 2), racks for utensils, granaries (Fig. 3) and any other structure are made by specialized individuals who use locally-available materials like timber, grass, fibres, sticks and soil. In situations where these are not available, these people have improvised and utilized asbestos, cement and modern fittings. The builders live within the same community and have acquired such IK skills from parents and other elders. It is a requirement that each family has members with different commonly acceptable skills. If a particular skill is not there, they can hire a requisite-skilled person to do it for them at a fee.

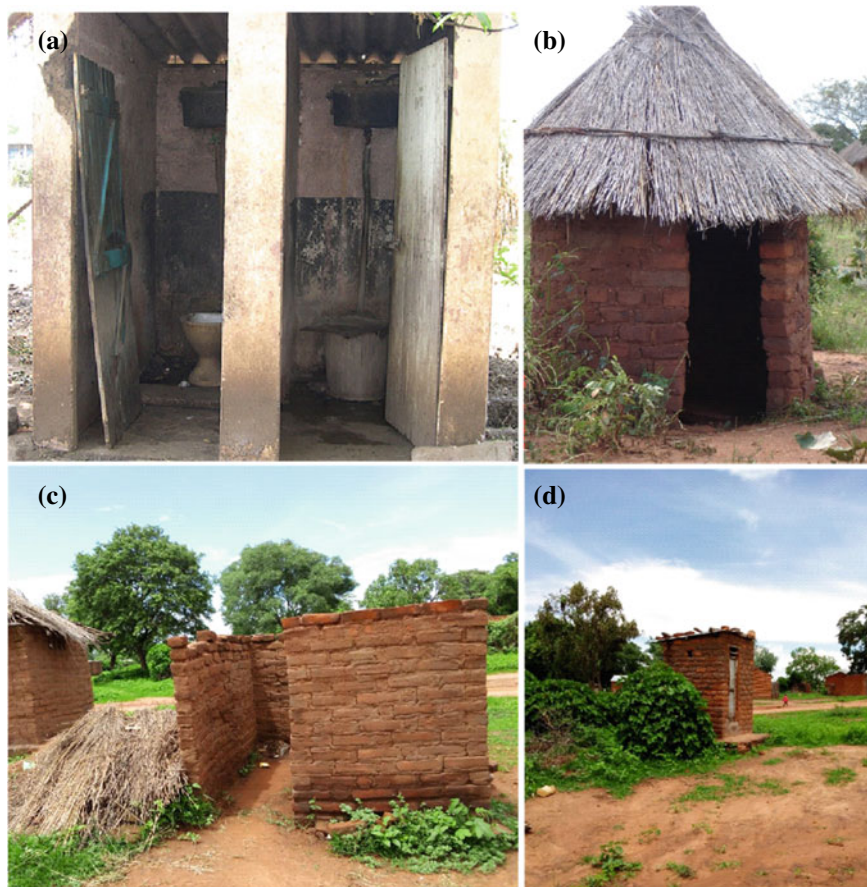


Fig. 1 Types of pit latrines **a** Blocks and cement with asbestos roofing, flushable with bowl and cistern, and wooden door. **b** Earthen blocks and mortar with thatched roof and movable door. **c** Fire-burnt clay bricks and grass thatch being prepared for roofing **d** Clay brick building with iron-sheet roofing and iron door. **a** and **b** are from Petauke district, and **c** and **d** from Sinda district, all from eastern province of Zambia

7.2 *The Use of Wood Ash as a Detergent and as a Fly Repellant*

The local communities in rural areas are generally perceived not to care about hygiene. One of the good hygiene practices is the utilization of wood ash as a germ killer and fly repellant. It is employed to wash their hands, in place of commercial soap, every time after they use a toilet. This practice is encouraged in children and inculcated throughout their formative years. Ash is stored in a container and placed outside a pit latrine usually next to a container of water.



Fig. 2 Types of pig kraals: **a-e** are mainly constructed using wooden poles and trusses, grass thatch roofs, bare or covered by iron sheets. Floors are earthen. *Sources* Sinda and Katete districts of eastern province of Zambia



Fig. 3 Village settlement mapping and its associated amenities is key **a** Granaries (circled) situated in the village inner circle and **b** A raised stage for drying washed utensils and safeguarding from children and dogs (arrow) with a pig kraal in the background (circled) close to the homesteads. Sources Sinda district of eastern province of Zambia

In as much as the local people may not know that ash is caustic potash, at least they know that there is a chemical substance within the ash that kills germs. This may have helped to reduce the transmission of water-borne and food-borne diseases like cholera, typhoid, cysticercosis, giardia.... (Veterinary Paraprofessional).

Similarly, the community members have a basic understanding that flies can transmit diseases to people and animals. What they may not explicitly know are the names of specific diseases or the responsible pathogens. What is appreciable is the fact that knowledge of flies acting as flies vectors of different pathogens is well-grounded. Since the majority cannot afford to buy disinfectants and repellants, they also put ash in pit latrines as a way of chasing flies to prevent them from carrying germs from the faecal matter and also as a prevention of malodour.

It is scientifically postulated that flies can transmit cysticercosis when they sit and feed on human stool from a tapeworm carrier. So in as much as the local people would not know that the flies transmit cysticercosis, they know that they can transmit pathogens (Veterinary technologist).

7.3 Herd Immunity and Other Health Practices

7.3.1 Isolation of Sick Pigs as a Way of Disease Control

African swine fever is rampant in the Eastern Province of Zambia. The huge economic losses that farmers incur due to high mortalities bring despair and anguish. The local people have come to understand that there is neither a vaccine nor treatment for it. Therefore, every time they encounter an outbreak and some pigs survive, they don't slaughter those that survive for any reason whatsoever. They instead preserve them as breeding stock.

In as much as they do not know about enzootic stability, at least they know that the pigs that survive the first encounter may survive the succeeding ASF encounters. They sometimes isolate the sick ones from the ones not showing any signs as a way of preventing the spread of the disease. They do have some knowledge that by interacting with the sick ones, other pigs can contract the disease (Veterinary Paraprofessional).

7.3.2 Feeding is Restricted to a Designated Person

There is always a designated person among the family members who feeds the pigs in a household. It is common knowledge among local communities that when pigs are fed by one person, they minimize the spread of diseases to the livestock. In rare circumstances when the designated person is unwell or for some reason is unavailable for the feeding duties, then someone else can feed the pigs.

They believe that if anyone else feeds them the pigs will have cysts. Previously the community believed the cysts came from feeding pigs local beer bran (Clinical Officer).

7.3.3 Restriction of Diseased Pork

The practice of meat inspection is rarely performed or not done at all in many rural areas. However, local farmers have knowledge about the presentation of ASF and cysticercosis in pigs. Particularly during outbreaks, in some isolated farming areas, farmers don't allow their family members to bring pork from other farms as a way of not importing diseases from suspected diseased farms.

7.3.4 Traditional Forms of Insurance Against Potential Risks

Insurance, in the modern sense, may not be a concept known in the rural communities. However, there is a practice with tell-tale signs of a modified insurance system at play. For example, in order to avoid losing all the pigs when there is an outbreak, farmers have practiced a system where they lend their pigs to other people who do not have pigs in nearby villages so that in case they lose pigs due to ASF outbreaks, they can still get some pigs back from those they lent some to for breeding and restocking their piggery. There are different terms of reference on how they share the profits or offspring from the initial breeding stock.

7.3.5 Empowering Other Friends and Relatives

This practice of empowering others is similar to the insurance system. The initial pigs are lent or freely given away with the understanding that when they multiply, the donor and the recipient shares them. The offspring act as a pool from which pigs are given to a new set of beneficiaries. The cycle is repeated as long as there are pigs to

share. This distribution cycle is to alleviate poverty in communities and offer some form of sustainability.

7.3.6 Traditional Remedies for Animal Health

African Swine Fever (ASF) represents the main threat to swine production in Africa, with heavy economic consequences for both farmers and the food industry. Farmers are aware of the non-treatment of ASF and dread its emergence and devastating mortality among the pigs. They attempt to minimize the risk of losses by practicing what has been indicated above as a form of insurance and promotion of herd immunity.

Despite what seems like a gloomy picture with animal infectious diseases, the local communities have evolved ethnoveterinary remedies. Traditional medicine involves the use of parts of plants and animals sourced from local environments which are conserved and protected by the community. In rare circumstances, some may invoke spiritual therapies from traditional healers. The efficacy of such treatments is debatable, but the practitioners insist on their effectiveness.

8 One Health Research Strategies

IK and its associated practices may not be very spectacular in their origin, adoption, and applicability. They are easily embedded in the daily routines of the community. Despite their effectiveness in society, they are sometimes ignored or completely overlooked. That is why, to raise their profile, a paradigm shift of utilizing systems thinking in identifying and solving problems is gaining ground. Scott and Caress (2005) and Ruegg et al. (2018) observed that OH strategies may have some success but are faced with challenges where a particular discipline is perceived or indeed dominated by others. As a result, the less involved ones get discouraged, involve themselves less, and lose interest and commitment to the goal. The essence of collaboration falls away.

9 Indigenous Knowledge Strategies

This transmission happens within their families, but also within the community. Elders act as reservoirs and mentors of IK institutional memory and culture identity for both tangible and ICH. That heritage covers many aspects from wellness, health, practices, and agricultural insights, thus rendering benefit to many (Busija et al., 2020; Viscogliosi et al., 2020). Noteworthy is that while the elderly may be considered as major custodians, different age groups and generations have the rights and privileges of having and practicing the IK tenets. Any break in that transmission cycle is

proving a disconnect between what type and depth of IK are retained. Some of the reasons for such loss have been attributed to migration to urban areas of the younger generation, poor uptake by the ones that remain, or the disbelief and stigmatization they experience from some sections of society that look at such beliefs to be archaic or inappropriate for the modern times.

10 Potential Roles of Integrating IK

While it is easy to justify the role of scientific approaches, the role that IK plays has been poorly understood or coordinated. Therefore, systems thinking (Ostrom, 2009; Rüegg et al., 2018) is being used to integrate all aspects of a problem in, firstly, understanding it and weighing all potential stakeholders' cooperation in finding a solution. This system departs from the previous paradigms that a linear approach was adequate for all purposes. Arising from such, resources users like livestock farmers, are being recognized to self-organize for many purposes including trying to overcome hunger and improve nutrition, but also can stand up and resist governments, NGOs, or projects imposed interventions.

An enriched curriculum and institutionalized IK are a validation of the value the creators of IK have always claimed. Much effort is still needed to make IK a mainstay source of useful knowledge. How that will be done is a matter of a national agenda actualized at the university and even titrated downwards into secondary and primary education. Such a move will demystify the process and existence of such knowledge and prevent the stigma and fear of exploring the richness of IK. Sillitoe and Marzano (2009) discuss the future of IK research in development and propose how best it can be incorporated so that more opportunities are given to local communities to take charge of their priorities.

11 Limitations of IK

When IK is not documented, useful information that could be exploited to enhance food security is lost and affects skills transfer from one generation to another. Further, there is an inability of the locals to attribute a scientific explanation to their practices despite the convictions that they work. IK creators or performers are not willing to share it and thus limit access to others. Subsequently, it becomes overlooked and with time can easily become endangered. While research adapting, it has been noted that research institutions and funding agencies have lagged behind. In some instances, claims have been made that the two have paid little attention to the promotion and integration of IK and hindered the local communities from benefits that could accrue to their communities.

12 Understanding IK Differential Impact on Hunger

Adoption of modern livestock and health-seeking practices is a good undertaking, but it must be complemented by a proactive extension service (Siankwilimba et al., 2021) and harnessing the community through IK (Breidlid, 2009; Keane, 2017; Moore, 2014). Local knowledge that may include IK as observed above is useful and makes an important contribution and difference to sustainable development. (Mbah, 2019).

The OH initiatives have seen progressive improvements in community involvement, acceptability of integrated interventions, and innovations (Gabriel et al., 2020; Hobbs et al., 2019; Mwape et al., 2015). Such successes are probably what Keane (2017) and Mbah (2016, 2019) envisioned could come out of a university-wide approach to sustainable community development. The collaboration between universities, local research institutions, traditional leadership, and ministries of health and Agriculture definitely affirms that transdisciplinary research that does not discriminate sources of knowledge from others may lead to sustainable development. The pace at which that can be achieved may be different from community to community. The co-designing of some interventions, as well as evaluations, has received cooperation and the spirit of “buying in”.

13 Conclusions

Achieving the end hunger SDG needs a multiplicity of actions by different players. The voices of participants and their adaptation must be promoted. IK research, particularly for development, is not a standalone approach, and neither is it an exclusive solution to many local problems. It adds another dimension to mainstream research and brings alive the transdisciplinary approach that can work for development. Just like the SDGs are interlinked, so is their achievement. Achieving one consequently affects the realization of the other. Therefore investing in people, processes, and the product (in this case SDG), must be undertaken together.

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References

Andrews, M. (2021). The farmer-input subsidy program (FISP) does not service the poor. *Development*, 64, 288–291. <https://doi.org/10.1057/s41301-021-00317-w>

- Breidlid, A. (2009). Culture, Indigenous knowledge systems and sustainable development: A critical view of education in an African context. *International Journal of Educational Development*, 29(2), 140–148.
- Busija, L., Cinelli, R., Toombs, M. R., Easton, C., Hampton, R., Holdsworth, K., Macleod, Bp. A., Nicholson, G. C., Nasir, B. F., Sanders, K. M., & McCabe, M. P. (2020). The role of elders in the wellbeing of a contemporary Australian indigenous community. *The Gerontologist*, 60, 513–524. <https://doi.org/10.1093/geront/gny140>
- Butala, C., Fyfe, J., & Welburn, S. C. (2021). The contribution of community health education to sustainable control of the neglected zoonotic diseases. *Frontiers in Public Health*, 9. <https://doi.org/10.3389/fpubh.2021.729973>
- CDC. <http://www.cdc.gov/phcommunities/resourcekit/intro/index.html>. Accessed on January 20th, 2022.
- Davis, J., Magadzire, N., Hemerijckx, L. -M., Maes, T., Durno, D., Kenyana, N., Lwasa, S., van Rompaey, A., Verburg, P.H., & May, J. (2022). Precision approaches to food insecurity: A spatial analysis of urban hunger and its contextual correlates in an African city. *World Development*, 149, 105694. <https://doi.org/10.1016/j.worlddev.2021.105694>
- Ebi, K. L., Harris, F., Sioen, G. B., Wannous, C., Anyamba, A., Bi, P., Boeckmann, M., Bowen, K., Cissé, G., Dasgupta, P., Dida, G. O., Gasparatos, A., Gatzweiler, F., Javadi, F., Kanbara, S., Kone, B., Maycock, B., Morse, A., Murakami, T., ... Capon, A. (2020). Transdisciplinary research priorities for human and planetary health in the context of the 2030 agenda for sustainable development. *International Journal of Environmental Research and Public Health*, 17, 8890. <https://doi.org/10.3390/ijerph17238890>
- Gabriël, S., Mwape, K. E., Hobbs, E. C., Devleeschauwer, B., van Damme, I., Zulu, G., Mwelwa, C., Mubanga, C., Masuku, M., Mambwe, M., de Coster, T., Phiri, I. K., Berkvens, D. L., Colston, A., Bottieau, E., Speybroeck, N., Ketzis, J. K., Willingham, A. L., Trevisan, C., & Dorny, P. (2020). Potential elimination of active *Taenia solium* transmission in Africa. *New England Journal of Medicine*, 383, 396–397. <https://doi.org/10.1056/NEJMc1909955>
- Hobbs, E. C., Mwape, K. E., Devleeschauwer, B., van Damme, I., Krit, M., Berkvens, D., Zulu, G., Mambwe, M., Chembensofu, M., Trevisan, C., Baauw, J., Phiri, I. K., Speybroeck, N., Ketzis, J., Dorny, P., Willingham, A. L., & Gabriël, S. (2019). Effects of ‘The Vicious Worm’ educational tool on *Taenia solium* knowledge retention in Zambian primary school students after one year. *PLOS Neglected Tropical Diseases*, 13, e0007336. <https://doi.org/10.1371/journal.pntd.0007336>
- Johansen, M. V., Trevisan, C., Gabriël, S., Magnussen, P., & Braae, U. C. (2017). Are we ready for *Taenia solium* cysticercosis elimination in sub-Saharan Africa? *Parasitology*, 144, 59–64. <https://doi.org/10.1017/S0031182016000500>
- Keane, M. (2017). Decolonising methodology: Who benefits from indigenous knowledge research? *Educational Research for Social Change*, 6, 12–24. <https://doi.org/10.17159/2221-4070/2017/v6i1a2>
- Lauridsen, S., Braae, U. C., Ngowi, H. A., & Johansen, M. V. (2019). Impacts of using the electronic-health education program ‘The Vicious Worm’ for prevention of *Taenia solium*. *Acta Tropica*, 193, 18–22. <https://doi.org/10.1016/j.actatropica.2019.02.018>
- Magni, G. (2017). Indigenous knowledge and implications for the sustainable development agenda. *European Journal of Education*, 52(4), 437–447.
- Mason, N. M., Kuteya, A., Ngoma, H., Tossou, D. A., & Baylis, K. R. (2020). Does shifting to a flexible e-voucher approach improve input subsidy program outcomes? Quasi-experimental evidence from Zambia’s crop forecast surveys. Food Security Policy Research Papers. https://www.canr.msu.edu/fsp/publications/research-papers/RP_165ac.pdf
- Mbah, M. (2016). Towards the idea of the interconnected university for sustainable community development. *Higher Education Research and Development*, 35(6), 1228–1241.
- Mbah, M. (2019). Can local knowledge make the difference? Rethinking universities’ community engagement and prospect for sustainable community development. *The Journal of Environmental Education*, 50(1), 11–22.

- Mbah, M., Johnson, A. T., & Chipindi, F. M. (2021). Institutionalizing the intangible through research and engagement: Indigenous knowledge and higher education for sustainable development in Zambia. *International Journal of Educational Development*, 82, 102355. <https://doi.org/10.1016/j.ijedudev.2021.102355>
- Moore, T. L. (2014). Community-university engagement: a process for building democratic communities. *ASHE High. Educ. Rep.* (Vol. 40(2)). <https://doi.org/10.1002/aehe.20014>
- Morton Ninomiya, M. E., Atkinson, D., Brascoupé, S., Firestone, M., Robinson, N., Reading, J., Ziegler, C. P., Maddox, R., & Smylie, J. K. (2017). Effective knowledge translation approaches and practices in Indigenous health research: A systematic review protocol. *Systematic Reviews*, 6, 34. <https://doi.org/10.1186/s13643-017-0430-x>
- Mwape, K. E., Blocher, J., Wiefek, J., Schmidt, K., Dorny, P., Praet, N., Chiluba, C., Schmidt, H., Phiri, I. K., Winkler, A. S., & Gabriël, S. (2015). Prevalence of neurocysticercosis in people with epilepsy in the Eastern province of Zambia. *PLoS Neglected Tropical Diseases*, 9(8), e0003972.
- Ostrom, E. (2009). A general framework for analyzing sustainability of social-ecological systems. *Science*, 325, 419–422. <https://doi.org/10.1126/science.1172133>
- Phiri, J. S., Moonga, E., Mwangase, O., & Chipeta, G. (2013). Adaptation of Zambian agriculture to climate change—A comprehensive review of the utilisation of the agro-ecological regions. In M. M. Lewanika (Ed.), *Climate change, agriculture and agro-eco regions of Zambia* (pp. 1–41). Zambia Academy of Sciences.
- Ramnthugala, G., Cunningham, F. C., Plumb, J. J., Long, J., Georgiou, A., Westbrook, J. I., & Braithwaite, J. (2011). A realist evaluation of the role of communities of practice in changing healthcare practice. *Implementation Science*, 6, 49. <https://doi.org/10.1186/1748-5908-6-49>
- Renaudeau, D., Collin, A., Yahav, S., de Basilio, V., Gourdine, J. L., & Collier, R. J. (2012). Adaptation to hot climate and strategies to alleviate heat stress in livestock production. *Animal*, 6(5), 707–728. <https://doi.org/10.1017/S1751731111002448>
- Rüegg, S. R., Nielsen, L. R., Buttigieg, S. C., Santa, M., Aragrande, M., Canali, M., et al. (2018). A systems approach to evaluate one health initiatives. *Frontiers in Veterinary Sciences*, 5, 23. <https://doi.org/10.3389/fvets.2018.00023>
- Scott, L., & Caress, A.-L. (2005). Shared governance and shared leadership: Meeting the challenges of implementation. *Journal of Nursing Management*, 13, 4–12. <https://doi.org/10.1111/j.1365-2834.2004.00455.x>
- Siankwilimba, E., Mwaanga, E. S., Munkombwe, J., Mumba, C., & Hang'ombe, B. M. (2021). Effective extension sustainability in the face of COVID-19 pandemic in smallholder agricultural markets. *International Journal for Research in Applied Science and Engineering Technology*, 9, 865–878. <https://doi.org/10.22214/ijraset.2021.39403>
- Sillitoe, P., & Marzano, M. (2009). Future of indigenous knowledge research in development. *Futures*, 41, 13–23. <https://doi.org/10.1016/j.futures.2008.07.004>
- Thys, S., Mwape, K. E., Lefvre, P., Dorny, P., Marcotty, T., Phiri, A. M., Phiri, I. K., & Gabriel, S. (2015). Why latrines are not used: Communities? Perceptions and practices regarding latrines in a *Taenia solium* endemic rural area in Eastern Zambia. *PLoS Neglected Tropical Diseases*, 9. <https://doi.org/10.1371/journal.pntd.0003570>
- Thys, S., Mwape, K. E., Lefvre, P., Dorny, P., Phiri, A. M., Marcotty, T., Phiri, I. K., & Gabriel, S. (2016). Why pigs are free-roaming: Communities' perceptions, knowledge and practices regarding pig management and taeniosis/cysticercosis in a *Taenia solium* endemic rural area in Eastern Zambia. *Veterinary Parasitology*, 225. <https://doi.org/10.1016/j.vetpar.2016.05.029>
- Vaernewyck, V., Mwape, K. E., Mubanga, C., Devleeschauwer, B., Gabriël, S., & Trevisan, C. (2020). Effects of 'The Vicious Worm' educational software on *Taenia solium* knowledge among key pork supply chain workers in Zambia. *PLoS Neglected Tropical Diseases*, 14, e0008790. <https://doi.org/10.1371/journal.pntd.0008790>
- Viscogliosi, C., Asselin, H., Basile, S., Borwick, K., Couturier, Y., Drolet, M. -J., Gagnon, D., Obradovic, N., Torrie, J., Zhou, D., & Levasseur, M. (2020). Importance of Indigenous elders' contributions to individual and community wellness: results from a scoping review on social

- participation and intergenerational solidarity. *Canadian Journal of Public Health = Revue canadienne de sante publique*, 111, 667–681. <https://doi.org/10.17269/s41997-019-00292-3>
- Warburton, H., & Martin, A. (1999). Local people's knowledge. Best practice guideline. Socio-Economic Methodologies Programme. London, DFID.
- Weber, E. U., & Stern, P. C. (2011). Public understanding of climate change in the United States. *American Psychologist*, 66(4), 315–328. <https://doi.org/10.1037/a0023253>
- Wenger, E., McDermott, R., & Snyder, W. (2002). *Cultivating communities of practice: A guide to managing knowledge*. Harvard Business School Press. Amy HI Lee received the MBA degree from the University of British Columbia, Canada.
- Wenger, E., Trayner, B., & de Laat, M. (2011). *Promoting and assessing value creation in communities and networks: A conceptual framework*. Rapport 18, Ruud de Moor Centrum, Open University of the Netherlands.
- WHO. (2012). [https://www.who.int/news/item/01-01-2012-building-adaptation-to-climate-change-in-health-in-least-developed-countries-through-resilient-water-sanitation-and-hygiene-\(wash\)](https://www.who.int/news/item/01-01-2012-building-adaptation-to-climate-change-in-health-in-least-developed-countries-through-resilient-water-sanitation-and-hygiene-(wash)). Accessed on 23/01/2022.
- Willett, W., Rockstrom, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., De Clerck, F., Wood, A., et al. (2019). Food in the anthropocene: The EAT—Lancet Commission on healthy diets from sustainable food systems. *Lancet*, 393, 447–492. [https://doi.org/10.1016/S0140-6736\(18\)31788-4](https://doi.org/10.1016/S0140-6736(18)31788-4)
- Winters, B., Osbert, N., Tiwari, A., Chikobo, C., Larsen, D. A., Crooks, P., Muleya, S., Ngulube, V., Hoehne, A., Zimba, R., Manangi, A., Mukosha, L., & Lukama, C. (2016). Chiengi District, Zambia open defecation free after 1 year of community-led total sanitation. *The American Journal of Tropical Medicine and Hygiene*, 95, 925–927. <https://doi.org/10.4269/ajtmh.16-0210>
- World Food Programme. (2014). Technical report on FISP index insurance product improvement. https://docs.wfp.org/api/documents/WFP0000130342/download/?_ga=2.17324537.1737764351.1644180843-475798365.1644180843
- Yeboah-Antwi, K., MacLeod, W. B., Biemba, G., Sijenyi, P., Höhne, A., Verstraete, L., McCallum, C. M., & Hamer, D. H. (2019). Improving sanitation and hygiene through community-led total sanitation: The Zambian experience. *The American Journal of Tropical Medicine and Hygiene*, 100, 1005–1012. <https://doi.org/10.4269/ajtmh.18-0632>

Public Health Education in Africa: The Case of Epistemic (in) Justice and Indigenous Health Systems



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Abstract This chapter interrogates epistemic injustice in public health education; with a focus on indigenous systems in Africa; and calls for the prompt address of the persistent injustices associated with knowledge development, validation, and application. The forms of epistemic injustices including interpretive marginalisation and credibility deficit are discussed and arguments raised on how common practices in public health and public health education (such as research partnerships, authorship practices, and choice of research structure) are infused with imbalances. This viewpoint aims to interpret, avert, and nullify biased knowledge observances in public health that are imposed on indigenous individuals in their capacity as apprehenders, producers, and users of knowledge. It further provides probable means of accepting, developing, and sustaining useful knowledge systems with an ultimate intention of fostering good health and wellbeing for all as captured in the Sustainable Development Goal [SDG]- 3.

Keywords Epistemic injustice · Public health · Public health education · Indigenous health systems · Africa

1 Introduction

The adoption of indigenous knowledge [IK] to meet health care necessities dates to 1978 when the World Health Organisation [WHO] in the Health for All Declaration (1978) highlighted the conceivable application of traditional healing practices and prompted the use of these practices in primary health care. Indigenous knowledge, otherwise known as aboriginal or traditional knowledge (Bruchac, 2014), has been

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established as being instrumental in meeting world-wide health care goals (Lama, 2000). This was based on, but not limited to, the premise that the indigenous systems of health care practices have been employed to meet the needs of communities over numerous centuries and continue to do so now (Janska, 2008; Lama, 2000).

Indigenous knowledge of health care is simply based on the application of traditional medicine [TM] to gratify health care necessities (Rankoana et al., 2015). According to WHO (2002), “traditional medicine” denotes knowledge, opinions, and approaches encompassing plant, mineral or animal-based treatments, spiritual rehabilitation, and manual procedures used independently or collaboratively for preventive, protective, and curative health care. Knowledge of indigenous plant-derived remedies is considered a primordial form of health care and the oldest known to human history (Petrovska, 2012). Du Toi (1998) and Marecik (2007) argued that indigenous knowledge of health care goes beyond mere treatment; and is considered applicable in the understanding of the very nature and principal causes of diseases. TM persistently plays a significant role in the fight against life-threatening ailments such as malaria, diabetes, tuberculosis, among others, in several parts of the world (Fasanmade & Dangogo, 2015; Li et al., 2020).

Various affirmations have been made about the persistent application of IK in health care. Keleher (2001) asserts that to make health care easily acceptable and accessible in indigenous communities, community participation would be indispensable. For von Wolputte and Devisch (2002), community involvement would equip communities to combat the glitches in their health care in the most suitable ways as community leaders could make rational verdicts regarding primary health care while providing suitable support for health projects. Manguvo I and Mafuvadze (2015) also argued, that most members of African communities habitually seek counsel from traditional leaders in times of crises. However, as related by Bhakuni and Abimbola (2021, p. 1465), ‘knowledge systems are social systems, with their share of social prejudices and implicit biases that result in credibility deficits or interpretive marginalisation for members of marginalised groups’.

Certain class of individuals are acknowledged as credible contributors (predominantly modern-day experts), while the experience and knowledge presented by others is misrepresented and attributed with inferior credibility (Bhakuni & Abimbola, 2021). This situation depicts the concept of epistemic injustice which embodies the notion that an individual can be unjustly discriminated against his competence as a provider of knowledge grounded on prejudices about his social background, race, tone of voice, gender, ethnicity, sexual orientation, or accent (Fricker, 2013). Within the scope of health and healthcare guidelines, epistemic privileges are given to contributors with modern professional healthcare status (such as biomedical scientists, medical doctors, pharmacists). This invariably gives them an unfair advantage in communicating their experiences or ideas compared to their traditional-oriented counterparts (Byskov, 2021; Fricker, 2007).

The knowledge of patients alongside that of traditional or indigenous health-care providers is oftentimes restricted to their personal use and is not readily

integrated into mainstream public health education or policy development (Wainwright & Macnaughton, 2013). These biases restrict many individuals from participating copiously and equally in the invention, utilization, and circulation of knowledge (Bhakuni & Abimbola, 2021). Considering this inequity, calls to democratise, decolonise, and decentralise public health education, have been on the rise (Abimbola & Pai, 2020). To decolonise knowledge is therefore to counterbalance integrity discrepancies and counter interpretive marginalisation in the society (Tobi, 2020). Decolonisation of western or Eurocentric forms of knowledge is certainly overdue in public health, a discipline developed in colonialism, which incessantly presents inherent hierarchical postulations, and shows significant indifference towards indigenous knowledge systems (Affun-Adegbulu & Adegbulu, 2020; Büyüm et al., 2020; Richardson 2019). Furthermore, there have been growing calls for improved and principled diversion from top-down approaches to interventions, community engagement, and research; to approaches that impartially tend to the health needs of societies globally (Bardosh, 2018; Yegros-Yegros et al., 2020), which is where the thrust of the chapter is directed at.

Using Africa as a case study, the present chapter, therefore, seeks to make a case for epistemic justice and indigenous knowledge integration in public health and public health education interventions intending to foster good health and wellbeing for all as captured in the Sustainable Development Goals [SDGs]-3 (Rankoana et al., 2015). The rest of the chapter will examine the interplay between public health and epistemic justice, the methodological approach, key findings and discussions, and conclude with some recommendations.

2 Public Health and Epistemic Injustice

Public health, a concept with dynamic parameters and multiple interpretations, has experienced several transitional stages and debates over the years (Marks et al., 2011). Novick and Morrow (2010) described public health [PH] as efforts structured to progress the wellbeing of societies, merging both scientific and social approaches, with the principal aim of plummeting ailments and promoting health. Bryant (2014) supported this definition by describing PH as the art and science of averting disease, promoting health [both physical and mental], and prolonging life, while recognizing the importance of community input. Although PH should be defined to suit all societies, and ethnicities, irrespective of their industrialization status; however, some organized efforts may be more applicable in some societies compared to others (Azevedo 2017). It has therefore also been argued that PH definitions must be concise, while comprising fundamental components, and presenting functions that are relevant to the subject being defined (Azevedo 2017).

Definitions of PH that note the pronounced dependence of public health on the contribution of art and scientific innovations are assessed. However, the questions put forward are: who defines public health? Also, does public health still exist in the absence of science and technological advancements? By outlining public health

using this Eurocentric approach of science and art, as done over time, the less industrialized world, including Africa, may not have public health (Azevedo, 2017). Public health should involve, as Bryant (2014) elaborates, public health strategies provided by recognised influencers, including traditional medical practitioners or traditional rulers, as present in Africa. Furthermore, it has been established that public health and public health education cannot dismiss cultural or indigenous realization as its content has cultural principles underpinning it (Abah et al., 2013).

It is well known that epistemic exclusion endures persistently in various knowledge systems including public health education and that apprehenders, producers, and recipients of knowledge, from marginalised groups in both industrialized and non-industrialized countries experience distinct epistemic injustices [EIJs] (Bhakuni & Abimbola, 2021). The systematic models of epistemic injustice [EIJ] as positioned by Fricker (2007) include interpretive injustice [IIJ] and testimonial injustice [TIJ]. TIJ occurs when lower credibility is prejudicially ascribed to a speaker's ideas or experiences, for instance, via events that silence, misrepresent or debase the inputs of the speaker (credibility deficit); while IIJ ensues when individuals or groups find it difficult to effectively transfer their knowledge or experience due to various limitations such as access to standardized resources or when the experiences of such marginalised groups are not well comprehended by others because they do not align with any theories known to them (interpretive marginalisation).

3 Methodology

This chapter draws on a review that comprises a literature search on popular science, health research, and education databases comprising Google Scholar, Cumulative Index to Nursing and Allied Health Literature [CINAHL], and Education Resources Information Center [ERIC]. These databases were explored to retrieve relevant publications on the potential role of indigenous knowledge systems, and epistemic justice in public healthcare education and practices in Africa. Both primary and secondary papers, including grey literatures, were consulted. A total of forty articles published in English from the year 2004 to February 2022 with the keywords; "Africa", "Indigenous knowledge", "Traditional African Medicine", "Public Healthcare", "Public Healthcare Education", "Epistemic Injustice", "Modern Biases Against Indigenous Knowledge", and "Indigenous Knowledge Integration", and their alternative synonyms were retrieved subsequently. Boolean operators and truncations were applied to the search terms, to aid the retrieval of studies of relevance. Manual hand-searches through the reference lists of relevant studies were performed to further identify eligible studies (Bandara et al., 2015). Excluded from this review were non-relatable, duplicate studies, and papers that failed to attain the inclusion criteria. The retained outputs were analysed thematically. Thematic synthesis which is well established as a method that sustains the unambiguous link between the text of reviewed studies and conclusions attained, while preserving the objectives of the

review process (Thomas & Harden, 2008), was employed in combining relevant data from the studies retrieved and identifying the appropriate key themes.

4 Findings and Discussions

4.1 *Indigenous Knowledge Systems and Africa's Public Health*

Although the complexity and assortment of the health-seeking preferences of Africans is well established (Mpofu et al., 2011), Africa being one of the poorest continents in the world (Benson, 2021), is faced by a double burden of diseases characterised by the constant battle of long-lasting non-communicable and infectious ones (Agyei-Mensah & de-Graft Aikins, 2010; Kushitor & Boatemaa, 2018). African countries remain confronted by daunting public health challenges, particularly with the advancing numbers of HIV/AIDS patients and mortalities; the persistence of malaria and tuberculosis; the occurrence of the dreadful Ebola, Lassa fever and the current COVID-19 pandemic (Fukunaga et al., 2021; WHO 2022a, 2022b). Additionally, African countries experience hurdles including poverty, depreciation of health structures as well as low funding, and participation in health-related research. For many of these countries, this situation has resulted in a significant decline in the standard of living over the last twenty years, and this is predominantly so in sub-Saharan Africa where the disease burden is most pronounced (Kasproicz et al., 2020). However, Africa has reportedly had opportunities to address these challenges.

According to Mpofu et al. (2011), Africans have over time developed local or culturally inclined health care systems of responding to health needs. In many African nations, traditional medicine is used by approximately 80–90% of indigenous populaces to cope with their basic health essentials, with verification that over 120 pharmacological products are plant-derived, and 74% were first utilised by these indigenous populations (Elujoba et al., 2005; Mahomoodally, 2013). Aspirin for instance is produced from salicylic acid produced by white willow (*Salix alba*) and the *Filipendula ulmaria*, commonly known as meadowsweet plant. Also, Anticancer medications: Vinblastine and Vincristine are synthesized from *Catharanthus roseus* (Madagascar periwinkle) while popular antimalarial drugs including Artemisinin and Quinine are derived from *Artemisia annua* and *Cinchona pubescens* respectively (Oreagbe et al., 2011; Ozioma & Chinwe, 2019).

In African nations, indigenous remedies have gained non-stop impetus, with some of the compensations being low fee rates, easy access, high level of acceptance by the local populations, and reportedly low toxicity (Anthony & Kanu, 2021; Naja et al., 2015). The use of TM particularly herbal drugs declined in the nineteenth century owing to the initiation of synthetic chemistry (Rastogi, 2020). However, there has been exacerbating curiosity about the usage of naturally obtained traditional medicine globally, as synthetic drugs have indicated less effectiveness due to the

rising rates of drug resistance, higher toxicity, as well as high cost of drug synthesis (Kamsu-Foguem & Foguem, 2014; Shaiju & Omanakumari, 2013).

The use of TM has been extensively reported in Africa, particularly in underprivileged households (Cameron et al. 2008). As published by Vahekeni et al. (2020, p. 8), “the proportion of TM practitioners to the Africa population is 1:500 compared to 1:40,000 modern medical practitioners”. Moreover, a significant number of modern medicine experts accessible in Africa are densely resident in urban zones, at the detriment of rural regions; thus, for many rural dwellers, TM practitioners remain their source of healthcare (Abdullahi, 2011a, 2011b).

The concept of “Indigenous Knowledge” refers to local knowledge, technologies, practices, and belief systems, synonymous to traditional knowledge which is different from the knowledge systems [KSs] established by certain communities of the industrialized world or research institutions (Chikaire et al., 2012; Rankoana, 2012). Healthcare based on indigenous knowledge is reportedly one of the most ancient and diverse approach to health care that has stood the test of time (Abdullahi, 2011a, 2011b; Mothibe & Sibanda, 2019). It is commonly referred to as traditional medicine [TM] or traditional health practices, and these are unique to the communities where they are practiced and understood as real-world, intimate, and circumstantial elements which cannot be detached from individuals or their community (Tharakan, 2017; WHO, 2022c).

Traditional medicine or indigenous knowledge as used in healthcare, denotes all knowledge practices, justifiable or not, employed in prevention, diagnosis, management, and treatment of social, mental, or physical, health disorders, while trusting entirely on informal experiments or the experiences acquired from one generation to the next, whether in written or verbal form, prior to the inception of modern-day medicine (Ndubisi et al., 2021 ; WHO, 2022d). African traditional medicine [ATM] is Africa’s way of retorting to health challenges, using diverse methods (Anthony & Kanu, 2021). They include the use of animal parts, herbs or minerals and non-medication remedies which could be spiritual or manual (Fokunang et al., 2011). African indigenous knowledge and TM remain accepted even where modern practice of medicine is accessible (Kasilo et al., 2019). Furthermore, it is projected that its acceptance and high level of utilization is due to people being accustomed to ATMs as part of their culture (Ahlberg, 2017; Galabuzi et al., 2010); and there are convincing indications that traditional health care systems are being sought after by Africans, not only resident in Africa but also globally (Cook, 2009).

African traditional medicine has gone through several evolutionary phases, which have been described as trial and error (Ekeopara, 2005); but owing to the recent advances in the skills and testaments reported, the effectiveness of African traditional health care has become more appreciated by global health policy developers (Conserveafrica, 2006), while traditional healthcare providers have overtime gained increased recognition in their respective communities (Fokunang et al., 2011). Moreover, in the African perception, the concepts of diseases and mortality are commonly attributed to both metaphysical and physical causes (Kinsman, 2012); and as such the IKS-based healthcare employs a holistic approach in the identification, and management of ailments as they simultaneously account for not only the physical, but social,

mental, and metaphysical aspects of well-being, contrary to modern medicine which mainly seeks to treat diseases (Farzaei et al., 2015; Ochwang'i & Oduma, 2017). This is in line and agreement with WHO's definition of "health" as stated in Kühn and Rieger (2017, p.1): "health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity".

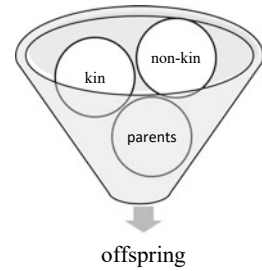
Furthermore, ATM centres on the fact that health issues do not occur by mere chance but are prompted by displacements in the physical or spiritual realms; hence it varies significantly from modern remedies which are based on scientific techniques and analysis (Ubani, 2011). Reportedly, in many African communities, traditional healers often stand as arbitrators between the physical and spiritual realms; in most cases to define the spirits in action or to understand how best to facilitate the timely recovery of their patients (Abdullahi, 2011a, 2011b).

As reported by Mahomoodally (2013), the world health organisation has been persistent about sensitizing African Member states towards the integration and extensive use of these traditional remedies otherwise known as Traditional African Medicine [TAM] into their health system. In addition, WHO (2001) approved a resolution on advancing the function of TM in Healthcare for Africa. This resolve acknowledged the prospect of ATM for the accomplishment of absolute wellbeing in Africa. In successive meetings, the African leaders declared 2001–2010 and 2011–2020 as key decades for the thrive of TM (WHO 2001, 2011), while WHO, announced every 31st of August as the African Traditional Medicine Day (Chinsembu, 2009). However, these goals are yet to be achieved, and to realise them, African governments need to establish policies to encompass the qualities of the present inter-disciplinarily health care systems in a poly-epistemic world, where knowledge systems are rather complementary than competitive (Nlooto & Kaya, 2017). It is based on the above considerations that this chapter presents perspectives on issues related to African Indigenous Knowledge Systems and Public Health Education.

5 Indigenous Knowledge System and Public Health Education in Africa

As affirmed by Abah et al. (2015), African indigenous knowledges have been in existence for thousands of years with underpinning unique education systems. This was long before western education was introduced by foreign missionaries and colonialists. However, present-day formal education continues to present Euro-centric orientation, reflecting and placing Western scientific discoveries over the indigenous orientations of learners or their instructors (Magni, 2017). Considering that the routes of transmitting modern scientific knowledge conflicts with those of indigenous education, the introduction of western education meant that learners confronted the contrasting expectations of their indigenous system and the newly introduced modern systems (Thaman, 2009).

Fig. 1 Transmission of indigenous knowledge



Research has demonstrated that the institutionalization of Western culture has given rise to a clash of ideologies, creating an uneven power-distribution or value-hierarchy that basically undercuts and pilloried Africa's traditional health care system due to the over-riding power given to Western culture (Abdullahi, 2011a, 2011b; Stavenhagen, 2015). As a result, many modern instructors have been affirmed to frequently de-highlight the ideals of the learners' individual cultures, particularly if they conflict with those that the modern learning institutions aim to incite. Consequently, the prior cultural knowledge of the learners becomes repressed not only by the ideas being promoted by the modern system of knowledge but also the reward of progressing with the school system (promotion to the next class) (Thaman, 2009).

Indigenous knowledge creation is based on beliefs and findings closely handed down across generations via tutelage which involves parents and elders in the community (as depicted in Fig. 1 below) imparting practical knowledge of culture, and survival using a broad range of songs, meetings, stories, initiations, bans, among others (Dweba & Mearns, 2011; Magni, 2017; Mokgobi, 2014).

Unlike indigenous epistemologies, Western scientific techniques are confined to classrooms with students detached from their cultures. The learner-teacher centred nature of formal education which confines learners to classroom and separated from their culture and environment also detaches children from the society, consequently leading to the parents and society-members being less able to transfer generational knowledge to their progenies (Hammersmith, 2007; UNESCO, 2010). This is more worrisome because the educational pattern negates the effective constructivist model which opines that learners ought to be taught how to construct their knowledge, rather than passively accepting ideas related to them by their instructors (Shah, 2019).

Until lately, IKSs were considered outdated and irrelevant, despite their conceivable ability to solve modern-day problems (Abah et al., 2015). Hence, it is vital that the shareholders in the African educational sector develop strategies, such as the reformation of the educational curriculum which permits the integration of indigenous knowledge system into the educational sector; therefore, making the process of teaching and learning culturally inclusive and easier for both teachers and the learners (Abah et al., 2015). Several authors (Johannson-Fua, 2006; Thaman, 2009) have proposed that for educational systems to confidently respond to health care needs; there is need for a standard modification from the modern-day Euro-centric educational curricula in place in Africa. However, it can be argued that this proposed

shift may be challenging for instructors serving as an interface between the distinct systems. As cultural mediators, teachers in the African setting are placed on a vital but culturally obtruse position. While their professional training obliges them to the reasoning and applications of their western education, their individual identities, alongside those of their students, are imbedded in their individual traditions and cultural beliefs (Tsindoli et al., 2018).

Without cultural competence among users, the survival of indigenous knowledge practices such as traditional medicine may be threatened (Ahlberg 2017). Hence, for Africans to undertake public health education with meaningful hands-on experience within their communities, there is need to constantly review and extend the existing pedagogical models beyond the current custom of transmission and indoctrination in a bid to ease learning through integration of the learner's IKS to transform their knowledge into forms understandable and applicable by learners (Abah et al., 2015). Academics and medical practitioners in Africa have chiefly been educated by means of theories from modern understandings; while modern understandings of indigenous knowledge and healing practices, have been limited (Levers 2006a, b).

While traditionally oriented Africans are more liable to seek indigenous remedies (Mpofu et al., 2011); many Africans with Western education may choose conventional medicines over indigenous systems (Levers, 2006a, b; Mpofu & Harley, 2002), partly due to several deductions about the association between African traditional healing and witchcraft (Levers 2006a, b). The topic "witchcraft" remains thought-provoking, and the connotation has vastly contributed to the stigmatization of ATM continuously (Mbah & East, 2022; Ozioma et al., 2019). The anti-witchcraft" laws were formally ratified and imposed by Christian colonists, who in many cases introduced Western medicine along with Christianity, but also deciphered several traditional practices including traditional medicine as evil (Levers, 2006a, b; Mumo, 2018); none withstanding, ATM practices have remained an important aspect of the region's culture (Levers, 2006a, b; Jidong et al., 2021); and a significant number of the people, particularly the traditionally oriented Africans or those who subscribe to a spiritual explanation for wellbeing still consult the indigenous health care system. Popular authors (Moodley, 2005; Mpofu et al., 2011) have referred to the supernatural and satanic projections by industrialized nations toward African traditional healing methods as being irrational, and queries have emerged from the ways in which ATM practitioners have been "othered", particularly in comparison with conventional medical practitioners. TM was the leading healing system for a greater percentage of the African population before the colonial period, which was a critical defining moment in the history of the long-standing custom of the sole use of TM in Africa (Ejikemeuwa & Kanu, 2021). The institutionalisation of the modern knowledge systems has been seen by many as one of the compulsory steps towards industrialization in Africa. Conversely, others opine that westernization hindered the development and standardization of indigenous knowledge systems in Africa specifically in terms of production and acceptance (Afisi, 2009; Taiwo, 1993). These researchers referred to capitalism, slavery, colonialism, and all practices of dominations that were entrenched in these eras as key hinderances in the realization of indigenous African advancement.

Epistemic injustice in public health education can be arguably linked to credibility excess allotted to dominant groups (Medina, 2011). This can be evidenced in who is recognised as a credible knowledge producer and whose interpretive tools are used to make sense of existing or novel knowledge; and as such, modern academic researchers tend to enjoy credibility excess while non-academic actors are afforded credibility deficit or interpretive marginalisation. Parker and Kingori (2016) reported that commonly in international research collaborations, while experts from industrialized nations who are assigned the role of theory makers tend to enjoy credibility excess, the role of indigenous low middle income countries [LMICs] scientists is oftentimes restricted to providing samples or undertaking fieldwork (credibility deficit [CD]) (Walker & Martinez-Vargas, 2020). As affirmed by Bhakuni and Abimbola (2021), the global health community tends to experience a frequent cycle in which researchers suppose that the indigenous communities in side-lined zones lack the capacity to contribute to research, and thereby bypass their contribution. Furthermore, academics are known to further exacerbate the interpretive marginalisation of indigenous holders by assessing their interventions using interpretive devices from other sources, without acknowledging or consulting the local individuals with the daily experience of implementing those interventions (Abimbola, 2021); therefore, imposing extraneous and dominant interpretive frameworks and theories on local realities which could lead to unfitting analyses, and ultimately to false results.

Credibility deficit can also ensue if local experts are not acknowledged as authors in positions indicating ownership. Various studies analysing authorship in international collaborations (Hedt-Gauthier et al., 2019; Schneider & Maleka, 2018), have identified a stuck-in-the-middle trend for indigenous experts, such that, even when acknowledged as authors, these local partners from LMICs are often neither first nor last author of studies carried out in their own country. Indeed, such exertions of power and position are so common that the phenomena have been given labels such as the Matthew effect (Merton, 1968) where established and recognised co-authors receive disproportionate credit over the less established or more junior researchers or the White Bull effect (Kwok, 2005) where senior researchers coercively claim a first authorship credit. A form of bias otherwise termed editorial racism can also be seen in how the work of LMIC experts or marginalised people when compared to high income countries [HICs] is judged and perceived based on their local position by peers, editors, and peer reviewers of academic journals (Skopec et al., 2020; Victora & Moreira, 2006). Credibility deficit results in prejudicial denial of the knowledge-production capacity of indigenous knowledge holders or members of marginalised groups (Lauer, 2017).

6 Integrating African Indigenous Knowledge into Modern Healthcare Educational Systems in Africa

Regardless of some preliminary scepticism on the functions of herbalists in public health, some advancements have been reported in some African communities (Appiah, 2012). In certain African countries, internal referral systems have been established to enable modern medical practitioners to identify and refer patients who require alternative treatments for certain ailments including hypertension and diabetes, and vice-versal (Ahlberg, 2017). Also, in the study by Osowole et al. (2005), over 50% of the ATM practitioners suggest modern medicine to their patients as an additional treatment, confirming that ATM practitioners can serve as a traceable lead to the use of modern medicine. Additionally, African governments have commenced trials and approval of several herbal remedies that have the potential to be included into modern medicine (Ailemen, 2020; Gavriilidis & Östergren, 2012) some of which include *Cryptolepis sanguinolenta* (traditionally used as an antimalarial) (Tempesta, 2010); “asena decoction,” (arthritis) (Kumadoh et al., 2014) and; *Bridelia ferruginea* (diabetes management); a *Psidium guajava* medication that has anti-cestodal potency (Tangpu & Yadav, 2006); alongside a concoction known as “campa T” that is derived from *Thonningia sanguinea* and employed in the management of waist pain and asthma (Appiah, 2012). There is therefore strong evidence to depict a wide array of possibilities for integrating African indigenous knowledge into modern healthcare educational systems in Africa.

To wholly accomplish unbiased standardisation, regulation, integration, and endorsement of TM application and indigenous knowledge in healthcare educational systems in the continent, certain challenges must be subdued. In the conventional medical circle, it is commonly believed that TM flouts the requirements for justifying safety for use and efficacy (Okaiyeto & Oguntibeju, 2021). Although, there are indications that some of the physical elements of TM (such as herbal remedies) can be technically evaluated using the conventional methods of investigation; scientific analysis of the spiritual realms may be far from feasible (Oyelakin, 2009). From a scientific view, aspects of ATM that cannot be proven by science including psychic healing or divination, cannot be integrated (Appiah, 2012).

Additionally, for the integration of ATM into modern medicine to wholly occur, other factors to consider would involve the consultation of holders of indigenous knowledge as it is still shrouded in secrecy and not easily disseminated (Ozioma & Chinwe, 2019). Consideration can be given to the provision of training or education of medical practitioners on the philosophy and the efficacies of ATM, possibly via curriculum review and incorporation of teachers of ATM. Also, as depicted in Fig. 2, the integration of Indigenous Knowledge or ATM into Modern Healthcare Educational Systems in Africa can draw on areas of commonalities that ascribe mutual strength to both forms of knowledge systems. However, the intrinsic epistemological and ideological characteristic differences of both knowledge systems [KSs], the decision on who determines the efficacy of ATM between the two KSs seems obscure. It is based on these difficulties that popular scholars (Konadu, 2008; Oyelakin, 2009)

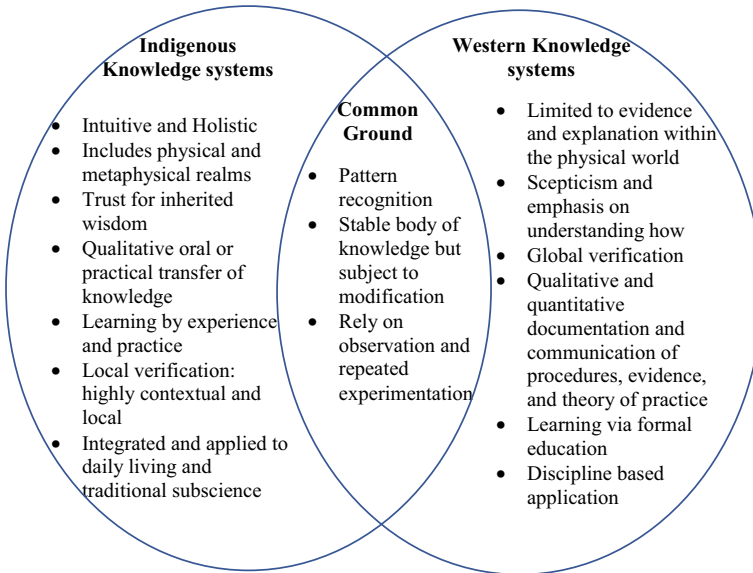


Fig. 2 Similarities and differences between IKs and WKs; adapted from Barnhardt and Kawagley (2005) and Lauter (2018)

suggest that both systems be allowed to operate and develop independently of each other. Furthermore, considering the western-centric predispositions in conventional public health educational systems, if indigenous knowledge systems get integrated into it without structures that promote and support epistemic inclusivity, the superiority of western epistemologies may be reinforced, thereby jeopardising the integrity of ATM (AbdullahI, 2011a, 2011b). Kiringe (2005) identified the influence of religion and Western education on the acceptance of TM and it can be maintained that since the integration of Western education and Christianity into African rural societies, certain traditions have been displaced and, in many cases, utterly forsaken.

Various ethnomedicines reportedly used to treat diabetes, malaria, and other opportunistic diseases are yet to attain scientific validation for their effectiveness and safety. This is because the present TMs and the underpinning forms of indigenous knowledge are considered yet to undergo rigorous standardization and evaluation. This, in itself, is problematic and gives credence to epistemic hegemony, whereby a form of knowledge is seen to be superior and seeks to validate another via scientific methods, for instance. These shortcomings that surround the prospects of integrating indigenous knowledge systems in public health education can be greatly ascribed to the noticeable paucity of collaborative research between modern scientist and TM practitioners (Kayombo et al., 2007); therefore, highlighting the need for intentional and sustained collaborations between the two parties (Banda et al., 2007; Chinsebu, 2009; Mills et al., 2006). However, inducting this is evidently not as easy as it seems from literature, and for it to yield results of high value, rigorous systematic actions must be taken (Kayombo et al., 2007).

Although not limited to TM practice alone, another vital contest to TM integration and wide acceptance in public health education systems in Africa is the re-counted events of false experts and healing. Arazeem (2011) reported that with the persistent economic status of Africa and affiliated high proportions of redundant individuals, there is a noticeable escalation in the rates of supposed traditional experts, among whom there are, inopportunately, several swindlers. For instance, reports on the Ebola outbreak in West Africa disclosed that several traditional healers misleadingly claimed to have the capability to cure Ebola (Umeora et al., 2018). One reported case was the use of warm salt baths and salt drinks as preventive measures (Umeora et al., 2018). Also, in Uganda ATM practitioners applied herbal medications on the bodies of their patients after making incisions. Noting that the transmission of Ebola ensues from contact with infected body fluids, it is not startling that the traditional healers themselves reportedly got infected and became sources of the disease (Manguvo & Mafuvadze, 2015). This however does not dismiss the fact that many ATM practitioners could be valid libraries or sources of information that could grant access to fresh insights into the identification of novel health remedies. Therefore, genuine ATM practitioners can be consulted and an enabling context framed for their participation in African public health educational systems as co-creators of relevant knowledge. Also, it is much easier for individuals to respect instructions given by well-respected local leaders considered indigenous knowledge holders, custodians and enforcers of their traditions, compared to unacquainted health officials or scientific experts who may not be in touch with the lived realities in communities. In addition, well-informed traditional persons and leaders in Africa can help with identifying skilled individuals or those with the potential to facilitate the development of applicable health educational interventions in their local communities (Manguvo & Mafuvadze, 2015). The resultant outcomes of such interventions would be reliable and important means of promoting the realisation of health and wellbeing, as captured in SDG3.

7 Recommendations and Conclusion

Stakeholders in both African and international health care sectors are progressively arriving at a consciousness that TM practitioners and their indigenous knowledge systems are key assets in public health promotion, particularly in LMICs (Hausmann-Muela et al., 2003). It is evident that these TM practitioners add value to health promotion and function as notable points of reference in modern medicine. Therefore, it can be deemed necessary for African public health educational actors to be attentive to the global dialogues and trends on TM and seek constructive avenues to integrate indigenous knowledge systems, for the benefit of all.

Although there have been several research initiatives to ascertain the potency of traditional remedies in some African countries like Nigeria, Ghana and South Africa (Adusi-Poku et al., 2010; Appiah, 2012; James et al., 2018), and ensuing prospects for recognition in public health education, these interventions are considered inadequate and marginal and there remains a dearth of research evidence in

Africa when compared to Asian traditional medicine which has grown popular across the world, including in Africa (Chazha & Atharv, 2020). This study acknowledges that overcoming epistemic injustices within the framework of public health education in Africa might require further resources and actions from all stakeholders (Mbah et al., 2021). For instance, while African traditional healers require attention, they also require training on best practices for their approaches. On the long run, the integration of ATM with modern medicine will oblige more training of both TM and scientific health practitioners and their instructors on the merits and application of both fields. Also, there is need for structured and impartial process of evaluating the available evidence on the efficacy of ATM products and services, to aid the arrival at a sustainable and explicit contribution (Raynor et al., 2011). Since the goal is to challenge epistemic injustice, counterbalance credibility deficits and overrule interpretive marginalisation (Tobi, 2020) in health knowledge systems, and not to undermine or simply use TM practitioners as mere extension workers aiding the access to health services, but rather to promote those elements exclusive to both knowledge systems and blend them to advance the quality of health services; therefore, there is need for new directions.

Having a plurality of perspectives, approaches, and sensemaking resources that complement one another is vital in public health education; as understanding a complex social system requires multiple ways of making sense of it (Appiah, 2017; Cilliers, 2004). In support, the successful implementation of even unanimously proven scientific interventions has been established to require such plurality to understand the complex systems within which such interventions will be implemented and the realities that they will alter or create (Bhakuni & Abimbola, 2021; Naaldenberg & Aarts, 2020).

Furthermore, as proposed by Zhang et al. (2011) this chapter advances that the integration of indigenous knowledge systems and TM in African public health education can be attained by incorporating TM as integral parts of a country's formal health care curriculum. Elements of TM ignored by modern medical professionals will require intentional considerations and conscious efforts to understand via investigation and training. It is vital to incorporate the training of the foundational principles of TM in all learning institutions from the basic primary level with the active involvement of indigenous health experts themselves who ideally possess the knowledge. What is hence being called for in this chapter is a search for openness to promote mutual collaboration that improves both systems as proposed by Ahlberg (2017).

In conclusion, it is important that both modern and TM practitioners recognize their strengths and limitations; and genuinely concern themselves with the demanding but obligatory task of minimising the current distrust perceived between both knowledge systems. Also, firm structures to disclose the impostors in TM practice should be established in Africa. It is only when these are adequately followed that the objective of legitimisation and institutionalisation of TM services alongside the recommended integration between TM and modern health infrastructures, and their underpinning knowledge systems can be attained for the benefit of millions of individuals who are dependent on both systems in Africa.

References

- Abah, J., Mashebe, P., & Denuga, D. D. (2015). Prospect of integrating African indigenous knowledge systems into the teaching of sciences in Africa. *American Journal of Educational Research [online]*, 3(6), 668–673.
- Abdullahi, A. A. (2011a). Trends and challenges of traditional medicine in Africa. *African Journal of Traditional, Complementary, and Alternative Medicines [online]*, 8(5).
- Abdullahi, A. A. (2011b). Trends and challenges of traditional medicine in Africa. *African Journal of Traditional, Complementary, and Alternative Medicines [online]*, 8(5S).
- Abimbola, S. (2021). The uses of knowledge in global health. *BMJ Glob Health [online]*, 6, e005802.
- Abimbola, S., & Pai, M. (2020). Will global health survive its decolonisation? *Lancet [online]*, 396, 1627–1628.
- Adusi-Poku, Y., Okire, L. K. N., Lortsi-Akakpo, F. K., Fleischer, T. C., Mensah, M. L. K., & Arhin, P. (2010). Assessing herbal medical practitioners in professional qualifying examination in Ghana, a model. *African Journal of Traditional, Complementary, and Alternative Medicines [online]*, 7(1), 85–87.
- Affun-Adegbulu, C., & Adegbulu, O. (2020). Decolonising global (public) health: From western universalism to global pluriversalities. *BMJ Global Health [online]*, 5, e002947.
- Afisi, O. T. (2009). Tracing contemporary Africa's conflict situation to colonialism: A breakdown of communication among natives. *Philosophical Papers and Reviews*, 1(4), 59–66.
- Agyei-Mensah, S., & de-Graft Aikins, A. (2010). Epidemiological transition and the double burden of disease in Accra, Ghana. *Journal of Urban Health Bulletin of the New York Academy of Medicine [online]*, 87, 879–897.
- Ahlberg, B. M. (2017). Integrated health care systems and indigenous medicine: Reflections from the sub-sahara African region. *Frontiers in Sociology*, 2(12), 1–10
- Ailemen, A. (2020). FG approves bill for the establishment of council for traditional, alternative, and complementary medicine practice in Nigeria. *Business Day*.
- Anthony, K. I., & Kanu, I. A. (2021). *African religion and culture: Honoring the past and shaping the future [online]* (pp. 1–204). The Association for the Promotion of African Studies.
- Appiah, B. (2012). African traditional medicine struggles to find its place within health care. *CMAJ [online]*, 184(16), 831–832.
- Azevedo, M. J. (2017). Public health in Africa: Theoretical framework. In *Historical perspectives on the state of health and health systems in Africa* (Vol. 1, pp. 1–77). Palgrave Macmillan
- Banda, Y., Chapman, V., Goldenberg, R. L., Stringer, J. S., Culhane, J. F., Sinkala, M., Vermund, S. H., & Chi, B. H. (2007). Use of traditional medicine among pregnant women in Lusaka, Zambia. *The Journal of Alternative and Complementary Medicine [online]*, 1391, 123–127.
- Bandara, W., Furtmueller, E., Miskon, S., & Beekhuizen, J. (2015). Achieving rigor in literature reviews: Insights from qualitative data analysis and tool-support. *Communications of the Association for Information systems*, 37(1), 154–204.
- Bardosh, K. L. (2018). Towards a science of global health delivery: A socio- anthropological framework to improve the effectiveness of neglected tropical disease interventions. *PLoS Neglected Tropical Diseases [online]*, 12, e0006537.
- Barnhardt, R., & Kawagley, A. O. (2005). Indigenous knowledge systems and alaska native ways of knowing. *Anthropology and Education Quarterly [online]*, 36(1), 8–23.
- Benson, E. A. (2021). These are Africa's 10 poorest countries in 2021. <https://africa.businessinsider.com/local/lifestyle/top-10-poorest-countries-in-africa-in-2021/qrsbhj9#:~:text=Accord%20to%20World%20Population%20Review,the%20poorest%20continent%20on%20earth>. Accessed: March 27, 2022.
- Bhakuni, H., & Abimbola, S. (2021). Epistemic injustice in academic global health. *The Lancet Global Health [online]*, 9(10), 1465–1470.
- Bruchac, M. (2014). Indigenous knowledge and traditional knowledge. In C. Smith (Ed.), *Encyclopedia of global archaeology* (pp. 3814–3824). Springer.
- Bryant, J. (2014). *Global health*. Encyclopedia Britannica.

- Büyüm, A. M., Kenney, C., Koris, A., Mkumba, L., & Raveendran, Y. (2020). Decolonising global health: if not now, when?. *BMJ Global Health [online]*, 5(8), e003394.
- Byskov, M. F. (2021). What makes epistemic injustice an “Injustice”? *Journal of Social Philosophy [online]*, 52(1), 114–131.
- Cameron, A., Ewen, M., Ross-Degnan, D., Ball, D., & Laing, R. (2008). *Medicine prices, availability, and affordability in 36 developing and middle-income countries: A secondary analysis*. Geneva: The World Health.
- Chazha, L. M., & Atharv, G. (2020). Traditional chinese medicine is gaining traction in Africa. Can it also help in the fight against COVID-19? <https://chinaafricaproject.com/analysis/traditional-chinese-medicine-is-gaining-traction-in-africa-can-it-also-help-in-the-fight-against-covid-19/>. Accessed March 7, 2022.
- Chikaire, J., Osuagwu, C. O., Ihenacho, R. A., Oguegbuchulam, M. N., Ejiogu-Okereke, N., & Obi, K. U. (2012). Indigenous knowledge system: The need for reform and the way forward. *Global Advanced Research Journal of Agricultural Science [online]*, 1(8), 201–209.
- Chinsembu, K. C. (2009). Model and experiences of initiating collaboration with traditional healers in validation of ethnomedicines for HIV/AIDS in Namibia. *Journal of Ethnobiology and Ethnomedicine [online]*, 5(1), 1–13.
- Cilliers, P. (2004). Complexity, ethics, and justice. *Journal of Humanist [online]*, 5, 19–26.
- Conserveafrica, 2006. Overview of medicinal plants and traditional medicine in Africa. Retrieved October 27, 2010. http://www.conserveafrica.org.uk/medical_plants.pdf
- Cook, C. T. (2009). ‘Sangomas: problem or solution for South Africa’s health care system’. *Journal of the National Medical Association [online]*, 101(3), 261–265.
- Du Toit, B. M. (1998). Modern folk medicine in South Africa. *South African Journal of Ethnology, [online]*, 21(4), 89–92.
- Dweba, T. P., & Mearns, M. A. (2011). Conserving indigenous knowledge as the key to the current and future use of traditional vegetables. *International Journal of Information Management [online]*, 31, 564–571.
- Ekeopara, C. A. (2005). *African traditional religion: An introduction* (p. 25). Natos.
- Elujoba, A. A., Odeleye, O. M., & Ogunyemi, C. M. (2005). Traditional medicine development for medical and dental primary health care delivery system in Africa. *African Journal of Traditional, Complementary and Alternative Medicines [online]*, 2(1), 46–61.
- Farzaei, M. H., Rahimi, R., Farzaei, F., & Abdollahi, M. (2015). Traditional medicinal herbs for the management of diabetes and its complications: an evidence-based review. *International Journal of Pharmacology [online]*, 11(7), 874–887.
- Fasanmade, O.A., & Dangogo-Jack, S. (2015). Diabetes Care in Nigeria. *Annals of Global Health [online]*, 81(6), 821–829.
- Fokunang, C. N., Ndikum, V., Tabi, O. Y., Jiofack, R. B., Ngameni, B., Guedje, N. M., Tembe-Fokunang, E. A., Tomkins, P., Barkwan, S., Kechia, F., & Asongalem, E. (2011). Traditional medicine: Past, present, and future research and development prospects and integration in the National Health System of Cameroon. *African Journal of Traditional, Complementary, and Alternative Medicines [online]*, 8(3).
- Fricker, M. (2007). *Epistemic injustice: Power and the ethics of knowing*. Oxford University Press.
- Fricker, M. (2013). Epistemic justice as a condition of political freedom? *Synthese*, 190(7), 1317–1332.
- Fukunaga, R., Glaziou, P., Harris, J. B., Date, A., Floyd, K., & Kasaeva, T. (2021). Epidemiology of Tuberculosis and Progress Toward Meeting Global Targets—Worldwide, 2019. *Morbidity and Mortality Weekly Report [online]*, 70(12), 427.
- Galabuzi, C., Agea, J. G., Fungo, B. L., & Namoga, R. M. N. (2010). Traditional medicine as an alternative form of health care system: A preliminary case study of Nangabo Sub-County, Centra Uganda. *African Journal of Traditional Complementary and alternative Medicines [online]*, 7, 11–16.
- Gavriilidis, G., & Östergren, P. O. (2012). Evaluating a traditional medicine policy in South Africa: Phase 1 development of a policy assessment tool. *Global Health Action*, 5(1), 17271.

- Hammersmith, J. A. (2007). *Converging indigenous and western knowledge systems: Implications for tertiary education* University of South Africa.
- Hausmann-Mueala, S., Muela Ribera, J., & Nyamongo, I. (2003). Health-seeking behaviour and the health system response. (*DCCP*) Working Paper, 14, 1–37.
- Hedt-Gauthier, B. L., Jeufack, H. M., & Neufeld, N. H. (2019). Stuck in the middle: A systematic review of authorship in collaborative health research in Africa, 2014–2016. *BMJ Global Health [online]*, 4, e001853.
- James, P. B., Wardle, J., Steel, A., & Adams, J. (2018). Traditional, complementary and alternative medicine use in Sub-Saharan Africa: A systematic review. *BMJ global health [online]*, 3(5), e000895.
- Janska, E. (2008). Health knowledge, traditional. In: W. Kirch (Eds.), *Encyclopedia of public health*. Springer.
- Jidong, D. E., Bailey, D., Sodi, T., Gibson, L., Sawadogo, N., Ikhile, D., Musoke, D., Madhombiro, M., & Mbah, M. (2021). Nigerian cultural beliefs about mental health conditions and traditional healing: a qualitative study. *The Journal of Mental Health Training, Education and Practice*.
- Johansson-Fua, S. (2006). Preliminary research findings from Tonga. Personal communication.
- Kamsu-Foguem, B., & Foguem, C. (2014). Adverse drug reactions in some African herbal medicine: Literature review and stakeholder interviews. *Integrative Medicine Research [online]*, 3(3), 126–132.
- Kasilo, O. M. J., Wambebe, C., Nikiema, J. B., & Nabyonga-Orem, J. (2019). Towards universal health coverage: Advancing the development and use of traditional medicines in Africa. *BMJ Global Health [online]*, 4(9), e001517.
- Kasprowicz, V. O., Chopera, D., Waddilove, K. D., Brockman, M. A., Gilmour, J., Hunter, E., Kilembe, W., Karita, E., Gaseitsiwe, S., Sanders, E. J., & Ndung'u, T. (2020). African-led health research and capacity building—is it working? *BMC Public Health [online]*, 20(1), 1–10.
- Kayombo, E. J., Uiso, F. C., Mbwambo, Z. H., Mahunnah, R. L., Moshi, M. J., & Mgonda, Y. H. (2007). Experience of initiating collaboration of traditional healers in managing HIV and AIDS in Tanzania. *Journal of Ethnobiology & Ethnomedicine [online]*, 3, 6.
- Keleher, H. (2001). Why primary health care offers a more comprehensive approach to tackling health inequities than primary care. *Australian journal of primary health*, 7(2), 57–61.
- Kinsman, J. (2012). 'A time of fear': Local, national, and international responses to a large Ebola outbreak in Uganda. *Global Health*, 8, 15.
- Kiringe, J. W. (2005). 'Ecological and anthropological threats to ethno-medicinal plant resources and their utilization in Maasai communal ranches in the Amboseli region of Kenya'. *Ethnobotany Research and Applications [online]*, 3, 31–241.
- Konadu, K. (2008). Medicine and Anthropology in Twentieth Century Africa: Akan Medicine and Encounters with (Medical) Anthropology. *African Studies Quarterly [online]*, 10(2&3), 45–69.
- Kühn, S., & Rieger, U. M. (2017). Health is a state of complete physical, mental, and social well-being and not merely absence of disease or infirmity. *Surgery for Obesity and Related Diseases [online]*, 13(5), 887.
- Kumadoh, D., Adotey, J., Ofori-Kwakye, K., Kipo, S. L., Prah, T., & Patterson, S. (2014). Formulation of oral capsules from Asena herbal decoction used traditionally in Ghana for the treatment of arthritis. *World Journal of Pharmacy and Pharmaceutical Sciences [online]*, 3(7), 1824–1833.
- Kushitor, M. K., & Boatemaa, S. (2018). The double burden of disease and the challenge of health access: Evidence from access, bottlenecks, cost, and equity facility survey in Ghana. *PLoS One [online]*, 13(3), e0194677.
- Kwok, L. S. (2005). The white bull effect: Abusive coauthorship and publication parasitism. *Journal of Medical Ethics [online]*, 31, 554–556.
- Lama, A. (2000). Peru: Traditional knowledge enhances modern medicine. In Rankoana et al. 2015: The use of indigenous knowledge in primary health care: A case study of Makanye community in Limpopo Province, South Africa. *African Journal for Physical, Health Education, Recreation and Dance [online]*, 272–278.

- Lauer, H. (2017). How epistemic injustice in the global health arena undermines public health care delivery in Africa. In 25th International Congress of History of Science and Technology; Rio de Janeiro, Brazil; July 23–29.
- Lauter, O. (2018). Challenges in Combining Indigenous and Scientific Knowledge in the Arctic (pp. 1–12).
- Levers, L.L. (2006a). Traditional healing as indigenous knowledge: Its relevance to HIV/AIDS in southern Africa and the implications for counselors. *Journal of Psychology in Africa [online]*, 16(1), 87–100.
- Levers, L. L. (2006b). Samples of indigenous healing: The path of good medicine. *International Journal of Disability, Development and Education [online]*, 53, 479–88.
- Li, S., Odedina, S., Agwai, I., Ojengbede, O., Huo, D. and Olopade, O.I. (2020). Traditional medicine usage among adult women in Ibadan, Nigeria: A cross-sectional study. *BMC Complementary Medicine and Therapies [online]*, 20(93), 1–7.
- Magni, G. (2017). Indigenous knowledge and implications for the sustainable development agenda. *European Journal of Education*, 52(4), 437–447.
- Mahomoodally, M. F. (2013). Traditional medicines in Africa: An appraisal of ten potent African medicinal plants. *Evidence-Based Complementary and Alternative Medicine [online]*, (617459), 1–14.
- Manguvo, A., & Mafuvadze, B. (2015). The impact of traditional and religious practices on the spread of Ebola in West Africa: Time for a strategic shift. *The Pan African Medical Journal*, 22(1), 41–50.
- Marecik, N. (2007). Traditional societies in East Africa use wild plants for different purposes and means to survive. In H.O. Kay (Ed.), Promotion of public health care using african indigenous knowledge systems and implications for IPRs: Experiences from Southern and Eastern Africa. ATPS special paper series no. 30. Nairobi: African technology policy studies network.
- Marks, L., Hunter, D. J., & Alderslade, R. (2011). *Strengthening public health capacity and services in Europe*. WHO.
- Mbah, M. F., & East, L. A. (2022). How Can “Community Voices” from Qualitative Research Illuminate Our Understanding of the Implementation of the SDGs? A scoping review. *Sustainability*, 14(4), 2136.
- Mbah, M., Bang, H., Ndi, H., & Ndzo, J. A. (2021). Community health education for health crisis management: the case of COVID-19 in Cameroon. *International Quarterly of Community Health Education*, p.0272684X211031106.
- Medina, J. (2011). The relevance of credibility excess in a proportional view of epistemic injustice: Differential epistemic authority and the social imaginary. *Soc Epistemol [online]*, 25, 15–35.
- Merton, R. K. (1968). The Matthew effect in science—The reward and communication systems of science are considered. *Science [online]*, 159, 56–63.
- Mills, E., Singh, S., Wilson, K., Peters, E., Onia, R., & Kanfer, I. (2006). The challenges of involving traditional healers in HIV/AIDS care. *International Journal STD AIDS [online]*, 17(6), 360–363.
- Mokgobi, M. G. (2014). Understanding traditional African healing. *African Journal for Physical Health Education Recreation and Dance [online]*, 20(2), 24–34.
- Moodley, R. (2005). Shamanic performances: Healing through magic and the supernatural. In R. Moodley, R., & W. West (Eds.), *Integrating traditional healing practices into counseling and psychotherapy*, (2–14). London: Sage.
- Mothibe, M. E., & Sibanda, M. (2019). African traditional medicine: South African perspective. *Traditional and Complementary Medicine [online]*, 1–27.
- Mpofu, E., Peltzer, K., Bojuwoye, O., & Mpofu, E. (2011). Indigenous healing practices in sub-Saharan Africa. *Counselling People of African Ancestry [online]*, 3–21.
- Mumo, P. M. (2018). Western christian interpretation of african traditional medicine: A case study of akamba herbal medicine. *Ilorin Journal of Religious Studies [online]*, 8(1), 41–50.
- Naaldenberg, J., & Aarts, N. (2020). The compatibility of reductionistic and complexity approaches in a sociomedical innovation perspective. *BMJ Global Health [online]*, 5, e003858.

- Naja, F., Alameddine, M., Itani, L., Shoaib, H., Hariri, D., & Talhouk, S. (2015). The use of complementary and alternative medicine among Lebanese adults: Results from a national survey. *Evidence-Based Complementary and Alternative Medicine [online]*, 1–7.
- Ndubisi, E. J., & Kanu, I. A. (2021). Innovative trends in African traditional medicine. *Journal of African Studies and Sustainable Development [online]*, 45–63.
- Nloto, M., & Kaya, H. O. (2017). African indigenous knowledge systems and public healthcare. PULA: *Botswana Journal of African Studies [online]*, 31(1).
- Novick, L. F., & Morrow, C. B. (2010). “Defining public health: Historical and contemporary developments”. Chapter 1. 1–34. Jones and Bartlett Publisher.
- Ochwang’i, D. O., & Oduma, J. A. (2017). Overview of governmental support across Africa toward the development and growth of herbal medicine. In *Medicinal Spices and Vegetables from Africa* (153–169). Academic Press.
- Okaiyeto, K., & Oguntibeju, O. O. (2021). African herbal medicines: Adverse effects and cytotoxic potentials with different therapeutic applications. *International Journal of Environmental Research and Public Health [online]*, 18(11), 5988.
- Oreagba, I. A., Oshikoya, K. A., & Amachree, M. (2011). Herbal medicine use among residents in Lagos, Nigeria. *BMC Complementary and Alternative Medicines [online]*, 11, 117–124.
- Oyelakin R. T. (2009). ‘Yoruba traditional medicine and the challenge of integration’. *The Journal of Pan African Studies [online]*, 3(3), 73–90.
- Ozioma, E. O. J., & Chinwe, O. A. N. (2019). Herbal medicines in African traditional medicine. *Herbal Medicine [online]*, 10, 191–214.
- Parker, M., & Kingori, P. (2016). Good and bad research collaborations: Researchers’ views on science and ethics in global health research. *PLoS One [online]*, 11, e0163579.
- Petrovska, B.B. (2012). Historical review of medicinal plants’ usage. *Pharmacognosy reviews [online]*, 6(11), 1–5.
- Rankoana, S. A., Nel, K., Mothibi, K., Mothiba, T. M., Mamogobo, P., & Setwaba, M. (2015). The use of indigenous knowledge in primary health care: A case study of Makanye community in Limpopo Province, South Africa: indigenous knowledge system in health care. *African Journal for Physical Health Education, Recreation and Dance [online]*, 21(1), 272–278.
- Rankoana, S. A. (2012). The use of indigenous knowledge for primary health care among the Northern Sotho in the Limpopo Province (Doctoral dissertation, University of Limpopo (Turloop Campus)).
- Rastogi, S. (2020). Drug discovery, drug development and expensive failures. *International Journal of Scientific Development and Research (IJS DR) [online]*, 5(10), 105–109.
- Raynor, D. K., Dickinson, R., Knapp, P., Long, A. F., & Nicolson, D. J. (2011). Buyer beware? Does the information provided with herbal products available over the counter enable safe use? *BMC Medicine [online]*, 9, 94.
- Richardson, E. T. (2019). On the coloniality of global public health. *Medicine Anthropology Theory [online]*, 6, 761.
- Schneider, H., & Maleka, N. (2018). Patterns of authorship on community health workers in low-and-middle-income countries: An analysis of publications (2012–2016). *BMJ Global Health [online]*, 3, e000797.
- Shah, R. K. (2019). Effective constructivist teaching learning in the classroom. *Online Submission*, 7(4), 1–13.
- Shaiju, P. N., & Omanakumari, N. (2013). Negative impacts of traditional medicine: aristolochic acid model. *Asian Journal of Phytomedicine and Clinical Research [online]*, 1(4), 195–202.
- Skopec, M., Issa, H., Reed, J., & Harris, M. (2020). The role of geographic bias in knowledge diffusion: A systematic review and narrative synthesis. *Research Integrity and Peer Review [online]*, 5, 2.
- Stavenhagen, R. (2015). Indigenous peoples’ rights to education. *European Journal of Education [online]*, 50, 254–257.
- Taiwo, O. (1993). Colonialism and its aftermath: The crisis of knowledge production. *Callaloo [online]*, 16(4), 891–908.

- Tangpu, T. V., & Yadav, A. K. (2006). Anticestodal efficacy of *Psidium guajava* against experimental *Hymenolepis diminuta* infection in rats. *Indian Journal of Pharmacology [online]*, 38(1), 29.
- Tempesta, M. S. (2010). The clinical efficacy of *Cryptolepis sanguinolenta* in the treatment of malaria. *Ghana Medical Journal [online]*, 44(1), 1.
- Thaman, K. H. (2009). Towards cultural democracy in teaching and learning with specific references to Pacific Island Nations (PINs). *International Journal for the Scholarship of Teaching and Learning [online]*, 3(2), 6.
- Tharakan, J. (2017). Indigenous knowledge systems for appropriate technology development. *Indigenous People, [online]*, 123, 123–134.
- Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology [online]*, 8(1), 1–10.
- Tobi, A. T. (2020). Towards a plausible account of epistemic decolonisation. *Philosophical Papers [online]*, 49, 253–278.
- Tsindoli, S., Ongeti, K., & Chang'ach, J. K. (2018). Integration of existing indigenous knowledge within mathematics curriculum for primary schools in Kenya.
- Ubani, L. U. (2011). *Preventive therapy in complementary medicine*. Xlibris Corporation. ISBN 978-1-4628-7687-7.
- Umeora, O. U., Emma-Echiegu, N. B., Umeora, M. C., & Ajayi, N. (2018). Ebola viral disease in Nigeria: The panic and cultural threat. *African Journal of Medical and Health Sciences*, 13(1), 1–5.
- UNESCO. (2010). Indigenous knowledge and sustainability. www.unesco.org/education/tlsf/mods/theme_c/mod11.html. Accessed: March 18, 2022.
- Vahekeni, N., Neto, P. M., Kayimbo, M. K., Mäser, P., Josenando, T., da Costa, E., Falquet, J., & van Eeuwijk, P. (2020). Use of herbal remedies in the management of sleeping sickness in four northern provinces of Angola. *Journal of Ethnopharmacology [online]*, 256(2020), 1–18.
- Victoria, C. G., & Moreira, C. B. (2006). North–south relations in scientific publications: Editorial racism? *Revista de Saude Publica [online]*, 40, 36–42. (in Portuguese).
- Wainwright, M., & Macnaughton, J. (2013). Is a qualitative perspective missing from COPD guidelines. *The Lancet Respiratory Medicine [online]*, 1(6), 441–442.
- Walker, M., & Martinez-Vargas, C. (2020). Epistemic governance and the colonial epistemic structure: Towards epistemic humility and transformed south–north relations. *Critical Studies in Education*. <https://doi.org/10.1080/17508487.2020.1778052>
- WHO. (2022a). Malaria. <https://www.who.int/news-room/factsheets/detail/malaria>. Accessed: February 14, 2022.
- WHO. (2022b). HIV/AIDS. <https://www.afro.who.int/healthtopics/hiv aids#:~:text=The%20WHO%20African%20Region%20is,HIV%20in%20the%20African%20Region>. Accessed: February 14, 2022.
- WHO. (2022c). https://www.who.int/health-topics/traditional-complementary-and-integrative-medicine#tab=tab_1. Accessed: February 14, 2022.
- WHO. (2022d). Traditional, Complementary and Integrative Medicine. https://www.who.int/health-topics/traditional-complementary-and-integrativemedicine#tab=tab_1. Accessed January 10, 2022.
- WHO. (2001). Legal status of traditional medicine and complementary/alternative medicine: A world review. Geneva: World Health Organisation.
- Yegros-Yegros, A., van de Klippe, W., Abad-Garcia, M. F., & Rafols, I. (2020). Exploring why global health needs are unmet by research efforts: The potential influences of geography, industry, and publication incentives. *Health Res Policy Syst [online]*, 18, 47.
- Zhang, A. L., Xue, C. C., & Fong, H. H. S. (2011). Chapter 22: Integration of herbal medicine into evidence-based clinical practice. *Herbal Medicine: Biomolecular and Clinical Aspects [online]*, 1–15.

Use of Traditional Medicine in Indigenous Communities from Mexico: A Practice for Sustainable Development



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Abstract Since 2015, the United Nations call to action about the goals of the Sustainable Development Goals, including targets related to the health and well-being of populations. Indigenous populations in southern Mexico are the most affected by social inequities, making traditional medicine more accessible and affordable for their treatment. This chapter aims to describe traditional medicine practices in the main illness conditions of Mexican indigenous communities. A case study was carried out in Oaxaca (Mexico) between 2017 and 2019. Surveys were applied to retrieve information on these communities' knowledge and practices regarding traditional medicine. Several traditional practices were recovered to cure diseases cataloged in international classifications and cultural affiliation syndromes among the main results. 70.3% of the participants used homemade remedies, typically, in preparation of tea, and some compositions of medicinal herbs. *Mezcal*, the typical alcoholic beverage of the region, has also been reported as one of the most widely used. In addition to the conception of biomedical disease, a total of 40 syndromes of cultural filiation or "cultural diseases" were reported; the most frequent were *empacho* (indigestion), followed by the *mal de ojo* (the evil eye), and *susto* (frighten). This chapter brings us closer to knowing how they cope with illness by using traditional medicine in indigenous communities without the use of health services. Contributing to reach the Sustainable Development Goal 3 (SDG3).

Keywords Traditional medicine · Cultural affiliation syndromes · Primary healthcare

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1 Introduction

In 2015, the World Health Organization proposed a series of goals called “Sustainable Development Goals” to improve the world population’s situation. Sustainable Development Goal 3 (SDG3) focuses on ensuring healthy lives and promoting well-being in people of all ages (UN General Assembly, 2015). The study of this goal involves the analysis of factors such as inequalities that are somehow related to communicable and non-communicable diseases in each population. In order to meet this objective’s goals, it is necessary analyze the use of traditional medicine in populations that are considered more vulnerable and prone to get sick due to their living conditions; because it is believed that these populations may be put at risk to meet the established goals (Del Popolo, 2014). Additionally the SDG3 intertwines with other objectives in a collateral manner since health directly impacts the economic sphere (UNDP, 2015).

To date, several indicators have been found that show progress in the fulfillment of this SDG3 and its corresponding goals, including improving maternal and child health or reducing infant mortality. However, progress is still lacking in other aspects, such as access to health services (United Nation Statistic Division, 2020). This lack of achievements in health at a global level is observed in various populations, especially those with a higher vulnerability index, such as indigenous populations. People who are part of these communities start from a situation of greater vulnerability than the rest of the population (Del Popolo et al., 2014). This situation is related directly to the social factors associated with health, The World Health Organization (WHO) define them like “the circumstances in which people are born, grow up, work, live and age, including the broader set of forces and systems that influence the conditions of everyday life” (WHO, 2019). These social determinants influence health equity and include factors such as social protection, education, food insecurity, housing, early childhood development, social inclusion, and access to affordable health services, among others. Most indigenous populations live in rural communities with little access to health services and potable water. In addition to having limited access due to geographic conditions or the non-existence of the service in their communities, they have an additional barrier to the rest of the population’s “language” (Webster, 2018). This series of previously invisible inequities come to light in conditions where the entire population is at risk. Still, these communities have a higher risk of getting sick or dying (Curtice & Choo, 2020). All these disadvantages are reflected in indicators such as life expectancy at birth, years of a healthy life, maternal mortality, etc., where indigenous communities have differences from the rest of the population (Sernicharo & Coronel, 2017).

The question arises that if they have so many things against them, how do these populations maintain their health status not so different from the rest of the population? And the answer could be that they have a series of strengths that could somehow support the lack of health services and prevent the state of health from being even worse for them. These strengths lie in the use of traditional medicine. According to WHO, the traditional medicine or complementary medicine is defined “as all those

practices, approaches, knowledge, and beliefs in health. It has its basis from plants, animals, minerals, physical, mental, and spiritual therapies, applied individually or collectively to maintain well-being (World Health Organization. WHO, 2013a).

Therefore, how they react to a condition, symptom, or disease is related to the conception of the disease and how they respond to it. Within this behavior toward the disease, several factors highlight the role played by the family. When an individual perceives a symptom, they do not usually analyze it in isolation but seek to relate it to other experiences, both personal and family and friends, which always influence preventive behaviors and coping responses of individuals who perceive the disease (Bannon et al., 2017). Highlighting two relevant phenomena, one of these is biomedical perception. This is where disease perception is explained from a purely biomedical perspective, considering only the individual's corporeal (biomedical) symptoms and the perception of disease from a cultural approach. It includes syndromes of cultural affiliation, defined as "diseases that possess the medical models of various parts of the world, different from the Western 'scientific' one" (Joyce-Moniz & Barros, 2007; Salud., 2003). The people say these syndromes are not cured by a physician (Urióstegui-Flores, 2015). Therefore, there are diseases known as allopathic in communities with a biomedical perspective and syndromes of cultural affiliation.

The aim of this chapter is to elucidate how Mexican indigenous populations maintain their health status using traditional medicine despite the health vulnerability they present. Specifically which traditional medicine or remedy use for the allopathic or cultural disease in their communities. Likewise, analyze what biological studies have been carried out with respect to the medicinal properties reported by the population.

2 Methodology

A survey was conducted in the state of Oaxaca to know how the population with the highest percentage of indigenous people in Mexico uses the knowledge of traditional medicine. In the survey, they were asked about which were the principal diseases they had in their community and how they cured these diseases. In turn, a literature search was conducted on the phytopharmacological properties of the plants reported as a cure for the diseases mentioned by the interviewees was carried out. The responses were analyzed with descriptive statistics.

3 Results and Discussion

3.1 *Description of Study Population*

In the world, there are several countries with indigenous populations that make use of traditional medicine; among them is Mexico. In this country, there are more than seven million indigenous people. This population is in the country's southern region. Living conditions are like indigenous populations in the rest of the world, where 69.5% of the indigenous population lives in poverty. Approximately half of the population resides in rural localities of less than 2500 inhabitants. The poverty rate is 78.5%. Regarding health, it is known that 78.2% of the population lack social security benefits; 15.54% lack access to health services; 57.7% lack access to basic housing services; and 31.5% lack food (National Council for the Evaluation of Social Development Policy. CONEVAL, 2019). The indigenous population's health status compared to the non-indigenous population is lower in alcohol consumption and obesity; however, it is higher in the number of pregnancies and births and adolescent births. For childbirth care, indigenous women use hospital unit care less frequently than the non-indigenous population and use midwives more frequently (Pelcastre-Villafuerte et al., 2020). The leading diseases that occur in Mexican indigenous communities are respiratory tract infections, intestinal infections, and urinary tract infections. At the same time, the main causes of mortality are heart disease, malignant tumors, and diabetes (National Epidemiologic Surveillance System. SINAVE, 2010).

The state of Oaxaca is the entity with the highest percentage of an indigenous population in Mexico, with 31.2% (Instituto Nacional De Estadística Y Geografía. INEGI, 2020) It is in southwestern Mexico, and the state's surface is characterized by being part of the neo-volcanic axis, the Sierra Madre del Sur, Sierra de Chiapas, the Gulf Coastal Plain, and the Central American mountain range with numerous rivers, dams, and lagoons that supply it with water. The state is divided into eight regions, which are as follows: Istmo, Mixteca, Sierra Sur, Costa, Sierra Norte, Valles Centrales, Tuxtepec or Papaloapan, and Cañada; and 570 municipalities. The region's geographical diversity and climate give it a great biological variety, being the state with the greatest biodiversity of the Mexican republic (Instituto Nacional de Estadística y Geografía. INEGI, 2016; WWF, 2021). The indigenous population is distributed in 245 municipalities where one of the 16 native indigenous languages and ten foreign languages are spoken, and 20% of the inhabitants are monolingual. The predominant languages are Zapotec, Mixtec, Mazatec and Chinantec (Comisión Nacional para el Desarrollo de Los Pueblos Indígenas, 2008). These indigenous communities are in localities of less than 2500 inhabitants, and the indigenous population living in poverty conditions ranges between 12 and 35% (Consejo nacional de Evaluación de la Política de Desarrollo Social. CONEVAL, 2019).

The indigenous population of the state of Oaxaca is given consideration in health programs like the entire population of the country. However, the indigenous community is more vulnerable regarding their health since they have, no access to drinking water and sewage, cook with coal sources that generate indoor air pollution and

reduced access to health services (González-Villoria & Zuñiga, 2018). In addition to the reduced access to health services, there are other reasons why the inhabitants of indigenous communities do not make use of health services. Among them are the geographical barrier, the scarcity of clinics or the absence of personnel attending to patients in these health units, and cultural issues. These issues include when the population does not use this service under certain circumstances because they consider that the doctor does not cure their illness (Pérez-Nicolás et al., 2017).

From the above, it can be noted that the health of indigenous populations is nuanced by specific variables between their condition of vulnerability and how they recover their state of health in the face of allopathic and cultural conditions. Therefore, since they do not use health services, the primary way to recover or improve their state of health is using ancestral knowledge, specifically traditional medicine. This type of medicine employs various treatments or methods of healing and varies depending on the disease itself or the population in question. The procedures they use are cleanings, massages, baths, and even herbal teas known in the region.

3.2 Main Conditions and Forms of Treatment in Oaxaca's Indigenous Communities

A total of 929 surveys were given in which the population reports both allopathic diseases and syndromes of cultural affiliation. The allopathic two most reported diseases were urinary tract infection and upper respiratory tract infection, followed by a much lesser degree of illnesses such as diarrhea, diabetes, and even polycystic ovary.

4 Allopathic Diseases

4.1 Urinary Tract Infection (UTI)

This allopathic disease was also reported as “mal de orín”, which is used in the syndromes of cultural affiliation as a synonym for cystitis. It is characterized by increased urination, burning, or pain during urination. This disease was reported in 10.5% of cases.

Most of the respondents say to increase water intake as an alternative to treat the burning and pain, to cure urine sickness, or to clean the urine. The properties that they attribute to the different herbal remedies vary. They mention that these remedies help clean, wash, disinfect, and reduce inflammation of the urinary tract and the kidneys. They say, “it serves to calm the burning or pain,” to disinfect the urine,” and they also attribute properties to prevent infection in the urinary tract.

The medicinal plants mentioned that are used to treat the condition are consumed in the form of tea (aqueous extract). They are in order of importance horsetail tea, corn silk tea, cuachalala tea, palo azul tea, and all of them are used to cure the infection or to wash the kidneys.

- Horsetail tea (*Equisetum arvense*) is used to cure the infection. The plant is obtained from a plant that grows on the banks of bodies of water. The phytochemical analysis of its components shows that it is composed of flavonoids and phenolic acids (substances). Different studies report the function of the extracts include modulates inflammation, hepato-protective, antidiuretic, antibacterial, and antioxidant (Gründemann et al., 2014).
- Corn silk tea (*Zea Mays L. Hairs*) is obtained from the hair of corn cobs. Tea is used to cure urine disease. Studies show that it repairs kidney damage in combination with other plants and also has a bactericidal effect (Saleh et al., 2017; Sukandar et al., 2013).
 - The third remedy used is palo azul tea (*Eysenhardtia polystachya*). Studies propose that it has a diuretic effect (Pablo-Pérez et al., 2016). For its part, the cuachalala, cuachalalate (*Amphipterygium adstringen*), has anti-inflammatory and anti-ulcer properties (Knauth et al., 2018).
- The use of hibiscus water (*Hibiscus sabdariffa*) is to flush the kidneys, for which they prepare an aqueous concentrate of the flower and drink it throughout the day. It makes them increase the frequency they urinate and thus flush the kidneys. Studies show that it has several properties, among them: antioxidant-antiradical activity, anti-inflammatory action, antiobesity, antihyperlipidemic, antihypertensive, inhibition of blood platelets aggregation, diuretic, anti urolithicatic, antimicrobial, anticancer, hepatoprotective, reno protective, antitumor, immunomodulatory properties (Riaz & Chopra, 2018).
- Chamomile tea (*Chamaemelum nobile*) is used in the treatment of urinary tract infections. It has been shown to contain terpenes, flavonoids, and to have antimicrobial activity against UTI-causing bacteria. It prevents the formation of bacterial biofilm (Berroukche et al., 2018; Kazemian et al., 2015; Srivastava et al., 2010).
- Occasional use of other remedies for urinary tract infection was also reported, including pineapple water, coconut water, parsley water, passion fruit water, sugar water, lemon water, cat's claw tea, and mace water.

Additionally the treatment is not only of the disease as such but also refers to some symptoms. For example, they mention that the pain or burning when urinating is cured with Mexican honeysuckle, Pointleaf manzanita (pingüica - *Arctostaphylos pungens*) tea, Rustyback (doradilla - *Asplenium ceterach*) or stone leaf, peppermint, or mallow tea. In the case of a foul smell of the urine, turtle leaf is used; for a change of color, a combination of corn silk with beet is used.

5 Respiratory Tract Infection

This condition was reported in the 4.4%. This disease have the particularity to be cured with remedies are not only ingested but can also be administered orally and topically.

Another particularity is that the teas used can contain a single herb such as mullein tea (*Verbascum thapsus*), honey with lemon, and a combination of several herbs or flowers. For example, “to cure the flu thyme tea, ginger, bougainvillea is used” (*Zingiber officinale*, *Bougainvillea*). These plants have been noted for their anti-inflammatory activity, antioxidants, antibacterial (Munekata et al., 2020; Saleem et al., 2019; Shareef et al., 2016). Mezcal (a local alcoholic beverage made from agave) is also used for a runny nose, or oregano (*Origanum vulgare*) tea to treat coughs This plant have antimicrobial properties (Akrayi et al., 2015).

Among the topical remedies to treat the symptoms of upper respiratory tract infections are mentholated ointment on the chest, back, and nose, mezcal bath with urine, and applying mezcal on the soles of the feet and the soft spot (fontanel) of babies. Tomato (*Physalis philadelphica*) heated, cures “by applying tomato onto arms and the throat.”

In addition to these two diseases, which coincide with the most frequent outpatient visits to the health services, diarrhea and diabetes were reported less frequently. There were even individual responses such as polycystic ovary. It was mentioned that the way to cure it was “through teas such as mint which is quite effective and homeopathic medicine instead of disgusting hormones prescribed by specialist doctors.” The literature reports that mint (*Mentha spicata*) has anti-androgenic properties, so it is a candidate for treating polycystic ovary (Amoura et al., 2015). In the case of exanthemata’s diseases such as chickenpox or Smallpox, they mention that the treatment is that “It is cured with camphor, brandy, a mixture is made, and it is put on when you finish bathing.”

As for specific symptoms such as fever, the remedy is to “put onion on the feet and tie it with a bandage.” For a stomachache, “take chamomile tea (*Chamaemelum nobile*) and two Alka Seltzers (antacids); you must take it hot to take effect.” For ear pain, you “apply basil with coconut oil.” Phyto-pharmacological studies show that medicinal plants that have been used for centuries to have positive effects on the allopathic diseases mentioned.

6 Cultural Affiliation Syndromes

The illnesses that the population reported are not cured by a doctor were mentioned frequently, with “empacho” being the most reported at 41.2%. **Empacho** is an illness with various digestive disorders caused by ingesting food or substances that “stick” in the intestine or stomach because they cannot be digested. There are dry foods that cause indigestion, such as cookies, and occur when ingesting inedible things

such as cardboard and even eating food after getting angry (Biblioteca Digital de la Medicina Tradicional Mexicana. BDMTM, 2009). The forms of healing have subtle variations, but they deal with the mechanisms to get what was ingested to come out of the stomach. Examples among what they reported are “Rubbing the stomach so they can get rid of what they have. The ladies say that they loosen what you have stuck, and for that reason, you do not eat well, or your food does not go down well because you have overdone it (you did not eat at the time you should).” Another person reported the use of a soft drink “You make a mixture of Yoli soft drink with Estomaquil (medicine that is used for gastritis since three different antacids formulate it) and you rub the stomach.”

- **The evil eye** was the second most reported disease, 29.2%. This condition is caused by the intense look of some people or envy; that is, there are people who make others sick by looking at them. Among the symptoms it causes are diarrhea, vomiting, crying, and restlessness (Biblioteca digital de la medicina tradicional mexicana, 2009). One person reported that the evil eye is cured by going to the healer. “The healer rubs a chicken egg on your face and all over your body, then basils it with water from 7 males and finally breaks the egg in water and tells you what you have, and you have to cover yourself.” To cure them, “they rub herbs of odors (lime leaf, lemon, tangerine, rue, a broken nut, alcohol mixed with leaves) and at the end, they light a match and rub the children.” Additionally, people say that this syndrome can be prevented by “putting on a deer’s eye seed.”
- **The scare or shock** is a disease caused by an impression, this is given by the encounter with animals, supernatural entities, falling, or any strong experience that causes a trauma that puts at risk their physical and emotional integrity, the symptoms are drastic, since the soul is lost or is weakened, so care must be immediate (Biblioteca digital de la medicina tradicional mexicana, 2009), this phenomenon was reported in 22.7% of the population. To cure a scare, it was found that the affected person should go to a healer. “The healer rubs an egg on the person’s head, breaks it, and in a glass with water interprets the yolk of the egg; then cleanses the person with herbs. This is done three times” or smear an egg with herbs, a clean with juniper or aromatic herbs. In various studies, the effect that these herbs have by inhalation or absorption via topical route has been observed. Also, they have antidepressant or stimulant effects on the nervous system (Mata-Pinzón, 2018).

Bad air is a condition caused by air with malignant properties. It is acquired when there is a sudden temperature change or when you go out at night without protection. Also, when you have alcohol in your stomach and drink cold water, the malignant air enters the affected person. The symptoms are diverse, but the most common are dizziness or episodes, tearing or eye irritation (Biblioteca digital de la medicina tradicional mexicana, 2009). How the bad air is cured is by specialists such as healers, “Go to raise earth, yes with the healer,” “Cleaning with a turkey egg, cleaning with herbs.”

Anger is another reported condition in which the affected person has a series of physiological reactions that make him sick. These are worse when the sensations are

repressed, causing the concentration of bad feelings. One manifestation is the spilling of bile which causes digestive problems. They also mentioned that the cause of bile spillage is due to the heating of the blood or liver. Among the cures, it is said that bitter herb teas should be ingested. “It is cured with bitter herbs” or with the ingestion of “Silver sagebrush (estafiate - *Artemisia ludoviciana*) tea, or Fetid goosefoot (hierba de zorillo - *Chenopodium graveolens*), with salt and other ingredients.”

Other conditions that were reported less frequently:

“**Chipilera**” is a condition in which the youngest child of a family shows physical symptoms of illness or behavioral symptoms when its mother is pregnant. The way of cure mentioned is “The pregnant woman sweeps the child with the broom.”

Sinking of the soft spot (fontanel) This condition occurs in infants by sudden movements and in adults by carrying heavy things with the head. It is predominant in infants, in which the symptoms depend on age, in infants the fontanel sinks, and they have diarrhea, fever, vomiting, weakness. On the other hand, adults do not have fontanel sinking but palatal sinking, weakness, and tiredness. The cure is obtained by “Placing a roasted tomato on the chest, and a little bit is put in the mouth with a finger.” Rubbing the tendons and muscles on the back of the neck, squeezing the head from the nape of the neck towards the head, with roasted tomato spread and olive oil.

“**Tiricia**” is a condition resulting from fright, anger, the loss of a loved one, or people who have had illnesses for a very long time. The symptoms are lack of appetite, pallor, listlessness (Biblioteca digital de la medicina tradicional mexicana, 2009). To be cured of apathy, it is recommended to take a bath, but these baths have the characteristic of being aromatic baths since the answers were: “Bathing with herbs and flowers” or “Bathing with fresh herbs such as lime leaves” (Biblioteca digital de la medicina tradicional mexicana, 2009).

These diseases are constantly treated by witches or people with specialties such as bone workers, or with midwives. This helps sustain the health system and is even recognized as a social health system. So, the regulation of these services has been important.

7 Country Regulations of Traditional Medicine

The World Health Organization recognizes traditional medicine as an important element for populations to maintain their health. Because of this situation, it proposed the 2014–2022 strategy aimed at developing policies and action plans that promote the use of traditional medicine to maintain people’s state of health. The proposal deals with four areas: policy so that it is inserted in health services, safety, efficacy through knowledge and regulation, access by improving availability, and rational use (World Health Organization. WHO, 2013b).

The Mexican government has made several interventions to implement the WHO recommendations like: include the traditional medicine in the health care for the

indigenous population, which is the one that uses this medicine as the first level of health care.

Advances in legislation, safe use, and affordability include:

Article 6 VI bis of the General Health Law proposes recognizing and developing indigenous traditional medicine and its practice in adequate conditions (General health Law, 2011).

The Constitution of the United Mexican States in Article 2 recognizes the right of indigenous peoples to preserve their culture. Section A III mentions access to health through expanding the system and duly taking advantage of traditional medicine (Constitución Política de los Estados Unidos Mexicanos, 2021).

In the case of Mexican midwifery, there have been great advances. Since it is completely regulated, people who are trained and obtain the midwifery document as established in article 103 of the general health law can practice this profession (Secretaría de Salud, 2020).

Article 93 of the General Health Law establishes that the Secretary of Public Education and the Secretary of Health will establish health education. It will also recognize, respect, and promote the development of indigenous traditional medicine (Ley General de Salud, 2012).

Also, as part of the regulation of this medicine, active research is conducted on the phytocomponents of the plants used in Mexican herbal medicine through research networks that fall under the leading universities in the country (Bautista-Robles et al., 2020; Mata et al., 2019).

Given the need to establish a program to increase knowledge regarding herbal medicine, plans and programs to study Mexican herbal medicine to strengthen medical practice were established by the Interinstitutional Commission for the Formation of Human Resources for Health (Secretaría de Salud, 2009).

Attempts have been made in some regions to establish a dual health system, especially in communities with a deep-rooted use of traditional medicine. In these places, health institutions speak native languages and use midwives. Also, regulations have been established to include native languages in communities such as Oaxaca and Chiapas (Navarro et al., 2017).

Bilingual health services have also been established to try to reduce the language barrier in the use of services (Webster, 2018).

Also the government document DOF: 15/12/1999 indicate the way in which they will be consumed, as well as the labeling for their sale (Secretaría de Gobernación. Diario Oficial de la Federación 1999). This document was actualized in 2018 by the Federal Commission for Protection Against Sanitary Risks (COFEPRIS) regulates the consumption of medicinal plants (Comisión Federal para la Protección contra Riesgos Sanitarios 2018).

7.1 Study Limitations

The study did not include health specialists such as witches, midwives, shamans etc. to corroborate the answers provided by the interviewees.

8 Conclusion

Even though the indigenous population has an increased vulnerability due to living conditions and has fewer years of life than the rest of the population, life expectancy at birth is not proportional to all the vulnerability factors that the indigenous population faces. So traditional medicine can contribute to achieving the welfare of people at the physical and psychological level since it treats ailments considered as allopathic diseases and emotional ailments such as sadness. Therefore, the use of traditional medicine in indigenous communities contributes to the Sustainable Development Goal 3 (SDG 3) since the population is in conditions of increased vulnerability. Their use serves as the first level of care since studies show that the phytochemical components of the plants used to treat diseases have the effects reported by the population. The use of traditional medicine and its availability to the entire community allows the population's protection as the primary care for the indigenous population to make use of it even before seeking allopathic care. The first level of care is done at home by drinking tea; if this does not have the expected effect is then that is when they resort to going to the doctor.

The use of traditional medicine should be analyzed in the impact on the health of the population such as midwives has been a good example of the use of traditional medicine in Mexico, in which the impact on the reduction of maternal mortality.

References

- Akrayi, H. F., Salih, R. M., & Hamad, P. A. (2015). In vitro screening of antibacterial properties of *Rhus coriaria* and *Origanum vulgare* against some pathogenic bacteria. *Aro-the Scientific Journal of Koya University*, 3, 35–41.
- Amoura, M., Lotfy, Z. H., Neveen, E., & Khlood, A. (2015). Potential effects of *Mentha piperita* (peppermint) on Letrozole-induced polycystic ovarian syndrome in female albino rat. *International Journal*, 3, 211–226.
- Bannon, B., Dahl-Aslan, A., Pedersen, N., & Reynolds, C. (2017). Social support predicts illness behavior trajectories in the Swedish adoption/twin study of aging. *Innovation in Aging*, 1, 890
- Bautista-Robles, V., et al. (2020). *Cnidioscolus aconitifolius*: Therapeutic use and phytochemical properties. *Literature Review Revista De La Facultad De Medicina*, 68, 446–452.
- Berroukche, A., et al. (2018). Antibacterial effects of *Prunus cerasus* and *Chamaemelum nobile* against drug resistant strains induced urinary disorders East African Scholars. *Journal of Medical Sciences*, 1, 26–31.
- Biblioteca digital de la medicina tradicional mexicana B. (2009). Diccionario Enciclopédico de la Medicina Tradicional Mexicana.

- Biblioteca Digital de la Medicina Tradicional Mexicana. BDMTM. (2009). Empacho. Universidad Nacional Autónoma de México. <http://www.medicinatradicionalmexicana.unam.mx/index.html>. 2021.
- Comisión Federal para la Protección contra los Riesgos Sanitarios. (2018). COFEPRIS anuncia la liberación de 18 plantas medicinales, para su uso legal. <https://www.gob.mx/cofepris/prensa/cofepris-anuncia-la-liberacion-de-18-plantas-medicinales-para-suuso-legal?idiom=es>
- Comisión Nacional para el Desarrollo de Los Pueblos Indígenas. (2008). Condición socioeconómica de la población indígena. Región sur tomo 1 Oaxaca. México.
- Consejo Nacional de Evaluación de la Política de Desarrollo Social. CONEVAL. (2019). Pobreza en la población indígena. https://www.coneval.org.mx/Medicion/MP/Paginas/Pobreza_Indigena.aspx. 2021.
- Curtice, K., & Choo, E. (2020). Indigenous populations: left behind in the COVID-19 response. *The Lancet*, 395(10239), 1753. [https://doi.org/10.1016/S0140-6736\(20\)31242-3](https://doi.org/10.1016/S0140-6736(20)31242-3)
- Constitución Política de los Estados Unidos Mexicanos (2021). México.
- Del Popolo, F.J., & Dirk. (2014). Los pueblos indígenas en América Latina. Avances en el último decenio y retos pendientes para la garantía de sus derechos. Síntesis Comisión Económica para América Latina y el Caribe:128.
- Del Popolo, F., Jaspers, D., & Cepal, N. (2014). Los pueblos indígenas en América Latina. Avances en el último decenio y retos pendientes para la garantía de sus derechos. Síntesis.
- General Health Law. (2011). REGLAMENTO de la Ley General de Salud en Materia de Prestación de Servicios de Atención Médica Agenda de Salud.
- González-Villoria, A. M., & Zuñiga, R. A. A. (2018). Social vulnerability and its possible relation to the principal causes of morbidity and mortality in the Mexican state of Oaxaca. *International Journal for Equity in Health*, 17, 1–7.
- Gründemann, C., Lengen, K., Sauer, B., Garcia-Käufer, M., Zehl, M., & Huber, R. (2014). Equisetum arvense (common horsetail) modulates the function of inflammatory immunocompetent cells. *BMC Complementary and Alternative Medicine*, 14, 1–10.
- Instituto Nacional de Estadística y Geografía. INEGI. (2016). Presenta INEGI los resultados de una nueva serie de la Encuesta Nacional de Ingresos y Gastos de los Hogares. Ciudad de México. https://www.inegi.org.mx/contenidos/programas/enigh/nc/2018/doc/enigh2018_ns_presentacion_resultados.pdf
- Instituto Nacional de Estadística y Geografía. INEGI. (2020). Censo de población y vivienda.
- Joyce-Moniz, L., & Barros, L. (2007). Psicología de la enfermedad para cuidados de la salud: desarrollo e intervención. *El Manual Moderno*.
- Kazemian, H., et al. (2015). Antibacterial, anti-swarming and anti-biofilm formation activities of *Chamaemelum nobile* against *Pseudomonas aeruginosa*. *Revista da Sociedade Brasileira de Medicina Tropical*, 48, 432–436.
- Knauth, P., Acevedo-Hernández, G. J., Cano, M. E., Gutiérrez-Lomelí, M., & López, Z. (2018). In vitro bioactivity of methanolic extracts from *Amphipterygium adstringens* (Schltdl.) Schiede ex Standl., *Chenopodium ambrosioides* L., *Cirsium mexicanum* DC., *Eryngium carlinae* F. Delaroché, and *Pithecellobium dulce* (Roxb.) Benth. used in traditional medicine in Mexico. *Evidence-Based Complementary and Alternative Medicine* 2018.
- Ley General de Salud. (2012). Ley General de Salud (Vol. 166).
- Mata, R., Figueroa, M., Navarrete, A., & Rivero-Cruz, I. (2019). Chemistry and biology of selected Mexican medicinal plants. *Progress in the Chemistry of Organic Natural Products*, 108, 1–142.
- Mata-Pinzón, S. (2018). Plantas medicinales para el tratamiento del susto y mal de ojo. Análisis de sus posibles efectos sobre el sistema nervioso central por vía transdérmica e inhalatoria. *Etnobiología*, 16, 30–47.
- Munekata, P. E., Alcántara, C., Žugčić, T., Abdelkebir, R., Collado, M. C., García-Pérez, J. V., Jambak, A. R., Gavahian, M., Barba, F. J., & Lorenzo, J. M. (2020). Impact of ultrasound-assisted extraction and solvent composition on bioactive compounds and in vitro biological activities of thyme and rosemary. *Food Research International*, 134, 109242.

- National Council for the Evaluation of Social Development Policy. CONEVAL. (2019). La pobreza en la población indígena de México, 2008-2018. Mexico. https://www.coneval.org.mx/Medicion/MP/Documents/Pobreza_Poblacion_indigena_2008-2018.pdf
- National Epidemiologic Surveillance System. SINAVE. (2010). Perfil epidemiológico de los municipios indígenas en México. Mexico.
- Navarro, R. C., Sánchez, E. Y. P., & Maya, A. P. (2017). Aproximación crítica a las políticas públicas en salud indígena, medicina tradicional e interculturalidad en México (1990–2016). *Salud colectiva*, 13, 443–455.
- Pablo-Pérez, S. S., Estévez-Carmona, M. M., & Meléndez-Camargo, M. E. (2016). Diuretic activity of the bark of *Eysenhardtia polystachya*. *Bangladesh Journal of Pharmacology*, 11, 212–217.
- Pelcastre-Villafuerte, B. E., Meneses-Navarro, S., Sánchez-Domínguez, M., Meléndez-Navarro, D., & Freyermuth-Enciso, G. (2020). Condiciones de salud y uso de servicios en pueblos indígenas de México salud pública de México 62.
- Pérez-Nicolás, M., Vibrans, H., Romero-Manzanas, A., Saynes-Vásquez, A., Luna-Cavazos, M., Flores-Cruz, M., & Lira-Saade, R. (2017). Patterns of knowledge and use of medicinal plants in Santiago Camotlán, Oaxaca. *Mexico Economic Botany*, 71, 209–223.
- Ponce Sernicharo, G., & Kánter Coronel, I. del R. (2017). Al día: las cifras hablan. Día Internacional de los Pueblos Indígenas. In Instituto Belisario Domínguez (Vols. 70, Núm). <http://www.bibliodigitalibd.senado.gob.mx/bitstream/handle/123456789/2149/AD29.pdf?sequence=1&isAllowed=y>
- Riaz, G., & Chopra, R. (2018). A review on phytochemistry and therapeutic uses of *Hibiscus sabdariffa* L. *Biomedicine & Pharmacotherapy*, 102, 575–586.
- Saleem, H. et al. (2019). Multidirectional insights into the biochemical and toxicological properties of *Bougainvillea glabra* (Choisy.) aerial parts: A functional approach for bioactive compounds. *Journal of Pharmaceutical and Biomedical Analysis*, 170, 132–138.
- Saleh, R. H., Hindi, N. K. K., & Ali, M. R. A. (2017). Antibacterial Activity of Aquatic Zea Mays L. Hairs extract against different bacteria in babylon province: An in-vitro study. *Journal of Global Pharma Technology*. ISSN:0975-8542.
- Salud, Sd. (2003). Relación intercultural con la medicina tradicional: manual para el personal de salud. Secretaría de Salud, Mexico.
- Secretaría de Gobernación. Diario Oficial de la Federación. (1999). ACUERDO por el que se determinan las plantas prohibidas o permitidas para tés, infusiones y aceites vegetales comestibles. Mexico.
- Secretaría de Salud. (2009). Guía Metodológica Para La Estructuración De Planes Y Programas De Estudio Para El Diplomado De Herbolaria Para El Fortalecimiento De La Práctica Médica. Mexico.
- Secretaría de Salud. (2020). Medicina Tradicional. Gobierno de Mexico. <https://www.gob.mx/salud/acciones-y-programas/medicina-tradicional> 2021.
- Shareef, H. K., Muhammed, H. J., Hussein, H. M., & Hameed, I. H. (2016). Antibacterial effect of ginger (*Zingiber officinale*) roscoe and bioactive chemical analysis using gas chromatography mass spectrum. *Oriental Journal of Chemistry*, 32, 20–40.
- Srivastava, J.K., Shankar, E., & Gupta, S. (2010). Chamomile: A herbal medicine of the past with a bright future. *Molecular Medicine Reports*, 3, 895–901.
- Sukandar, E. Y., Sigit, J.I., & Adiwibowo, L.F. (2013). Study of kidney repair mechanisms of corn silk (*Zea mays* L. Hair)-binahong (*Anredera cordifolia* (Ten.) Steenis) leaves combination in rat model of kidney failure. *International Journal of Pharmacology*, 9, 12–23.
- UN General Assembly. (2015). Transforming our World: The 2030 Agenda for Sustainable Development. http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E. Accessed octubre 2021 2020.
- UNDP. (2015). Índice de Desarrollo Humano para las entidades federativas, México 2015. Avance continuo, diferencias persistentes. Programa de las Naciones Unidas para el Desarrollo (PNUD México, DF).

- United Nation Statistic Division. (2020). *Ensure healthy lives and promote well-being for all at all ages*. United Nations.
- Urióstegui-Flores, A. (2015). Síndromes de filiación cultural atendidos por médicos tradicionales. *Revista de salud pública*, 17, 277–288.
- Webster, P. (2018). *Language barriers restricting access to health care for Indigenous populations*. Can Med Assoc.
- World Health Organization. WHO. (2013a). Estrategia de la OMS sobre medicina tradicional 2014–2023. OMS Ginebra.
- World Health Organization. WHO. (2013b). Estrategia de la OMS sobre medicina tradicional 2014–2023.
- WWF. (2021). Oaxaca. https://www.wwf.org.mx/que_hacemos/programas/oaxaca/
- World Health Organization. (2020). Supporting indigenous communities during the COVID-19 pandemic. <https://www.who.int/about/accountability/results/who-results-report-2020-mtr/country-story/2020/supporting-indigenous-communities-during-the-covid-19-pandemic>

Breaking the Barriers of Health Problems and Political Dislocations Through Theatre for Development (TfD) Approaches: The Ulunya-Ovoko Example



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Abstract This paper is motivated by Sustainable Development Goal 3: Good Health; and Goal 6: Clean Water and Sanitation. It is driven by a community research visit focused on a Water Sanitation and Health Paradigm (WASH) project carried out in Ulunya-Ovoko community in Igbo-Eze South Local Government Area, Enugu State, Nigeria. The researchers adopted Theatre for Development and Health Humanities methodologies and Albert Bandura's Social learning theory as the theoretical framework. The study explored indigenous practices like masquerading, songs, dances, idioms, storytelling, and oratory to create effective communication models that connected with community members and involved them in changing their narratives. Data was primarily gathered through In-depth Interviews (II) Key Informant Interviews (KII) and Focus Group Discussions (FGDs). Findings revealed that discovered health problems were associated with political conflicts and showed the willingness of community members to become catalysts and strong advocates of positive change through collaborative community effort. The paper recommends interventionist theatre approaches that exploit indigenous performance forms towards finding sustainable solutions to problems associated with achieving the Sustainable Development Goals in local communities like Ulunya-Ovoko.

Keywords Sustainable development goals · Theatre for development · WASH · Health humanities · Indigeneity · Political dislocation

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1 Introduction

The seeming alarming situation of underdevelopment in many communities in Nigeria raises critical questions about the credibility of political office holders that represent them. Lack of good roads, poor water supply, and ineffective health care system has increased mortality rates in Nigeria. Besides from this, poverty, ignorance, and illiteracy are major factors faced by many low-income communities. While skeletal plans are made by the government to ameliorate some difficulties, there still exists a quantum level of insensitivity, corruption, abandonment, and ineptitude towards providing basic amenities for the majority of the masses. In situations where provisions are made to address the plight of the communities, such efforts end up being truncated, diverted, or hijacked by corrupt officials and representatives.

Also, a tussle for power at the grass-root level sometimes brings about dislocation between local communities at the bottom and government at the top. This situation justified the need to address health challenges and barriers affecting some communities in Nigeria using a Theatre for Development project carried out in Ulunya-Ovoko community in Igbo Eze South Local Government Area in Enugu State, Nigeria for illustration. This study operates under the paradigm of Health Humanities. Paul Crawford et al. (2015) note that;

There is a growing need for a new kind of debate at the intersection of the humanities and healthcare, health, and well-being. In the recent past, the field of medical humanities has grown rapidly, but it is timely and appropriate to address the increasing and broadening demand from other professions to become involved, to accommodate new sectors of the healthcare workforce and the public, and to extend ‘appliedness’ concerning how arts and humanities knowledge and practices can inform and transform healthcare, health, and well-being (1).

The need to move health concerns from the spectrum of health workers and health science has become imperative because of the need for behaviour change. Health communication using indigenous language registers like songs, idioms, praise-singing, dancing, chants has now become an accepted means of communicating change in communities through art-based approaches. Crawford et al. (2015) maintain that:

Health Humanities offer a route to impact for the humanities and the subsumed arts. The health humanities movement is a paradigm shift in how arts and humanities can be applied to healthcare, health, and well-being. Already, this movement is spreading across the globe and the tradition of medical humanities is changing in response (156).

In emphasizing the role of theatre in health humanities Alachi (2008) submits that “Healthy living is not just responsibility of doctors and nurses alone, but that of everyone. It is a major concern not only for the medical sciences but also for other fields, especially the theatre arts” (5).

2 The Sustainable Development Goals and Interventionist Theatre

The Sustainable Development Goals were adopted by the United Nations, to close gaps on failures of the Millennium Development Goals, established in 2000 and suspended in 2015. Hak et al. (2016) state that “SDGs in their recent form is a universal set of goals, targets, and indicators that UN member states will use to frame their agendas and policies over the next 15 years.” (566).

The goals, targets, and indicators have not been fully achieved in most Low- and Medium-Income Countries because of political imbalance, government insensitivity, negligence, and sometimes abandonment of local communities. The present study is focused mainly on Sustainable Development Goals 3: Good Health and Wellbeing (Ensure healthy lives and promote well-being for all at all ages; and Goal 6: Clean Water and Sanitation (ensure availability and sustainable management of water and sanitation for all).

The initial baseline research carried out at Ulunya-Ovoko by the research team comprising of Theatre Arts students and Lecturers as well as others from Microbiology from the University of Nigeria, Nsukka, observed lack of toilet facilities, boreholes, and low-level compliance to the Water Sanitation and Hygiene (WASH) paradigm. This was premised on the fact that the team needed to identify a theme that will provide information on needed community intervention through theatre.

The team decided to identify two or three goals for the theatre interventionist project at Ulunya-Ovoko. The community problems gave room for SDG Goals 3 and 6, and the team set to work. Interventionist theatre allows researchers to engage the community in behavioural change and attitudinal reorientation. The strategy enabled a symbiotic relationship between community members and facilitators and helped to engage participants through participatory efforts. The drama skits created were to encourage social and community change and development.

3 Theatre for Development and Social Change

Theatre, through the ages, has remained a dynamic tool for addressing social concerns, engineering social change in society, and a channel for peace and conflict resolution among other functions. Thus, theatre can be viewed as a tool for advocacy, mobilization, and re-orientation. It has remained a potent instrument for community development and one of the tools of emancipation globally. Buttressing this point about the role of theatre, Kidd (2002) states that:

Theatre for Development is a problem-solving performance-oriented process in a specific society. This could be a socio-economic, environmental, and religious problem. It is a means of expression, which is traditionally being used to educate the young, unify the community and articulate the community felt concerns and aspirations of the people (204).

Theatre for Development hereafter referred to as TfD in this paper is a medium for mirroring the society to change lives, habits, values, and practices that may be detrimental to the individual and the community at large. TfD offers community members the desired opportunity to take part (participation) in an activity (problem-solving) that concerns the community through sensitization and engagement.

It is in this context, that the researchers explored how theatre could be used as a tool for mobilization and sensitization with specific reference to a collaborative project carried out at Ulunya-Ovoko targeted at breaking the barriers of health challenges and leadership crisis through TfD.

Erojikwe et al (2014) note, “The high prevalence of various health challenges and sicknesses has contributed to high mortality rates among women and children in Nigeria. Among the causes of this situation are ignorance, illiteracy, and lack of access to good health facilities especially among rural dwellers” (1).

The need to examine the oscillating power of drama in health communication, advocacy, and promotion is highly imperative for addressing various health challenges visible in many Nigerian communities. The interventionist approach that drama adopts not only inculcates behavioural change but would also progressively bring a permanent solution to many health problems in Nigeria. As Hodgeon (1972) points out:

Through appropriate images, drama calls forth the invisible creatures of the imaginative world of the text into visible expression. The human body reacts to the mental images which remain in the minds of the audience, quietly adjusting and transforming their hosts into themselves. The power of the theatre to change society is to implant images in the consciousness of the audience which represents society (6).

The various roles of drama in communicating health is not just to advocate for change, but to discuss change, re-strategize, and engage in different issues of societal development.

4 Theatre for Development Methodology

Drama serves as a catalyst and a propellant in health communication and development. The functions of theatre in a given society are limitless. Epskamp (2006) defines Theatre for Development as “...Application of performing art as a ‘weapon’ used strongly and explicitly to oppose political and social oppression” (11).

Historically, this theatrical format evolved out of the need to move theatre from the confines of the auditorium to the people, therefore creating a liberated space where the spectators become ‘spect-actors.’ Epskamp submits that;

...influenced by Paulo Freire’s critical pedagogies, (Augusto) Boal developed a didactics of progressive theatre technique, experimenting with the use of theatre as a rehearsal of social intervention. He viewed theatre as a laboratory and platform for conscientization, awareness-raising, and problem study. In elaborating his first book *Theatre of the Oppressed*, Boal combined the didactics developed by Friere and theatre skills and techniques developed by Brecht. As a result, he developed a wide range of dramatic strategies and games (12).

The researchers are of the view that the efforts at community development through Theatre for Development have been rewarding in many countries. But there is still much to be done because a lot of communities in Nigeria are still cut off or underserved. This justified the project in the focus community.

5 The Ulunya-Ovoko TfD Research Project

Research Question

How can TfD be utilized as an effective action and participatory research tool in reducing water and sanitation hygiene issues in a local community in South-East Nigeria?

Key Objectives

- Investigate the health challenges faced by a selected community in South-East Nigeria using purposively selected Health Humanities and TfD research methods: Community Dialogues, Interviews, and Surveys and through these.
- Test/utilize the indigenous performance forms as behavioural change action tools using TfD as a paradigm.
- Interrogate the immediate and remote causes of prevalent health problems associated with W.A.S.H within the selected community.

Before the visit to Ulunya-Ovoko, the team of four lecturers and forty-four students, met and out of the six local governments areas in Nsukka senatorial zone, Igbo Eze South was chosen, and Ulunya-Ovoko was identified as the particular community that will be visited. The decision was premised on the high rate of health-related challenges and decay in infrastructural development prevalent in the community. Ethical approval was given by the University and the community to carry out the project.

The project followed the eight methodological steps recommended for TfD projects: Preliminary Visit, Data Collation, Data Analysis, Scenario Creation, Rehearsal, Last Rehearsals (production), Post Performance Evaluation, and Monitoring and Evaluation. These steps were followed to achieve the desired results in the TfD project. Six members of the team were selected for the preliminary visit.

Preliminary Visit

This is the rapport-building and mobilization stage (initial contact with the community). The first part was a visit to the *Igwe* (traditional ruler of Ulunya-Ovoko), with an intermediary and gifts in form of native kola nuts and native drink as culture required. The core researchers introduced themselves and intimated The *Igwe* about their proposed visit. He accepted the 'gifts' presented and told the team to return in a fortnight. This was to enable him to get his council and other stakeholders involved since he could not take decisions alone. As agreed, the team returned and informed the council and stakeholders of the proposed TfD project.

For security and ethical reasons, every issue concerning the project was explained in detail. For example, the number of people coming, the purpose of visit, duration of visit, nature of the visit, and scope of the visit. The *Igwe* and members of his council, as well as other stakeholders, welcomed the idea as a noble one. They were elated that the community was chosen for such a project. Besides, the team also informed them that the University had written to the Local Government Chairman of Igbo-Eze South, to inform him about the proposed visit. The council deliberated and gave due approval to the team. It also told the team about the norms and value system of the community. This is very necessary given the premium value accorded to sacred icons and communal cultural heritage. A list of sacred and culturally forbidden places was enumerated and the researchers were subtly warned to conform and avoid problems that may arise from the desecration of sacred objects and spaces. The community representatives wished the team well and pledged total cooperation.

As explained elsewhere, the team comprising four lecturers and forty-four students, arrived Ulunya-Ovoko from the University of Nigeria, Nsukka on the 3rd of July 2021. The team set up the orchestra and with intensive drumming and dancing, announced its arrival. The community members presented gift items, like fruits and food, and also joined in the dancing and singing. With this, the initial contact, familiarization, and conversations started. The proper cordial atmosphere for the project was thus established.

Data Collation

The research facilitators were mobilized into different parts of the community to gather first-hand data about the health challenges faced by the people. The essence of this was to gain trust and confidence and to get the people to feel free and open up on issues bothering them. This process lasted for four days. The students used various approaches to obtain information from the indigenes. Some of these approaches were Focus Group Discussions, In-depth Interviews, and Key Informant Interviews.

The process provided the team with information on the political problems caused by serious leadership tussles in the community. Before the arrival of the TfD team, the *Igwe* and the community were not on good terms. Therefore, the health challenges faced by the community were often relegated amid political squabbles. The diseases which were largely caused by lack of water and poor sanitation prevailed because the leadership problems did not permit communal effort necessary for tackling them.

In addition, the level of knowledge about water sanitation and hygiene was low in the community due to ignorance and illiteracy because health educators usually avoided the community owing to its notorious political conflicts, whereas the few community members with some background knowledge about basic hygiene were undermined by lack of primary health facilities and poverty. These reasons coupled with nonchalance encouraged open defecation and a poor attitude to water management. The high cost of clean water and prevalent wrong diagnosis from quacks made most community members unaware of the health implications of poor hygiene and unclean water.

The team conducted twenty In-depth Interviews, five Focus Group Discussions, and ten Key Informant Interviews to ascertain the basic health problems of the

community. The interviews and discussions unanimously revealed the existence of a political tussle in the community. A participant told the research team that ‘the leadership of the community has refused to listen to cries and aspirations of the people. I am not sure that you will succeed.’ (Male, 26) Another participant explained thus ‘the problem of this community is beyond you and us, we have no *Igwe*, we cannot acknowledge him as *Igwe* until he does the right thing’ (Female 50).

An elderly participant who granted a more detailed interview stated the genesis of the political problem. According to him, ‘Our *Igwe* started well and our community was progressing. But all of a sudden, he stopped listening to people and advice’. Go to other places and ask questions. Go to the churches. They are closer to the people than the *Igwe*’ (Male, 84).

The team’s visit to the churches provided an opportunity to interact with the faith-based organizations in the community. The priests provided more detailed information on the situation. Their popular narrative summarised that a borehole installed by the *Igwe* to serve the community was stolen by people believed to be his relatives or associates. The *Igwe* was believed to have avoided taking action on the matter to protect his selfish interest. This caused dissatisfaction among community members, as their demand for justice was disregarded by the *Igwe* (Fig. 1).

This next step was the interactive session between the research team (facilitators) and community members. It was used as a survey to find out the most pertinent problems which required immediate intervention. It is most imperative that community members were involved in the project because they are the ones facing the challenges. If not, they might become passive members in the change process. Tfd tools like **pairwise ranking**—where participants begin to prioritize their problems collectively, allowed the community members to select the greatest problem confronting the community.

Fig. 1 A focus group discussion



Data Analysis

The analysis of data revealed that the political tussle, water, sanitation and health issues were interconnected. A facilitator argued that our focus was on health, therefore, the research team should not be dragged into village politics. But a community member pointed out that the foundation of their health problems was the political dislocation which resulted in the abandonment of the community by the government. This connection was considered valid as it has been observed over time that poor or no leadership at the grass-roots level, encourages government insensitivity. Thus, the leadership tussle was also adopted as one of the challenges to be tackled. This adoption was considered to be justified because the data collected from the field should provide materials for scenario creation as a core aspect of the TFD (scenario creation) process.

Scenario Creation

After the collation and analysis of data, the researchers began to form a storyline for the required theatre performance. The first scenario captured the tussle between the traditional ruler and the community and the need for peace, unity, and mutual respect in the community. The second scenario was built on inadequate or lack of water supply to the community as a result of ineptitude by the government. The third scenario portrayed the installation of a borehole in the community, while the next one revealed a setback in the community depicted in form of the mysterious disappearance of some equipment installed to aid the water supply. The next scenario was about sanitation and the consequences of not observing proper toilet hygiene.

Rehearsals

The team started rehearsals (practicing) after selecting the participants (members of the casts and crew) who were largely community members and some of the research team members. The rehearsal time and venue were always conveniently adjusted so that the team and community members could work together. This was to facilitate the cooperation process because if the Tfd work is not properly balanced with the community members being part of it, the impact of the project would be truncated (Fig. 2).

Fig. 2 Rehearsals



Production/Performance and Post Production: This was the last rehearsal or the climax step of the Tfd project. The community, including the *Igwe* and visitors from the University of Nigeria (Resource persons), were in attendance.

The team was able to create exciting and engaging improvised performances. This was done using dance and drama incorporating local idioms, proverbs, chants, and adopting indigenous performance media like masquerades and griots who exploited their traditional roles as cultural gatekeepers, arbiters, and ethical umpires to connect with the people on the themes of the drama. The Scenario creation resulted in improvised drama skits revolving around the identified health challenges and the catalysing political problems identified during the field research.

With the arrival of the traditional ruler of the community, the performance (production) started with a rendition of songs. The first song talked about the community. It was a song aimed at extolling the essence of the community's existence and the need for peace, unity conflict resolution, and management. The song started on a slow tempo and gradually raised salient concerns that the community was struggling to contain. It is pertinent to assert that when music is utilized appropriately, it often accomplishes the desired essence. Confirming this assertion, Crawford et al. (2015) acknowledge that "Across the life span, and society, music can express, educate about, and generate discourse about health in numerous ways. As an expression, it can convey the experience of struggle with health issues..." (94) In community theatre, music is vital because much information about the drama is often embedded in it. When music is applied appropriately and songs that the community members can identify with are rephrased to carry the project's message, oftentimes, youths, children and women recall the songs long after the performance and this helps to serve as a reminder to the community.

Next was the masquerade performance which was moderated with fast-paced singing and dancing from members of the orchestra. At this point, more members of the community started gathering, as many of them were curious about what exactly was going on. They were attracted by the varied songs and instruments from the orchestra. A sole performer entered next to usher in a mime which portrayed men and women (of a certain age grade) calling the attention of the villagers to the need for unity to encourage communal effort. They were all bearing empty water gallons and buckets, suggesting the scarcity of clean water (for bathing or drinking) in the community. This depiction was done in full view of the traditional ruler and other community members. A narrator entered to interpret the mime just depicted. This was done in the dialect of the community. In the next scene, there was a depiction of the installation of boreholes and taps and the villagers were excited, they join the facilitators in depicting this scene. The narrator went on to suggest that the installation of the taps was not liked by some people who not long after installation, reportedly carted away the facilities. There was sadness in the village because the next time people arrived at the taps to fetch water, there was no water supply so they resorted to unclean water sources.

The next scene showed a man who is visibly unwell and is visited by a friend. As the man described his symptoms the storyteller engaged the villagers about the

possible cause of the man's ill health. They all unanimously suggested that it was a result of consuming bad water.

In the next scene a community member is eating and suddenly has the urge to defecate. He covers his food, uses the toilet, washes his hands and continues eating without any problems afterward. Another person is shown who carelessly keeps his food and goes to use the same toilet without covering his food. The narrator called his attention to the open dish but he boasted that he was strong and that nothing could happen to him. After using the toilet, he does not wash his hands and proceeds to eat. Next time, he is seen to be suffering from an upset stomach and making frequent trips to the toilet. The narrator informed him that if he had only washed his hands and covered his food, he would not be having an upset stomach. The next scene depicted multiple users of the same toilet who do not care about cleaning up after themselves resulting in every one of them becoming infected.

In the following scenes, the narrator linked the myriad of health challenges in the community to the political problems which have not allowed communal efforts necessary for managing sanitation and hygiene in the community.

The music and singing from the orchestra rose in tempo to depict fighting and commotion among the people. This happened before the *Igwe* who was directly involved in the tussle. The overwhelmed *Igwe*, on the narrator's prompt, stood and beckoned to other villagers who join him in a dance of mutual forgiveness in a convivial spirit.

From primordial times to the present, dance has remained an integral part of the performance. The effect of dance can be relaxing and therapeutic. In community theatre, dance serves a wider role. It complements the dramatic action and enhances communication.

As a sign of goodwill, after the enthralling performances, the *Igwe* apologised for his shortcomings and presented a vote of thanks to the research team, on behalf of his community. The researchers thereafter initiated an interactive session to enable the community members to express their perception and understanding of the project as captured through the improvised drama. The people were marvelled at how the challenges confronting them were identified and possible solutions to them proffered. Based on the outcome of the meeting, some recommendations were made to sustain the project through monitoring and evaluation.

Monitoring and Evaluation

An M&E visit to the focus community five months later, on the 3rd of December 2021 showed a satisfactory improvement in the WASH practices and primary health care management. According to a participant involved in the concluded Tfd project, there was great progress in the provision of social amenities as against what used to be the norm following the amended relationship between the *Igwe* and community members. He added that the villagers were excitedly expecting the government to provide infrastructural facilities to the community as some government officials had arrived in the community and taken pictures of the various decayed infrastructural amenities in the community (Male, 40).

A random respondent testified to a “reduction in sicknesses like diarrhoea and typhoid because of improved lifestyles” (Female 40) Also, another respondent believed that “There is a steady supply of water and many people have changed their toilets and are embracing good personal hygiene” (Female 25). On his part, the *Igwe* who declared that “plans towards having a good toilet are being made and personal hygiene is better”, pleaded that projects like the one completed by the researchers in his community be extended to other parts of the Local Government Area with similar development challenges.

Evidence from the field clearly showed a significant impact on the one hand but the failure of collective sustainable development on the other. The team discovered that the committee established to sustain the impact of the concluded TfD project was dormant. Village members who understood and participated in the community theatre project were achieving the desired results more than those who were not part of the event. Knowledge sharing was therefore identified as a factor undermining collective community growth. Revisiting Ulunya-Ovoko to activate an effective community theatre committee is therefore imperative if collective and sustainable development is to be achieved.

6 Conclusion

Community engagement through TfD seems to be a herculean task but with appropriate participatory theatre techniques, it is expected that communities with appropriate guidance, will respond and take control of their challenges. Thus, they will no longer have to wait indefinitely for government intervention as the sole solution to their problems.

Fighting the tides of ignorance and illiteracy motivated the facilitators to adopt methods that did not position them as pontificators thereby undermining their efforts. Rather they adopted an approach that made the people receive them, become their friends, offer them gifts, teach them indigenous songs, dances, dialects and participate actively in the project. The kingship tussle which orchestrated political dislocation between the people and the government gave the facilitators room to investigate more before embarking on the TfD project. The climax and highpoint were observed when the *Igwe* apologized and promised to run a more inclusive government. The excitement among the community members was heightened when he danced with joy among his people amidst ovations and ululations. Thus, from the target of solving health issues, this project also assisted in conflict resolution and management and breaking the barriers of political dislocation as evidenced from the report from the follow Up/Monitoring and Evaluation team.

In light of the above, the researchers are of the view that TfD when harnessed properly is capable of leading to a communal effort. It is therefore the people’s theatre.

The limitation of the project was largely institutional. Owing to the unavailability of funds, the researchers were incapable of effectively coordinating the Monitoring

and Evaluation (M & E) component of the project, which is key to sustainability. For instance, the M&E visit carried out five months after the project performance should have come with adequate liaison with the committee earlier established at the community for that purpose. The delay was arguably responsible for the dormancy of the committee. The facilitators and key researchers understand that the part to sustainable development is not a one-way track road, they admit to the limitations and shortcomings of the project and this research, but they also understand that there is always room for improvement.

Recommendations

- The interventionist approaches of Tfd are suitable for health communication in local communities as evidenced in the Ulunya-Ovoko project. The researchers recommend the approaches for attaining other Sustainable Development Goals.
- Follow-up visits especially in the areas of health care and basic hygiene need to be sustained. There is a need for Tfd practitioners to continually partner with community-based organizations, stakeholders, and health care providers to meet the demands of Sustainable Development Goals.
- The study further recommends that social issues, communal conflicts, and leadership crises can be addressed using Tfd approaches adapted to explore indigenous dispute management forms
- The paper recommends further experiments with indigenous performance elements (masquerades, music, dance, songs, idioms, proverbs) to establish performance structures rooted in people's original theatrical traditions. This will aid Tfd to connect with target audiences and accelerate sustainable development.

References

- Alachi, J. A. (2008). Introduction. In J. Alachi (Ed.) *Theatre for development in the Benue Valley*. Book Marks Publishing.
- Crawford, P., Brian, B., Charley, B., Victoria, T., & Brian, A. (2015). *Health Humanities*. Palgrave Macmillan.
- Epskamp, K. (2006). *Introduction to theatre for development: An introduction to context, application and training*. Zed Books.
- Erojikwe, I., Nnanna, N., & Aguzie, J. (2014). *Onyekulufa and Atumma: Breaking the barriers of gender discrimination in health-related indigenous performances in Nigeria*. *The Creative Artist: A Journal of Theatre and Media Studies*, 8(1), 83–96.
- Hák, T., Svatava, J., & Moldan, B. (2016). Sustainable development goals: A need for relevant indicators. *Ecological Indicators*, 60, 565–573.
- Hodgeon, J. (1972). *The use of drama*. Eyre Methuen Limited.
- Kidd, R. (2002). Popular theatre and non-formal education. In E. Illah (Ed.) *Theatre Politics and Social Consciousness in Nigeria*. Leadership Production Press.

Towards an Integrated Approach to Climate Change Education in Tanzania: The Role of Indigenous Knowledge Systems



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Abstract There have been many efforts globally toward fighting climate change; including international agreements, conferences, research, policies, forums, etc. In addition to these efforts, climate change education has recently emerged as an essential capacity-building tool to curb the climate crisis. However, development practitioners from the Global South have cited limitations with climate change education due to the dominance of Eurocentric epistemologies over indigenous knowledge (IK) approaches. This study therefore advocates for the integration of indigenous knowledge into climate change education in Tanzania for achieving a sustainable environment. Seventy documents, including peer-reviewed papers, reports from corporate institutions, policy briefs, proceedings and other grey literature were reviewed. We establish that IK systems are not integrated into CCE in Tanzania. However, we find opportunities for integration due to the evidence of the existing CCE efforts and potential complementary indigenous practices. By identifying, documenting, and validating indigenous knowledge and merging this knowledge with scientific insights, the fostering of an integrated approach to combat the enduring effects of climate change can be evidenced.

Keywords Climate change · Climate change education · Indigenous knowledge · Adaptation · Sustainable development goals

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1 Introduction

Climate change refers to the long-term change in the average weather patterns that have come to conceptualize Earth's national, regional and global climates (NASA, 2022). It is a global phenomenon with a prolonged foreseeable challenge to achieving the 2030 sustainable development goals (Apollo & Mbah, 2021). Many studies have shown that the climate crisis adds to the burdens for an already world vulnerable food systems/chain; increasing food insecurity in developing countries (Addaney, 2018; Armatas et al., 2016; Huho, 2015; Kangalawe et al., 2011). Simpson et al. (2021) and Mbah et al. (2021) particularly assert that the African continent is the most at risk to environmental changes, with significant challenges for its largely agricultural-dependent economies. The impacts of the crises are already manifesting in the sectors of crop production, pastoralism, fishing, hunting and gathering, access to water resources etc. (Tanyanyiwa, 2019).

Certainly, the Intergovernmental Panel on Climate Change (IPCC) Special Report on global warming has warned about the seriousness of the challenges faced by the global community in curbing temperature increases and erratic precipitation variations (IPCC, 2018). The United Nations Environmental Program (UNEP, 2019) also asserts that even if the Paris Agreement (COP 21) of Nationally Determined Contributions is met, there is still a higher chance that global temperatures will rise to over 3 °C above pre-industrial levels. As a result of these predictions, Petzold et al., (2020a, 2020b) argue that climate adaptation and climate justice are likely impossible to be attained in the near future. However, there is hope as Henderson et al. (2017) evidence that educating populations on climate change in addition to the current efforts can ensure more inclusive and sustainable mitigation and adaptation efforts. Apollo and Mbah (2021) confirm that such knowledge is a power source for getting information that would influence change in behavior and finding solutions to the pressing global crisis.

Climate change education here refers to the teaching or training on topics related to understanding global environmental change, causes and impacts, and how to mitigate or adapt to it (Henderson et al., 2017; Molthan-hill et al., 2021; UNESCO, 2015). Currently, two sets of knowledge exist in the fight against climate change; modern science and indigenous knowledge. UNESCO (2015) defines indigenous knowledge (IK) as the awareness, knowledge and general understanding advanced by people with a long background of interaction with their natural environment. Mistry (2009) adds that this knowledge is spatial and/or cultural contextual, collective, holistic, and adaptable. Simply put, IK entails the practices by local people, especially the rural poor, in fighting for their livelihood against hindering factors such as climate change by resorting to activities that offset the impacts and secure their survival. As some scholars have argued, scientific or technological mechanisms alone are ineffective tools for climate forecasting (Kugara et al., 2021).

A survey by Afrobarometer found that over 2/3 of the participants are aware of climate change and agree measures should be taken to mitigate it, but only 51% expressed confidence about their ability to make a difference (Simpson et al., 2021).

Hence, this doubt and inability to contribute to the fight against climate change calls for education as an essential element of capacity building among populations. That being the case, East African countries, including Tanzania, are increasingly recognizing climate change education's importance and integrating it into the education curriculum (Apollo & Mbah, 2021; Carr et al., 2015). However, despite the attempt to promote CCE, Saruni (2016) and McCrohan (2017) argue that the current curriculum in Tanzania is still dominated by western imposed scientific thinking. Speranza et al. (2009) also found that the East African climate change education syllabus has no local situation relevance and realities. According to Songkok et al. (2011), this failure to incorporate local people's expertise ignores community involvement and excludes critical local experiences in the process.

This study therefore asserts that integrating indigenous knowledge and scientific knowledge in the fight against climate severity is paramount. As Foss and Ko (2019) and Tanyanyiwa (2019) found, local people and their knowledge, as well as their effective engagement, are inseparable; the locals are naturally rooted primarily at the social-ecological boundaries, such as tropical forests, grassland, coastlines and watersheds, and desert margins. Hence the conservation and application of local knowledge into CCE is essential to allow for multidisciplinary and multi-stakeholder engagement. Such an approach would also promote sustainable learning that produces practical understanding and knowledge suitable for all community situations instead of the overall application of complex scientific aspects.

In this light, this chapter intends to examine the opportunities for integrating indigenous knowledge (IK) into climate change education (CCE) in Tanzania. It will firstly highlight the widespread impacts of climate change in the country. It will also indicate the crucial need for CCE to be more noticeable, especially capacitating marginalized people with the right skills and learning to cope with erratic weather efficiently. Additionally, the study will assess available frameworks, for capacity building including the application of IK in climate change education processes. As Leal and Hemstock (2019) stated, the best approaches and actions for climate change adaptation are not universal. Thus, the decision about the most suitable practices discussed in this study will consider local realities, available knowledge, and resources in Tanzania. Given the aforementioned context, this study hopes to contribute to SDG no. 13 on climate action and its target no. 3 which advocates for awareness raising and building institutional capacity through education to promote climate change mitigation and adaptation.

1.1 Climate Change in Tanzania

The United Republic of Tanzania (URT) is the largest East African country with a land size of approximately 947,303 km², located on the Indian Ocean coastline and borders Kenya and Uganda to the north, Mozambique to the South and Malawi, Zambia, the Democratic Republic of Congo, Burundi and Rwanda to the East. It represents the

13th largest country in the continent by physical size, and second-largest economy in the region, after Kenya (URT, 2012).

The climate conditions in Tanzania vary depending on altitude/distance from sea levels. The temperatures heat from 10 to 20 °C (50 and 68 °F) along the mountains during cool and warm periods, respectively. Other parts of the country have low temperatures from 20 °C (68 °F). November to February (25–31 °C or 77.0–87.8 °F) are the hottest months while May and August (15–20 °C or 59–68 °F) are the coolest periods. Overall, the country's weather condition indicates that the annual temperature is 20 °C (68.0 °F) (Future Climate for Africa Climate, 2017). The country has two main rainy seasons: uni-modal (October–April) and bi-modal (October–December and March–May). Uni-modal appears in south, middle, and western areas. The bimodal type of rainfall is found north of Lake Victoria, extending east to the coast. The bi-modal rainfall results from the seasonal migration of the Inter-tropical Convergence Zone (ICZ) (Future Climate for Africa, 2017).

According to the World Bank (2012), the latest data for Africa indicates that the costs of climate change in the Sub-Saharan Africa region are high, despite the region remaining the lowest contributor to global greenhouse gas emissions. In Tanzania, as in many parts of Sub-Saharan Africa, the poor and rural populations remain highly vulnerable to climate change due to their high livelihood dependence on natural resources which are adversely affected by climate related disasters such as floods and droughts. As a matter of fact, Tanzania has had six major droughts over the past 30 years. The annual precipitation is anticipated to fall in heavy rainfall events and the global sea level is expected to increase by 0.75–1.90 m in 2100 (USAID, 2021). According to the Disaster Risk Reduction Office (UNISDR) Index for Risk Management (INFORM) [1] statistics for 2018, out of 191 countries, Tanzania ranks as the 25th most at-risk country, the 53rd in terms of hazard and exposure, the 32nd in terms of vulnerability and the 40th in terms of lack of coping capacity (Fig. 1).

UNDP (2021) reports that the climate related disasters and other impacts discussed above have drastically impacted Tanzania's economic performance and undermined poverty reduction strategies. Hence to respond to the phenomena, the Tanzanian government has made several efforts to fight climate change effects including the ratification of international treaties, policies and laws, the constitution etc. The government is also increasingly promoting environmental education (CCE) as a tool for mitigation and adaptation (McCrohan, 2017). In addition, there are existing application of indigenous knowledge (IK) to climate change adaptation within rural communities in Tanzania. Thus, both CCE and IK shreds of evidence/existence and the existing gap for their integration provides opportunities for improvement which will be discussed in the next parts of this paper.

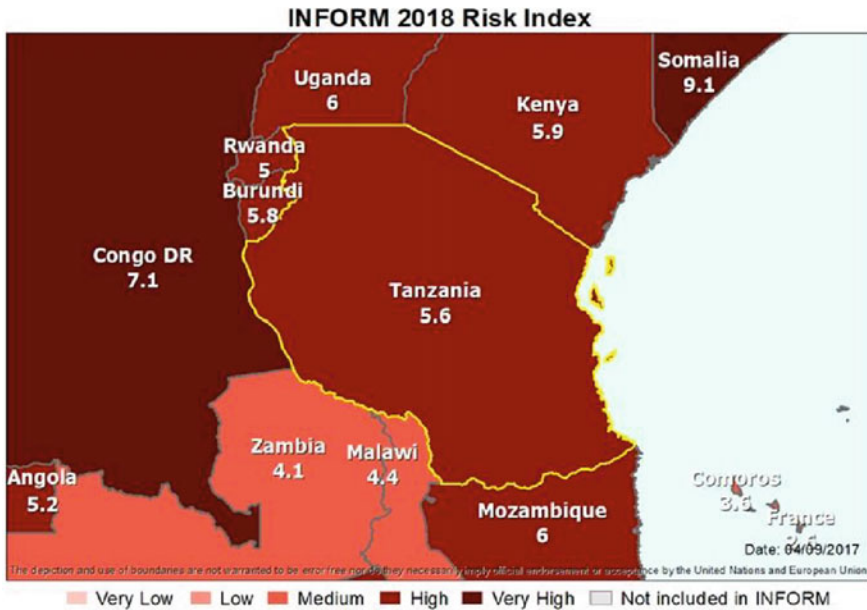


Fig.1 Tanzania climate and risks vulnerability ranking. *Source*, INFORM, 2018 (Retrieved/modified from IRISH AID, 2018)

1.2 Climate Change Education in Tanzania

The Tanzanian Environment Management Council (NEMC) which is the body mandated to manage environmental affairs in Tanzania, defines environmental education as a lifelong process whereby an individual acquires knowledge, develops ethics, and becomes environmentally informed, with relevant skills in identifying, managing, monitoring, evaluating, and solving environmental issues and problems (URT, 2009). Through its ministry of education, Tanzania first introduced environmental education courses and officially incorporated them into the secondary school curriculum as integrated subjects, not stand-alone subjects in the 1990s (Mwendwa, 2017). However, despite the initiative, climate change education efforts in Tanzania have continued to suffer from several setbacks. McCrohan (2017) observes that most schools do not have enough teachers and the available staff are already over-worked with regular class responsibilities, hence CCE teaching is almost impossible. Further, environmental affairs learning have been placed under science teachers, thus limiting collective decisions at education levels. The relegation of environmental concepts and interests to school-based systems alone also excludes the rural poor’s contribution to knowledge production. Bangay and Blum (2010) argue that such learning approaches, which are mostly focused on knowledge dissemination, eliminates contextual analysis and how it interacts with other related matters about society to ensure relevant and applicable education to all populations.

1.3 Indigenous Knowledge (IK) and CCE in Tanzania

Even though considered a new concept in some contexts, IK has long been regarded a key source of knowledge in climate change education in many localities worldwide. Tanzania, along with many countries in developing countries, has a history of indigenous communities and their knowledge applications. For instance, the hunter-gatherers (Tindiga and Hadzabe) and pastoralists (Barabaig and Maasai) have had their indigenous status endorsed by the African Commission on Human and Peoples Rights (ACHPR). This can also be witnessed among communities in Lushoto climate-smart villages where farmers use indigenous knowledge (IK) forecasts to predict weather patterns (CCAFS, 2015) to time their planting seasons and improve food production.

Despite the existence and acceptance of IK in many parts of the world, Mbah et al. (2021) observe that local people are still facing challenges as their knowledge is widely disregarded over modern science. According to the International Work Group for Indigenous Affairs (IWGIA, 2021), removing local peoples from their ancestral lands, mainly promoted by increased land-based investments and enlargement of protected areas also adds as an obstacle to the lack of recognition of indigenous communities and conservation of their knowledge. The report highlights that this can play as a setback towards acceptance of IK and their adoption, which ultimately compromise climate change adaptation struggles. It is likely for some of these reasons that IK is not significantly integrated into Tanzania's education curriculum to date.

1.4 Theoretical Framework

1.4.1 Indigenous Decolonization Theory

Several scholars have developed theories to understand and conceptualize IK, such as Nkhata et al. (2019), Khupe (2020), Manyozo (2018), Absolon (2010) and Knopf (2015). For this chapter, Indigenous decolonization theory will be discussed. The theory describes ongoing debates and processes whose goal is to critique and design new explanations regarding local people's backgrounds plus the impacts of western imperialism, killings, cultural digestion, and exploitative western research (Smith, 1999).

Many scholars have used indigenous decolonization theory as a tool for critical analysis of climate justice in the global south. The aim is to criticize dominant Eurocentric points of view toward an integrated approach that incorporates ideas from developing countries that accommodate indigenous knowledge. For instance, Vermeylen (2019), in environmental justice and epistemic violence, made a critical assessment by highlighting how global South's intellectual heritages, epistemologies, and ontologies should tell the freedom practices with global environmental justice. The author warns that environmental justice will be equipped with epistemic

destruction if the Global North only influences climate change ideas (ibid). Hulme (2011) also criticizes this dominance, asserting that new climate thinking should not be solely based on the monopoly of natural sciences over the reality of human life and future visions. To curb these challenges, Chokor and Odemerho (1994) suggest that modern scientific and community values should be put together, to minimize the hostility and enmity toward traditional and scientific conservation procedures in tropical Africa.

Therefore, the research adopts indigenous decolonization theory as its framework in examining how to integrate IK into CCE in Tanzania. We use the framework to scrutinize indigenous knowledge and practices that can complement conventional impact-led approaches to climate change education for adaptation. Using the theory, we criticize dominant modern and western knowledge that do not consider local contexts and realities to tackle climate change. Indeed, local communities in Tanzania practice different types of adaptation strategies using indigenous knowledge, which has been derived from their daily experiences of living with nature. As the indigenous decolonization theory advocates, we emphasize that such knowledge is vital for the local communities as it is grassroots-based, and it is relevant for their community situations.

2 Methodology

This research adopts an instrumental case study where Tanzania is chosen as the center of the analysis. Tanzania is selected because it is a natural resource-dependent economy that is vulnerable to climate change. Secondly, the country adopted climate change education in its education policy, providing good ground for assessment. Lastly, there is enough evidence of indigenous knowledge innovation and practices, which provides a good foundation for analysis and integration into climate change education. The study also adopted a qualitative approach to examine the subject matter in its natural settings while making sense of the whole. Baxter and Jack (2008) highlight that this research methodology undertakes the exploration through multiple lenses to reveal various facets of the phenomenon. Hence, since this chapter aims to examine the integration of IK into CCE, the qualitative approach fits most as it enables the explanation of different concepts and their interpretation without the need for quantification. Further, using the qualitative method ensured that the researchers were not limited to their predetermined hypotheses, thus allowing new insights to be gained.

2.1 Data Sources—Secondary Sources

The case study adopted a combination of peer-reviewed outputs (see Table 1) such as journal articles, book chapters, and grey literature such as policies and corporate

Table 1 Documents used for review

S/N	Type of document	Content	Number of documents
1	Journal articles	Climate change, climate change education, indigenous knowledge	27
2	Reports	Climate change, climate change adaptation, indigenous knowledge, climate change education	21
3	Book Chapters	Climate change, indigenous knowledge	3
4	Books	Climate change adaptation, climate change education	2
5	Conference proceedings	Climate change adaptation	3
6	Policy documents	Climate change adaptation, Education Policy	4
7	Policy briefs	Climate change education and indigenous knowledge	1
8	Web search	Climate change education	1

reports to review the existing knowledge on related topics. All sources of data were found through Google search. Search terms employed were “indigenous knowledge”, “local knowledge”, “traditional knowledge”, “climate change adaptation”, “climate change education”, and “indigenous theory”. A total of seventy documents were reviewed in this research.

2.2 Data Analysis—Contextual Analysis

Qualitative analysis was performed by identifying key themes in the publications related to the research subject and using thematic codes to categorize them. This required reading all the articles first to discover relevant themes and create coding categories (Vaismoradi et al., 2015). Then all the papers were reread, with applicable codes assigned to sections of the texts. The research themes were then assessed by evaluating the coded text together with the qualitative analysis.

2.3 Limitations

The findings or results captured in this chapter are not without limitations because most of the published studies on IK-based climate change adaptation are from Tanzania—hence not generalisable. Thus, the existing literature may not be a sufficient representation of the developing world. Also, the study did not include primary

data. A cross-tabulation of different data (sources) and data collection techniques such as interviews, literature review and observation could have made a difference. Also, it could have been more appropriate if indigenous people were interviewed to capture their views in this research.

3 Results and Discussion

This research found that Tanzania's climate change adaptation policies mainly focus on issues of livelihoods, energy, forests, agriculture and food security, disaster, transport sector amongst others, as Apollo and Mbah (2021) had earlier suggested. Very few of the strategies mentioned climate change education as an essential tool to achieve the intended goal. Tanzania Climate Change Strategy (URT, 2013) reports about drought, floods, and other natural disasters in Manyara, Arusha, Dodoma, and Lindi that hindered children's access to school. All these events should be taken as a catalyst and opportunity for climate change education. While the education policy of the 1990s considered climate change as a critical aspect to be incorporated into the curriculum, learning has been mainly focused in higher education system that is characterised by western scientific knowledge.

Moreover, the application of CCE in Tanzania has several setbacks; firstly, there are not enough environmental science experts or teachers, and the few do not have adequate resources and skills to teach the subject. For instance, Kira and Kafanabo (2016) revealed that Tanzanian secondary teacher's awareness of climate change education is overlapping. Mtaita's (2007) also shows that some Tanzanian teachers cannot address classroom climate education. The studies therefore indicate that even people legitimized to provide such knowledge are not knowledgeable enough as this area has received minimal attention. Secondly, in most cases, environmental change is applied mostly as a topic in subjects such as science or geography. Even at the university level, environmental science is taught as a module, as is the case at the University of Dar es Salaam (UDSM) which is considered as the most prestigious university in the country. Lastly, climate change concept is taught as a theory that lacks practical coherence to promote behavioral change.

Additionally, the content cover under climate change education also pose major challenges. Current research confirms that anthropogenic factors are dominant in causing climate change and this is a very important aspect to teach students. However, Kira and Kafanabo's (2016) research indicates that teachers only focused on teaching students about the natural causes of climate change such as volcanic eruptions. According to the authors, such content and in some instances teaching approaches, eliminate the ability of students to perceive how their actions can contribute to the crises and thereby influencing positive behavior change that is critical for climate change mitigation and adaption. Hence, due to the challenges discussed above, Carr et al. (2015) confirm that students in Tanzania still have limited knowledge of climate change.

This research also established that western epistemologies still dominate research conducted on CCE in Tanzania. For instance, Carr et al. (2015) used a sample size of students in secondary schools affiliated with Dar es Salaam University of College Education (DUCE) to assess their understanding of climate change taught in their classes. Students were supposed to agree or disagree on questions such as (i) climate change is mostly something that happens naturally, (ii) Europe and America are causing most climate change, (iii) Humans have a significant effect on climate change, etc. This research was urban-based, and most of the questions asked to students were based on what they learned in class and not what was happening in the community. No single question was asked regarding the importance of indigenous knowledge.

While the International Union for Conservation of Nature (IUCN, 2016) initiatives encourage the interface of academia, pastoralism, and policy, Tanzania's vital local knowledge has largely been ignored in the academic and scientific arena (Roba & Oba, 2009; Saruni, 2016). This study found that awareness and application of IK in Tanzania is also not documented despite the existence of indigenous knowledge witnessed in practice among communities. Consequently, while Tanzania's Education Policy recognize the importance of CCE, it remains silent about indigenous knowledge. The National Action Plan for Adaptation (NAPA) by contrast, has documented the importance of indigenous knowledge but not its integration into climate change education. The lack of acknowledgment in the policies therefore means that there is no official document about IK's integration in climate change education. Selemani (2020) cites this lack of acquiring and engaging local skills for preservation as scientific prejudice.

A prospect for integrating IK into CCE in Tanzania was evidenced in a research by CCAFS (2015). The purpose was to compare local people's interpretation of weather changes with scientific weather data provided by the meteorological office. This research was compared with the seasonal March–April–May (MAM) forecasts in 2012 from indigenous insights and Tanzania Meteorological Agency (TMA), with both approaches predicting a regular rainy season. Historical rainfall data were combined with data collected through household surveys, focus group discussions, and key informant interviews. However, the indigenous forecasts were more reliable in the long rainy MAM season than in the short rainy October–November–December season. This indicates the importance of indigenous knowledge documentation.

An analysis reveals enough evidence of indigenous knowledge-based practices in the country. For instance, Kangelawe et al. (2011) found that communities in the Great Ruaha River near the river basin and those in Shinyanga Region cultivated in the wetlands to respond to drought using their understanding of the environment. Other studies by Silas and Jacob (2012) and Lema and Majule (2009) also observed that local communities in Rufiji River Basin and Singida region were growing drought-resistant crops to cope with drought conditions respectively. Additionally, Mkomazi sub-catchment local communities grew crops that could survive dry spells, such as maize and paddy (Ndaki, 2014) to offset the impacts of climate change.

The use of IK above differed from one community to another depending on the contextual challenge a particular society faced. For instance, others were based on early warning needs, others on fighting drought, and others on increased productivity.

The indigenous knowledge mentioned is considered a baseline study of the current Climate-Smart Agriculture (CSA) approach among local people. CSA is a holistic approach that aims at improving the agricultural sector by increasing productivity, and building resilience through adaptation and mitigation by reducing the emission of greenhouse gases using applied local knowledge.

Indigenous communities should not be excluded from climate change education discussions as this can have adverse consequences. In Arusha, Manyara, Kilimanjaro, and Mara, for example, the loss of the rangelands' ecosystem is contributed by abandoning the role of local people. On the contrary, indigenous peoples demand more financial support as a critical priority element to improve their adaptive strategies to climate change impacts. Achieving resilience to CC should not just concentrate on new activities but consider existing livelihood adaptation practices through knowledge empowerment and skills sharing in a holistic manner (Addaney, 2018).

The results reveal that there is no platform for exchanging knowledge, skills, and ideas in promoting the visibility, recognition, and utilization of indigenous climate change knowledge by the climate change community, i.e. researchers and indigenous people. The current understanding of climate change impacts is broadly generalized and coarse-grained and falls short of detecting impacts on local social-ecological systems in Tanzania. The insights also captured here also indicate local communities' invaluable insights to strengthen climate change knowledge and validate evidence given by climate models. Table 2 summarizes the results of this research.

4 Conclusion

This research employed an instrumental case study using Tanzania to examine the integration of indigenous knowledge into climate change education. We started by exploring background information about Tanzania, climate change, climate change education, and indigenous knowledge. We also defined critical key terms. We used an overview of previously published works on climate change, climate change education, and indigenous knowledge.

Key findings: we found that the education system of Tanzania has not institutionalized IK as an essential aspect of the curriculum to promote adaptation or mitigation strategies toward climate change despite existing practices by local people. Moreover, there is CCE and indigenous policies in Tanzania. The existing CCE is widely dominated by Eurocentric views through modern science.

Therefore, in integrating IK into CCE, this study proposes a modified framework by Hiwasaki et al. (2014). The framework entails a process of integrating indigenous knowledge into modern science by building the capacity (training) of local scientists (selected) through the participation of the whole community. The trained personnel are engaged in collecting data using local knowledge. The data collected are linked with scientific data. Finally, harmonized data are adopted and ready for utilization in climate change adaptation. The integration can be achieved through identifying,

Table 2 Summary of the results

S/N	Results	Observation	Comment
1	Presence and existence of IK systems	Communities are aware of the CC and act to offset its impacts on their livelihood	They use non-formal informed measures mainly social adaptation
2	Social adaptation is predominant than institutional and structural adaptation among indigenous people	Institutional and structural adaptation is not very common	Social adaptation is easily implemented and cheaper
3	Cultivation in wetlands among communities in semi-arid areas	Adopted by communities to offset the drought trade-off	Indigenous communities are aware of their environment and the demand for the crops hence opt to cultivate in wetlands
4	Planting of drought resistance crops	Communities adapt to climate change by opting to plant drought-resistant crops	This kind of knowledge is provided in climate-smart agriculture, a paradigm advocated by western adaptation techniques
5	Adaptation techniques by indigenous not documented	The social adaptation although cross-cut to modern adaptation approaches is not documented in Tanzania	The practices are considered local
6	Policies are silent	National Action Plan for Adaptation (NAPA, 2007), Education Policy	NAPA adopted by Tanzania through UNEP does not contain any vocabulary of IK application, with respect to coping with CC. Tanzania Education Policy acknowledges climate change education but is silent on indigenous knowledge and its integration into CCE
7	Teaching climate change education in schools	The curriculum consider CCE but Teachers' knowledge is limited	There is a lack of capacity building on teaching CCE in Tanzania
8	CCE curriculum	The curriculum is focused on modern/conventional science or western-oriented	The curriculum focuses on structural adaptation and ignores the role of indigenous knowledge and their social set-up

(continued)

Table 2 (continued)

S/N	Results	Observation	Comment
9	CCE and IK	CCE is institutionalized but IK is not considered at institutional level	The two concepts are treated differently. The Policy of CCE does not indicate the integration or importance of indigenous knowledge integration into the curriculum
10	Lack of policy coherent	Policies on adaptation in Tanzania are sector-specific focusing on energy, agriculture, food security, etc	Lack of horizontal coherence limits cross-cutting consideration to adaptation which limits indigenous consideration
11	Lack of CCE/IK research in Tanzania	All reviewed documents reveal no single research in integrating indigenous knowledge into CCE in Tanzania	The policy community does not have enough information about linking the two. Both exist but separately
12	Opportunities for integration	Presence of both CCE and indigenous initiatives in the country	The need for a framework that includes multi-stakeholders

documenting, and validating local and indigenous knowledge and integrating this knowledge with science.

There are five major phases in the process namely; *preparation* (preparing researchers at the indigenous level/apprenticeship), *data gathering* (IK recorded), *analysis and validation* (giving meaning to observations and confirming the expected impact actually took place), *science integration* (local and indigenous knowledge with a scientific explanation is combined with empirical data from the field), and *popularization and utilization of local and indigenous knowledge* (promoted through information, education and communications (IEC) materials to be used by communities). The process is community-led, with initial support from outside resource organizations such as the government, research agencies, or development organizations. The community is provided with an orientation and training to identify, document, assess, and validate their knowledge. By undertaking this process, communities can categorize local and indigenous knowledge and choose which knowledge to integrate with science (Hiwasaki et al., 2014), as indicated in Fig. 2.

The process can be supported by existing opportunities for CCE education as proposed by Apollo and Mbah (2021), such as overwhelming support from educators, the government's commitment, the presence of indigenous knowledge systems, and the role of international organizations working in the environmental protection field in Tanzania.

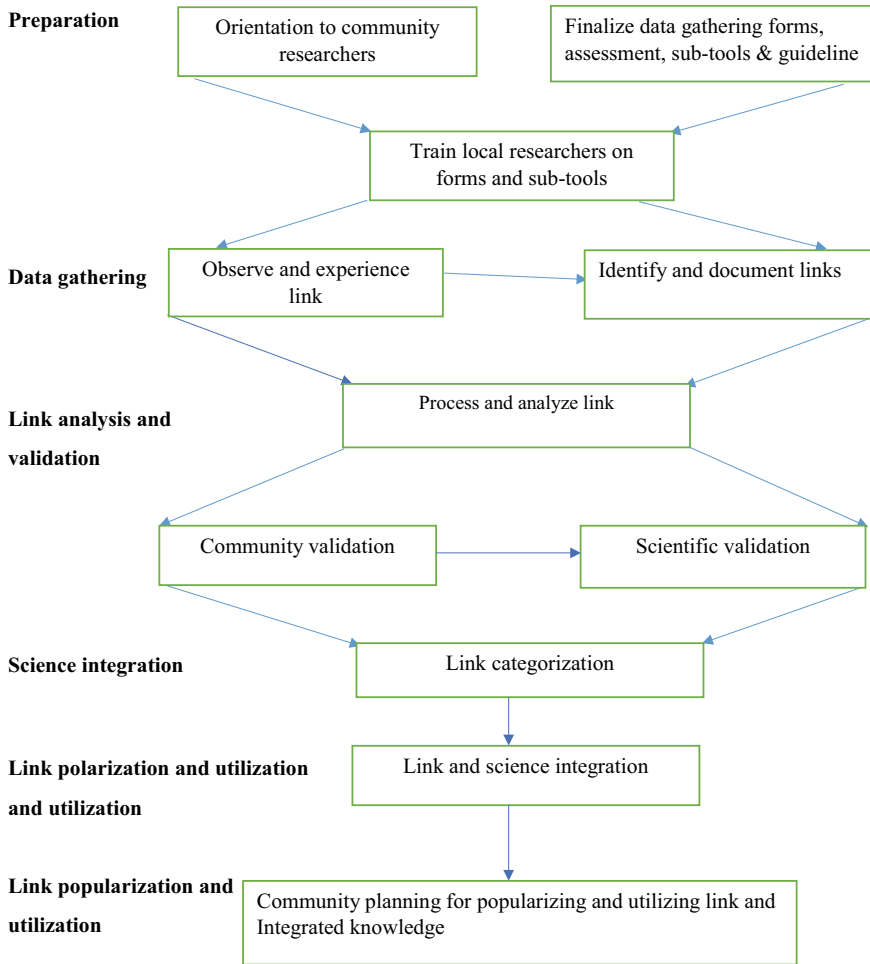


Fig. 2 A process to integrate local and indigenous knowledge with science. (Source, modified from Hwasaki et al. 2014)

5 Recommendations

- The study established that there is paucity of research on the integration of IK into CCE in Tanzania. Thus, this demands a need for more research to advocate for a holistic and inclusive climate change education system.
- The study reveals few experts on CCE and indigenous knowledge in the country. The government, research institutions, and donors should collaborate to build capacity by training climate change education and indigenous knowledge professionals lacking in Tanzania.

- The question of how local knowledge gets involved in formal education is evident. Mbah et al. (2021) suggested that indigenous knowledge of weather forecasting be integrated into geography and meteorology, cropping, pest and disease management in medicine and other health studies, and structural adaptation in engineering and other technological fields. This could also be applicable in Tanzania.
- This study indicates that social adaptation to climate change is more predominant than structural and institutional adaptation among populations in Tanzania. Therefore, communities need support from the government and other organizations to develop their capacity to adapt structurally and institutionally. This is also evidenced in many indigenous adaptation types of research (Egeru, 2012; Petzold, 2020; Reshel, 2021; Theodory, 2021; Walshe et al., 2016).
- Tanzania should formulate a comprehensive policy of CCE and IK systems and elaborate explicitly on how the two aspects can be integrated. The presence of policy will enhance more radical changes in understanding and valuing indigenous knowledge and how it can be enhanced to improve resilience among vulnerable people.

References

- Absolon, K. (2010). Indigenous wholistic theory: A knowledge set for practice. *First Peoples Child & Family Review*, 5(2), 74–87. <https://doi.org/10.7202/1068933ar>
- Addaney, M. (2018). Climate change adaptation law and policy in the African Union: Creating legal pathways for adaptation. In *Proceedings of the 5th International Climate Change Adaptation Conference*, Cape Town, South Africa, pp. 18–21.
- Apollo, A., Mbah, M. F. (2021). Challenges and opportunities for climate change education (CCE) in East Africa: A critical review. *Climate*, 9(6), 93.
- Armatas, C. A., Venn, T. J., McBride, B. B., Watson, A. E., & Carver, S. J. (2016). Opportunities to utilize traditional phenological knowledge to support adaptive management of social-ecological systems vulnerable to changes in climate and fire regimes. *Ecological Society*, 21(1), 16.
- Bangay, C., & Blum, N. (2010). Education responses to climate change and quality: Two parts of the same agenda? *International Journal of Education and Development*, 30, 359–368.
- Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, 13, 544–559.
- Carr, P., Buggy, C. J., & McGlynn, G. (2015). *Climate change awareness amongst secondary level students in a Dar es Salaam University College of Education (DUCE) affiliated school in urban Tanzania*. United Nations Sustainable Development Network 3rd Annual International Conference on Sustainable Development Practice, Columbia University, New York, USA (pp. 23–24).
- Chokor, B., & Odemerho, F. (1994). Land degradation assessment by small-scale traditional African farmers and implications for sustainable conservation management. *Geoforum*, 25, 145–154.
- Egeru, A. (2012). Role of indigenous knowledge in climate change adaptation: A case study of the Teso Sub-Region, Eastern Uganda. *Indian Journal of Traditional Knowledge*, 11, 217–224.
- Foss, A. W., & Ko, Y. (2019). Barriers and opportunities for climate change education: The case of Dal-las-FortWorth in Texas. *Journal of Environmental Education*, 50, 145–159.
- Future Climate for Africa0 (2017). *Future Climate Projections for Tanzania*. Future Climate for Africa.

- Henderson, J., Long, D., Berger, P., Russell, C., & Drewes, A. (2017). A. Expanding the foundation: Climate change and opportunities for educational research. *Educational Studies*, 53, 412–425.
- Hiwasaki, L., Luna, E., & Syamsidik, R. S. (2014). Process for integrating local and indigenous knowledge with science for hydro-meteorological disaster risk reduction and climate change adaptation in coastal and small island communities. *International Journal of Disaster Risk Reduction*, 10(A). <https://doi.org/10.1016/j.ijdrr.2014.07.007>
- Huho, J. M. (2015). Climate change knowledge gap in education system in Kenya. *International Journal for Innovation Research in Educational Sciences*, 2, 2349–5219.
- Hulme, M. (2011). Reducing the future to climate: A story of climate determinism and reductionism. *Osiris*, 26(1), 245–266.
- INFORM. (2018). INFORM global risk index results 2018. Accessed January 25, 2022 from <https://reliefweb.int/sites/reliefweb.int/files/resources/INFORM%20Annual%20Report%202018%20Web%20Spreads.pdf>
- International Work Group for Indigenous Affairs (IWGIA). (2021). *Climate Change Mitigation Strategies and Eviction of Indigenous Peoples from their ancestral lands: The Case of Tanzania*. Tanzania Indigenous Peoples Policy Brief. Accessed January 7, 2022 from https://www.iwgia.org/images/publications/0731_CC_Mitigation_Strategies_Eviction_of_IPs_.pdf
- IPCC. (2018). Summary for Policymakers Global Warming of 1.5 °C. An IPCC Special Report on the Impacts of Global Warming of 1.5 °C above Pre-industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty, ed V Masson-Delmotte et al. Geneva, Switzerland: World Meteorological Organization.
- IRISH AID. (2018). *Tanzania Country Climate Change Risk Assessment Report*. Irish Aid, Resilience and Economic Inclusion Team, Policy Unit. Irish AID, Ireland.
- IUCN. (2016). Integrating traditional knowledge into red list assessments. In: Workshop paper #9744 presented at the IUCN WCC 2016 on 2 September, Honolulu, Hawai'i.
- Kangalawe, R., Shadrack, M., & Petro, M. (2011). Climate change impacts, local knowledge and coping strategies in the Great Ruaha River Catchment Area, Tanzania. *Natural Resources*, 2, 212–223.
- Kira, E., & Kafanabo, E. (2016). Secondary school teachers' knowledge level of the concepts of environmental education in Morogoro, Tanzania. *Huria: Journal of the Open University of Tanzania*, 26. ISSN: 0856-6739.
- Khupe, C. (2020). Indigenous knowledge systems. In: B. Akpan, T. J. Kennedy (Eds.) *Science education in theory and practice*. Springer Texts in Education. Springer. https://doi.org/10.1007/978-3-030-43620-9_30
- Knopf, K. (2015). The turn toward the indigenous: Knowledge systems and practices in the academy. *Amerikastudien/American Studies*, 60(2/3), 179–200. <http://www.jstor.org/stable/44071904>
- Kugara, S., Tapiwa, A., Kugedera, A. T., Chivhenge, E., Museva, T., & Sakadzo, N. (2021). The role of indigenous knowledge systems (IKS) in climate change in handbook of research on protecting and managing global indigenous knowledge systems (2022). *Igiglobal Publishers*. <https://doi.org/10.4018/978-1-7998-7492-8.ch00>
- Leal Filho, W., & Hemstock, S. (Eds.) (2019). Climate change education: An overview of international trends and the need for action. In *Climate change and the role of education* (pp. 169–187). Springer.
- Lema, A. M., & Majule, A. E. (2009). Impacts of climate change variability and adaptation strategies on agriculture in semi-arid areas of Tanzania: The case of Manyoni District in Singida Region, Tanzania. *Journal of Environmental Science and Technology*, 3(8), 206–218.
- Manyozo, L. (2018). The context is the message: Theory of indigenous knowledge communication systems. *Javnost—the Public*, 25(4), 393–409. <https://doi.org/10.1080/13183222.2018.1463351>

- Mbah, M., Ajaps, S., & Molthan-Hill, P. A. (2021). Systematic review of the deployment of indigenous knowledge systems towards climate change adaptation in developing world contexts: Implications for climate change education. *Sustainability*, *13*, 4811. <https://doi.org/10.3390/su13094811>
- McCrohan, S. (2017). Environmental education in Tanzania. The Arizona association for environmental education. Accessed March 16, 2022 from <https://www.arizonaee.org/arizona-environmental-education-news/page/6/>
- Mistry, J. (2009). Indigenous knowledge. In R. Kitchin, N. Thrift (Eds.) *International encyclopedia of human geography* (pp. 371–376). Elsevier. ISBN 9780080449104. <https://doi.org/10.1016/B978-008044910-4.00101-2>
- Molthan-Hill, P., Blaj-Ward, L., Mbah, M.F., Ledley, T.S. (2021). Climate change education at universities: Relevance and strategies for every discipline.
- Mtaita, U. Y. (2007). *Stakeholders' perception of their participation in environmental education in Tanzania*. Waikato University.
- Mwendwa, B. (2017). Learning for sustainable development: Integrating environmental education in the curriculum of ordinary secondary schools in Tanzania. *Journal of Sustainability Education*, *12*. ISSN: 2151-7452.
- National Aeronautics and Space Administration (NASA). (2022). Overview: Weather, global warming and climate change. Accessed on January 20, 2022 from <https://climate.nasa.gov/resources/global-warming-vs-climate-change/>
- Ndaki, M. P. (2014). *Climate change adaptation for smallholder farmers in rural communities: The case of Mkomazi sub-catchment*. University of Oldenburg, Carl Von Ossietzky.
- Nkhata, B., Mkandawire, S. B., Nachiyunde, K., Phiri-Nalube, P., Kaani, B., Mulenga, I. M., & Chipindi, F. M. (2019). Exploring selected theories applicable to educational disciplines and social sciences research.
- Petzold, J., Andrews, N., Ford, J. D., Hedemann, C., & Postigo, J. C. (2020a). Indigenous knowledge on climate change adaptation: A global evidence map of academic literature. *Environmental Research Letters*, *15*, 113007.
- Petzold, J., Andrews, N., Ford, J. D., Hedemann, C., & Postigo, J. C. (2020b). *Environmental Research Letters*, *15*, 113007.
- Petzold, J., Andrews, N., Ford, J. D., Hedemann, C., & Postigo, J. C. (2020). Indigenous knowledge on climate change adaptation: A global evidence map of academic literature. *Environmental Research Letters*, *15*(11), 113007.
- ReShel, A. (2021). The ancient indigenous art of rainmaking. Uplift. 2020. Accessed January 26, 2022 from <https://upliftconnect.com/ancientindigenous-rainmaking/>
- Roba, H. G., & Oba, G. (2009). Efficacy of integrating herder knowledge and ecological methods for monitoring rangeland degradation in Northern Kenya. *Human Ecology*, *37*(5), 589–612. <http://www.jstor.org/stable/40344000>
- Saruni, K. (2016). Indigenous knowledge systems and rangeland governance in Northern Tanzania. *Tanzanian Journal of Population Studies and Development*, *23*(1&2), 1–31.
- Selemani, I. S. (2020). Indigenous knowledge and rangelands' biodiversity conservation in Tanzania: success and failure. *Biodiversity and conservation*, 1–14. Advance online publication. <https://doi.org/10.1007/s10531-020-02060-z>
- Silas, R. S., & Jacob, K. (2012). Understanding community based adaptation strategies to climate variability in fishing communities of Rufiji River Basin in Tanzania. *Africa Journal of History and Culture*, *4*(2), 17–26.
- Simpson, N., Trisos, C., Krönke, M., & Andrews, T. (2021). Climate change literacy in Africa. *Nature Climate*.
- Smith, L. T. (1999). *Decolonizing methodologies: Research and indigenous peoples*. Zed Books.
- Songkok, C. K., Kipkorir, E. C., Mugalavai, E. M. (2011) Integration of indigenous knowledge systems into climate change adaptation and enhancing food security in Nandi and Keiyo Districts, Kenya. In *Climate change management* (pp. 69–95). Springer Science and Business Media.

- Speranza, C. I., Kiteme, B., Ambenje, P., Wiesmann, U. M., Makali, S. (2009) Indigenous knowledge related to climate variability and change: Insights from droughts in semi-arid areas of former Makueni District, Kenya. *Climate Change*, 100, 295–315.
- Tanyanyiwa, V. I. (2019). Indigenous knowledge systems and the teaching of climate change in Zimbabwean secondary schools. *SAGE Open*. <https://doi.org/10.1177/2158244019885149>
- The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). (2015). *Integrating indigenous knowledge with scientific forecasts in lush, Tanzania*. Accessed January 7, 2022 from <https://ccafs.cgiar.org/news/integrating-indigenous-knowledge-scientific-forecasts-lushoto-tanzania>
- The United Republic of Tanzania (URT). (2012). *Basic facts and figures on human settlements*. National Bureau of Statistics, Tanzania Ministry of Finance. Dar es Salaam.
- The World Bank. (2012). Taking action for a sustainable Tanzania. Accessed January 06, 2021 from <https://www.worldbank.org/en/events/2021/11/11/keeping-climate-change-on-the-agenda-in-tanzania>
- Theodory, T. F. (2021). Understanding the relevance of indigenous knowledge on climate change adaptation among mixed farmers in the Ngoni River Basin, Tanzania, Africa. *Journal of Science and Technology Innovation Development*, 13, 51–59.
- United Nations Development Programme (UNDP). (2021). *Climate change adaptation: Tanzania*. Accessed January 6, 2022 from <https://www.adaptation-undp.org/explore/eastern-africa/untied-republic-tanzania>
- UNEP. (2019). Emissions gap report 2019. United Nations Environment Programme (UNEP)
- UNESCO. (2015). *Not just hot air: Putting climate change education into practice*. UNESCO.
- URT. (2007). National Adaptation Programme of Action (NAPA). Vice President's Office, Environment Division. Dar es Salaam, Tanzania.
- URT. (2013). National climate change strategy. Vice President's Office, Department of Environment.
- URT. (2009). *National education and environment communication strategy* (2nd ed.). National Environment Management Council.
- USAID. (2021). Tanzania climate vulnerability profile. Accessed January 24, 2022 from https://www.climatelinks.org/sites/default/files/asset/document/tanzania_climate_vulnerability_profile_jan2013.pdf
- Vaismoradi, M., Jones, J., Turunen, H., Snelgrove, S. (2015). Theme development in qualitative content analysis and thematic analysis. *Journal of Nursing Education and Practice*, 6. <https://doi.org/10.5430/jnep.v6n5p100>
- Vermeylen, S. (2019). Special issue: Environmental justice and epistemic violence, local environment. *The International Journal of Justice and Sustainability*, 24(2), 89–93. <https://doi.org/10.1080/13549839.2018.1561658>
- Walshe, R., Argumedo, A., Ayni, A., & Chanincha, Y. (2016). The cultural values enabling adaptation to climate change in communities of the Potato Park, in the Peruvian Andes. *GAIA Ecological Perspective Science Society*, 25, 166–173.

Indigenous Peoples' Views on Climate Change and Their Experiences, Coping and Adaptation Strategies in South Asia: A Review



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Abstract Climate change is a global issue that affects everyone. According to Amnesty International, nearly 370 million indigenous peoples live in more than 90 countries and account for 5% of the world's population. Because of their close contact with the environment, they have an extensive understanding and knowledge of local climate conditions. Understanding how indigenous peoples perceive and interpret climate change and how they cope with the negative impacts of climate change is critical to formulating sustainable strategies for these local communities. Yet, there is a large gap in understanding climate change perceptions, especially among indigenous peoples around the world. Therefore, this chapter reviews some existing kinds of literature on indigenous peoples' views on climate change and explores their coping and adaptation strategies, especially for those living in South Asian countries. In addition, this chapter also discusses how indigenous peoples predict various climatic events in their own ways. Finally, in this chapter, we have outlined why it is important for the well-being of indigenous peoples and their resilience to climate change to integrate local or traditional knowledge and experiences into the mainstream scientific understanding of climate change. We found that while different indigenous groups perceive climate change differently, there is some agreement, particularly regarding changing patterns of temperature and precipitation. Local ways of understanding climate events ultimately make them aware of climate change adaptation strategies. We also found that indigenous experiences should be prioritized at the policy level to ensure sustainable development for local communities. The United Nations Sustainable Development Goal (SDG) highlights the need to take urgent

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action to address climate change and its impacts (SDG 13 or Goal 13) and suggests developing policies, plans, and strategies at the national level that include action on climate change (13.2) and prioritize local and marginalized communities, as well as women and youth (13.b). If we are to meet the requirements of the SDGs, the voices, experiences, and knowledge of indigenous peoples should be considered as part of a fair and effective participatory approach. This review study has the potential to encourage a wide range of stakeholders and policymakers to take sustainable actions that link indigenous peoples' knowledge and experiences with mainstream scientific policy to reduce the impacts of climate change on local communities and address appropriate mitigation and adaptation strategies.

Keywords Perception · Climate change · Indigenous population · Indigenous knowledge · Coping/adaptation to climate change · South Asia

1 Introduction

Climate change is a reality and pressing issue that has already been witnessed by natural and human systems (Braman et al., 2010). Although all countries are facing climate change, it is of particular concern in South Asian countries given their increased vulnerability to climate-related hazards (Hussain et al., 2018). It also brings a vulnerability to different populations, sectors, and geographic regions in many ways (Füssel & Klein, 2006; IPCC, 2007; Watson et al., 1998). A great deal of climate change estimations is regional or national in scale, making it difficult to translate to the local level (Bridges & McClatchey, 2009). Forty percent of the world's naturally protected areas are home to indigenous populations, who are the most vulnerable to the damaging effects of climate change because of their close ties to nature (Garnett et al., 2018; Green & Raygorodetsky, 2010; IPCC, 2014; Lam et al., 2019; Makondo & Thomas, 2018; Salick & Ross, 2009). Indigenous peoples have a deep understanding of the natural rhythms and processes of their environment and are among the very first to face the direct and indirect impacts of climate change and have been coping with local climate variability for thousands of years (Ahmed & Haq, 2019; Vogt et al., 2002). Although they have limited resources and few opportunities to cope with or adapt to the changing climate through their local knowledge, such knowledge plays a critical role in addressing climate change adaptation and mitigation strategies (Rahman & Alam, 2016). It is also argued that indigenous communities are better able to respond successfully to climate change, upholding their knowledge may be more useful in climate change assessments (Alexander et al., 2011; Nyong et al., 2007; Petheram et al., 2010; Sánchez-Cortés & Chavero, 2011; Turner & Clifton, 2009; Yeh et al., 2014). The Sustainable Development Goals (SDGs) adopted by the United Nations General Assembly include 17 specific goals and 169 targets, six of which include specific references to indigenous populations (Roy & Chakma, 2015). In recent times, the role of indigenous peoples and their knowledge systems in adapting to climate change has been increasingly recognized

in Intergovernmental Panel on Climate Change (IPCC) assessments and special reports (IPCC, 2014). In addition, the importance of indigenous peoples' observations of environmental changes, particularly those related to weather and climate, is also increasingly recognized in Western scientific pieces of literature (Green & Raygorodetsky, 2010).

In recent years, a great deal of research was conducted worldwide exploring local perceptions and knowledge in climate change (Macchi et al., 2014; McNamara & Prasad, 2014; McNamara & Westoby, 2011; Nehren et al., 2013). Some studies have also addressed indigenous peoples' views on climate change (Ahmed & Haq, 2019; Kent & Hannay, 2020). Local people's perceptions of climate change and indigenous coping mechanisms are key to shaping policy and decision-making. Therefore, understanding climate hazards from the perspective of local people and communities is necessary to increase their resilience to climate change (Kanwal et al., 2021). Understanding local views on climate change is key to assessing the feasibility of national and international adaptation programmes (Kim, 2011; Knight, 2016). Climate change adaptation measures will be no more than promises if they do not take into account the views of local people, who are the direct beneficiaries of the measures. This research understands the need of exploring perceptions of indigenous populations about climate change, coping, and adaptation strategies that can have implications for further research and disaster risk reduction policy.

The primary objective of this chapter is to understand how indigenous populations perceive climate change and its impacts and how they use their traditional knowledge to predict and adjust to different climate events. We choose selected countries of South Asia such as Bangladesh, India, Pakistan, Nepal and Sri Lanka to provide examples of traditional experiences and local strategies of indigenous populations. Before we conclude the chapter, we argue the importance of integrating indigenous knowledge into mainstream science of climate change adaptation and mitigation for sustainable development of indigenous communities. This chapter can be an effective reference tool for understanding indigenous peoples' perceptions of climate change and will make policy recommendations for adaptation and mitigation measures that incorporate indigenous peoples' experiences.

This chapter has been developed starting with the introduction. In the next section (Sect. 2), we briefly outline the methodology of the chapter. In Sect. 3, we present our results and discussions in different subsections. We reviewed how different indigenous communities perceive climate change (Sect. 3.1). The next section (Sect. 3.2) summarizes the different indigenous methods used to predict and understand climate risk. Section 3.3 summarizes the different problems identified by indigenous communities and their suggestions for overcoming these problems. The next subsection (3.4) shows how indigenous knowledge contributes to climate change coping and adaptation in our selected South Asian countries. In the final sub-section of the results and debates Sect. (3.5), we then attempt to argue why it is important to integrate indigenous knowledge into the scientific knowledge and understanding of climate change adaptation and mitigation policies. Finally, we conclude the chapter with some limitations and recommendations for further studies (Sect. 4).

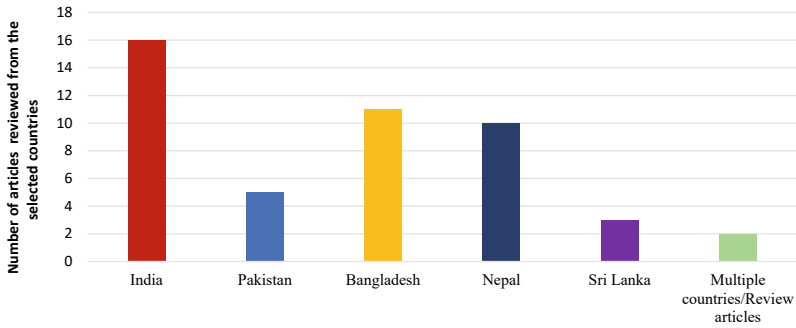


Fig. 1 Number of reviewed articles by countries

2 Methodology

We reviewed journal articles published in various databases (e.g., Web of Science, PubMed, Scopus and Google Scholar). The search technique aimed to find peer-reviewed literature that dealt with the perception of climate change and indigenous people's perception of climate change. Our literature search was limited to journal articles published only in English, between 1900 and 2021. Initially, we found 308 available literature pieces based on our inclusion criteria. We then searched again for available literature in the period between these years in some specific South Asian countries such as Bangladesh, India, Pakistan, Nepal and Sri Lanka. After specifying these requirements, we found 51 available articles. We initially reviewed all abstracts of original peer-reviewed articles and checked whether they met our targeted geographic areas (Bangladesh, India, Pakistan, Nepal and Sri Lanka), population (indigenous or local) and focus of this chapter (climate change perceptions, indigenous coping/adaptation strategies, indigenous ways of understanding climate change, etc.). We noted that four articles did not perfectly fit our inclusion criteria and we, therefore, removed them from the final review. In the end, 47 articles were reviewed for the purpose of writing this chapter. Figure 1 shows the number of articles and their study context that we reviewed for this chapter.

3 Results and Discussion

Based on our reviewed articles, in this section, we separately discussed our results in various parts keeping the objectives and aims of this study in our consideration.

3.1 Indigenous People's Perception of Climate Change: Understandings and Experiences

Kanwal et al. (2021) examined indigenous peoples' perceptions of weather-related risks and the various techniques they use to mitigate these risks in semi-arid regions of India. They selected two districts as study areas, one from a drought-prone region (Bikaner) and the other from a flood-prone region (Kota). Regarding the experience with climatic events, a large number of participants (43.4%) from drought-prone areas responded that they had experienced major droughts in the past 10 years. In contrast, most participants (76.7%) from flood-prone areas had not experienced drought. Most participants from both drought- and flood-prone regions indicated that they had experienced rainfall anomalies in the past 10 years. Another study, conducted in India by Pandey et al. (2018), noted that respondents cited changes in temperature and precipitation and decrease in water quantity and quality as the most difficult environmental challenges. In recent years, most respondents observed an increase in local average and extreme temperatures. In addition, in the past, they observed that winter lasted from October to March, while now it lasts from November to February. The combination of increasing winter temperatures and changing precipitation patterns has led to a reduction in water availability. Shukla et al. (2016) found a similar result, where most respondents (85%) in India were aware of and experienced an increase in temperature.

Paudel et al. (2020) surveyed three ecological regions of Nepal (mountains, hills, and Tarai) and found that farmers' socioeconomic and agricultural characteristics directly influenced their perceptions of climate change. Temperature changes were the most commonly observed indicator of climate change in Nepal (99.2%). In addition, other indicators observed included changes in rainfall (98.9%), climate-related diseases and pests (96.8%), changes in vegetation types and diversity (96.0%), and frequency of drought (80.2%). The temperature change was the most strongly felt indicator in the mountain region, while farmers in the mountain and Tarai regions felt changes in precipitation the most. People in the mountain and hill regions generally observed the occurrence of drought, while it was slightly less noticeable in the Tarai region. Dangi et al. (2018) found that snowfall decreased and precipitation was less predictable in two mountainous regions of Nepal (Myagdi and Mustang) that he studied. Average minimum winter temperatures have increased, and in mountainous regions, shorter winters and less snowfall threaten the livelihoods of people who depend on freshwater.

In Bangladesh, Rahman and Alam (2016) investigated the climate change perceptions of three forest-dependent indigenous communities (Khasia, Tripura and Garo) and found that indigenous people reported changes in temperature and precipitation, landslides, soil erosion and flash floods, extreme cold and fog, and natural disasters as the most common climate events. A similar study conducted by Ahmed and Haq (2019) in Bangladesh found that both the Khasia and Tripura populations largely believe that temperatures are rising. However, in terms of precipitation, Khasia is

more likely to believe that it is decreasing (61.1%), while the majority of Tripura believes that it is increasing (45%).

Ali et al (2020) surveyed farmers' perceptions of climate change in Pakistan and observed that the majority of respondents perceived hot days (93%), extreme temperatures (68.9%), higher rainfall intensity (83.4%) and more flooding (91.2%) in their areas.

Although perceptions of climate change vary between indigenous communities, depending on their understanding and experiences, we have discovered some commonalities between indigenous tribes when it comes to changes in temperature and rainfall. The vast majority of indigenous peoples found that temperatures were increasing and rainfall was decreasing. They also reported that some climate events such as floods, droughts and other hazards are occurring more frequently than in the past, affecting the livelihoods of many indigenous peoples. Local knowledge of climate is undoubtedly very important among indigenous peoples who live close to nature and rely on natural resources for livelihood. As a result of their reliance on natural resources, they are also able to preserve their immediate environment for future generations. Therefore, policymakers need to attach great importance to the perceptions of indigenous peoples to develop effective policies to make these communities resilient to climate change.

3.2 Indigenous Ways of Forecasting Climatic Risks

Indigenous peoples have their traditional and distinctive ways of understanding and interpreting climatic events that are part of their cultural or spiritual beliefs and are transferred to the next generations. McCall (1988) and UNESCO (2009) have therefore argued that it is pointless and dangerous to separate indigenous knowledge from its socio-cultural context, as this can lead to inaccurate interpretation and exploitation of information. This section discusses how indigenous peoples identify various climate risks based on their traditional knowledge and interpretations. However, these methods are not scientific in all cases.

Kanwal et al. (2021) found that participants from India used various indigenous methods to detect climate events. The appearance of a large number of luminous butterflies predicted the approach of heavy rains in the region. The presence of large numbers of ants and termites also indicated such events. Respondents noted that during heavy rains, certain tree species, such as ficus and acacia, bloom and green especially profusely. Factors such as the direction of the wind, the movement of the stars, and the clouds all play a role in determining whether a location will receive a lot or a little rain. Another study by Inaotombi and Mahanta (2019) in northeastern India found that participants used their indigenous knowledge to predict various weather and climate variations. When a large group of Reticulitermes insects, a group of termites, emerge from the ground during the monsoon season, it indicates that rains will be delayed by a few days. When frogs croak from bodies of water for an extended

period in the evening, participants believe rain is on the way. Unusual spinning, such as making shorter and thicker webs, also predicts rain.

In Bangladesh, Irfanullah and Motaleb (2011) found several traditional methods of prediction and preparation used by indigenous groups. For example, high temperatures and humid conditions indicate increased rainfall, good *jhum* production indicates increased wild boar attacks, and fruiting bamboo indicates increased rat attacks. Extremely high *jhum* production was also cited as an indicator of severe cold and flooding in the following months. Interestingly, participants explained that ants climb up houses during hailstorms, while they only cross highways during cyclones or *kalboishakhi*; however, they do both during heavy rains.

3.3 Local Level Problems and Policy Priorities for Climate Change Adaptation

Farmers in the villages of Maharashtra, India, face the most difficult challenges due to lack of implementation of government policies, lack of trust in scientific warnings, poor infrastructure, and lack of irrigation and mechanical equipment. Adapting agriculture to climate change involves changes in agricultural management practices that can reduce the likelihood of crop failure and improve the socio-economic situation of farmers (Swami & Parthasarathy, 2020). A survey of people in the Western Himalayas in India found that it is difficult to obtain climate information at the local level due to the lack of weather stations. Respondents cited increased forest protection, stronger building structures, and the use of alternative energy sources as possible policy priorities for adaptation. In addition, most respondents cited lack of funding, lack of access to information, and lack of awareness or understanding as to the top three barriers to planning and implementing adaptation measures (Pandey et al., 2018).

Rayamajhi and Manandhar (2020) noted that changes in biophysical indicators varied; the most commonly reported were a decrease in grazing area, followed by a decrease in crop yields and faster snowmelt on pastures in Nepal. They suggested that migrant herders' perceptions provide an important basis for state knowledge in data-poor areas, which in turn helps develop adaptation and intervention strategies to ensure the sustainability of the migrant herder system in the Himalayas. Another study in Nepal by Dangi et al. (2018) suggested that the development of weather stations to collect temperature and precipitation data at specific times and places and the continued involvement of local people, scientists, and governments could help address the global problems of these innocent mountain communities. In their study, Paudel et al. (2019) suggested that better farmer education, supportive policies, and adaptive strategies that encourage collaboration with local communities as part of sustainable policies are appropriate ways to manage farmland in Nepal.

In this section, we found that local people are constantly faced with a variety of barriers and that there are numerous ways to improve their circumstances. It is difficult

to implement effective climate change adaptation strategies at the local level due to the lack of infrastructure, particularly the lack of weather stations, lack of accurate information, and lack of trust in scientific knowledge. Therefore, it is the primary responsibility of the respective authorities and policymakers to properly disseminate scientific information at the local level, gain their trust, and increase awareness of climate change adaptation and mitigation policies to help these communities become more resilient to climate change.

3.4 Indigenous Knowledge and Climate Change Coping/Adaptation: Examples of Selected Countries

Purcell (1998, p. 260) defines ‘indigenous knowledge’ as the historically grounded body of knowledge associated with the long-term adaptation of human groups to biophysical environments. Indigenous peoples use their traditional knowledge and actions to cope with the adverse effects of climate change. In this section, we describe how indigenous peoples are coping with and adapting to climate change based on their traditional knowledge and lessons learned from their own experiences. In our literature review, we have identified several important coping/adaptation mechanisms, which are summarized and presented in Table 1.

In Nepal, Dangi and colleagues (2018) found that the expansion and diversification of agricultural production, adoption of good land management techniques, and an increase in tree planting all indicate improvements in community farming practices. People are concerned about drought and declining tourism on their former migration routes but are willing to shorten the harvesting season, extend the growing season, increase the size of the Sarvasi forest, establish markets and sanitation facilities, and expand tourism activities during the dry season. In another study conducted in Nepal by Panta et al. (2020), participants identified extreme rainfall followed by unfavourable geographical conditions, deforestation, drought and wind as the most important factors contributing to soil erosion in maize fields. Although the vast majority of people did not take any measures to reduce erosion, there were indigenous practices such as postponing harvesting dates, improving drainage systems and minimizing the frequency of weeds. While; Uprety et al. (2017) observed that the local people of Nepal have created some adaptive livelihoods to adapt to climate and environmental changes. For example, increasing pest infestation has affected traditional farming practices. As a result, respondents are now using pesticides and wearing mosquito nets to protect themselves from mosquitoes, which previously did not exist in the region.

Taking into account various factors (climatic, socio-economic, institutional, water and infrastructure), Swami and Parthasarathy (2020) found that in India, fear of crop failure has led farmers to use contaminated water in various forms for irrigation. Farmers’ awareness of climate variability and experience of crop failure in the previous season led them to adopt adaptation measures. Farmers have mostly

Table 1 Indigenous coping/adaptation techniques for agriculture and livelihood in South Asian countries

Country	Participants (N)	Coping/adaptation techniques	References
Bangladesh	Indigenous populations (93)	<ul style="list-style-type: none"> • Rainwater harvesting through digging pond and deeper well • Mulching/covering soil with litter • Changing planting time • Crop diversification • Homestead gardening • Handicraft's business • Livestock rearing 	Rahman and Alam (2016)
	Indigenous populations (78)	<ul style="list-style-type: none"> • Crop diversification • Changes in planting and harvesting periods • Cultivating short-season crops • Running a grocery shop • Working as a tour guide • Handicraft's production 	Ahmed and Haq (2019)
	General populations (120)	<ul style="list-style-type: none"> • Crop diversification • Homestead gardening • Change in planting and harvesting time • Application of Pesticides • Plantation in heap • Mulching • Floating Garden • Duck rearing • Cage Aquaculture 	Anik and Khan (2012)
Nepal	Farmers (654)	<ul style="list-style-type: none"> • Shifting harvest times • Upgrading drainage • Minimizing the frequency of weed 	Panta et al. (2020)
	General populations (42)	<ul style="list-style-type: none"> • Employing pesticides • Wearing mosquito nets 	Uprety et al. (2017)
	General populations (64)	<ul style="list-style-type: none"> • Shorten the harvesting season • Extend the growing season • Increase the size of the forest • Create markets and sanitation facilities • Expand tourism activities 	Dangi et al. (2018)
Pakistan	Farmers (386)	<ul style="list-style-type: none"> • Changes in cropping patterns • Changed in cropping activities • Changes in input applications • Changes in soil conservation • Changes in water conservation • Diversification of income 	Ali et al. (2020)

(continued)

Table 1 (continued)

Country	Participants (N)	Coping/adaptation techniques	References
India	Farmers (180)	<ul style="list-style-type: none"> • Adjustments made in sowing time • Crop rotation throughout the season • Land area diversification • Mixed farming 	Kanwal et al. (2021)
	Farmers (400)	<ul style="list-style-type: none"> • Short duration crops • Drought resistant varieties • Crop diversification • Using irrigations • Raising animals 	Swami and Parthasarathy (2020)
	Indigenous populations (120)	<ul style="list-style-type: none"> • Crop diversification • Mixed cropping • Farming • Crop rotation • Agro-forestry/agro-production • Improved varieties etc 	Meena et al. (2019)
Afghanistan, China, Bhutan, Nepal, Pakistan, and India	General populations (221)	<ul style="list-style-type: none"> • Livestock and agricultural diversification • Grow fruit trees on private land 	Wu et al. (2014)

adopted short duration crops, drought-tolerant varieties and crop diversification in implementing different adaptation strategies. The results also indicate that the vast majority of farmers do not want to change the timing of sowing and harvesting and do not want to take out crop insurance; however, a large majority of farmers use irrigation and livestock as adaptation strategies to combat climate change. In semi-arid regions of India, Kanwal and colleagues (2021) have shown that local participants use various strategies to minimize losses from climate events such as adjustment of sowing dates, in-season crop rotation, crop diversification, mixed cropping, etc. Participants are now also adopting crop diversification strategies to cope with climate disasters. Similarly, Meena et al. (2019) in their study argued that indigenous communities in the high altitude Pangri Valley in the Indian Himalayas are not overly engaged in modern agricultural practices and rely on traditional or indigenous techniques such as crop diversification, mixed cropping, field cultivation, crop rotation, agroforestry/agroforestry, improved varieties, etc.

Wu and colleagues (2014) conducted a study in six Hindu Himalayan countries, Afghanistan, Bhutan, China, India, Nepal and Pakistan. They found that herders in Pakistan and Afghanistan move their large animals seasonally between low-lying winter pastures and alpine summer pastures while practicing agriculture and raising goats near their permanent lowland residence. These communities have diversified both livestock and agriculture as a risk management technique. Some families in Afghanistan, Nepal and Pakistan also cultivate fruit trees on private land. The pastoralist peoples of the Hindu Kush-Himalayan region have always used livestock

diversification as a form of 'insurance' against major disease outbreaks, as different domestic livestock species are not usually susceptible to the same pathogen.

A study by Rahman and Alam (2016) has shown that climate change has multiple impacts on the livelihoods of indigenous communities (*Khasia, Tripura and Garo*) in northeastern Bangladesh. The indigenous communities have developed several adaptation strategies based on local knowledge and modern tools and techniques including rainwater harvesting by digging ponds and deeper wells, mulching/soil mulching, changing the timing of planting, crop diversification, home gardening, handicrafts, animal husbandry, etc. Ahmed and Haq (2019) also found that the indigenous people of Bangladesh (*Khasia and Tripura*) are now adopting different techniques to cope with the negative impacts of climate change: diversifying crops, changing planting and harvesting dates, and growing short-lived crops. In addition, both Khasia and Tripura residents are engaged in various activities to generate additional income, such as running food shops, working as tour guides or producing various handicraft products.

In Pakistan, Ali et al. (2020) found that few farmers were able to adapt to climate change due to various barriers, although they were aware of the problems. 77% and 94% of farmers had changed their cropping patterns and production activities, respectively. Other adaptation techniques used by farmers include: changing the use of inputs (89%), soil conservation (92%), water conservation (90%) and income diversification (64%).

3.5 Integrating Indigenous Knowledge into Scientific Knowledge of Climate Change Adaptation/Mitigation Policies

In the field of climate change, indigenous knowledge is recognized as critical to understanding scientific knowledge, and it is, therefore, important to link scientific data and indigenous knowledge to better inform mitigation and adaptation measures (Chaudhary & Bawa, 2011; Nicols et al. 2004; Speranza et al., 2009). Moreover, integrating local knowledge into climate change policy can lead to the development of effective, cost-efficient and sustainable adaptation strategies (Baul & McDonald, 2015). However, Berkes (2008) argues that it is a false assumption that all traditional/indigenous practices are ecologically appropriate and sustainable in their current form. Therefore, local observations and interpretations should be used as a complement to the scientific community and policymakers, but should not replace scientific knowledge on climate change, as it has many limitations (Byg & Salick, 2009).

Traditional knowledge is one of the most important sources of information that can be used to plan adaptation to climate change at the household level. Improving the flow of available scientific information can facilitate the implementation of adaptation measures in the region, but traditional knowledge will continue to play an

important role in mitigating the impacts of climate change and helping to restore various ecosystem services. Therefore, to effectively use sustainable development and adaptation information, robust adaptation strategies and plans need to be integrated into top-down and bottom-up planning approaches (Pandey et al., 2018). Ali et al. (2020) also emphasizes the integration of indigenous knowledge and locally relevant adaptation strategies for the development of local and national adaptation policies. They suggest that involving indigenous peoples in the decision-making process can be achieved and will help in understanding constraints and opportunities at the local level. Rahman and Alam (2016) noted that climate change has multiple impacts on the livelihoods of indigenous communities and that local knowledge can be a good starting point for developing climate change adaptation and mitigation strategies. The new Agenda 2030 calls for urgent collective action to empower indigenous peoples to protect their rights, participate in decision-making and become active agents of change (Magni, 2017).

A key promise of the Sustainable Development Goal is that *no one will be left behind*. Goal 13 of the SDGs calls for urgent action to combat climate change and its impacts, where it specifically mentions the need to integrate climate action into national-level plans and policies (13.2), taking into account local marginalized communities, women and youth (13.b). Indigenous peoples also live in close contact with nature and rely on natural resources for their survival, and are therefore well informed about their immediate environment and its sustainable management. Therefore, to promote the protection, restoration and sustainable use of ecosystems (SDG 15), indigenous peoples' experiences and lessons learned can be integrated into scientific knowledge and this can help to develop better policies to help local communities better adapt to climate change.

Indigenous populations' understanding of changing climate conditions in different regions of the world shows that traditional knowledge, local observations and experiences are an important source of data for climate science, and scientists argue for the importance of integrating local knowledge into scientific evidence (Becken et al., 2013; Bridges & McClatchey, 2009; Byg & Salick, 2009; Chaudhary & Bawa, 2011; Ford et al., 2016; Hiwasaki et al., 2014; Nicolas et al., 2004; Turner & Clifton, 2009).

4 Conclusions and Recommendations

This study focuses on indigenous populations' views and experiences of climate change and how they are adapting to different coping and adaptation strategies. We found that changes in temperature and precipitation are the two most commonly observed indicators of how respondents interpret climate change issues. In addition, extreme cold and fog, landslides, soil erosion, flash floods and natural disasters were also reported as common climate events at the local level. In terms of coping with the adverse impacts of climate change, we found that indigenous populations use different coping and adaptation strategies based on their traditional knowledge. This local or traditional knowledge and experiences are transferred from a generation to

another and help them to reduce their vulnerability to climate change impacts as much as possible and to survive in harsh environments. However, the perceptions, experiences and coping or adaptation strategies of indigenous or local people may not be perfectly suited to all the challenges that climate change will bring. There is therefore an urgent need to validate their traditional knowledge and embed it in a scientific context. Appropriate research needs to be carried out to demonstrate that it can be applied in the current context (Wisner, 2009). Experts argue that a participatory approach is essential to successfully balance different knowledge systems and it is essential to ensure that all relevant stakeholders see it as equally valid, relevant and relevant (Magni, 2017).

Scientific knowledge, ideas and information must be shared with these local communities to make them more resilient to adverse climate conditions. Reliable information provides new avenues and ideas for adaptation planning and coping and adaptation strategies tend to increase as the flow of information on different livelihood strategies of households improves (Pandey et al., 2018). However, in the literature we reviewed, we found gaps in the flow of scientific information at the local level. Meteorological stations are rarely visible at the local level, which therefore makes it difficult for locals to access credible climate information. A major limitation of the study is that it focused on only a few specific South Asian countries (Bangladesh, India, Pakistan, Nepal and Sri Lanka). It is highly recommended that this type of research be carried out in other locations, especially developing countries, as they are more exposed to climate change risks than developed countries. Moreover, a comparative study between developed and developing countries will certainly pave the way to a better understanding of how different country contexts, cultural contexts, levels of information dissemination, indigenous populations' level of awareness of climate change issues and other factors combine to influence local populations' coping and adaptation strategies to climate change.

A recommendation is that all stakeholders, including indigenous peoples and local populations, should be involved in policy dialogue for the development of sustainable climate change adaptation and mitigation policies. Local knowledge, experiences and perspectives should be seriously considered and validated in scientific evidence. Local people are the main beneficiaries of these policies and programs. Therefore, without their voices being heard, these actions are less likely to bring positive changes to their communities. We, therefore, emphasize that climate change adaptation and mitigation measures should be developed through a bottom-up strategy (involving local people and their experiences) rather than a top-down approach by the government or the state (which often excludes the voices and experiences of local people).

References

- Ahmed, M. N. Q., & Haq, S. M. A. (2019). Indigenous people's perceptions about climate change, forest resource management, and coping strategies: A comparative study in Bangladesh.

- Environment, Development and Sustainability*, 21, 679–708. <https://doi.org/10.1007/s10668-017-0055-1>
- Alexander, C., Bynum, N., Johnson, E., King, U., Mustonen, T., et al. (2011). Linking indigenous and scientific knowledge of climate change. *BioScience*, 61(6), 477–484. <https://doi.org/10.1525/bio.2011.61.6.10>
- Ali, M. F., Ashfaq, M., Hassan, S., & Ullah, R. (2020). Assessing indigenous knowledge through farmers' perception and adaptation to climate change in Pakistan. *Polish Journal of Environmental Studies*, 29(1), 525–532. <https://doi.org/10.15244/pjoes/85194>
- Anik, S. I., & Khan, M. A. S. A. (2012). Climate change adaptation through local knowledge in the north eastern region of Bangladesh. *Mitig Adapt Strateg Glob Change*, 17, 879–896. <https://doi.org/10.1007/s11027-011-9350-6>
- Baul, T. K., & McDonald, M. (2015). Integration of Indigenous knowledge in addressing climate change. *Indian Journal of Traditional Knowledge*, 1(1), 20–27.
- Becken, S., Ak, L., & Espiner, S. (2013). The cultural context of climate change impacts: Perceptions among community members in the Annapurna Conservation Area, Nepal. *Environmental Development*, 8, 22–37. <https://doi.org/10.1016/j.envdev.2013.05.007>
- Berkes, F. (2008). *Sacred ecology* (1st ed.). Routledge.
- Braman, L. M., Suarez, P., & Van Aals, M. K. (2010). Climate change adaptation: Integrating climate science into humanitarian work. *International Review of the Red Cross*, 92(879), 693–712. <https://doi.org/10.1017/S1816383110000561>
- Bridges, K., & McClatchey, W. (2009). Living on the margin: Ethnoecological insights from Marshall Islanders at Rongelap Atoll. *Global Environmental Change*, 19(2), 140–146. <https://doi.org/10.1016/j.gloenvcha.2009.01.009>
- Byg, A., & Salick, J. (2009). Local perspectives on a global phenomenon—Climate change in Eastern Tibetan villages. *Global Environmental Change*, 19(2), 156–166. <https://doi.org/10.1016/j.gloenvcha.2009.01.010>
- Chaudhary, P., & Bawa, K. (2011). Local perceptions of climate change validated by scientific evidence in the Himalayas. *Biology Letters*, 7, 767–770. <https://doi.org/10.1098/rsbl.2011.0269>
- Dangi, M. B., Chaudhary, R. P., Rijal, K., Stahl, P. D., Belbase, S., Gerow, K. G., et al. (2018). Impacts of environmental change on agroecosystems and livelihoods in Annapurna Conservation Area, Nepal. *Environmental Development*, 25, 59–72. <https://doi.org/10.1016/j.envdev.2017.10.001>
- Ford, J. D., Cameron, L., Rubis, J., Mailet, M., Nakashima, D., Willox, A. C., et al. (2016). Including indigenous knowledge and experience in IPCC assessment reports. *Nature Climate Change*, 6, 349–353. <https://doi.org/10.1038/nclimate2954>
- Füssel, H. M., & Klein, R. J. (2006). Climate change vulnerability assessments: An evolution of conceptual thinking. *Climatic Change*, 75, 301–329. <https://doi.org/10.1007/s10584-006-0329-3>
- Garnett, S. T., Burgess, N. D., Fa, J. E., Fernández-Llamazares, A., et al. (2018). A spatial overview of the global importance of Indigenous lands for conservation. *Nature Sustainability*, 1(7), 369–374. <https://doi.org/10.1038/s41893-018-0100-6>
- Green, D., & Raygorodetsky, G. (2010). Indigenous knowledge of a changing climate. *Climatic Change*, 100, 239–242. <https://doi.org/10.1007/s10584-010-9804-y>
- Hiwasaki, L., Luna, E., & Syamsidik, S. R. (2014). Process for integrating local and indigenous knowledge with science for hydro-meteorological disaster risk reduction and climate change adaptation in coastal and small island communities. *International Journal of Disaster Risk Reduction*, 10(Part A), 15–27. <https://doi.org/10.1016/j.ijdr.2014.07.007>
- Hussain, M., Liu, G., Yousaf, B., Ahmed, R., Uzma, F., Ali, M. U., Ullah, H., & Butt, A. R. (2018). Regional and sectoral assessment on climate change in Pakistan: Social norms and indigenous perceptions on climate-change adaptation and mitigation in relation to global context. *Journal of Cleaner Production*, 200, 791–808. <https://doi.org/10.1016/j.jclepro.2018.07.272>
- Inaotombi, S., & Mahanta, P. C. (2019). Pathways of socio-ecological resilience to climate change for fisheries through indigenous knowledge. *Human and Ecological Risk Assessment: An International Journal*, 25(8), 2032–2044. <https://doi.org/10.1080/10807039.2018.1482197>

- IPCC. (2007). Regional climate projections. In 2007: Climate Change: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). Accessed October 11, 2021 from <https://archive.ipcc.ch/report/ar4/wg1/>
- IPCC. (2014). AR5 climate change 2014: Impacts, adaptation, and vulnerability, ed C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, L. L. White. Cambridge University Press. Accessed October 11, 2021 from www.ipcc.ch/report/ar5/wg2/
- Irfanullah, H. M., & Motaleb, M. A. (2011). Reading nature's mind: Disaster management by indigenous peoples of Bangladesh. *Indian Journal of Traditional Knowledge*, 10(1), 80–90.
- Kanwal, V., Sirohi, S., & Chand, P. (2021). Farmers' perception on climate extremes and their coping mechanism: Evidences from disaster prone regions of India. *Indian Journal of Traditional Knowledge*, 20(2), 512–519.
- Kent, R., & Hannay, R. (2020). Explaining 'carbon' in community sequestration projects: A key element in the creation of local carbon knowledges. *Environmental Communication*, 14(3), 364–377. <https://doi.org/10.1080/17524032.2019.1673459>
- Kim, S. Y. (2011). Public perceptions of climate change and support for climate policies in Asia: Evidence from recent polls. *The Journal of Asian Studies*, 70(2), 319–331.
- Knight, K. W. (2016). Public awareness and perception of climate change: A quantitative cross-national study. *Environmental Sociology*, 2(1), 101–113. <https://doi.org/10.1080/23251042.2015.1128055>
- Lam, S., Dodd, W., Skinner, K., Papadopoulos, A., Zivot, C., Ford, J., Garcia, P. J., Harper, S. L., & IHACC Research Team. (2019). Community-based monitoring of Indigenous food security in a changing climate: global trends and future directions. *Environmental Research Letters*, 14(7). <https://doi.org/10.1088/1748-9326/ab13e4>
- Macchi, M., Manandhar-Gurung, A., & Hoermann, B. (2014). Community perceptions and responses to climate variability and change in the Himalayas. *Climate and Development*, 7(5), 414–425. <https://doi.org/10.1080/17565529.2014.966046>
- Magni, G. (2017) Indigenous knowledge and implications for the sustainable development agenda. *European Journal of Education* 52(4). <https://doi.org/10.1111/ejed.12238>
- Makondo, C. C., & Thomas, D. S. G. (2018). Climate change adaptation: Linking indigenous knowledge with western science for effective adaptation. *Environmental Science & Policy*, 88, 83–91. <https://doi.org/10.1016/j.envsci.2018.06.014>
- McCall, M. (1988). The implications of Eastern African rural social structure for local-level development: The case for participatory development based on indigenous knowledge systems. *Regional Rural Dialog*, 9, 41–72.
- McNamara, K. E., & Westoby, R. (2011). Local knowledge and climate change adaptation on Erub Island Torres Strait. *Local Environment*, 16(9), 887–901. <https://doi.org/10.1080/13549839.2011.615304/cr019109>
- McNamara, K. E., & Prasad, S. S. (2014). Coping with extreme weather: Communities in Fiji and Vanuatu share their experiences and knowledge. *Climate Change*, 123(2), 121–132. <https://doi.org/10.1007/s10584-013-1047-2>
- Meena, R., Verma, T., Yadav, R. P., Mahapatra, S., Surya, J., Singh, D., & Singh, S. (2019). Local perceptions and adaptation of indigenous communities to climate change: Evidences from High Mountain Pangri valley of Indian Himalayas. *Indian Journal of Traditional Knowledge*, 18, 58–67.
- Nehren, U. M., Subedi, J., Yanakieva, I., Sandholz, S., Pokharel, J., Lal, A. C., et al. (2013). Community perception on climate change and climate-related disaster preparedness in Kathmandu Valley, Nepal. *Journal of Natural Resources and Development*, 4, 35–57. <https://doi.org/10.5027/jnrd.v3i0.04>
- Nichols, T., Berkes, F., Jolly, D., et al. (2004). Climate change and sea ice: Local observations from the Canadian Western Arctic. *Arctic*, 57(1), 68–79.

- Nyong, A., Adesina, F., & Elasha, B. O. (2007). The value of indigenous knowledge in climate change mitigation and adaptation strategies in the African Sahel. *Mitigation and Adaptation Strategies for Global Change*, 12, 787–797. <https://doi.org/10.1007/s11027-007-9099-0>
- Pandey, R., Kumar, P., Archie, K. M., Gupta, A. K., Joshi, P. K., Valente, D., & Petrosillo, I. (2018). Climate change adaptation in the western-Himalayas: Household level perspectives on impacts and barriers. *Ecological Indicators*, 84, 27–37. <https://doi.org/10.1016/j.ecolind.2017.08.021>
- Panta, B., Bhandari, T., & Paudel, B. (2020). Soil erosion vulnerability and adaptation strategies in maize field of Sindhukhola sub-watershed region, Nepal. *SN Applied Science* 2, 1940. <https://doi.org/10.1007/s42452-020-03747-2>
- Paudel, B., Zhang, Y., Yan, J., Rai, R., & Li, L. (2019). Farmers' perceptions of agricultural land use changes in Nepal and their major drivers. *Journal of Environmental Management*, 235, 432–441. <https://doi.org/10.1016/j.jenvman.2019.01.091>
- Paudel, B., Zhang, Y., Yan, J., et al. (2020). Farmers' understanding of climate change in Nepal Himalayas: Important determinants and implications for developing adaptation strategies. *Climatic Change*, 158, 485–502. <https://doi.org/10.1007/s10584-019-02607-2>
- Petheram, L., Zander, K., Campbell, B., High, C., & Stacey, N. (2010). Strange changes: Indigenous perspectives of climate change and adaptation in N.E. Arnhem Land (Australia). *Global Environmental Change* 20(4), 681–692. <https://doi.org/10.1016/j.gloenvcha.2010.05.002>
- Purcell, T. W. (1998). Indigenous knowledge and applied Anthropology: Questions of definition and direction. *Human Organization*, 57, 258–272.
- Rahman, M. H., & Alam, K. (2016). Forest dependent indigenous communities' perception and adaptation to climate change through local knowledge in the protected area—A Bangladesh case study. *Climate*, 4(1), 12. <https://doi.org/10.3390/cli4010012>
- Rayamajhi, N., & Manandhar, B. (2020). Impact of climate change and adaptation measures on transhumance herding system in Gatlang, Rasuwa. *Air, Soil and Water Research*, 13, 1–10. <https://doi.org/10.1177/1178622120951173>
- Roy, R. D., & Chakma, M. K. (2015). *National seminar on indigenous peoples in Bangladesh: Human rights and sustainable development goals*. Accessed November 11, 2021. Accessed October 09, 2021 from https://www.ilo.org/dhaka/Areasofwork/WCMS_447669/lang--en/index.htm
- Salick, J., & Ross, N. (2009). Traditional peoples and climate change. *Global Environmental Change*, 19, 137–139.
- Sánchez-Cortés, M. S., & Chavero, E. (2011). Indigenous perception of changes in climate variability and its relationship with agriculture in a Zoque community of Chiapas, Mexico. *Climatic Change*, 107, 363–389. <https://doi.org/10.1007/s10584-010-9972-9>
- Shukla, G., Kumar, A., Pala, N. A., et al. (2016). Farmer's perception and awareness of climate change: A case study from Kanchandzonga Biosphere Reserve, India. *Environment, Development and Sustainability*, 18, 1167–1176. <https://doi.org/10.1007/s10668-015-9694-2>
- Speranza, C. I., Kiteme, B., Ambenje, P., Wiesmann, U., & Makali, S. (2009). Indigenous knowledge related to climate variability and change: Insights from droughts in semi-arid areas of former Makueni District, Kenya. *Climatic Change*, 100, 295–315. <https://doi.org/10.1007/s10584-009-9713-0>
- Swami, D., & Parthasarathy, D. (2020). A multidimensional perspective to farmers' decision making determines the adaptation of the farming community. *Journal of Environmental Management*, 264. <https://doi.org/10.1016/j.jenvman.2020.110487>
- Turner, N. J., & Clifton, H. (2009). "It's so different today": Climate change and indigenous lifeways in British Columbia, Canada. *Global Environmental Change*, 19, 180–190. <https://doi.org/10.1016/j.gloenvcha.2009.01.005>
- UNESCO. (2009). *Learning and societies today*. UNESCO.
- Uprety, Y., Shrestha, U. B., Rokaya, M. B., Shrestha, S., Chaudhary, R. P., Thakali, A., Cockfield, G., & Asselin, H. (2017). Perceptions of climate change by highland communities in the Nepal Himalaya. *Climate and Development*, 9(7), 649–661. <https://doi.org/10.1080/17565529.2017.1304886>

- Vogt, K. A., Beard, K. H., Hammann, S., Palmiotto, J. O., Vogt, D. J., Scatena, F. N., & Hecht, B. P. (2002). Indigenous knowledge informing management of tropical forests: The link between rhythms in plant secondary chemistry and lunar cycles. *Ambio*, 31(6), 485–490. <https://doi.org/10.1579/0044-7447-31.6.485>
- Watson, R. T., Zinyowera, M. C., & Moss, R. H. (1998). *The regional impacts of climate change: An assessment of vulnerability*. Cambridge University Press.
- Wisner, B. (2009). Local knowledge and disaster risk reduction. Keynote. Side meeting on indigenous knowledge, Global platform for disaster reduction, Geneva. University College London, England. Accessed November 7, 2021 from <https://www.coursehero.com/file/99620715/Wisner-LocalKnowledgeDRR-25-6-09doc/>
- Wu, N., Ismail, M., Joshi, S., et al. (2014). Livelihood diversification as an adaptation approach to change in the pastoral Hindu-Kush Himalayan region. *Journal of Mountain Science*, 11, 1342–1355. <https://doi.org/10.1007/s11629-014-3038-9>
- Yeh, E. T., Nyima, Y., Hopping, K. A., & Klein, J. A. (2014). Tibetan Pastoralists' vulnerability to climate change: A political ecology analysis of snowstorm coping capacity. *Human Ecology* 42(1). <https://doi.org/10.1007/s10745-013-9625-5>

The Forest as a Cropscape: The Cultivated Legacy of the Ancient Maya



Anabel Ford

Abstract Everything utilized by the ancient Maya of lowland Mesoamerica was derived from the resources of the Maya forest: agricultural fields, useful perennials, and habitats of the closed canopy forest. For pre-conquest Americans, including the Maya, cultivation was largely rainfall dependent, and land management was undertaken with human power, manipulated with tools of stone and fire. The Maya cultivated the entire landscape and relied on the dynamic relationship between fields and forest for all needs. Some two hundred years ago Malthus wrote that the choice appears to be between cultivated fields or forest; he was equating cultivable with *arable*, but arable correctly defined is *plowable*. Clearly, demand for cropped fields inherently reduces land covered with forests, and at the same time, it is assumed that more cleared land increases erosion and reduces fertility. This does not describe the Maya system. The agrarian Maya civilization was based on an intimate engagement with nature and the environment using labor, knowledge, and skill to direct vibrant growth toward human priorities. The expansion of the ancient Maya civilization in the tropical Mesoamerican lowlands across the millennia, exemplary long-term land management system: the milpa-forest garden. Using historic and prehistoric data, this paper demonstrates that the imposed narrative of the Western ecological imperialist limits the appreciation of the nature of land use in the tropics in general and the Maya forest in specific. Achievements of the ancient Maya chart a path for attaining the core of the United Nations Sustainable Development Goals. Health and well-being (SDG 3) as well as life on land (SDG 6, 13, 15) are dependent on useful forests and productive fields ensuring access to recourse and food sovereignty (SDG 2). Calling for a reassessment of the disparaged technology and culture based on what the Western vision sees as shifting agriculture uncovers the co-creative landscape promoting sustainable principles of land use.

Keywords Swidden · Milpa · Landscape · Maya Forest

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1 Introduction: What is a Cropscape?

The ancient Maya were an agricultural society whose growth and development provides ample proof of their sustainability. Yet the “mystery” of Maya civilization is promulgated as fact in Western narratives: emerging in an inhospitable environment and bound to fail, collapsing under the weight of environmental misuse. The Western ecological imperialist attitude persists in pejorative views of the tropics and shows reticence to discuss a successful example of human adaptations, such as the Maya, in the context of planning for a viable future. Exploring solutions past provides an adaptable model to address access to resources, water conservation, biodiversity, and food sovereignty. This requires the recognition of the Indigenous land-use practices and the intentions to coexist in the landscape; so we look to the Maya example.

Controversy surrounds the environmental legacy of the ancient Maya (Fig. 1). The notion that the tropics are fragile and cannot support agriculture contrasts with the enduring impacts of Maya lifeways, illegitimately described as environmentally destructive. Alternative lines of evidence, including a robust archaeological record spanning millennia of growth and long-surviving Indigenous understandings of forest ecology and food production, promote a revision. The evidence speaks to the great potential of the tropical woodlands for supporting populations without a loss to the long-term viability of tropical landscapes where the temperature has been moderated with land cover, biodiversity maintained in forests and fields, water conserved with the cycle, soil fertility managed with habitat diversity, and erosion checked with dynamic land cover.

The consequence is that the Maya forest today is the result of accumulated human selective priorities. Farmer decisions based on practical experimentation by generations, centuries, and millennia, were executed with labor and skill and founded on the experience of nature, especially its cycles, tolerances, and resilience. Cultivation of the Maya landscape is founded on the milpa forest garden cycle, including the use of domesticated plants and the selection of favored trees. This traditional environmental knowledge prioritizes the building of resilience and predictability in order to fulfill basic human needs. Forest gardens are intentionally and deliberately structured within the landscape, and the recognition of purposeful cultivation makes the Maya forest a cropscape. The endurance of this cropscape is the product of the cultivation of biological “capital.”

Temperate zone preconceptions have colored, and continue to color, views of the tropics as unwelcoming, with unstable environments, mediocre soils, and lacking important resources. In fact, Indigenous food production strategies are typically framed in reference to what they lack when compared to temperate zone practices: metal, draft animals, and plows (Mt Pleasant, 2015). To transform what Gourou (1980) judges as useless tropical land into something beneficial for European-style cultivation requires that “only with correct techniques can [tropical soil] be permanently improved to yield good harvests.” While such positions are being espoused, other observers see complex cultivation systems. An appreciation and value placed



Fig. 1 Location of Mesoamerica and the Maya Area with relevant places indicated. *Credit* MesoAmerican Research Center

on traditional tropical agriculture (Altieri, 1987; Conklin, 1963; Dove, 1983) are the nexus of environment and culture, and cycles over time, sustaining life on land.

Contemporary development schemes envisioned and put into practice without local Indigenous input, and plantation monocultures and extensive pasturage are exacerbating environmental challenges. These unsustainable practices collectively raise temperatures, eliminate biodiversity, squander water, impoverish soil, and cause erosion. Reexamining and questioning the assumptions of land use in the tropics in general and the Maya forest in particular, this paper reassesses the disparaged technology and culture, belittled by Western colonials as shifting agriculture. The “invisible” co-creative cropscape of fields and forests becomes evidence of the sustainable benefits of Indigenous methodologies. Sustainable development goals parallel the natural outcomes of Indigenous production by addressing climate impacts,

conserving water, lowering the temperature, expanding the diversity and variety of crops, promoting food sovereignty, and securing sustainable life on land.

The path to attaining the core of the United Nations Sustainable Development Goals in the tropics needs to consider traditional Indigenous practices. Addressing the roots of climate change (SDG 13) is the foundation for health and well-being (SDG 3) as well as life on land (SDG 15). Useful forests and productive fields provide access to resources, including water (SDG 6) and ensure food sovereignty (SDG 2). The examination here calls for a reassessment of the disparaged shifting agriculture, using the co-creative landscape of the Maya to promote sustainable principles of land-use.

2 Background: Ancient Mesoamerica and the Maya

The contemporary Maya forest is a hotspot of biodiversity known for its remarkable abundance of useful plants (Chazdon, 2014; Gómez-Pompa & Kaus, 1992; Mittermeier et al., 2000). Modern forests' inventories represent the residual of past transformations, first by the selection process of the ancient Maya and then, with the Spanish conquest, from the continued imposition of foreign land-use strategies: pasturage and plows, where once only human labor and skill had existed. This misunderstanding is the basis for assuming the collapse of civilization and relating it to deforestation (Binford et al., 1987; Rice, 1976; Turner & Sabloff, 2012). I propose that the Maya forest is a cropscape. The scope of managed forest products, and the role of the Maya in forest maintenance, are apparent in role of the dominant plants (Table 1; see Balick et al., 2000; Campbell et al., 2006; Fedick, 2020; Ford, 2008; Roys, 1931).

The ever-changing fluctuations of the ancient Maya cropscape are contingent on the intentional management of the relationship of fields to forests. Based on the Western narrative, demand for fields inherently reduces forest cover, and generally the more cleared land increases erosion and reduces fertility (Webster, 2002). Principles that agricultural projects around the world promote are the basis for the dire predictions of E. O. Wilson in his *Future of Life*, and the underpinning of the Belize Valley soil study (Birchall & Jenkin, 1979). In the search for cultivable lands, development focus lies blindly on only *arable* land. Arable lands are cultivable but cultivable lands include much more than those which are plowable. Traditional land use is largely based on human labor (see Bray, 1994). These conflicting perspectives devalue the importance of traditional knowledge.

Reimagining the Maya forest as a landscape of resources developed by land-use decisions for the long-term is a new way of appreciating the ancient Maya methods. To accomplish this, we need to consider debates and misunderstandings about past forest use as the received wisdom of ecological imperialism (Crosby, 1986). Popular views state the Maya people outstripped their environment in the quest for resources (Diamond, 2005). This assumption originates from interpretations of accounts by early Spanish conquistadors, who saw the forest as impenetrable. They were used to

Table 1 The top twenty dominant plants of the Maya forest

Scientific name	Common name	Pollinator	Primary use
<i>Alseis yucatanensis</i>	Wild mamey	Moths	Food
<i>Aspidosperma cruentum</i>	Malerio	Insects	Construction
<i>Attalea cohune</i>	Corozo	Insects	Oil
<i>Brosimum alicastrum</i>	Ramon	Wind	Food
<i>Bursera simarouba</i>	Chaca	Bees	Medicine
<i>Cryosophila stauracantha</i>	Escoba	Beetles	Production
<i>Licania platypus</i>	Succotz	Moths	Food
<i>Lonchocarpus castilloi</i>	Manchich	Insects	Construction
<i>Manilkara zapota</i>	Chicle	Bats	Food
<i>Piscidia piscipula</i>	Jabin	Bees	Poison
<i>Pouteria campechian</i>	Mamey criolla	Insects	Food
<i>Pouteria reticulata</i>	Zapotillo hoja fina	Insects	Latex
<i>Sabal morrisiana</i>	Escoba	Insects	Production
<i>Simira salvadorensi</i>	Palo colorado	Moths	Instruments
<i>Spondias radlkoferi</i>	Jocote	Insects	Food
<i>Swietenia macrophylla</i>	Mahogany	Insects	Construction
<i>Tabebuia rosea</i>	Macuelizo	Bees	Construction
<i>Talisia oliviformi</i>	Kinep	Bees	Food
<i>Vitex gaumeri</i>	Yaxnik	Bats	Construction
<i>Zuelania guidonia</i>	Tamay	Bees	Medicine

eating beef daily, and merely tolerated local maize. There was no appreciation for the diversity of the Maya forest as a garden (Schwartz, 1990). The conquistadors' success in provisioning their armies belies perceptions of a useless landscape (Cortez, 1971; Diaz, [1568], 1927). By acknowledging the bounty relied on during their brutal conquest, we dismantle the received perspective and begin examining ancient Maya cropscares free from its bias.

3 The Cropscape of the Maya Forest

When Maya agricultural techniques are viewed through a Western European filter, forest and field become opposites—the expansion of one comes at the expense of the other. Crops need open space, and more forests must be cleared to support growing populations. How could the ancient Maya maintain the forest while continuing land clearance for agriculture? Environmental destruction is at the core of reputed causes of the Classic Maya collapse in the ninth century, with some researchers suggesting the Maya are reenacting the story today (Townsend, 2009; Turner & Sabloff, 2012; Webster, 2002). The destructive “slash-and burn” system, as supposedly revealed by satellite imagery, is seen, without question, as the root of contemporary threats to the forest. These satellite images clearly expose the expansion of cattle pasturage and plowed fields, not the smallholder milpa farming characteristic of traditional agriculture (Fig. 2).

There is no reservation that land use intensification came with ancient Maya development, but the question of how that was accomplished remains unaddressed. Archaeological data show a steady increase in residential sites that reflects population growth, and many archaeologists imagine this landscape overrun by people and fields. Importantly, there is clear archaeological evidence of centuries of steady growth and expansion of monumental civic centers, denoting the smooth operation of a hierarchical system. How can this system grow if the environment is at risk? This is an important issue and bears on the present and future of the Maya forest in terms of conservation and development.

The ancient Maya cleared fields with hand tools, managed lands with skill, and used knowledge of fire to develop their landscape. These adaptations are integral to the human–environment relationship (Fedick, 2003, 2010; Gómez-Pompa & Kaus, 1992; Graham, 1999; Martínez-Reyes, 2016; McNeil, 2012; McNeil et al., 2010). This system sustained the Maya over millennia of growth and development, demonstrated by the well-known chronology of the Maya civilization (Ford & Nigh, 2015). The archaeological remains indicate settlements expanded and centers grew, land use was intensified. Farming settlements were established founded on resource management and the hierarchy at the civic centers was dependent on the farming populace (Ford, 1986). The source of Maya wealth lay in their landscape and how it was managed, thus the maintenance of that landscape was essential. Land use intensification was achieved with labor, skill, and knowledge. Maya civilization grew with consistent, predictable, and reliable resources.

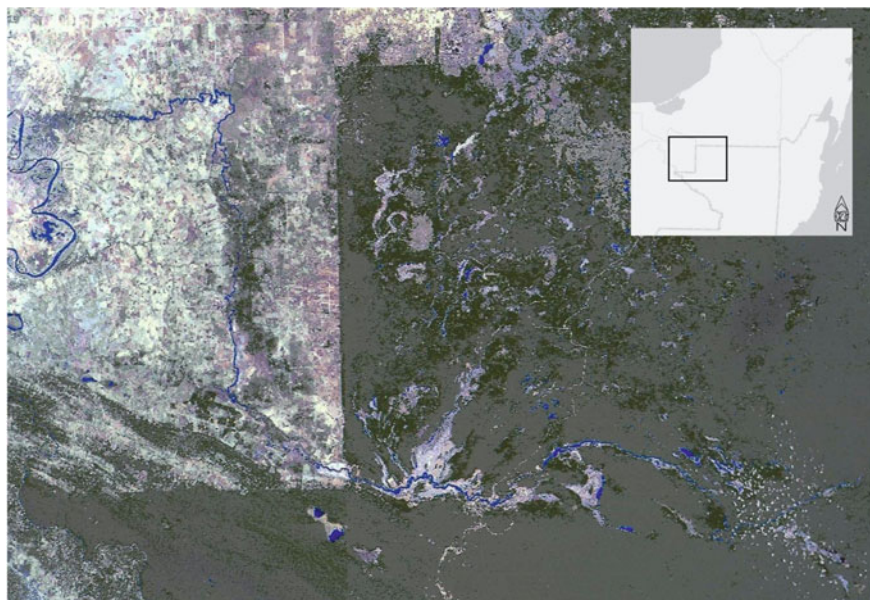


Fig. 2 National air and space administration landsat composite image 1986–1988 showing the impact of pasture and plow at the Mexican-Guatemala border, with inset location. Satellite image produced by NASA https://www.nasa.gov/mission_pages/landsat/news/40th-top10-mexico-guatemala.html. Compiled by MesoAmerican Research Center

Ancient Maya settlements were located among resources necessary to meet the regular needs of their lives. Everyday belongings used to fulfill routine household activities were in the orbit of the household. From the mundane to the esoteric, to the vernacular and the ritual, these daily activities were the fundamentals of the household economy. Food and condiments were a daily requirement for energy. Kitchen supplies, cooking utensils, and home furnishings were essentials for maintaining daily activities. Clothing, shelters, and tools were also essential. House construction and maintenance, as we all know, would be constant. Constructing and maintaining dwellings sourced perishable building materials from the nearby forests, directed second growth, and mature closed canopy. (cf. Arvigo & Balick, 1993; Balick et al., 2000; Cook, 2016; Roys, 1952; Wauchope, 1938). In short, everything we do on a regular basis would be stocked from the fields, gardens, and forests. The diversity of needs met by the products of the Maya milpa cycle provide solutions to address disparities identified in the UN SGDs in the world today.

4 Crop Stocks of the Maya Forest

The traditional milpa cycle opens the forest to emphasize annual crops while conserving useful trees of the forest. Fields are replete with many crops, selected by farmers from a basketful of over 100 potential choices (Ford & Nigh, 2015). Managed for useful plants that fix nitrogen and provide herbs, spices, and medicine—as well as attracting pests from menacing crops—fields cleared with fire provide access to sunlight for domesticated annuals that ripen in months. Edible plants are found in every habitat: Fedick counts nearly 500 indigenous food plants, from grasses to trees, providing a considerable range of choices for traditional Maya farmers. Fedick (2020) attests that more than 60% of edible plants are shrubs, trees, and palms. These plants are found in the forests and gardens, in shaded or sunny environs, and their harvests are important components of the Maya cropscape. Many trees of the domesticated cropscape tolerate, and even proliferate, in response to the cutting and burning humans use to build forest gardens (Ford et al., 2021; Gammage, 2011). Thus, the cycle initiates with deliberate clearing for fields, and is followed by consistently favoring preferred trees and nurturing useful volunteers (Ford & Nigh, 2015).

A varied mosaic of staggered stages created by generations of farmers emerges from interaction with the landscape, encouraging economic values that become the cropscape. Selection is part of the opening of a suitable field, and slope and drainage are critical factors (Ford et al., 2009). Areas too steep or too wet, making up about 40% of the region, are consequently avoided (Dunning et al., 2002; Fedick & Ford, 1990). Such habitats would be maintained as part of the perennial component for the extraction of plants and animals. On average, open fields are developed in approximately 20% of the landscape at any one time (Ford & Clarke, 2019). The remaining 80% of the area would be maturing as the forest garden, divided between maturing perennial and the established closed-canopy mature forest. Perennial generation would take at least 16 years, making the complete milpa-forest garden cycle last a minimum of 20 years. The resultant patchwork matrix would supply the varied economic needs of residents, serving as a storehouse for use on demand.

Every stage of the cropscape, horizontally and vertically, offers utility for the commons of society: home gardens, fields, regenerating second growth, and mature forests (Atran, 1993). Plants are recognized for utility, directly for human consumption or indirectly as landcover. Plants supply food, shelter, shade for temperature and water conservation, and to provide animal habitats. In a word, all household needs—at the daily, monthly, annually, and generational timescales—were supplied from the managed biodiverse cropscape that inhibits erosion and enhances soil fertility to maintain a life of land (SDG 15).

Forests are also homes for animals. Archaeological data show that deer remains were consistently present in household middens, suggesting the ready availability of meat protein. Deer habitat is enhanced by a varied and diverse patchwork of forests and interspersed fields, which create ecotones containing many resources. The supply of deer, the conquistador Diaz ([1568], 1927) observed, were “innumerable and so tame almost to come to our hands [and] in very little space of time we killed above

20.” The deer themselves were not domesticated, but the landscape they inhabited was, managed for food sovereignty (SGD 2).

Additionally, the caretaking of the local honeybees, *Melipona* spp., never fully domesticated, at ease living in the forests as well as in gardens. Known for their expertise at the time of the conquest as beekeepers, the Maya were confident beekeepers, recognizing bees in the forest: *K'axil kab*, and, like the deer, were part of the cropscape. As with all bees, they would need a consistent supply of water and flowers for the production of honey and wax, prized by the colonial powers as tribute (Farriss, 1992; Jones, 1977). This is possible when winter never comes (Bates, 1952). Bees thrive in a healthy environment, an essential indicator of ample water (SDG 6), with moderate temperatures and a diversity of flowers for year round pollination (SDG 13).

Materials for kitchen tools and containers, fibers and colorants, toys and instruments, burden baskets and hammocks, necklaces and head gear, and constant construction and maintenance all derive from the management of the cropscape. Fuel selection considers size, burning qualities, and the destination of use—in hearths or kilns, for smoking or charcoal, or for use as kindling (Cook, 2016). Long-lived palms, representing as much as half the forest trees, have a myriad of economic uses and are literally subsidies from nature (McKillop, 1994; cf. Anderson et al., 1991). This biological capital provides a wide array of essential products: beverages, building materials, cosmetics, feeds, fertilizers, food, fuel, medicines, oils, ritual materials, roofs, and shelters. Medicinal plants of the Maya pharmacopeia are found in home gardens and milpas, in succession forest plots, and in the deep shade of the mature canopy. Forests are the pharmaceutical commons. Remedies cover most general ailments encountered in the household. Medicine/poisons are managed carefully and prescribed in doses refined by trial and error through time, such as Cola de Faison for sore throat and Chaya for vitamins and protein (See Arvigo & Balick, 1993; Cook, 2016, Schwarcz et al. 2021). This provides a snapshot of the products available through the careful management of the cropscape (SDG 3).

A dependable cropscape results from interacting with and maintaining the life on the land (SDG 15). The interactions of people with forests and fields, based on farmer choices and plant adaptations, produce the forest garden. Developed over successive generations of trial and error, the resultant cropscape of adaptable annuals and perennial plants is managed with sophisticated skill and environmental knowledge. This is an intensive land-use system of agroforestry that engages with natural processes to minimize risk over time and maximize production across space.

Maya forest garden practices evolved for flexible and changing land cover to ensure cycling and staggered conversion from annual crops to perennial trees at all times (Ford & Nigh, 2015). The mosaic of land cover moderates rainfall variations and builds soil fertility with each phase of the high-performance milpa field development (Handelsman, 2021; Wilken, 1987). The system retains significant complexity, dependent on the landscape gradients from field to forest. Without clearing to initiate the annual milpa polyculture field, there would be no opportunity to select and stock the forest with useful trees (see Table 1). The managed, mixed cropscaapes result from integral perennial investments in the milpa forest garden. Dependent on the

knowledge and skill of cropscape managers, the horizontal and vertical distribution of forest products are sustained within the milpa forest garden cycle.

5 Distribution of Forest Croscapes

The karst limestone platform that influences the topography of the Maya forest is essential for adaptable agricultural practices, traditional knowledge of the earth remains vital for its successful management and adaptation to climate change. Drainage features and water distribution reflect the local variations in the porous and absorbent limestones. Rainfall averages vary from 500 mm in the northwest Yucatan Peninsula to 4000 mm in the far south; the central area around the ancient sites Tikal and El Pilar receives 1500–2000 mm a year (West, 1964; White & Hood, 2004). Land cover over the limestone base varies depending on local climate, rainfall, and soil conditions (Beach et al., 2006; Dunning et al., 1998).

Within the Maya region, seasons refer to traditionally observed annual precipitation. Farmers in the Maya area, however, recognize two rainy periods. The first is a warm wet period, called *Chaak Ikal* for the thundering wind and hurricanes. This is followed by the *Ikal Ixpelon*, the cool wet period associated with *nortes*, or storms derived from the eastern US. The shortest period is the dry period, *yaxk'in*, noted as the time for preparing the milpa field. Understanding the climate patterns and adjusting to changes are essential to the millennial practices of the Maya (SDG 13 & 15).

The porosity of limestone causes rainwater to seep into subterranean flows, thus limiting access to water on the surface (Ford, 1996; Lucero, 2003; Scarborough, 1993, 2003). Rain drains from the hills, ridges, and escarpments to collect in depressions across the region. These variations of karstic topography and water access generate the four general ecosystems and habitats from uplands to wetlands that provide vital resources used by ancient and modern people in the southern lowlands. Knowledge of these general environmental zones impact access to water (SDG 6).

To visualize the croscapes of the ancient Maya, we must turn to the well-drained uplands, where residential units were the most dense with 35–70 primary residential units per km² (Ford & Clarke, 2019). These densely settled residences would be surrounded by complex infields forming an agro-urban landscape (Fisher, 2014; Isendahl, 2002, 2012). The Maya term *Otoch K'aax* refers to the forest as home (Atran, 1993). Traverses from residential hubs to outfields would cross varied habitats of the lowlands and wetlands, allowing residents to accumulate an understanding of the cropscape, honing observations of supplies, habitats, and environmental changes.

The vertical tiers of the Maya forest hold a remarkable variety and abundance of useful plants (Balick & Arvigo, 2015; Campbell et al., 2006; Gómez-Pompa et al., 2003; Ross, 2011; Roys, 1931). The crops of the forest materialize from the shade and sun of home gardens, the sunny milpa fields of annuals and perennials, (Kellman & Adams, 1970) and shady mature closed canopy forest. The forest and garden tiers

give rise to a vertical diversity of crops from the ground cover, understory bush, shrubs and palms, and canopy trees.

Tropical rainfall guarantees exuberant plant growth, and the intentional management of that growth, with constant selection, intervention, and engagement with natural process creates the cropscape. Vertical diversity develops in one space over time, progressing from the field to forest, making room for layers composed of trees, palms, shrubs, grasses, vines, epiphytes, and forbs (Ford, 2008). Maya management strategies imposed priorities and preferences on the landscape, and the plants adapted to the pervasive human management style. This is evident in the frequency of re-sprouting among trees and the establishment of entire plant communities that respond well to cutting and burning (e.g., *Attlea* spp., see Anderson et al., 1991). The cropscape unfolds as a co-creative process of people living in the woodlands (Toledo, 1994).

Human impacts on the Maya forest in the past, as well as the present, are likely to have reduced overall diversity. Botanists indicate that the Maya forest has lower biodiversity than the Amazon forest (Campbell et al., 2006; Mittermeier et al., 2000). Given the dense ancient Maya settlements, it is not surprising that they had impact on biodiversity reflected in the forest today. In fact, a high proportion of plants have been recognized economically by economic botanists (Campbell et al., 2006; Ross, 2011). Areas of highest settlement density reveal homogeneity, in contrast to the Amazon. Outfields with low settlement density are less homogeneous. Maya resource management strategies worked with the forest landscape, prioritizing utility in the short-term that, in the long-term, developed a cropscape by working within the natural cycles. The short term daily needs of families and long term management goals are key to life on the land (SDG 15).

Over time, field crops give way to first low, and then high, shady forest crops. Pioneering plants gain dominance after a short phase of the milpa field, and the natural regeneration cycle transforms the field from annuals to perennials. Neither abandoned nor fallow, this phase of the cycle demands continuous care in the selection and direction of growth for the useful cropscape qualities. This is the steppingstone where the farmer's choices guide the nature of land cover to meet social and economic needs (Chazdon, 2014; Guariguata & Ostertag, 2001).

The Maya land use system creates a horizontal and vertical matrix of diverse assets that make up the cropscape. Basic household materials, medicinal plants, fruits and spice trees, and important agricultural products and forest animals underwrote the Maya life. Equally, the forest was a source of wealth and prestige. Colored birds and prized felines were esteemed for ornamentation, regalia, and display. The investment in forest products and intensive land management resulted in a dependable and varied cropscape that has endured to this day (cf. Armstrong et al., 2021).

6 Reflecting on the Value of Croscapes

Recalling that the Maya forest is a biodiversity hotspot (Mittermeier et al., 2000), that the dominant plants of the Maya forest are all useful, and that there are around 500 edible plants used by the Maya today, underscores the results of management practices of the ancient Maya. Daily investments in Maya forest gardens are subtle and even inconspicuous, construed as wild by ecological imperialists. Investments are made incrementally, initiated by farmer priorities to enhance desirable habitats and resources while remaining embedded in natural cycles (Ford & Nigh, 2015; see also Conklin, 1963; Dove, 1983). Agricultural fields, worked by hand, focused on rocky fertile soils to secure short- and long-term necessities in the croscapscape. Water was conserved by the mosaic of landcover which minimizes evapotranspiration and erosion. Fields, dispersed in forested uplands and lowlands, were continually navigated, providing constant opportunities in the process of selecting and domesticating the landscape. The most visible to the ecological imperialist is the transient milpa field, with the rest of the croscapscape misrepresented as abandoned.

Active and intensive investment in habitats for plants and animals enhanced life on the land. The distribution of field and forest resources created a diverse countryside that supported the economy of the Maya civilization. This is what the Spanish encountered when they first entered the region and mistook the exuberant tropical growth as unbridled chaos; not comprehending the croscapscape essential to living sustainably in the forest.

Management skills and knowledge transformed the landscape into what we now can define as the croscapscape. The Spaniards availed themselves of a landscape stocked with resources by long-term Maya investments, oblivious to its value and completely unaware of the impact of their actions and views. They ignored the croscapscape that enveloped them and created misconceptions that endure, untested, to this day. This ecological imperialist attitude persists in pejorative views of the tropics and a reticence to discuss successful example of human adaptations, such as the Maya, in the context of planning for a viable future.

The Mesoamerican and Maya forest is a biodiversity hotspot that is the historical outcome of ancient Maya land use. With the expansion of ecological imperialism, the inappropriate and unsustainable “conventional” farming, based on cattle ranches and plowed monocrops, has expanded at the expense of the forest. This was not the trajectory of the ancient Maya, and there are lessons to be learned. Calls for conservation have promoted the creation of protected areas that restrict access to the forest and guarantee no Maya forest croscapscape in the future. The real threat to the Maya forest is the loss of traditional Maya farming practices. Indigenous strategies, preserved in the archaeological record and documented by ethnography, illustrate the value of exploring the past to develop innovative solutions to address the critical sustainable development goals.

7 Sustainable Croscapes in Review

Long-term land management is essential in the contemporary tropics, having endured extreme impacts from population growth and deforestation and are projected to host the highest levels of future population growth (Roberts, 2020). Tropical forests are regularly dismissed resource poor, inadequate to sustain large populations without substantial alteration. This is the attitude currently putting these environments at risk. At the same time, long-surviving food-production and land use practices, involving sophisticated understandings of forest ecology and the benefits of managing vegetation dovetail with the Sustainable Development goals outlined by the United Nations. The ancient Maya did indeed develop sustainable methods to support themselves in the tropics with land use principles, strategies, and practices that engage with food sovereignty (SDG 2), access to necessary resources (SDG 3), conservation of water (SDG 6), flexibility with climate change (SDG 13), and maintain biodiversity that enhances life on land (SDG 15). If we are looking for action to address climate change we need to look to practices and methods with local roots. These are time-honored answers to challenges of sustainability including lowering temperature, conserving water, building soil fertility, reducing erosion, and maintaining biodiversity (Handelsman, 2021). Local traditions developed from millennia of experimentation offer viable solutions for a sustainable future. The example of the Maya is one case among many worthy of application, and demonstrate the value of exploring solutions past to inform development programs and policies of the future.

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Bibliography

- Altieri, M. A. (1987). *Agroecology: The scientific basis of alternative agriculture*. Westview Press.
- Anderson, A. B., May, P. H., Balick, M. J. (1991). *The Subsidy from Nature: Palm Forests, Peasantry, and Development on an Amazon Frontier*.
- Armstrong, C. G., Miller, J. E. D., McAlvay, A. C., Ritchie, P. M., & Lepofsky, D. (2021). Historical indigenous land-use explains plant functional trait diversity. *Ecology and Society*, 26(2). <https://doi.org/10.5751/ES-12322-260206>
- Arvigo, R., & Balick, M. J. (1993). *Rainforest remedies: One hundred healing herbs of Belize* (1st ed.). Lotus Press.
- Atran, S. (1993). Itza Maya tropical agro-forestry. *Current Anthropology*, 34(5), 633–700.
- Balick, M. J., & Arvigo, R. (2015). *Messages from the gods: A guide to the useful plants of Belize*. Oxford University Press.
- Balick, M. J., Nee, M. H., & Atha, D. E. (2000). Checklist of the vascular plants of Belize with common names and uses. In W. R. Buck (Ed.), *Memoirs of the New York botanical garden*. The New York Botanical Garden Press.

- Bates, M. (1952). *Where winter never comes: A study of man and nature in the Tropics*. Charles Scribner's Sons.
- Beach, T., Dunning, N., Luzzadder-Beach, S., Cook, D. E., & Lohse, J. (2006). Impacts of the ancient Maya on soils and soil erosion in the central Maya lowlands. *CATENA*, 65(2), 166–178. <https://doi.org/10.1016/j.catena2005.11.007>
- Binford, M. W., Brenner, M., Whitmore, T. J., Higuera-Gundy, A., Deevey, E. S., & Leyden, B. (1987). Ecosystems, paleoecology and human disturbance in subtropical and tropical America. *Quaternary Science Reviews*, 6(2), 115–128
- Birchall, C. J., & Jenkin, R. N. (1979). *The soils of the Belize Valley, Belize*, Vols. 1 & 2. Land Resources Development Centre.
- Bray, F. (1994). Agriculture for developing nations. *Scientific American*, 271(1), 30–37.
- Campbell, D. G., Ford, A., Lowell, K., Walker, J., Lake, J. K., Ocampo-Raeder, C., Townesmith, A., & Balick, M. (2006). The Feral forests of the eastern Petén. In W. Balée & C. Erickson (Eds.), *Time and complexity in the neotropical lowlands: Studies in historical ecology* (pp. 21–55). Columbia University Press.
- Chazdon, R. L. (2014). *Second growth: The promise of tropical forest regeneration in an age of deforestation*. University of Chicago Press.
- Conklin, H. C. (1963). *The study of shifting cultivation*, Vol. 185. Union Panamericana.
- Cook, S. (2016). *The forest of the Lacandon Maya: An ethnobotanical guide*. Springer.
- Crosby, A. W. (1986). *Ecological imperialism: The biological expansion of Europe, 900–1900, studies in environment and history*. Cambridge University Press.
- del Castillo, D., & Bernal, C. (1927). *The true history of the conquest of Mexico, written in the Year 1568*. National Travel Club.
- Diamond, J. (2005). *Collapse: How societies choose to fail or succeed*. The Penguin Group.
- Dove, M. (1983). Theories of swidden agriculture and the political economy of ignorance. *Agroforestry Systems*, 1, 85–99.
- Dunning, N., Beach, T., Farrell, P., & Luzzadder-Beach, S. (1998). Prehispanic Agrosystems: Adaptive regions in the Maya lowlands. *Culture and Agriculture*, 20(4), 87–101.
- Dunning, N. P., Luzzadder-Beach, S., Beach, T., Jones, J. G., Scarborough, V., & Patrick Culbert, T. (2002). Arising from the Bajos: The evolution of a neotropical landscape and the rise of Maya civilization. *Annals of the Association of American Geographers*, 92(2), 267–283.
- Farriss, N. M. (1992). *Maya society under colonial rule: The collective enterprise of survival* (5th ed.). University of Princeton Press.
- Fedick, S. L. (Ed.). (1996). *The managed Mosaic: Ancient Maya agriculture and resource use*. University of Utah Press.
- Fedick, S. L. (2003). In search of the Maya forest. In C. Slater (Ed.), *In search of the rain forest* (pp. 133–166). Duke University Press.
- Fedick, S. L. (2010). The Maya forest: Destroyed or cultivated by the ancient Maya. *Proceedings for the National Academy of Sciences*, 107(3), 953–954.
- Fedick, S. L. (2020). Maya cornucopia indigenous food plants of the Maya lowlands. In A. Freidel Marilyn, A. Masson David, A. Demarest Arthur (Eds.) *The real business of ancient Maya economies*. University Press of Florida, Gainesville.
- Fedick, S. L., & Ford, A. (1990). The prehistoric agricultural landscape of the central Maya lowlands: An examination of local variability in a regional context. *World Archaeology*, 22, 18–33.
- Fisher, C. (2014). The role of infield agriculture in Maya cities. *Journal of Anthropological Archaeology*, 36, 196–210.
- Ford, A. (1986). Population growth and social complexity: An examination of settlement and environment in the central Maya lowlands. *American Antiquity*, 52(4), 886–887.
- Ford, A. (1996). Critical resource control and the rise of the classic period Maya. In S. L. Fedick (Ed.), *The managed Mosaic: Ancient Maya agriculture and resource use* (pp. 297–303). University of Utah Press.
- Ford, A. (2008). Dominant plants of the Maya forest and gardens of El Pilar: Implications for paleoenvironmental reconstructions. *Journal of Ethnobiology*, 28(2), 179–199.

- Ford, A. (2017). Valuing the Maya forest as a garden. In N. Sanz (Ed.), *Exploring frameworks of tropical forest conservation*. UNESCO.
- Ford, A. (2020). The Maya forest: A domesticated landscape. In S. R. Hutson, T. Arden (Eds.), *The Maya World*. Routledge.
- Ford, A., & Clarke, K. C. (2019). Linking the past and present of the ancient Maya: Lowland use, population distribution, and density in the late classic. In C. Isendahl & D. Stump (Eds.), *Handbook of historical ecology and applied archaeology* (pp. 156–183). Oxford University Press.
- Ford, A., Clarke, K. C., & Raines, G. (2009). Modeling settlement patterns of the late classic Maya with Bayesian methods and GIS. *Annals of the Association of American Geographers*, 99(3), 496–520.
- Ford, A., & Nigh, R. (2015). *The Maya forest garden: Eight millennia of sustainable cultivation in the tropical woodlands*. Left Coast Press.
- Ford, A., Horn III, S., Crimmel, T., & Tran, J. (2021). Conserving the American tropics: Exploring the cropscape of the ancient Maya. *Technology's Stories*, 9(1). <https://doi.org/10.15763/jou.2021.03.23.01>
- Gamage, W. (2011). *Biggest estate on earth*. Allen and Unwin.
- Geertz, C. (1963). *Agricultural involution: The processes of ecological change in Indonesia*. University of California Press.
- Gómez-Pompa, A., Allen, M. F., Fedick, S. L., & Jimenez-Osornio, J. J. (2003). *The lowland Maya area: Three Millennia at the human-wildland interface, garden experiment, folk ecology, value systems*. Food Products Press.
- Gómez-Pompa, A., & Kaus, A. (1992). Taming the wilderness myth: Environmental policy and education are currently based on western beliefs about nature rather than on reality. *BioScience*, 42(4), 271–279.
- Gourou, P. (1980). *The tropical world: Its social and economic conditions and its future status*. Longman.
- Graham, E. (1999). Stone cities, green cities. In E. A. Bacus, L. J. Lucero (Eds.) *Complex polities in the ancient tropical world*, pp. 185–194. American Anthropological Association.
- Guariguata, M. R., & Ostertag, R. (2001). Neotropical secondary forest succession: Changes in structural and functional characteristics. *Forest Ecology and Management*, 148, 185–206.
- Handelsman, J. (2021). *A world without soil: The past, present, and precarious future of the earth beneath our feet*. Yale University Press.
- Isendahl, C. (2002). Common knowledge: Lowland Maya urban farming at Xuch. Ph.D. thesis, Uppsala University.
- Isendahl, C. (2012). Agro-urban landscapes: The example of Maya lowland cities. *Antiquity*, 86(334), 1112–1125. <https://doi.org/10.1017/S0003598X00048286>
- Johnston, K. J. (2003). The intensification of pre-industrial cereal agriculture in the tropics: Boserup, cultivation lengthening, and the classic Maya. *Journal of Anthropological Archaeology*, 22(2), 126–161.
- Jones, G. D. (Ed.). (1977). *Anthropology and history in Yucatan, The Texas Pan American Series*. University of Texas Press.
- Kellman, M. C., & Adams, C. D. (1970). Milpa weeds of the Cayo District, Belize (British Honduras). *Canadian Geographer/le Géographe Canadien* XIV, 4, 323–343.
- Martinez-Reyes, J. E. (2016). Moral ecology of a forest: The nature industry and Maya post-conservation. In M. Doane, D. Brockington, T. Heatherington, B. Buscher, M. Checker, J. Igoe (Eds.), *Critical green engagements: Investigating the green economy and its alternatives*. The University of Arizona Press.
- McKillop, H. (1994). Ancient Maya tree cropping: A viable subsistence adaption for the Island Maya. *Ancient Mesoamerica*, 129–140.
- McNeil, C. L. (2012). Deforestation, agroforestry, and sustainable land management practices among the classic period Maya. *Quaternary International*, 249, 19–30.
- McNeil, C. L., Burney, D. A., & Burney, L. P. (2010). Evidence disputing deforestation as the cause for the collapse of the ancient Maya Polity of Copan, Honduras. *PNAS*, 107, 1017–1022.

- Mittermeier, R. A., Myers, N., Mittermeier, C. G. (2000). *Hotspots: Earth's biologically richest and most endangered terrestrial ecoregions*. CEMEX.
- Mt Pleasant, J. (2015). A new paradigm for Pre-Columbian agriculture in North America. *Early American Studies*, 13(2), 374–412.
- Rice, D. S. (1976). The historical ecology of Lakes Yaxhá and Sacnab, El Petén, Guatemala. Ph.D. dissertation, Pennsylvania State University.
- Rivera-Nunez, T. (2020). Agroecología histórica maya en las tierras bajas de México. *Ethnoscintia*, 5, 1–26. <https://doi.org/10.22276/ethnoscintia.v5i1.299>
- Roberts, P. (2020). *Tropical forests in prehistory, history, and modernity*. Oxford University Press.
- Ross, N. J. (2011). Modern tree species composition reflects ancient Maya “Forest Gardens” in Northwest Belize. *Ecological Applications*, 21(1), 75–84.
- Roy, Ralph L. 1931. *The Ethno-Botany of the Maya*. Edited by Gino Germani. 1 vols. Vol. 2, *Middle American Research Series*. New Orleans, LA: The Department of Middle American Research, Tulane University.
- Roy, R. L. (1952). Conquest sites and subsequent destruction of Maya architecture in the interior of northern Yucatan. In *Contributions to American anthropology and history* (pp. 129–182). Carnegie Institution of Washington.
- Scarborough, V. L. (2003). *The flow of power: Ancient water systems and landscapes, a school of American research resident scholar book*. School of American Research.
- Schwarcz, H. P., Ford, A., Knyf, M., & Kumar, A. (2021). The Green Deer: Chaya as a potential source of protein for the Ancient Maya. *Latin American Antiquity*, 33(1), 175–186. <https://doi.org/10.1017/laq.2021.1071>.
- Schwartz, N. B. (1990). *Forest society: A social history of Petén, Guatemala*. University of Pennsylvania Press.
- Toledo, V. M. (1994). La Vía Ecológico-campesina de Desarrollo: Una Alternativa para la Selva de Chiapas. *La Jornada Del Campo*, 23, 4–6.
- Townsend, P. K. (2009). *Environmental anthropology from pigs to policies*. Weavland Press.
- Turner, I. I., Lee, B., & Sabloff, J. A. (2012). Classic period collapse of the central Maya lowlands: Insights about human–environment relationships for sustainability. *Proceedings of the National Academy of Science*, 109(35), 13908–13914.
- Voorhies, B. (1982). An ecological model of the early Maya of the central lowlands. In K. V. Flannery (Ed.), *Maya subsistence: Studies in memory of Dennis Edward Puleston* (pp. 65–95). Academic Press.
- Wauchope, R. (1938). *Modern Maya houses: A study of their archaeological significance* (1st ed.). Carnegie Institution of Washington.
- Webster, D. L. (2002). *The fall of the ancient Maya: Solving the mystery of the Maya collapse*. Thames & Hudson.
- West, R. C. (1964). Surface configuration and associated geology of Middle America. *Handbook of Middle American Indians*, 1, 33–83.
- White, D. A., & Hood, C. S. (2004). Vegetation patterns and environmental gradients in tropical dry forests of the Northern Yucatán Peninsula. *Journal of Vegetation Science*, 15(2), 151–160. <https://doi.org/10.1111/j.1654-1103.2004.tb02250.x>
- Wilken, G. C. (1987). *Good farmers: Traditional agricultural resource management in México and Central America*. University of California Press.

The Application of Indigenous Knowledge for Disaster Risk Management and Sustainable Development: Insights from Developing Countries



Henry Ngenyam Bang

Abstract This chapter interrogates the nexus between indigenous knowledge (IK), disaster risk management (DRM) and sustainable development. The central argument is that IK has been internalised by local communities over millennia for DRM with enormous potential to inform the Sustainable Development Goals (SDGs). Although IK has been time-tested and shown to be effective in mitigating community vulnerability to disaster risks, its application to contemporary DRM frameworks has been dismally insufficient in developing countries. This has implications for achieving the SDGs. Through an analysis of the relationship between IK, DRM, and the SDGs from various perspectives, this chapter has established that IK is a valued model of endurance in the history of DRM that contributes to achieving the SDGs. With this realisation, the chapter argues for the need to integrate IK with modern and/or scientific technology for optimal DRM performance, which will also accelerate accomplishing the SDGs. Hence, mainstreaming IK into DRM strategies to tackle the growing disaster risks in developing countries will also address impediments to achieving the SDGs. Arguably, this will be most beneficial to local communities that suffer the most from disaster risks and face the greatest challenges in achieving the SDGs. This chapter enhances knowledge on the relationship between IK, DRM and the SDGs and also contributes to literature in the field. Nevertheless, more research is required to better understand how merging indigenous and modern/scientific DRM approaches can be more beneficial to sustainable development particularly in local communities.

Keywords Indigenous knowledge · Disaster risk management · Sustainable development goals · Developing countries · Local communities · Natural hazards

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1 Introduction

Developing countries host remote, isolated, and disadvantaged communities living in some of the most inhospitable and fragile habitats in the world. These communities are especially vulnerable to several types of hazards, which continue to cause significant damages and pain to the destitute populace, with the hardest hit residing in local communities.

If we consent to the popular expression within the disaster management (DM) community that “*all disasters are local*”, then there is a rational argument that local, native, or indigenous knowledge (IK) should be instrumental in managing local disaster risks. Over generations, local communities survived all the challenges posed by nature, albeit not without difficulties using local strategies whose roots have been traced to IK.

Indigenous people’s knowledge encompasses a vast repertoire of knowledge and practices that has evolved in specific communities over several millennia of tackling livelihood and environmental challenges (Valez, 2020). This unique knowledge has evolved in various areas incorporating traditional environmental knowledge, local technical knowledge or referred to as “*science of the local people*” in some circles (Iloka, 2016).

Even prior to technological innovations in various approaches to disaster risk reduction (DRR) or standard operating procedures for disaster response, numerous indigenous people around the world have mitigated, prepared for, cope with and responded to natural hazards and/or disasters using local knowledge and cultural practices. The survival of IK to this day depicts a success story of adaptation and overcoming natural and human-induced hazards/disasters. Consequently, the DM skillsets of local people cannot be undermined.

The experience garnered by indigenous people to mitigate disaster risks plaguing local communities has implications for achieving the sustainable development goals (SDGs). Indeed, effective risk reduction and prevention using local knowledge is essential for local level sustainable development. Deprived of valuable resources, this chapter argues that the DRM practices of indigenous people in developing countries already contribute to sustainable development and should be recognised as invaluable in achieving the SDGs. Indeed, the application of DRR is implicit in several SDGs goals particularly in reducing vulnerabilities and enhancing resilience to disaster risks. That is why several global frameworks have been articulating the relationship between DRR and socio-economic development (UN, 2005, 2012, 2015).

Despite its potential, the integration of IK into DRR activities has been dismally insufficient in developing countries (Gaillard & Mercer, 2012; Rist & Dahdouh-Guebas, 2006; Shaw et al., 2009). Consequently, national policies that ignore local traditions/practices have often left indigenous people vulnerable to natural hazards with implications for attaining the SDGs. This chapter attempts to close this gap by highlighting the nexus between IK, DRR and sustainable development. This is a worthwhile exercise to create awareness in developing country governments

that inculcating IK systems into disaster risk aversion policies/plans also benefits in achieving the SDGs.

The discourse in this chapter has been arranged systematically in the following order: after this chapter, chapter two and three provides insights into the conceptualisations of IK and DRM respectively. The global recognition of the linkages between IK, DRM and sustainable development is the objective of chapter four. The fifth chapter attempts to examine the SDGs through the lens of DRM and IK. Next in Sect. 6, is the application of IK to DRM for sustainable development with examples from developing countries. Section 7 deals with the integration of IK into DRM measures to achieve the SDGs. There is a discussion section in Sect. 8 while Sect. 9 is the conclusion.

2 Conceptualising Indigenous Knowledge

The term IK defies a consensus on its usage and has been conceptualised in many ways: the knowledge that local people use to make a living in a specific environment (Warren, 1991); knowledge held collectively by a defined community (Williams & Muchena, 1991); a stock of knowledge developed by communities through generations of living in close proximity with nature (Johnson, 1992); an integrative system of knowledge that comprises of perceptions, concepts, values, and beliefs that occurs naturally amongst communities living in a rural environment (Sillitoe et al., 1998); a body of knowledge that originates from a specific geographical area (Ranasinghe, 2008); local, traditional and unique knowledge that exists within and evolved around certain circumstances of people indigenous to a certain geographic region (Grenier, 1998); and the functional knowledge of native people inhabiting a particular ethno-cultural and agro-ecological location or region (Haque, 2013).

Although these definitions may appear to be straight forward and simple, this unique knowledge has been described in several ways including phrases like “*traditional knowledge*,” “*local knowledge*,” “*indigenous technical knowledge*,” “*rural knowledge*,” “*traditional ecological knowledge*,” “*indigenous traditional knowledge*,” and “*traditional environmental knowledge*” (UNEP, 2008).

An analysis of the definitions shows that they emphasise key aspects such as the specificity of the knowledge in particular communities; its accumulation over several years and unwritten nature; its uniqueness in specific regions; its development under peculiar circumstances of local people; includes skills, beliefs, perceptions, concepts; achieved via experience or information transmitted over centuries; its relevance in the everyday life of people and application during disasters/crises.

By living in harmony with their environment, our ancestors developed exceptional strategies to cope with natural hazards, water and ecosystem management, climate change/variations, and especially agricultural practices that has sustained their livelihoods for centuries. The mode of IK acquisition and transmission has implications for theoretical and operational DRM.

3 Disaster Risk Management (DRM)

The term DRM warrants clarification to set the context of the discourse. DRM is defined by the United Nations as “*the application of DRR policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses*” (UN, 2016; p. 16).

From this definition it can be deduced that DRM encompasses DRR (pre-emptive strategies and processes to lessen prevailing disaster risks) and DM processes (preparing for disasters, response to disasters, and recovery after disasters) including any DRR regulations, laws, policies, institutional, administrative, and crises management instruments that has been established for coordinated and systematic DRM (Bang, 2021). Therefore, use of the term DRM in this chapter encompasses DM or DRR or both. In some instances, however, DM or DRR will be used to be more specific about the DRM activity.

The conceptualisation of DRM in this chapter aligns with the UN definition and seeks to interrogate the seemingly wide application of IK to DRM practices predominant in local communities in developing countries. As revealed later in the chapter, DRM activities that has been embedded in IK helps local communities to mitigate natural hazards and disaster risks, thereby increasing human security, enhancing livelihoods and well-being, which also contribute to accomplish the 2030 agenda for sustainable development. The linkages between IK, DRM and sustainable development have been acknowledged by the international community.

4 Global Recognition of the Linkages Between Indigenous Knowledge (IK), Disaster Risk Management (DRM) and Sustainable Development

Several global documents have recognised that IK systems can enhance DRR, and that DRM is an essential part of socio-economic development that is vital for sustainable development. The Rio de Janeiro Earth Summit (Agenda 21) demanded that international agencies and nation states should record and incorporate IK systems into research and development activities (UNCED, 1992). The first major international framework to address the mitigation of disaster risks, the Yokohama Strategy and Plan of Action for a Safer World (1994) acknowledged the nexus between DRR and sustainable development. Issues of DRM and vulnerability reduction were addressed in the UN Commission on Sustainable Development (UNCSD) in its 2004–2005 cycle in relation to human settlements, water management and sanitation. Similarly, the 2006–2007 cycle also addressed drought and desertification in reference to vulnerability and risk reduction (UN, 2013). In 2007, the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) underscored respect for indigenous peoples’ rights, their culture, IK, traditional practices and the contribution they make

to sustainable development and environmental management (UN, 2007). Shortly afterwards, the United Nations Environment Programme (UNEP) recognised and endorsed the use of IK in managing natural hazards/disasters and natural resource conservation practices (UNEP, 2008). The Rio de Janeiro UN Conference on Sustainable Development acknowledged the linkages between DRR and sustainable development (UN, 2012). Other global agreements like the 2030 Agenda for Sustainable Development, the Johannesburg Plan of Implementation (UN, 2005) and the Millennium Development Goals also reaffirmed the close interrelation between sustainable development and DRR by recognising the urgent need to mitigate disaster risks (UN, 2015).

Furthermore, the relevance of IK for DRM has been highlighted in international disaster management frameworks. Priority 3 of the Hyogo Framework for Action 2005–2015 underscored the application of IK into DRM policies and practices (UNISDR, 2005). The 2015 Sendai Framework for Disaster Risk Reduction highlighted that SDGs can be attained via DRR, for instance, by lessening vulnerability and exposure of local communities prone to disasters or building resilient infrastructures (UNISDR, 2015).

The United Nations Office for DRR (UNDRR) publication entitled “*Indigenous knowledge for disaster risk reduction: good practices and lessons learned from experiences in the Asia–pacific region*” underscores the need to develop consciousness for IK as a valuable tool for lessening disaster risks, particularly from natural hazards. A key objective of the publication is to motivate DRM administrators, policy makers and practitioners to integrate the wealth of local knowledge held by native/indigenous communities into contemporary and future disaster resilient projects (Shaw et al., 2009).

The seventh high-level meeting of the African Regional Platform for DRR that held in Kenya on the 19th of November 2021 acknowledged the role of IK in DRR in Africa. The document states “...encourage the adoption of a whole-of-society approach that integrates...indigenous and local knowledge systems and practices, age and cultural perspectives into the design and implementation of DRR” (ARPD RR, 2021, p. 5).

While outlining the vital role of IK to DRM, these international stakeholders underline its application in managing or mitigation community vulnerability to disaster risks. That also contributes to development and helps in achieving the SDGs.

5 Viewing the Sustainable Development Goals (SDGs) Through the Lens of Disaster Risk Management (DRM) and Indigenous Knowledge (IK)

The application of DRR is implicit in several SDGs and targets particularly in reducing vulnerabilities and enhancing resilience to disaster risks. Since disasters can cause and/or exacerbate poverty or set back development gains, effective DRM has

implications for poverty reduction. Hence, its relevance to (SDG1) “*End poverty...*”. The relationship of SDG1 with IK is easily established since local knowledge are also aimed at boosting agricultural practices/food production to enhance rural incomes fundamental to poverty reduction at the local level. Indeed, hunger and extreme poverty are principally rural (UN, 2020a), posing grave threat to local agrarian livelihoods.

SDG number 2, with regards to achieving food security and promoting sustainable agriculture is a viable DRR strategy against hazardous incidents like droughts that often cause food shortages or climate risks such as flooding that may damage farms or agricultural products. Ensuring food security and sustainable agricultural practices are also enshrined in IK practices.

Targets of SDG number 4 in relation to “*Ensure inclusive...education and promote lifelong learning...*” have relevance in both practical and theoretical education and sensitization to the populace on DRR measures or early warning for natural hazard-induced disasters.

“*Ensure availability and sustainable management of water...*”, SDG 6 is a vital DRR measure to preserve or responsibly manage water resources for use during drought conditions and/or store water due to water scarcity in dryland environments. Climate risks like flooding, famine and pollution pose grave threats to the range of invaluable services and livelihood needs sustained by water resources.

Although not explicit in SDG 9 (*building resilient infrastructure*), there is direct correlation to DRR in ensuring that structures/buildings can withstand natural hazards like earthquakes, hurricanes and/or floods.

SDG 11, which broadens the scope of resilience (and safety) to cities and human settlements, can be achieved through various DRM strategies. Examples are focus on dealing with anticipated disaster risks through better land-use planning/practices and/or water systems management; measures to mitigate disaster risks already present like retrofitting existing infrastructure or relocating vulnerable assets or populace and measures to enhance resilience to residual risks—preparedness, response, and recovery. These measures reaffirm the relation between DRM and sustainable development and have their roots in IK.

Due to their close interaction with natural and climate systems, local communities are highly vulnerable to climate risks. Hence, they can use their traditional knowledge to develop innovative means of responding to climate crises. Consequently, there is an intimate connection between IK and SDG13 on climate action.

SDG 16 has relevance in indigenous practices since it creates social harmony through the joined planning, organisation and implementation of DRM measures or natural resource management. Continues interaction amongst communities mitigates conflict and creates more inclusive societies.

Examples of IK practices with application in DRM that can foster the realization of the SDGs have been analysed in the next section.

6 Application of Indigenous Knowledge (IK) to Disaster Risk Management (DRM) for Sustainable Development: Examples/Cases from Developing Countries

This section highlights IK-induced DRM practices or case studies that have been carried out in various parts of the developing world that have implications for the SDGs. These have been obtained from contemporary practices, case studies, folk law and stories in various rural/indigenous communities.

Agricultural Practices that Mitigate Poverty (SDG1) and for Food Security (SDG2) During Natural Hazards

In the Lubombo regions of Swaziland, the local inhabitants are known to cultivate crops that can withstand dry conditions. Examples of such drought tolerant crops are jugo beans, cassava, bambara groundnuts, sweet potatoes, and sorghum. Cassava is also the preferred hazard (drought) resistant crop in Tanzania. Cassava can also remain unharvested for years on end without getting bad, hence providing food security during famine. Other drought resilient crops are pigeon peas, cocoyam, sorghum, millet, sweet potatoes, and cowpeas. Farming practices like mixed cropping ensures the availability of other food types when some crop species have poor yields. This is practiced by the Bunyore people in the western province of Kenya. They cultivate crops like cassava, potatoes, and millet etcetera, although their staple food is maize. When maize yields are poor, other crops are available as substitute for consumption (UNEP, 2008).

Furthermore, the success of livestock rearing has also relied on the indigenous medicinal skills of communities. A unique means of treating animals or preserving their health through immunity to specific diseases has been demonstrated by the Maasai in Kenya. During the outbreak of the rinderpest virus that posed a grave threat to cattle in the region, the Maasai took blood from the already infected animals in neighbouring villages and rubbed on the nostrils of the animals owned by them. This helped to build immunity in the animals that survived the disease (UNEP, 2008). These strategies help to fight poverty (SDG1), reduces the likelihood of famine, and enhances food security (SDG2).

Learning Through DRR Practices (SDG4)

Several examples abound of indigenous practices for DRR that have been sustained over generations due to the application of observational learning theories (Fryling et al., 2011). By observing how their elders/ancestors have applied structural and non-structural DRR measures, local people have used similar strategies to fight natural and environmental hazards. For instance, residents of Kashmir (India) have learned traditional construction techniques resilient to earthquakes (Dar & Ahmad, 2015). Through observations, people in Africa and Asia have learned to use local materials in constructing flood preventive structures (Stephen et al., 2008). Likewise, local people in Bangladesh, Thailand, Zimbabwe, Uganda, and Tanzania have learned to use animal behaviour and breeding trends to forecast the weather, seasonal changes, and

natural hazards (Arunotai, 2008; Mafongoya et al., 2021; Mondal, 2012; Okonya & Kroschel, 2013).

In addition, to survive cyclones, which are often associated with floods, local people have learnt to construct floating structures using locally sourced indigenous materials. Haque (2019) described how coastal communities of Bangladesh have developed indigenous survival strategies for cyclones that threaten the region annually by building floating items like straw piles, timber, bunches of coconuts, and thatched roof. To survive the strong cyclonic winds, they hold onto permanent structures and/or bind themselves to trees. Fostering environmental management and other attitudes through observational behaviour using IK (Morse et al., 2019) is a strategy to achieve SDG4.

Furthermore, the mode of community dissemination of IK could serve as an educational model for DRM. IK can be used to educate local communities to understand environmental change and threats. This enhances their ability to cooperate in tackling environmental hazards and disaster risks. For this to happen, stakeholders need basic education/training on IK.

Water Preservation and Extraction that Ensures the Availability and Sustainable Management of Water Resources (SDG 6)

Indigenous communities residing in arid environments have used local/traditional practices to preserve and extract water resources for centuries. To combat water shortage, locals have used traditional water management strategies (extraction and transportation) for centuries, especially in dryland environments. Such practices, locally known as “*Qanat*”, is a method of developing underground networks for transporting fresh water from deep wells on elevated or higher areas to planes (Beshah et al., 2016). *Qanat* have been used particularly in arid regions with low rainfall as the main method of getting water for irrigation and domestic purposes (Mohsen, 2013). In semi-arid environments that have average rainfall, rainwater collection practices (allowing subsurface percolation of runoff into aquifers and constructing ponds) have been used to collect and preserve water (Ferrand & Cecunjanin, 2014). These strategies are commonly applied in Morocco, Ethiopia, and some Central and Eastern Asian countries (Canavas, 2014). Notable, is the unique water conservation skills of the Konso tribe in Ethiopia that use terraces to channel runoff from catchments into ponds (Beshah et al., 2016). Unquestionably, these traditional practices contribute to achieving SDG6.

Traditional Architectural Designs Resilient to Natural Hazards (SDG9)

Traditional indigenous architecture has been used to mitigate contemporary risks and safe lives during natural hazards. For instance, the traditional vernacular residential architecture in India is known to have adapted to the climate and importantly to the region’s fragile/soft soils and vulnerability to earthquake risks for thousands of years. Traditional architectural techniques locally known as the “*Taq*” and “*Dhajji-Dewari*” in the State of Kashmir saved the life of thousands of people during the 2005 Kashmir Earthquake. The “*Taq*” technique involves inserting timber horizontally into stonewalls, which prevents the structure from cracking and collapsing during earth

tremors. The “Dhajji-Dewari” construction system entails placing timbers vertically, horizontally and crossed, which keeps the house firmer and more balanced. Indeed, the Kashmir earthquake confirmed that the application of indigenous architectural heritage in earthquake prone regions could be safer than modern techniques (Dar & Ahmad, 2015).

Likewise, the indigenes of Nias (Indonesia) build their wooden houses by slotting wooden beams vertically, horizontally, and diagonally that function as pillars and longitudinal and lateral bracing. The construction of the roof is similar to the underlying/supporting structure of the house. This traditional architectural design is resistant to earthquakes. During the devastating impact of the 2005 earthquake on Nias island’s population and infrastructure, most of the few wooden structures on the Island survived the earthquake while the dominantly modern masonry buildings were destroyed (Meyers & Watson, 2008). These indigenous DRM construction practices could be emulated to achieve SDG9.

Dredging Rivers and Building/Planting Flood Preventive Structures to Make Human Settlements Safe and Resilient (SDG11)

Indigenous communities have learnt over centuries that riverine flooding is exacerbated by the deposition of sediments on riverbeds, thereby, reducing its volume. To reduce sedimentation on their riverbeds and prevent their rivers overflowing their banks and flooding nearby areas, IK has required local people to desilt riverbeds. Through communal work, local residents in the Nandeswar village of Goalpara District India, remove silt and sand from rivers on a regular basis (Stephen et al., 2008) in order to keep their village safe from riverine inundation.

By the same token, building flood preventive structures using local materials and/or planting of flood resistant shrubs have been done in Asia and Africa. Local communities in both continents have mitigated the impact of riverine bank erosion and surface gully erosion using locally sourced indigenous plants like bamboo. The people of Nandeswar village in Goalpara District, India used silt and mud from rivers beds to build bunds along the sides of river channels. Then grass and bamboo are grown on the bunds to bind their surfaces in order to prevent erosion (ibid).

In the Niger Delta region of Nigeria, locals have grown bamboo and raffia-palm along riverbanks and areas susceptible to gully erosion. These served as water current breakers to prevent soil erosion in those areas. They have also planted bamboo on slopes, elevated areas, or hills to prevent landslides that often happens especially during the rainy/wet season when the soil becomes saturated with water and losses its binding capacity. The roots of the indigenous plants bond the soil together, reinforcing its strength. The soil then becomes more hardened and more resistant to soil erosion (Zhou et al., 2005; Iloka, 2016). These measures help to make their settlements safer and more resilient to natural hazards, aligning with SDG 11.

Coping and Adaptation Measures to Fight Climate Change and Its Effects (SDG13)

IK systems have been critical in adapting to various climate risks or natural hazards. Use of IK for climate change adaptation exists across regions through

practice, planning and behavioural measures. This include measures like the cultivation of climate-resilient crops, land management techniques, mobility/migration, warning/observation, and physical infrastructure measures, which have been used in Africa and Asia (Petzold et al., 2020).

For example, African pastoralists are known to adapt to drought conditions via various ways. Intra-African pastoralist migration is one of the most ancient and drought adaptation method used by nomadic pastoralist to continuously search for greener pastures in other regions particularly during droughts (Awinia, 2020). Another strategy is to rear a varieties of cattle with different degrees of resistance to environmental conditions. To ensure their herd have food always, they store fodder for later use. During drought conditions, local people eat cattle meat. They use fodder to feed sheep and goats, which are reserved for other purposes (Oba, 2013).

Furthermore, indigenous coping strategies have been employed for biodiversity preservation in local communities. Prior to the introduction of western methods for pest control, Africans used plant derivatives to fend off pests from damaging crops. These local pesticides have been found to have unique properties such as containing substances that hinder insects from developing resistance to them and having biodegradable plant derivatives that are innocuous to animals (Domfeh, 2007). The coping strategies of local Bangladeshi people following disasters have been applauded. One area is that of appropriate food preservation for use when crops are damaged by natural hazards. Before external assistance arrives after disasters, they drink rainwater or coconut water, eat the roots/stems of edible plants, and rely on local first aid for treating illnesses like fever, diarrhoea, and injuries (Haque, 2019). These practices demonstrate the vital role of IK to agriculture and livestock production, hence, enhancing food security in drought prone areas.

Another dimension is the abundance of greenery (forest, shrubs, indigenous plants, and other biodiversity) in indigenous habitats that helps to regulate carbon levels in the atmosphere (IFAD, 2019). Although indigenous people are amongst the most vulnerable to Climate Change, paradoxically, they are not culpable for the unsustainable emission of greenhouse gasses responsible for increasing the earth's temperature.

Strong Local Social Structures are Relevant for Peaceful and Inclusive Communities/Society (SDG16)

One of the largest contemporary indigenous community based natural resource management (CBNRM) programme in Africa is in Namibia. The CBNRM allows local communities to manage the forest resources in their lands through issuing community forest-use permits, control over farming and grazing land and the use of forest/wood and non-forest/wood products for commercial purposes (FAO, 2020). CBNRM creates inclusiveness amongst local people.

Another example in Nepal suffices. Though not fully recovered from the effects of the 2015 earthquake in Nepal, the local communities organised themselves and worked to repair key community infrastructures (shrines and community buildings). They also restarted important festivals and rituals integral to their spiritual well-being (Jigyasu, 2020).

Inclusiveness has also been demonstrated in community water management. The Borana community in Ethiopia have a traditional administration system (Gedaa) for water system management enshrined in participatory customary laws that impose responsibilities to all members. The local administrative system has a general assembly that meets regularly (8-year interval) to evaluate, review, and modify rules for the management of the local water resources (wells excavation and maintenance,) enacted in previous years. The entire community are responsible for the management of the water resources and failure to comply have consequences (Beshah et al., 2016).

As shown in this section, the manner in which the traditions/systems of indigenous people contribute to social/community organisations and inclusive societies cannot be undermined in a world where disunity, civil strife, conflicts, and social inequality are impediments to sustainable development. Community organisation and participation creates strong bonding/networks and social harmony relevant for peaceful and inclusive communities/society as prescribed by SDG16.

The examples and/or cases outlined in this section, underscores the importance of traditional wisdom in various DRM measures that foster the SDGs. Merging them would be of immense benefit for sustainable development.

7 Integration of Indigenous Knowledge (IK) into Disaster Risk Management (DRM) Measures to Achieve the Sustainable Development Goals (SDGs)

There is overwhelming evidence that the application of IK in DRM practices can contribute to the SDGs as revealed in the previous sections of this chapter. Yet, the application of IK for resilience against the vagaries of nature that also target the SDGs has been dismally insufficient in the plans and programmes of many developing countries. Indeed, indigenous ideas that facilitate risk aversion are rarely adequately addressed in DRM frameworks. Consequently, DRM decision-making processes that ignore local traditions/practices have often left local/indigenous people vulnerable to natural hazards. Therefore, it is relevant to involve indigenous communities in the public and private DRM planning processes.

With developing countries facing incredible challenges in mitigating disaster risks at the local level (Bang et al., 2019), there is need to recognise that community DRR measures anchored in IK systems have the potential to alleviate the well-being of local communities and achieve the SDGs. Therefore, bringing indigenous communities on board will facilitate the development of mutually beneficial cooperation and/or collaboration with their communities and stakeholders, which would foster the attainment of the SDGs.

This chapter endorses and advocates for an integrative perspective on IK and DRM to achieve the relevant SDGs. Arguably, since the livelihoods of indigenous communities and their cultures/traditions rely heavily on the tenets of social and

environmental sustainability, environmental and ecosystem management by indigenous people tend to be far better than those of other communities. For instance, the deforestation rate in indigenous people's territories in the Brazilian Amazon is less than 10% that of other regions (IFAD, 2019).

Developing a holistic approach to DRM that considers both indigenous and modern strategies is vital in rural communities of developing countries where risk reduction and development is often minimal. That is partly why the UN has recommended a holistic approach to sustainable agricultural practices (UN, 2020b), which will also facilitate response to natural hazards and intend, enhance the SDGs.

Advancements in technological innovations and modern DRM methods is one of the main reasons for the minimal application of indigenous wisdom and skills in many developing countries (Langill, 1999). As IK is abandoned in favour of contemporary practices, local communities can be more vulnerable to disaster risks. This calls for the need to integrate IK or local community approaches with modern DRM strategies. Two examples suffice to illustrate this assertion.

First, the traditional construction practices in some regions of India where houses are built with mud walls and thatch roofs could sustain some, but not all natural hazards in the region. During the 2006 unprecedented storms and floods in western India that seriously affected the drought stricken Barmer District of Rajasthan, most of the local houses were seriously damaged. Although the houses could withstand earthquakes and sandstorms, they easily succumbed to flooding. Consequently, the houses needed reinforcement in order to be resilient to flooding. That was provided by SEED, a national NGO that liaised with other regional and local stakeholders to integrate the indigenous construction practices and modern technology to build houses in the region that were resistant to multiple hazards including climate risks like flooding (Sharma & Joshi, 2008).

Second, a study carried out by CARE Kenya (NGO) noted that although 90% of the residents in the Luo community in Kenya's Nyanza province used clay pots, only 34% could access safe drinking water. In addition, the children had a high incidence of diarrhoea (47%). It was noted that the diarrhoeal diseases were caused by water contamination and storage when the inhabitants removed water from the wide-mouth clay pots using their hands, cups or calabashes that may be contaminated. Using the indigenous skills of local potters, the clay pots were modified (fitted with a flat base for easy extraction of water, a spigot, narrow mouth, and lid) with technical assistance from CARE Kenya. The water is treated, stored, and accessed via the spigot (UNEP, 2008). Thus, the modified pots are more hygienic, resilient, and environmentally friendly to the drought hazards in the region. These two examples demonstrate the benefits of merging traditional and modern technics.

8 Discussion: Critical Analysis of the Application of Indigenous Knowledge (IK) to Disaster Risk Management (DRM)

Despite continuous failures in western/modern strategies to effectively mitigate disaster risks in many developing countries, their DRM frameworks have either omitted or not sufficiently considered IK systems in their policies, plans and programmes. Continuous reliance on imported DM strategies and modern technology minimizes local people's resilience to hazards and disasters. This is disturbing especially considering that many developing countries have limited access to the prescribed modern/western DRR technologies. Even when available, such technologies are prioritised for use in urban settings to the detriment of local communities. Inefficiencies in addressing local risks underscores the relevance of sustaining IK in local communities that are often marginalised in DRM considerations.

DRR measures embedded in IK/practices are invaluable in mitigating disaster risks in local communities and the relevance of IK for DRM had been recognised by local communities centuries ago. Although IK systems have had little scientific inputs or tests, their suitability/ability to mitigate community vulnerabilities to disaster risks has been demonstrated as revealed in this chapter. This implies that IK can benefit DRM in identifying and proffering indigenous solutions to the growing disaster risks plaguing local communities.

Indeed, specific challenges of indigenous communities at the core of major issues in the SDGs are related to natural hazards, crises and emergencies requiring adequate DRM. The fact that disasters can seriously hamper development means the developmental process must consider DRM measures. IK has been the key to community development planning (Nyong et al., 2007) and coping strategies that has sustained local communities for many centuries. As argued in this chapter, this unique knowledge can significantly contribute to searching and resolving key natural and environmental hazard issues threatening the attainment of the SDGs.

Considering top-down DRM approaches have rarely been successful in many developing countries, IK represents "*bottom up*" approaches developed via a process of local understanding and grassroots participation. This unique knowledge is critical in empowering local/native people take leadership in DRM activities for their own benefit (Tharakan, 2015).

There is a requirement to enhance appropriate coping and resilience strategies in view of the anticipated increasing costs and fatalities from climate risks. IK have much to offer here. While victims of climate risks prefer preventive strategies, they are often left with no option than to adapt in their absence (Berman et al., 2014). Therefore, in planning for DRM, the authorities should prioritise both adaptation and mitigation in its policies and programs to cope with climate change. For instance, flood affected communities in Cameroon have used informal adaptive and coping strategies such as borrowing; consumption smoothing; asset liquidation; and individual, household or community-based actions (Balgah et al., 2019) that originate from IK.

Knowledge and understanding of local perceptions of risk and indigenous strategies to contain them is relevant to all DRM stakeholders at the local, regional, and international levels. Such knowledge will definitely influence the planning, design, and operational aspects of DRM to enhance community resilience to disaster risks while addressing the SDGs. In planning for DRR initiatives, stakeholders should recognize that indigenous people prefer to stay in their ancestral land for generations irrespective of any threats and accept disasters as their fate. In enclaved areas where communities usually have little or no access to modern technology, IK could be the ultimate solution to DRM issues. But merging indigenous and modern DRM strategies, where applicable, is arguably the best option.

The stance of this chapter is that mutually beneficial partnership can be developed around blending technical/scientific DRM knowledge with traditional knowledge from indigenous peoples' communities. This would enhance the involvement of indigenous communities in DRM planning, the realisation of policies, plans and projects, including the SDGs that benefit their communities. Thus, it is imperative to liaise with indigenous people to capture their knowledge and recognise their communities as key players in implementing the SDGs via unique local DRM measures. Considering the realisation of the 2030 sustainable development agenda underscores an overarching framework that promises to leave no-one behind, the argument in this chapter provides scope to incorporate indigenous people or local communities as partners in the realisation of DRM measures that contribute to realising the SDGs.

9 Conclusion

In this chapter, IK has been viewed through the lens of DRM as a combination of local or indigenous wisdom, practices, measures, activities, or actions practiced by indigenous/local communities to reduce vulnerabilities to disaster risks, which also contributes to the SDGs.

A review of international frameworks has revealed that indigenous wisdom encompasses most SDG objective and indigenous ideas are unique and valuable in advancing the SDGs including through DRM strategies. This chapter has revealed the repertoire of IK that communities in developing countries draw on to tackle natural hazards/disaster and environmental risks. This has been analysed with case studies or examples regarding SDG 1, 2, 4, 6, 9, 11, 13 and 16.

Although there has been heightened calls for the need to incorporate indigenous knowledge and its practices into DRM resilience planning and operations at all levels (local, regional and national) of the planning process, that objective is yet to be achieved. That poses severe impediment for achieving the SDGs since the invaluable nexus between IK, DRM and the SDGs have been established in this chapter.

Modern DRM techniques and/or innovation should not be a threat to IK. Therefore, this chapter has argued for the need to integrate or complement IK with modern scientific and technical ideologies for optimal performance in the local governance of disaster risks in developing countries. Some entry points to integrate IK with DRM

are mainly in the areas of policies, plans, development, institutional frameworks and response strategies, mapping of disaster risks, early warning, and adaptation.

Considering that natural hazards hit local communities hardest, and can easily be transformed into disasters, applying local/indigenous DRM measures to solve local community problems is a legitimate objective in developing country settings. Through that process, key SDGs will also be achieved as analysed in this chapter.

References

- ARPDRR (African Regional Platform for Disaster Risk Reduction). (2021). Declaration of the seventh high-level meeting on disaster risk reduction. IGAD/AU/UNDRR. Accessed January 03, 2022 from https://afpr.undrr.org/sites/default/files/2021-11/ADOPTED-2021%20AfRP_Nairobi%20Declaration_2.pdf
- Arunotai, N. (2008). Saved by an old legend and a keen observation: The case of Moken sea nomads in Thailand. In R. Shaw, N. Uy, & J. Baumwoli (Eds.), *Indigenous knowledge for disaster risk reduction: Good practices and lessons learnt from the Asia-Pacific region* (pp. 73–78). UNISDR Asia and Pacific.
- Awinia, C. (2020). The sociology of intra-African pastoralist migration: The case of Tanzania. *Frontiers in Sociology*, 5, 1–10. <https://doi.org/10.3389/fsoc.2020.518797>
- Balgah, R., Bang, H., & Fondo, S. (2019). Drivers for coping with flood hazards: Beyond the analysis of single cases. *Jambá: Journal of Disaster Risk Studies*, 11(1), a678. <https://doi.org/10.4102/jamba.v11i1.678>
- Bang, H. (2021). A gap analysis of the legislative, policy, institutional and crises management frameworks for disaster risk management in Cameroon. *Progress in Disaster Sciences*, 11, 1–12. <https://doi.org/10.1016/j.pdisas.2021.100190>
- Bang, H., Miles, L., & Gordon, R. (2019). Evaluating local vulnerability and organisational resilience to frequent flooding in Africa: The case of Northern Cameroon. *Foresight*, 21(2), 266–284. <https://doi.org/10.5897/JASD2018.0510>
- Berman, R., Quinn, C., & Paavola, J. (2014). Identifying drivers of household coping strategies to multiple climatic hazards in Western Uganda: Implications for adapting to future climate change. *Climate and Development*, 7(1), 71–84. <https://doi.org/10.1080/17565529.2014.902355>
- Beshah, M., Pekka, E., & Katko, T. (2016). Indigenous practices of water management for sustainable services: Case of Borana and Konso, Ethiopia. *Sage Open*, 6(4), 1–11. <https://doi.org/10.1177/2158244016682292>
- Canavas, C. (2014). Public awareness and safeguarding traditional knowledge: Challenges and conflicts in preserving and representing kārīz/kānérjīng in Xinjiang, PR China. *Water Science & Technology: Water Supply*, 14, 758–765.
- Dar, M., & Ahmad, S. (2015). Traditional earthquake resistant systems of Kashmir. *International Journal of Civil and Structural Engineering Research*, 2(2), 86–92. https://www.academia.edu/11475871/Traditional_Earthquake_Resistant_Systems_of_Kashmir
- Domfeh, K. (2007). *Indigenous knowledge systems and the need for policy and institutional reforms*. <http://www.krepublishers.com/06-Special%20Volume-Journal/S-T%20&%20T-00-Special%20Volumes/T%20&%20T-SV-01-Africa-Web/T%20&%20T-SV-01-05-041-07-Domfes-K-A/T%20&%20T-SI-05-041-07-Domfes-K-A-Tt.pdf>
- FAO. (2020). *Global forest resource assessment 2020 report, Namibia*. Accessed December 21, 2021 from <https://www.fao.org/3/cb0038en/cb0038en.pdf>
- Ferrand, A., & Cecunjanin, F. (2014). Potential of rainwater harvesting in a thirsty world: A survey of ancient and traditional rainwater harvesting applications. *Geography Compass*, 8, 395–413.

- Fryling, M., Johnston, C., & Hayes, L. (2011). Understanding observational learning: An Interbehavioral approach. *Analysis of Verbal Behaviour*, 27(1), 191–203. <https://doi.org/10.1007/BF03393102>
- Gaillard, J., & Mercer, J. (2012). From knowledge to action: Bridging gaps in disaster risk reduction. *Progress in Human Geography*, 37(1), 93–114. <https://doi.org/10.1177/0309132512446717>
- Grenier, L. (1998). *Working with indigenous knowledge: A guide for researchers*. International Development Centre.
- Haque, M. (2019). Indigenous knowledge and practices in disaster management: Experiences of the coastal people of Bangladesh. In Z. Bupinder, A. Akbaruddin, & B. Ananda (Eds.). *Disaster Risk Reduction: Community Resilience and Response*. Palgrave-McMillan.
- Haque, M. (2013). Indigenous knowledge and practices in disaster management, ELCOP Yearbook of Human Rights, ELCOP, Dhaka.
- IFAD. (2019). *Partnering with indigenous peoples for the SDGs*. https://www.ifad.org/documents/38714170/41390728/policybrief_indigenous_sdg.pdf/e294b690-b26c-994c-950c-076d15190100
- Iloka, G. (2016). Indigenous knowledge for disaster risk reduction: An African perspective. *Jamba: Journal of Disaster Risk Studies*, 8(1), a272. <https://doi.org/10.4102/jamba.v8i1.272>
- Jigyasu, R. (2020). *Harnessing the knowledge of indigenous communities for disaster risk reduction*. Accessed December 15, 2021 from <https://www.preventionweb.net/blog/harnessing-knowledge-indigenous-communities-drr>
- Johnson, M. (1992). *Lore: Capturing traditional environmental knowledge*. IDRC.
- Langill, S. (1999). *Indigenous knowledge: A resource kit for sustainable development researchers in dryland Africa, People, land and Water Program Initiative*. IDRC.
- Mafongoya, O., Mafonyoga, P., & Mudhara, M. (2021). Using indigenous knowledge systems in seasonal prediction and adapting to climate change impacts in Bikita District in Zimbabwe. *The Oriental Anthropologist*, 21(1), 195–209. <https://doi.org/10.1177/0972558X21997662>
- Meyers, K., & Watson, P. (2008). Legend, ritual, and architecture on the ring of fire. In R. Shaw, N. Uy, & J. Baumwoli (Eds.), *Indigenous knowledge for disaster risk reduction: Good practices and lessons learnt from the Asia-Pacific region* (pp. 17–22). UNISDR Asia and Pacific.
- Mohsen, T.-J.T.H. (2013). Review of ancient wisdom of Qanat, and suggestions for future water management. *Environmental Engineering Research*, 18, 57–63.
- Mondal, S. (2012). Disaster management through indigenous wisdom: voice from the people of Erendabari Char. *Journal of South Asian Disaster Studies*, 5(1–2). Accessed December 22, 2021 from https://www.preventionweb.net/files/46551_46551disastermanagementthroughindig.pdf
- Morse, B., Carman, J., & Zint, M. (2019). Fostering environmental behaviors through observational learning. *Journal of Sustainable Tourism*, 27(10), 1530–1552. <https://doi.org/10.1080/09669582.2019.1647219>
- Nyong, A., Adesina, F., & Osman, E. (2007). The value of indigenous knowledge in climate change mitigation and adaptation strategies in the African Sahel. *Mitigation and Adaptation Strategies for Global Change*, 5, 787–797. <https://doi.org/10.1007/s11027-9099-0>
- Oba, G. (2013). *Nomads in the shadows of empires: contests, conflicts and legacies on the southern Ethiopian-northern Kenyan frontier*. Brill, Leiden.
- Okonya, S., & Kroschel, J. (2013). Indigenous knowledge of seasonal weather forecasting: A case study in six regions of Uganda. *Agricultural Sciences*, 4(12), 641–648. <https://doi.org/10.4236/as.2013.412086>
- Petzold, J., Nadine, A., Ford, J. D., Hedemann, C., & Postigo, J. (2020). Indigenous knowledge on climate change adaptation: a global evidence map of academic literature. *Environmental Research Letters*, 15(11), 1–17. <https://doi.org/10.1088/1748-9326/abb330>
- Ranasinghe, P. (2008) Preservation and provision of access to indigenous knowledge in Sri Lanka. World library and information congress: 74th IFLA general conference and council 10–14 August 2008, Québec, Canada. Accessed December 22, 2021 from <https://archive.ifla.org/IV/ifla74/papers/106-Ranasinghe-en.pdf>

- Rist, S., & Dahdouh-Guebas, F. (2006). Ethnoscience—A step towards the integration of scientific and indigenous forms of knowledge in the management of natural resources for the future. *Environment, Development and Sustainability*, 8(4), 467–493. <https://doi.org/10.4102/jamba.v8i1.272>
- Sharma, A., & Joshi, M. (2008). Indigenous knowledge and modern science give environment friendly shelter solution in flood affected desert region of India. In R. Shaw, N. Uy, & J. Baumwoli (Eds.), *Indigenous knowledge for disaster risk reduction: Good practices and lessons learnt from the Asia-Pacific region* (pp. 09–13). UNISDR Asia and Pacific.
- Shaw, R., Takeuchi, Y., & Uy, N. (2009). *Indigenous knowledge, disaster risk reduction policy note*. ISDR Asia Pacific. Accessed January 07, 2022 from <https://www.researchgate.net/project/Indigenous-Knowledge-for-Disaster-Risk-Reduction>
- Sillitoe, P., Dixon, P., & Barr, J. (1998). Indigenous knowledge research on floodplains of Bangladesh: The search for a methodology. *Grassroots Voice*, 1(1), 5–15. Accessed December 12, 2021 from <https://assets.publishing.service.gov.uk/media/57a08da440f0b652dd001ab0/R6756Bullpap2.pdf>
- Stephen, I., Chowdhury, R., & Nath, D. (2008). Soil and water conservation through bamboo plantation: A disaster management technique adopted by the people of Nandeswar, Assam. In R. Shaw, N. Uy, & J. Baumwoli (Eds.), *Indigenous knowledge for disaster risk reduction: Good practices and lessons learnt from the Asia-Pacific region* (pp. 14–16). UNISDR Asia and Pacific.
- Tharakan, J. (2015). Indigenous knowledge systems-A rich appropriate technology resource. *African Journal of Science, Technology, Innovation and Development*, 7(1), 52–57. <https://doi.org/10.1080/20421338.2014.987987>
- UN. (2005). Johannesburg Plan of Implementation, UN department of Economic and Social Affairs. https://www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/POIToc.htm
- UN. (2012). The future we want: Outcome document of the United Nations Conference on Sustainable Development, Rio de Janeiro, Brazil, 20–22 June, 2012. <https://sustainabledevelopment.un.org/content/documents/733FutureWeWant.pdf>
- UN. (2013). *Lessons learned from the commission on sustainable development: Report of the Secretary General*. https://www.un.org/ga/search/view_doc.asp?symbol=A/67/757&Lang=E
- UN. (2015). *Transforming our world: The 2030 Agenda for sustainable development*. https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E
- UN. (2020a). *Poverty eradication-End poverty in all its forms everywhere*. <https://sdgs.un.org/topics/poverty-eradication>
- UN. (2020b). *Food security and nutrition and sustainable agriculture: End hunger, achieve food security and improved nutrition and promote sustainable agriculture*. <https://sdgs.un.org/goals/goal2>
- UN (United Nations) (2007) *United nations declaration on the rights of indigenous peoples*. Accessed December 18, 2021 from https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf
- UN (United Nations). (2016). Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction. United Nations General Assembly, https://reliefweb.int/sites/reliefweb.int/files/resources/50683_oiewgreportenglish.pdf
- UNEP (United Nations Environmental Programme). (2008). Indigenous knowledge in disaster management in Africa, UNEP Nairobi, Kenya.
- UNISDR (United Nations International Strategy for Disaster Reduction). (2005). *Hyogo framework for action 2005–2015: Building the resilience of nations and communities to disasters*. Accessed February 14, 2020 from www.unisdr.org/2005/wcdr/intergover/official-doc/L-docs/Hyogo-framework-for-action-english.pdf
- UNISDR (United Nations International Strategy for Disaster Reduction). (2015). *Sendai framework for disaster risk reduction 2015–2030*. Accessed October 02, 2018 from www.preventionweb.net/files/43291_sendaiframeworkfordren.pdf

- UNCED (United States Conference on Environment and Development). (1992). *United Nations Conference on Environment and Development*, Rio de Janeiro, Brazil, 3–14 June 1992. Accessed December 10, 2021 from <https://www.un.org/en/conferences/environment/rio1992>
- Valez, M. (2020). *Natural disasters and indigenous people's traditional knowledge*. Accessed December 26, 2021 from <https://nomadictribe.com/discover/items/19>
- Warren, D. (1991). Using indigenous knowledge for agricultural development. World Bank Discussion Paper 127. Washington, D.C.
- Williams, D., & Muchena, N. (1991). Utilizing indigenous knowledge systems in agricultural education to promote sustainable agriculture. *Journal of Agricultural Education*, 16(11), 52–56. Accessed December 30, 2021 from https://www.jae-online.org/attachments/article/741/Williams,%20D%20&%20Muchena,%20O_Vol132_4_52-57.pdf
- Zhou, B., Fu, M., Sie, J., Yang, X., & Li, Z. (2005). Ecological functions of bamboo forest: Research and application. *Journal of Forestry Research*, 16(2), 143–147. <https://doi.org/10.1007/BF02857909>

Nexus of Khawa Dune Challenge and Cultural Festival and Local People's Livelihoods in a Dryland Ecosystem of Botswana



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Abstract Cultural tourism is an essential socio-economic practice that sustains livelihoods of local communities in Botswana. Thus, the main purpose of this inquiry was to explore what local people's perceptions were about the Khawa Dune Challenge and Cultural Festival (KDCCF). Although Botswana has rich cultural tourism resources, little research has been conducted on its cultural events, particularly the KDCCF and its potential to sustain livelihoods within the local communities in the Kgalagadi desert. Since 2012, some of the experiences that participants can engage in include the *San* traditional dance, polka (*boerewalf*) dance, and quadbike riding. Prior research on the Kgalagadi desert focused on people's engagement and relationship to the Kgalagadi Transfrontier Park; moreover, previous research was quantitative in nature. This chapter asks two primary questions: How do the local people perceive, understand and participate in the planning and implementation of the Khawa Dune Challenge and Cultural Festival? And how do the local people contend the event has altered the communities' livelihood? It is hoped that the insights garnered from this qualitative approach can contribute to understanding how cultural tourism shapes the socio-economic parameters of local communities who live in proximity to indigenous natural resources. Furthermore, this research seeks to contribute to empowering local people in fostering sustainable development through their local experiences. Qualitative methodology is employed through field work observations, documents, semi-structured interviews and focus group discussions. The sustainable livelihoods

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approach is employed as the theoretical framework. The findings suggest that the cultural event has the potential to transform local people's livelihoods. However, it can foster conflict embedded within social hierarchies as barriers to community involvement and participation.

Keywords Cultural tourism · Indigenous community based research · Khawa Dune Challenge and Cultural Festival · Botswana

1 Introduction

In Africa, and Botswana in particular, cultural tourism plays a major role in the development of peripheral places by facilitating transition from an agriculture-based industry to a service-based industry (Ramkissoo, 2015). Cultural tourism, as a service industry, has the potential to contribute to a more equitable distribution of tourism-based development and yield benefits to local communities including socio-economic benefits (Moswete et al., 2015). In Botswana, the Khawa Dune Challenge and Cultural Festival (KDCCF) is a cultural tourism event that seeks to diversify the tourism offerings within the country (Botswana Tourism Organisation, 2019; Kgauthe, 2020). The objectives of the festival include enhancing community involvement and participation and enabling a platform for cultural exchange and commerce for the Khawa community (Botswana Tourism Organisation, 2019). The purpose of this chapter was to explore how KDCCF has shaped the livelihood of local communities in Khawa village.

The insights in this research may benefit local communities who live in proximity to natural resources such as Khawa village. Such cultural tourism as the KDCCF may empower local people to foster sustainable development through their local experiences. This research is underpinned by the Sustainable Development Goal 8.9 which contends that by 2030, Botswana communities should devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products (Ministry of Finance & Economic Development, 2018). UNESCO (2020) states that cultural tourism can help promote and maintain indigenous arts, handicrafts, and traditions, which are attractions for visitors. Consequently, local values and place-based food systems can promote a less carbon-intensive industry. Tourism research in Botswana is mainly skewed to the north western part of the country (Centre for Applied Research, 2016; Manwa et al., 2017). A few studies have been conducted on the southern part of Botswana including Manwa et al. (2017), Moswete et al. (2020) and Velempini and Perkins (2008). Manwa et al. (2017) focused on examining local awareness, attitudes and relations towards tourism operations in Maun and Tsabong, Moswete et al. (2020) examined community residents' attitudes towards the Kgalagadi Transfrontier Park (KTP), while Velempini and Perkins (2008) focused on integrating indigenous knowledge and modern scientific knowledge and its application in the utilization of veld products and wildlife in Khawa and Struizendam villages. Although the above studies focused on important issues such as indigenous

knowledge and biodiversity, tourism operations and attitudes of local people toward protected areas, the authors did not explore the nexus of a cultural event and its relationship to local people's livelihoods in Khawa village.

According to Botswana Tourism Organization (2017, 2019), funds were invested in hosting KDCCF, which takes place for three days per annum. In 2017 and 2018, P3976,703.60¹ (USD 336,154.15) and P3462,302.48 (USD 292,671.38) were spent by the government of Botswana to host the event; the estimated business sales were P3138,340.46 (USD 265,286.60) and P3497,929.62 (USD 295,682.98), respectively. Of the estimated business sales, the direct host community benefit was less at 1.6% (P131,200 or USD 11,090.45) of Khawa businesses. The majority of the sales went to Gaborone (capital town of Botswana) and Tsabong (major town in Kgalegadi south district of Botswana) businesses. Revenue accrued by Khawa Kopanelo Development Trust² (KKDT) was P64,000 (USD 5409.97) in 2017, P59,700 (USD 5046.49) in 2018 and P50,070 (USD 4232.46) in 2019 (Botswana Tourism Organisation, 2019). The above revenue suggests that government expenditures on the event is higher than the host community business revenue gains; therefore, displaying a financial discrepancy. Khawa village has relatively less of a development infrastructure than the other major areas. In Khawa, the majority of local people live in poverty (0.436 poverty rate) and are dependent on government social welfare programmes such as *Ipelegeng*³ as their main source of income (Statistics Botswana, 2015). Social grants are provided for the elderly, orphaned and vulnerable children. Research suggests that in Botswana, cultural tourism has been underutilized; yet, it has the potential to be more fully developed and yield a more equitable distribution of tourism-based benefits to local communities such as Khawa through cultural exchange and understandings through music, art, craft industries; community cohesiveness and cultural pride and identity (Saarinen et al., 2014). For this reason, this current research is guided by the key questions which ask, how has the KDCCF shaped the livelihoods of local people and how do they perceive or understand their involvement and participation in planning and implementation of the event? In essence, this research seeks to illuminate how local communities utilize cultural tourism for development and sustained livelihoods.

¹ 1USD = 11.3 BWP or Pula (P). Local currency in Botswana is Pula (P). <https://www.xe.com/currencyconverter/convert/?Amount=1&From=USD&To=BWP>.

² Khawa Kopanelo Development Trust (KKDT) is a registered Community Based Organization (CBO) in Khawa village that is operating under the Botswana program and conservation model called Community Based Natural Resources Management (CBNRM).

³ Ipelegeng is Government Initiative or programme whose main objective is to provide short term employment support and relief whilst at the same time carrying out essential development projects that have been identified and prioritized through the normal development planning process. Retrieved from <http://www.gov.bw/en/Ministries--Authorities/Ministries/Ministry-of-Local-Government-MLG1/Tools-and-Services/Services1/Ipelegeng-Project/>.

1.1 Context of the Study

Khawa is a remote village in Kgalagadi south district, approximately 700 km southwest of Gaborone in Botswana (Fig. 1). The village is situated in the heart of the Kgalagadi Desert, a dryland ecosystem where annual average precipitation is about 19.86 mm (0.78 inches) and has 43.91 rainy days annually (Weather & Climate, 2021). Khawa is endowed with natural resources such as sand dunes, rangelands, wildlife and has been allocated a Wildlife Management Area (WMA) of KD15 by the Department of Wildlife and National Parks (DWNP). The concession area (WMA) is operated by Khawa Kopanelo Development Trust (KKDT). KD15 is a Controlled Hunting Area (CHA) for income generation through tourism concessions.

According to Statistics Botswana (2011), Khawa had a population of about 840 (398 males and 442 females). Ethnic composition is made primarily of San/Hunter-gatherers (*Basarwa*), Bakgalagadi and few coloureds. Wildlife dominate the livelihood sources in Khawa. In addition to government social welfare programs, community's livelihoods are dependent on the collection of veld products such as

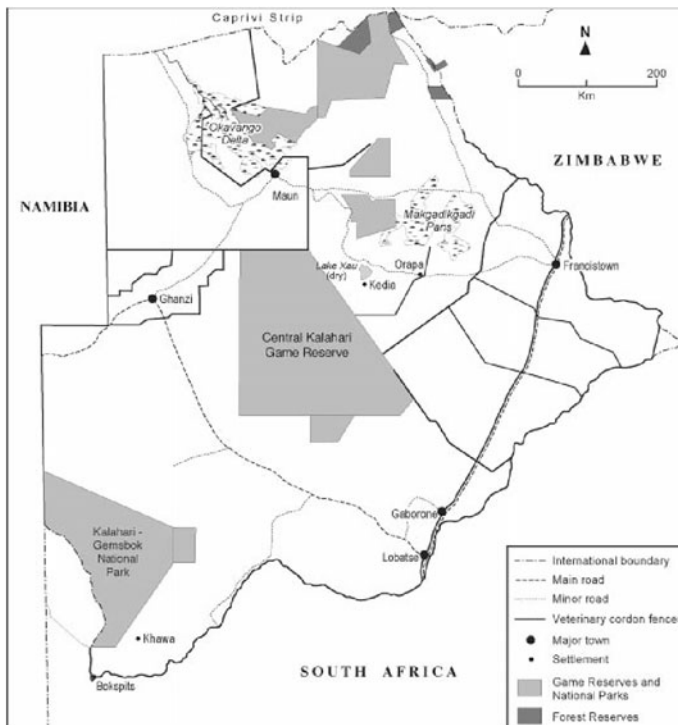


Fig. 1 Map of Botswana showing Khawa village adjacent to Kalahari Gemsbok National Park (now Kgalagadi Transfrontier Park), approximately 700 km southwest of Gaborone (*used with permission*). Source Sallu et al. (2010)

morama bean (*tylosema esculentum*), hoodia goordoni (*harpagophytum*), devil's claw (*harpagophytum procumbens*) for subsistence purposes and to supplement income (Madzwamuse et al., 2007; Velempini & Perkins, 2008). Also, livestock (e.g. goats, sheep and cattle) is one of the most important sources of livelihood. The poverty level, however, is higher in south western Botswana where Khawa is situated. Statistics Botswana (2015) reported that poverty incidence is 0.60–0.77 in Khawa and surrounding villages in the Kgalagadi Desert. Consequently, most residents of Khawa have a low socio-economic status (Centre for Applied Research, 2016).

Since 2012, the KDCCF, a popular cultural event, has taken place. It was established as a tourism product development program to contribute towards diversification of tourism in the region. Some of the community-based tourism activities that take place during KDCCF include camel rides, helicopter rides, quad bike rides, 4 × 4 obstacle challenge, sand-boarding, tug of war, volley ball and football competitions (Botswana Motor Sports, 2019). Evening activities include an official opening ceremony, music and traditional dances. This research seeks to explore how well the event has fostered cultural tourism and manifested its established aims thereby contributing to an understanding of cultural tourism events in the south western part of Botswana that have not been examined in the literature.

2 Literature Review

2.1 *Community Based Natural Resource Management and Participation of Local People*

The conservation model of Community Based Natural Resources Management (CBNRM) developed in the early 1980s emphasized the participation of local people in natural resource management (Ramachandra & Nagarathna, 2007). Participatory development empowers community members to develop skills, expertise and confidence in taking control of their environmental resources. In addition, participatory development encourages social collaboration and engagement, provides new positions and voices for young people, women, and the elderly, poor and disadvantaged minority people. CBNRM supports local communities in revitalizing their local economies and driving their own development agenda based on their worldviews and priorities. In China, Weng et al. (2019) reported that cultural tourism has been widely regarded as an opportunity to revitalize local economies and create employment opportunities for the local people. Weng et al. (2019) further indicated that cultural tourism can be incorporated to diversify rural tourism products and services resulting in the sustained livelihoods of local people. UNESCO (2020) contends that cultural tourism gained traction during the 1990s when sectors such as heritage tourism, arts tourism, gastronomic tourism, and film tourism emerged. Therefore, cultural tourism is place based and it is backed by a desire to discover, learn about and enjoy tangible and intangible cultural assets offered by local people. Cultural

tourism, however, continues to be transformed by changing lifestyles, burgeoning forms of culture and creativity, and digital innovation. Benefits of cultural tourism not only include the economic benefits in terms of growth and job creation, but intangible impacts such as travelling to gain an appreciation of cultural diversity, enhancing tolerance, and helping to keep cultural heritage alive. Indeed, cultural tourism can help encourage appreciation of and pride in local heritage and local knowledge. It can promote territorial cohesion and socioeconomic inclusion, and participation in generating economic livelihoods for women and youth in rural areas.

2.2 Local Knowledge and Natural Resources Management

In Africa, local knowledge continues to play a role in environmental resources (e.g. water and wildlife) management (Asuk & Nchor, 2018). According to Olson (2012), rural communities in Kenya relied on their local knowledge and its integration with modern scientific knowledge to cope with water scarcity in the east Africa region. Cultural tourism, through local knowledge, has benefitted local communities in the southern Africa region through poverty alleviation and job creation among disadvantaged communities such as in Mpophomeni in South Africa, San-hunter gatherers in Botswana, Maasai in Kenya and Tanzania (Nampushi & Namkaya, 2020). Cultural tourism projects provide visitors with collective experiences that combine cultural and historical elements. In Botswana, the conservation model of Community Based Natural Resources Management (CBNRM) was initiated in the early 1990s for local involvement and participation in the management of natural resources (especially wildlife), through employing indigenous knowledge systems (Department of Wildlife & National Parks, 2010; Mbaiwa, 2005). CBNRM aims at alleviating poverty, advance conservation, strengthen rural economies and empower local communities. In their study Moswete et al. (2015) reported that cultural tourism combines socio-cultural, political, environmental aspects and social norms. This enables local communities to take pride in their heritage and helps them to enhance collective identity as it relies on local products and objects of the host community.

In (2002) and (2007), the Republic of Botswana implemented Community Based Tourism (CBT) events by establishing platforms for local communities to participate in improving and sustaining their livelihoods through tourism opportunities. Indeed, one of the CBT events was the KDCCF. Officially, the event was initiated in 2012 by the Botswana Tourism Organisation (BTO). In 2019, it was on its seventh (7th) year. The event aimed at diversifying tourism and stimulating the domestic tourism market with the expectation of creating employment for local people, attract infrastructural development and promoting ecological heritage, socio-cultural exchange and preservation (BTO, 2019). Manwa et al. (2017) emphasized that sustainability of socio-cultural tourism is centered around community awareness, participation and derived socio-economic benefits from tourism.

Although the government of Botswana has developed policies to support local community participation and livelihood development through natural resources

management, there are still barriers in getting local people involved and participating in tourism activities. Leano et al (2014) reported a lack of information and transparency, social hierarchy and power relation struggles as barriers to the involvement and participation of local people in tourism activities.

3 Methodology

This research employed qualitative methodology to answer the research questions. Qualitative methodology is a systematic scientific paradigm that aims to create a coherent descriptive explanation that provides an understanding of the social phenomenon under investigation as wholly as possible within its natural context by the researcher (Patton, 2015). Qualitative methodology was chosen for this research because the purpose of this research was to explore the understandings of the participants about their involvement in the Khawa Dune Challenge and Cultural Festival event. Hence, it was chosen as the best methodology to answer the research questions which sought information from the participant's experiences using their own voice (Marshall & Rossman, 2011; Stake, 1995). Furthermore, the methodology permitted the researchers to explore how the context and ascriptive characteristics of the participants such as ethnicity and context shaped the experiences of the participants thereby explicating the purpose of the inquiry.

Qualitative methods such as documents, interviews, focus groups and observations permit the researcher to gain insight from the actual participants' voices. Documents such as *The Socio-Economic Survey from Botswana Tourism Organization* (BTO) were gleaned to provide information about the financial status of the organization and progress of the Khawa Dune Challenge and Cultural Festival. To gain participants for the interviews and focus groups, the researcher used both purposive and snowballing sampling. Purposive sampling was used to select key informants for semi-structured interviews with the village Chief (*Kgosi*), treasurer and secretary for Village Development Committee (VDC) and chairperson and treasurer for Khawa Kopanelo Development Trust. A total of five semi-structured interviews were conducted. Each interview lasted one-hour and the interviews were fully transcribed. Participants were promised confidentiality and pseudonyms were used for each participant. Additionally, purposive snowball sampling was employed with the VDC members to recruit participants for the focus group discussions. Participants in focus group discussions were mainly employees (*in Ipelegeng programme*) who were supervised by VDC members. The sample size of each focus group was not pre-determined. It depended on time and resources available as well as saturation of data (Naderifar et al., 2017). Two focus group discussions comprising nine ($n = 9$) and ten ($n = 10$) members of Khawa village were conducted to solicit perceptions of participants in relation to what extent are they involved and participating in Khawa Dune Challenge and Cultural Festival. Participants in focus group discussions were dominated by women and youth, who were normally considered as minority and marginalized groups. The focus group interviews were transcribed.

Observation was utilized throughout the interviews and focus group data collection; additionally, the actual cite of the Khawa village was visited to gain an understanding of the community. In essence, the qualitative methods employed for this research such as individual and group interviews, documents, and observations permitted the researcher to gain insights into the Khawa village from the actual participants in their own words; in total, twenty-four (24) people participated in the study. Consequently, this research employed the use of document analysis, observation, semi-structured interviews, and focus group discussions thus ensuring the credibility and trustworthiness of the research through the triangulation of data methods (Marshall & Rossman, 2011; Patton, 2015).

3.1 Theoretical Framework

The Sustainable Livelihoods (SL) approach, inspired by Robert Chambers' work in the 1980s are employed as the theoretical framework in this research. The SL approach is a framework for development work that highlights the understanding, analysis and description of main factors effecting poor people's livelihoods (Department for International Development, 2000). The SL approach describes what poverty reduction development should focus on to provide disadvantaged people with sustainable livelihoods and has two primary principles (Petersen & Pedersen, 2010). The first principle is that development work must focus on people and what matters to the poor, how different people and their cultures are, and how development affects the way they understand and appreciate their livelihood. The second principle is that the disadvantaged themselves must be key players in defining aspects of their own living conditions. Therefore, involvement and participation are important factors in local people's development. Additionally, SL has five assets in its approach. Assets under the SL approach used in this research were as follows: natural, human, social, financial, and physical assets (Department for International Development, 2000). Natural assets include tangible resources such as wildlife, landscape, and more intangible products such as the atmosphere. Human assets include knowledge and skills as well as the ecological ability to sustainable manage natural resources. Local knowledge and skills are essential for the implementation of the cultural event. Social assets include social networks, close ties and connections among people and organizations that build community cohesion (Department for International Development, 2000). Financial assets include resources to invest in community capacity building, business development to support civic and social entrepreneurship, and to accumulate wealth for future community development (Department for International Development, 2000). Physical assets are comprised of visible infrastructure to support livelihoods. The implication in employing five assets of the SL approach in this research is that if all the assets are considered by local people in coordinating the cultural event, a place-based vital economy for local people can be enhanced.

3.2 Data Analysis

All interviews were fully transcribed. Transcribed documents were stored directly in a computer file. After transcription, the researchers engaged in first cycle coding where each transcription was fully read and compared to the audio recording and emergent themes were gleaned (Saldana, 2016). After emergent themes were described, second cycle coding occurred where similar themes were grouped into categories to provide a coherent analysis of the data sources and the answering of the research questions posed for the study through in vivo coding of participants experiences as well as the application of the theoretical framework to the contents of each interview related to what particular asset manifested in the participant's responses. Thus, analysis of data was conducted thematically and data was categorized into larger categories related to the research questions. Thematic arrangement is an approach that identifies, analyses and report patterns across data. Four major themes were garnered from the thematic data analysis.

4 Results

4.1 "Good Thing About the Cultural Event"

Participants indicated that since the Khawa Dune Challenge and Cultural Festival started in 2012, there have been favorable outcomes related to the transformation of the livelihoods of local people. One of the elderly participants stated, "The good thing about the cultural event is that it employs the community of Khawa in casual jobs such as litter picking and the community also benefit through selling food at the stalls." Another participant asserted,

During the event there is money generated. Some people are benefitting and there are also individual benefits and indirect benefits that we get during the cultural event even though it is not much. Other people are given stalls to sell food and those are individual benefits, they make money to sustain their livelihoods.

The questions asked to the participants explored their perceptions towards the cultural event and how it functions. Natural, human, social, financial and physical assets emerged from participants' responses during data collection. The sand dunes function as the ecological landscape base for cultural event activities such as sand boarding, camel, helicopter, and quadbike rides. For the past 7 years, sand dunes have attracted local tourists and brought income to the village of Khawa through outdoor and adventure activities such as sand boarding, quad bike rides, camel rides and ball sports (Botswana tourism, 2019). KKDT manages the concession area (KD15) which has diverse wildlife such as lions, leopards, eland, and gemsbok and plant species that provide spectacular views during game drives through locally trained tour guides. Also, the cultural event has enabled training of local youth in Khawa through some

Table 1 Casual jobs, payments, and duration

Types of casual jobs	Payments local people gained (BWP)	Duration
Litter picking	100–500	3 days
Tent picking	100–200	3 days
Washing dishes and pots in catering companies	1500	3 days
Providing hot water, electricity and firewood	50	Per night
Selling small stock (goats and sheep)	1000	Per animal

of the activities. One of the elderly participants shared, “there are also children from Khawa who were trained on how to ride bikes and during the event they benefit by participating in bike racing competitions. This event aims at developing people so that they progress.” Donations of food hampers, toiletry, blankets and snacks (e.g. candies) were distributed to elderly people, orphans and other disadvantaged groups and children during the cultural event. The donations were made by the President of Botswana or his representative. Also, donations of football equipment were handed over to the village football teams.

Khawa Kopanelo Development Trust generated income through the use of natural resources found in the village. One of the participants responded by referring to partakers of the cultural event and attested,

They use our natural resources which are sand dunes. The trust oversees these natural resources through the program called CBNRM to facilitate tender processes. After they are done with this, the contractor provides the service during the event, after event, they pay for camping ground. The money generated by the trust ranges between P80,000 and P110,000.

Furthermore, participants in the study articulated that there was employment creation during the event. They stated they obtained casual jobs such as litter picking, pitching of tents, washing of cutlery, dishes and pots from catering companies during the vent. Table 1 shows payments local people gained from casual jobs.

Additionally, local people benefitted from the event through renting-out their homesteads to visitors who wanted to pitch camping tents. One of the elderly participants stated, “We are able to have a farm for Swakara⁴ sheep. The money that the trust receives from the cultural event is also used in the Swakara sheep project to pay for herdsmen to look after the sheep.” Other benefits mentioned by participants included payments to them due to participating in adventure activities such as football games, sand boarding, quad bike riding, traditional and polka dance (Table 2).

The village of Khawa is represented by two Polka dance groups, namely; (1) *Gareng-gadithota* and (2) *Blygesien*. The traditional dance group is represented by

⁴ Swakara sheep are also called Karakul sheep. “Farmers at Khawa are in the process of acquiring a flock of Karakul sheep for the Swakara trade to market pelts (coats made from Karakul lamb hides) (IUCN, 2014, p.69).

Table 2 Adventure activities, position, and monetary rewards

Adventure activity	Position	Monetary rewards (BWP)
Football	1	5000
	2	3000
	3	2500
Sandboarding	1	75
	2	50
	3	25
Quadbike	1	5000
	2	2500
	3	1000
Traditional (<i>San</i>) dance group		7000
Polka (<i>boerewalf</i>) dance group		7000

Table 3 KKDT income generation strategies during the cultural event

KKDT income generation strategies during the cultural event	Amount (BWP)
Selling 30 stalls	30/stall
Do It Yourself (DIY) camping (hot water & ablution facilities provided)	75/night
Ground camping fee (paid by the contractor)	90,000 ±
Camping, Game drive and sight viewing in KD15	200/visitor

Diganka tsa pele. Furthermore, participants stated that KKDT generated money during the cultural event as shown in Table 3.

The trust generated money through the ground camping fee which is paid by a contractor who has won the tender for providing accommodations at the Very Important Person (VIP) campsite. Responses suggested that the amount of P90,000.00 for participation in the camping accommodations keeps on fluctuating every year depending on the number of people who attend the cultural festival. Physical assets included infrastructure development such as road networks, buildings, water, and electricity. Kgauthe (2020) contended that due to the popularity and growth of the cultural event, the President of Botswana attested that the country had invested in the event through,

the paving of 3.2 kilometres internal roads at P7.4 million, installation of solar street lights at a cost of P3.4 million and construction of market stalls at P518,000 and donation of 150 date palm trees through the department of forestry and range resources (p. 1).

During data collection, the primary researcher, the lead author, observed that the construction of streetlights and stalls had commenced, and date palm trees were already planted along the road. One of the participants stated, “I am also happy that out of the whole of Botswana, Khawa was chosen to host this event. They gave Khawa first priority and that has made our village popular.” Consequently,

there is increased good for the region because of the popularity of the event and the community members had an increased sense of pride and empowerment because of the benefits created by the event. Besides the increase in infrastructure development, there was improvement in the livelihood of the community from their livestock.

One of the elderly participants noted that they learned a lot during the hunting ban not to rely on one stream of revenue generation because the trust and the community struggled in terms of generating money for the community. Further, responses from participants suggested that KKDT collaborated with the Kgalagadi south council in the Swakara sheep project which increased the revenue to the community from its livestock. The council paid for the construction costs associated with the farm. Moreover, it was through the cultural event that the trust donated P10 000 to Khawa Pre-school and P10 000 for equipment at the village guesthouse thereby instituting sustained development in the local community. Additionally, stands for spectators at the playground were built. Finally, community projects implemented by the central government of Botswana included construction of streetlights, building of destitute houses through the office of the president housing appeal, renovation of the communal gathering (*Kgotla*), pavement of internal roads and planting of date palms. Thus, when listening to the participants about the “good” of the cultural event, it appeared they benefitted on individual as well as community levels by the sustained resources brought to the community through cultural tourism.

4.2 “Too Much Littering”

Although the cultural event contributed to the transformation of livelihoods of local people, there were some unfavorable outcomes. Some of the negative impacts discussed included littering, noise pollution, dust, road accidents, alcohol abuse, crime and cultural shock. One of the participants contended, “But there is too much littering. You can find used condoms everywhere and children tend to pick them up and play with them.” Noise pollution from the bikes and cars at night irritates some local people who stated that even their domestic animals such as goats and dogs ran away because of the noise. Some of the assertions from the participants were as follows: “we are afraid of people because during the event there are multitudes of them. We are not used to people and we are afraid of diseases,” “we don’t sleep at night during the festival,” “we have already gave up, we are now used to the noise”. Participants explained that road accidents are usually caused by alcohol abuse and delayed grading of the gravel road from the village of Khuis to Khawa by the Kgalagadi south district council as a way of preparing for the cultural event. Participants complained of the dust due to quad bikes racing which usually caused dry cough and the common cold (flu). Also, crime was one of the negative impacts. Some participants stated that during the event their small stock such as goats was stolen.

In terms of leadership participation, KKDT trust has (2) two members who have been board members for a long time without election of new board members. This

can be an indication of a skills gap in the village. Additionally, it may suggest that there was low inclusivity and participation of community members in leadership positions. Although the population in Khawa is mostly characterized by youth, there were no youth participants in the board of KKDT. Furthermore, one of the participants voiced that, "Only family members of those who are already in community leadership positions are given first priority to be part of the board. We do not know how they are selected." The participant's experience indicated that how to be a part of the leadership of the organization was not fully disclosed to the local community. Consequently, one could surmise that participation in the leadership of the cultural event rested upon who one knew or through nepotism and favoritism. During the focus group discussions, one participant indicated, however, that participation in the leadership of the cultural event could happen if you worked for *Ipelegeng* and other community jobs were not eligible for job opportunities at the event. She iterated, "They say you are working, but we were told that during the event everyone is eligible for a job opportunity." Hence, the negatives of the event aligned with the actual benefits to some degree in that cultural tourism brings more people, but at the same time, it brings the aftermath of people as well such as litter. On the other hand, individual community members wanted to participate in the leadership of the event, but the doors of access were not as open to the general public or local citizens.

4.3 "Nothing About the Sharing of Ideas:" Community Involvement and Participation

In seeking to address the level of participation of local residents in the development of the actual event, the respondents indicated that local people were rarely consulted by either the Botswana Tourism Organization (BTO) or the village leadership. The participants in this research were only called to a communal (*Kgotla*) gathering to be told how to behave when visitors arrived during the event. One of the participants attested, "There is nothing about the sharing of ideas on what to include in adventure activities of the festival." Local people felt excluded and claimed that representatives of BTO rarely came to the *Kgotla* to consult and share with local people information about the cultural event. They contended it would have been better if at least BTO met with the leadership of the village and distributed a questionnaire seeking the input of the local people. Lack of consultation and involvement in planning of the cultural event by the local people due to the exclusion of BTO led to their (BTO) decision to include adventure activities that did not represent the needs of certain groups in the village such as women. The women who participated in the research contended that most of the activities (such as tug-of-war) favor men and not women. Participants claimed, "They never call the community of Khawa and they always decide for us that football should always be included in the competitions. They never ask about netball because as ladies we also want to have fun and participate." Another respondent uttered, "You only find women participating in polka dance and sand dune racing;

that is where you will find them [women].” In sum, the women preferred activities such as women’s football, netball, and volleyball so that they too could participate during the event in physical activities. When asked why they thought BTO was not involving them and providing them with space to share their ideas with them, one of the participants claimed, “BTO is looking down upon us and they don’t respect us.” Furthermore, interviewees responded that there was a lack of responsibility, accountability and transparency because of the lack of involvement structured into the event by BTO; hence, their inability to participate in the actual planning of the cultural event which was hosted in their village.

4.4 “We Don’t Participate as Women”

As a subset of the participants, many of the women contended that most of the activities offered favored men and not women. Consequently, a majority of the socio-economic rewards were received by men. Women indicated that they only participated in polka dance, traditional dance and sand boarding. They further specified that even in casual jobs men were preferred over women. Effectively, they were sidelined from having a voice in the construction of the event as well as in participating in the event because of their gender. Hence, men benefited the most and were able to sustain their individual livelihoods created by the event. This was attested to by one of the female participants,

During the event, we don’t participate as women in adventure activities. We only go to the event as spectators to watch football. After watching, we go back home and prepare for another activity in the evening. So, if adventure activities could cater for both men and women that would be better.

During the group discussion, another female echoed her frustration of not participating and benefiting from the cultural event compared to her male counterparts. A male participant responded to her frustration that, “you should work very hard and not be lazy for you to benefit...and maybe the reason why women are not benefiting is because the work load is too much for them.” This sentiment implied that for women to benefit, they should work twice as hard as their male counterparts and further implied that women should not be lazy. The woman responded and retorted, “In Ipelegeng, we work with cement and we also dig holes” demonstrating her capability as a woman, her lack of laziness and there was no need for men to exclude women.

Furthermore, women participants indicated that some adventure activities such as helicopter rides, camel rides and quad bike rides excluded them from participating as they catered to those who usually have money, whether male or female. Thus, there was an economic component in who could participate from the local community in the cultural event based on gender and economic status.

5 Discussion

Retrospectively, the purpose of this research was to explore how Khawa Dune Challenge and Cultural Festival altered the livelihood of local people and how they perceived their involvement and participation in planning and implementation of the event through engaging in qualitative methodology to capture the lived experiences of the participants. The results suggest that the cultural event enabled the transformation of the livelihoods of the local people in multiple ways such as the community (e.g. Swakara sheep project) initiatives implemented through money accrued from the cultural event. This suggest development and transformation in the village. This is buttressed by Mugizi et al. (2018) work that contends community projects implemented through community based tourism projects are viewed as accelerators of empowerment and represent a yardstick for community cohesiveness. The implication is that the village leadership should prioritize locals by giving them control and power in local development through capacity building. Local people should be at the forefront in the development of their village rather than just actors who are acted upon. They should have a voice in project development and be included at the leadership table. For example, one of the participants expressed the need to witness children from Khawa leading in the development of their community through local experiences such as their participation and involvement in the cultural event which is sustained by the rich indigenous natural resources.

On the other hand, the cultural event led to unfavorable outcomes such as an increase in negative community aspects i.e. litter, theft and noise; furthermore, the development of power relation struggles based on social hierarchies which became barriers to community involvement and participation. Power relations often sidelined those who were not relatives to the village leadership. This led to other village members benefiting more than others. During field work, the principal researcher observed that most people who occupied community leadership positions shared the same surname. The above occurrences often break social ties and bonds within the community leading to low involvement and participation of community events such as KDCCF. This is supported by research that barriers to local communities getting involved and participating in tourism activities were due to social hierarchy and power relation struggles (Lenao et al., 2014). This plays an integral role in ensuring a regenerative and inclusive cultural tourism sector. According to UNESCO (2020), inclusion must be at the heart of building back better the cultural tourism service sector. Stakeholders at different levels should participate in planning and management and local people cannot be excluded from benefitting from opportunities and economic benefits of cultural tourism. They should be supported and empowered to contribute in creating jobs and promoting local culture and products, particularly as indicated by the respondents in this study.

Additionally, this research indicated that women were marginalized in two primary ways: first, the activities provided were inaccessible to them i.e. they catered to the men and second, there were few if any opportunities for them to gain economically from the event i.e. casual jobs. This finding is incongruent with the efforts

of the government of Botswana in alleviating poverty, especially on vulnerable and minority groups which include rural women, youth and children. Gender equality advocates have sought equal opportunities for all especially for rural women who experience the severity of patriarchy. Moswete and Lacey (2015) argue that women must be empowered through “*cultural tourism in Botswana*.” They echo that women are still far from enjoying the same basic rights, privileges and benefits that men do even in the tourism industry as indicated in this research as well.

Regarding the benefits of the cultural event, participants shared there were direct and indirect benefits to members of Khawa community. Community benefits outweighed individual benefits such as the changes in infrastructure. This research demonstrated from the participants’ perspectives, however, that the benefits must include individuals including women and individual households particularly on the economic sustainability of the event. Without a more wide-spread benefit to individuals in the community it will not be easy for community members to acknowledge they are benefiting and have benefitted somehow from the cultural event. Thus, equity in distribution of the resource from the cultural event is warranted for all community members.

6 Conclusion and Recommendations

According to the participants in this study, the fame associated with the Khawa Dune Challenge and Cultural Festival event has given the community pride. Local people take pride that their village hosts an international event that contributes to the domestic tourism market. Local people’s involvement and participation in KDCCF has proven to be essential and a driving force for sustainable development to some degree in the community. Local people, however, need to capitalize on local collaboration and partnership for community cohesion purposes. Their fuller participation in KDCCF can strengthen social ties and community’s cohesiveness and the overall socio-economic sustainability of the event. Hence, it is imperative that KKDT, BTO and the leadership of the village are in touch with what is happening on the ground to local people.

Tourism diversification is expedient for the sustainability of natural resources and the buttressing of local communities such as Khawa. The government of Botswana has supported this development through increasing the infrastructure of such communities to support their sustainability. Khawa revenue streams are mainly based on climate sensitive resources; therefore, local people should capitalize on cultural tourism since the community already has a rich culture and multiple resources in all aspects of the assets needed to support and sustain cultural tourism in this southern part of Botswana that ultimately empowers the local community and its inhabitants regardless of gender. This research concludes that local people should drive their own agenda of development based on their place-based worldviews and priorities. Thus, enhanced partnerships between diverse stakeholders is important so that adventure

activities held in KDCCF are inclusive of both male and female members of the community and are sustained over time to further empower the community in which it exists.

References

- Asuk, S. A., & Nchor, A. A. (2018). Challenges of community-based ecotourism development in Southern Eastern Nigeria: Case study of Iko Esai community. *Journal of Scientific Research and Reports*, 20(1), 1–10. <https://doi.org/10.9734/JSRR/2018/42603>
- Botswana Motor Sports. (2019). *Supplementary regulations for Khawa Dune challenge and cultural festival*. Botswana Motor Sports.
- Botswana Tourism Organisation. (2017). *Khawa dune challenge and cultural festival: The socioeconomic survey*. Botswana Tourism Organisation.
- Botswana Tourism Organisation. (2019). *Khawa dune challenge and cultural festival: The socioeconomic survey*. Botswana Tourism Organisation.
- Centre for Applied Research. (2016). *2016 Review of community based natural resource management in Botswana*. Southern African Environmental Programme.
- Department for International Development. (2000). *Sustainable livelihoods guidance sheets*. Department for International Development.
- Department of Wildlife and National Parks. (2010). *Community based natural resources management in Botswana practitioners manual*. Ministry of Environment and Natural Resource Management.
- Kgautlhe, C. (2020, July 06). Khawa chief appreciates development. *DailyNews BOPA*. Gaborone, Botswana
- Leano, M., Mbaiwa, J., & Saarinen, J. (2014). Community expectations from rural tourism development at Lekhubu island, Botswana. *Tourism Review International*, 17, 223–236.
- Madzwamuse, M., Schuster, B., & Nherera, B. (2007). *The real jewels of the Kalahari: Drylands ecosystem goods and services in Kalahari South District, Botswana*. The World Conservation Union (IUCN).
- Manwa, H., Saarinen, J., Athlopheng, J. R., & Hambira, W. (2017). Sustainability management and tourism impact on communities: Residents attitudes in Maun and Tshabong, Botswana. *African Journal of Hospitality, Tourism and Leisure*, 6(3), 62–74. <http://hdl.handle.net/10311/1808>
- Marshall, C., & Rossman, G. (2011). *Designing qualitative research* (5th ed.). SAGE Publications.
- Mbaiwa, J. E. (2005). Community-based tourism and the marginalized communities in Botswana: The case of the Basarwa in the Okavango Delta. In M. Aicken, and C. Ryan (eds) *Indigenous Tourism: The commodification and management of culture* (1st ed., pp. 87–109). Elsevier.
- Ministry of Finance and Economic Development (2018). *Botswana SDGS roadmap. A guide to implementation of sustainable development goals*. Gaborone, Botswana.
- Moswete, N., Saarinen, J., & Monare, M. J. (2015). Perspectives on cultural tourism: A case study of Bahurutshe cultural village for tourism in Botswana. *Nordic Journal of African Studies*, 24(3&4), 279–300.
- Moswete, N., Thapa, B., & Darley, W. K. (2020). Local communities' attitudes and support towards the Kgalagadi Transfrontier Park in Southwest Botswana. *Sustainability*, 12(4), 1524. <https://doi.org/10.3390/su12041524>
- Moswete, N., & Lacey, G. (2015). “Women cannot lead”: Empowering women through cultural tourism in Botswana. *Journal of Sustainable Tourism*, 23(4), 600–617. <https://doi.org/10.1080/09669582.2014.986488>
- Mugizi, F., Ayorekire, J., & Obua, J. (2018). Contribution of tourism to rural community livelihoods in the Murchison Falls Conservation Area, Uganda. *African Journal of Hospitality, Tourism*

- and Leisure, 7(1), 1–17. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwj48tSa7rj0AhWhlFwKHX_kBckQFnoECA0QAw&url=https%3A%2F%2Fwww.ajhtl.com%2Fuploads%2F7%2F1%2F6%2F3%2F7163688%2Farticle_27_vol_7_1__2018.pdf&usg=AOvVaw2rr80Ys60w8QfwKggkC1Z
- Naderifar, M., Goli, H., & Ghaljaie, F. (2017). Snowball sampling: A purposeful method of sampling in qualitative research. *Strides in Development of Medical Education*, 14(3), 1–6.
- Nampushi, J., & Namkaya, J. (2020). An assessment of the Maasai residents' views on tourism in the Maasai Mara National Reserve, Kenya. *International Journal of Tourism & Hospitality Review*, 7(2), 1–11. <https://mgesjournals.com/ijth/article/view/ijth.2020.721>
- Olson, B. (2012). *Community based natural resource management: exploring collective action in Lumuria, Kenya*. The Pennsylvania State University. <https://etda.libraries.psu.edu/catalog/16240>
- Patton, M. Q. (2015). *Qualitative research & evaluation methods*. SAGE Publications.
- Petersen, E. K., & Pedersen, M. L. (2010). *Approaches to development: The sustainable livelihoods approach from a psychological perspective*. University of Aarhus, Institute of Biology.
- Ramachandra, T. V., & Nagarathna, A. V. (2007). *Community based natural resource management: Issues and cases from South Asia*. Sage Publications.
- Ramkissoon, H. (2015). Authenticity, satisfaction, and place attachment: A conceptual framework for cultural tourism in African island economies. *Development Southern Africa*, 32(3), 292–302. <https://doi.org/10.1080/0376835X.2015.1010711>
- Republic of Botswana (2002). Botswana National Ecotourism Strategy. Final Report. Prepared by IUCN (Botswana) and Symbiosis Consulting (Pty) Ltd. https://iucn2.cnr.ncsu.edu/index.php/PDF:_Botswana_National_Ecotourism_Strategy:_Final_Report
- Republic of Botswana. (2007). *Community based natural resource management policy*. Ministry of Environment Wildlife and Tourism.
- Saarinen, J., Moswete, N., & Monare, M. J. (2014). Cultural tourism: New opportunities for diversifying the tourism industry in Botswana. *Bulletin of Geography and Socio-Economic Series*, 26, 7–18. <https://doi.org/10.2478/bog-2014-0041>
- Saldana, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). SAGE Publications.
- Sallu, S. M., Twyman, C., & Stringer, L. C. (2010). Resilient or vulnerable livelihoods? Assessing livelihood dynamics and trajectories in rural Botswana. *Ecology and Society: A Journal of Integrative Science for Resilience and Sustainability*, 15(4). <https://www.ecologyandsociety.org/vol15/iss4/art3/>
- Stake, E. R. (1995). *The art of case study research*. SAGE Publications.
- Statistics Botswana. (2011). *2011 Botswana housing and population census*. Statistics Botswana.
- Statistics Botswana. (2015). *Mapping poverty in Botswana*. Statistics Botswana.
- UNESCO (2020). <https://en.unesco.org/news/cutting-edge-bringing-cultural-tourism-back-game>
- Velempini, K., & Perkins, J. S. (2008). Integrating indigenous technical knowledge and modern scientific knowledge for biodiversity conservation and human livelihoods in the South Kalahari, Botswana. *Botswana Notes and Records*, 39, 75–88.
- Weather and Climate (2021). Kgalagadi, Botswana Climate. <https://tckctck.org/botswana/kgalagadi>
- Weng, L., He, B., Liu, L., Li, C., & Zhang, X. (2019). Sustainability assessment of cultural heritage tourism: A case study of Pingyao ancient city in China. *Journal of Sustainability*, 11(1392), 1–16. <https://ideas.repec.org/a/gam/jjsusta/v11y2019i5p1392-d211481.html>

Building Bridges Between Indigenous Peoples and Geotourism Activity: The Case of the Raposa Ethnoregion in Roraima, Brazil



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Abstract The state of Roraima in Brazil registers a significant number of Indigenous People (IP), distributed throughout a diversity of ethnoregions. Among them, the municipalities of Amajari, located near the region of the riverbed of Baixo Cotingo, and in the upper Ajarani River, stand out. These IP include the ethnic groups of *Macuxi*, *Ingaricó*, *Taurepang* and *Wapixanas*, which together aggregate a culturally well-developed contingent. In the municipality of Mucajaí lives another IP community, the *Yanomami*, recognized as the most isolated IP from South America. These communities live in two regions with potential for geotourism activity: the Extreme North Tourist Region of Brazil, covering an environment which is extremely rich in diversity of landforms, such as hills, plateaus, and valleys, and the Roraima Tourist Region in the Amazon Savanna forests. The objective of this research is to present the *Macuxi* and *Yanomami* communities in the region, which are engaged with ethnic tourism activities, highlighting their skills in promoting sustainable tourism management, namely geotourism. The methodology is qualitative exploratory, based on literature and document research in the division of ecotourism in the Mucajaí State Department for Planning. This review work was carried out from June to August 2021. Among the distinct realities relating to the environment, the results indicate that the IP from the Raposa Serra do Sol Indigenous Land feel the need for training

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to better understand how to welcome the tourist, and, thus, attend the requirements of the Normative Instruction n. 03/2015, which establishes norms and guidelines regarding visitation activities for tourism purposes in indigenous lands (IL). The *Yanomami* indigenous community also seeks partnership with institutions, either under the form of events, workshops or meetings to conceptualize and carry out strategies allowing to structure the geotourism activity. Accordingly, tourism workshops were implemented, aiming to attend the planning and development of indigenous community tourism to offer a unique tourist experience, thus contributing to build bridges between the indigenous communities and the geotourism activity, in a broader context of the concept of sustainable development.

Keywords Indigenous peoples · *Yanomami* · *Macuxi* · Nature-Society Relations · Geotourism · Roraima

1 Introduction

There are between 370 and 500 million Indigenous People (IP) worldwide, in over 90 countries (The World Bank, 2021). According to the “The Indigenous World 2020” report (Mamo, 2020), IP represent 5% of the global world population. However, the same report states that they account for about 15% of the extreme poor, along with a life expectancy up to 20 years lower than of non-indigenous people worldwide. Despite these vital inequalities (Theborn, 2006), IP hold ancestral knowledge, transmitted from past generations and justified by living side by side with nature (von Seggern, 2021), crucial to learn how to live in balance and harmony with the natural ecosystem cycles. The need to respect and to live according to nature is part of the United Nations 2030 Agenda philosophy (United Nations, 2015), translated in the Sustainable Development Goal (SDG) 15, Life on Earth. The protection of the forests is crucial because it represents a vital resource from which about 1.6 billion people worldwide depend for subsistence. In this context, in addition to fostering new sustainable activities in which geotourism is part of, SDGs are globally linked to facilitating economic means and benefits that cover ethnic groups, since indigenous knowledge constitute valuable and dense inputs that act as a lens from the perspective of sustainable development (Newsome & Dowling, 2018; Santafe-Troncoso & Loring, 2021; Souza et al., 2021).

Located in the littoral-east coast of South America, Brazil is a country with a significant number of IP, more than 734,000 people. Among these are people who have recognized themselves as indigenous, mainly in the country’s urban areas (IBGE - Instituto Brasileiro de Geografia e Estatística, 2010; The International Work Group for Indigenous Affairs (IWGIA), 2020). IP have rights guaranteed by the Brazilian Constitution of 1988 regarding the soil, lands and its territories (Supremo Tribunal Federal, 2020). IP live in demarcated and preserved areas, representing a significant strength to the culture and beliefs within their communities. Thus, ancestral knowledge anchored by IP may pave the way for more sustainable growth in the

context of tourism and heritage safeguard (Santafe-Troncoso & Loring, 2021; World Tourism Organization, 2019), with implications in poverty and subsistence of these communities.

Roraima, the northernmost Brazilian state, comprises one of the largest indigenous populations in the country, estimated at around 55,922 people, distributed through 46,505 hectares (IBGE - Instituto Brasileiro de Geografia e Estatística, 2010). The same source confirms that these Indigenous Lands (IL) represent 83.2% of the region and households, dispersed in two ethnic groups or linguistic trunks, the *Macro-Jê* and *Tupis* that unfold into *Ingariçô* and *Macuxi*, with *Macuxi* being the largest ethnic group. There are also the *Patamona*, *Taurepang*, *Waimiri-Atroari*, *Wapixana*, *Wai-Wai*, *Ye'Kuana* and *Yanomami* (i.e., semi-nomads of Tropical Rainforests) IP that have developed specific forms of relationship with the natural environment (Bortolon, 2014; Niewöhner et al., 2021).

Geotourism is considered a segment of tourism based on information on geological and geomorphological attractions, valuing the integration of the citizens' knowledge to promote the sustainable development of a specific region (Dowling, 2014; Dowling & Newsome, 2005; Hose, 2006; Veras et al., 2020). In this sense, IP are guardians of a natural heritage, offering opportunities to promote attitudes towards sustainability (Satapathy & Bhattacharya, 2021). Aligned with the need to protect the natural heritage, treaties with the mission to defend goods of interest to humanity and to raise the local citizen awareness on sustainability patterns to preserve recognized sites in indigenous communities are welcome (Matshusa et al., 2021). Thus, considering the Roraima state reality regarding the significant diversity of IP, this chapter aims to present the *Macuxi* community from the Raposa region in the Raposa Serra do Sol Indigenous Land, which already taking advantage from the ethnic tourism, as well as the *Yanomami* indigenous community, from Maturuca indigenous land, highlighting the IP skills for the promotion of sustainable tourism management, in particular geotourism. In this work, the *Macuxi* and the *Yanomami* were selected due to their culture and geoecosystem richness, which acts in favour of the geotourism activity. Considering this scenario, the research will present the *Macuxi* and *Yanomami* communities that already work with ethnic tourism, highlighting their skills in promoting sustainable tourism management, namely geotourism.

2 Methodology

2.1 Study Area

Two IP were addressed in this research: the *Macuxi*, who inhabit the Raposa Serra do Sol IL located in the North of the State of Roraima, in a region that occupies 7.5% of the soil in Roraima, and the *Yanomami* from Maturuca IL (Fig. 1). In these IL, the ecological vegetation composition is made of savanna, locally known as *lavrado* and, for the *Yanomami* region, the environment is characterized by a forest system

and extensive plains interrupted by hills and mountains with varying altitudes of 200 to 500 m, as well as the existence of floodplain areas (Morais & Carvalho, 2015). The area is favourable to agriculture (i.e., cattle raising, *Oryza barthii* rice growing, *Zea mays* corn crops, and *Vigna unguiculata* beans) also rich in gold, diamonds and cassiterite, which has been attracting miners clandestinely exploiting these deposits in indigenous areas (Aleixo et al., 2020; Alonso, 2013; Oliveira, 2020).

In this nook, the geological and geomorphological ecosystem groups were shaped by erosional flattening and chemical weathering processes linking the Roraima Group's hill and the mountain ranges to this landscape, which generated acidic and dystrophic soils used by this group (Holanda et al., 2014; Schaeffer et al., 2018).

Raposa Serra do Sol IL experienced a territory demarcation process in 1977, characterized by a long political and judicial battle (Alonso, 2013). This immense area of 1678,800 hectares is occupied by the IP of the *Macuxi*, *Patamona*, *Taurepang*, *Wapixanas* ethnic groups, illegal farmers and squatters. This political and judicial battle ended in 1996 and all contestations were concluded by the Federal Supreme Court, which gave victory to the IP (Yamada, 2008). The full right of traditional occupation refers to the territory, which characterizes IP as the first inhabitants depending on the land. It includes the right to use land and natural resources under their IL tenure systems, as well as the natural role in protecting nature (Supremo Tribunal Federal 2020). The rights of grouped IP to land also encompass economic, social, cultural, civil and political, individual, collective, and development rights (Okeke, 2021). Therefore, these lands may have particular uses, including the tourist activity

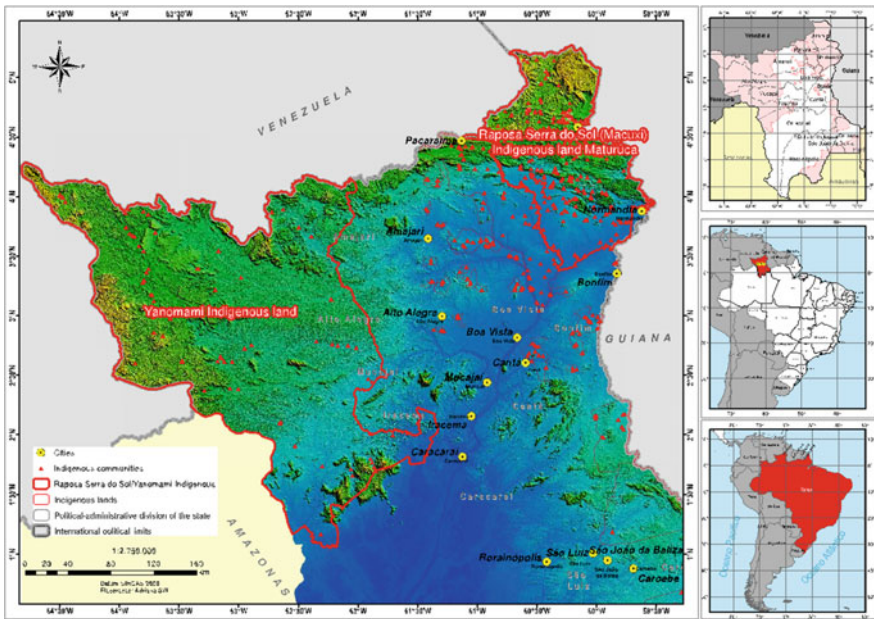


Fig. 1 Location map of the *Macuxi* and *Yanomami* indigenous lands, Roraima, Brazil

use, as long as satisfying the premises for operationalization and comply with the Normative Instruction n. 03/2015 and Law n. 11,771 (Presidency of Republic of Brazil, 2008).

Funai (2021), local institutions and indigenous women who care for the environment have been acting as supporters of the Yanomami ethnic group in the initiative to work with tourism, in a coalition force that brings together various actors around a sustainable project, discussed and submitted in March 2020. The first tourism model, whose protagonists are the managers of the business in their territories, the Yanomami themselves, will provide various services such as guides, porters and cooks. Indigenous women are also involved in the project, according to their President, Floriza da Cruz Pinto (Brasil. Ministério do Meio Ambiente, 2020).

The previous belief that IP should only live in the forest has changed. On the contrary, most national policies in Latin American countries, recognizing the indigenous person as the manager of natural resources and valuing ecological knowledge, triggering various actions, as in the 1980s Venezuelan environmental scientists, considering the Yanomami IP, asked the government to establish a National Park and a joint indigenous area for Yanomami who migrate to lands in the neighbouring country. These actions are supported by the UNESCO Man and the Biosphere Programme (UNESCO, 2020). In Brazil, the lands of the Yanomami ethnic group were recognized as official collective rights. The protection of their lives and survival and other activities, including tourism, through Decree n. 780, on May 15, 1992 (Presidência da República do Brasil, 1992), marks a breakthrough.

2.2 Research Methodology

This research is based on a qualitative exploratory approach to address indigenous communities and describing them in relation to the characteristics of their territories and local manufactured products and goods attracting the tourists. A literature analysis was carried out through journal articles, official websites and document research on the ecotourism division of the Roraima State Department for Planning in Brazil. This review work was carried out from June to August 2021.

Privileged information was obtained from the known Brazilian specialist Enoque Raposo—interlocutor and head of the Ecotourism Division GER/SEPLAN, author of a technical report produced in the Raposa Serra do Sol I Indigenous community (TIRSS)—a clay pot producer centre and an area to operate tourism at a professional level in the near future. Data from the analysis of the Tourist Visitation Plan process with the National Indian Foundation (Funai, 2015) was obtained from the Regional Coordinator of the National Indian Foundation (Funai) in Roraima. Regarding the indigenous names used in this chapter, they were transcribed as suggested by previous works from Barra (2020) and Senra (2020). For the production of the map, the Software ArcMap version 10.3 was used for the geographical cartographic projection (South America), central meridian -62° geodetic reference system: SIRGAS 2000.

The vectors used are IL available at the Funai website (Funai, 2021) and the cartographic base of the State of Roraima, scale 1:100,000, was downloaded at IBGE (2021). A numerical model of the Shuttle Radar Topography Mission (SRTM) shaded terrain was used.

3 Results and Discussion

Roraima is the state with the largest number of IP in Brazil, with more than 25,700 inhabitants. The ethnic groups in this area are: *Wapixana*, *Jaricuna*, *Taulipáng*, *Ingaricó*, *Waimiri*, *Atroari*, *Mawayána*, *Yanomami*, *Wai-Wai*, *Karafawyana*, *Yekuana* and *Macuxi* (Mamo, 2020). These ethnic groups represent a cultural diversity through the criteria of kinship and religion (i.e., cosmovision, the worldview). In this aspect, the worldview in the indigenous world is rooted in the places, in the houses where IP were born (i.e., emergence houses, houses of transformation, in the depths of the land, water and forests, in animals (Fakudze, 2021). IP share the territory, language, irrefutable physical differences and are responsible for the possession of a large geographical area, such as the *Macuxi* ethnic group who inhabit the valley of the Uraricoera River, the TIRSS territory. These IP make up a total of 72% in this region (Fleuri & Fleuri, 2018; Schröder, 2003; Silva, 2019; Spies, 2020). *Macuxi* are transnational people for geographical reasons, as they inhabit part of the Cooperative Republic of Guyana, in the basin of Rio Branco and Rio Rupunini, in Roraima. In Brazilian territory, namely in Roraima, the occupied area is divided into Raposa Serra do Sol IL, São Marcos IL (a large part) and the isolated Amajari and Alto Cauamé (Spies, 2020) lands.

3.1 The Macuxi

Embodied in traditional knowledge about nature, the behavior of this ethnic group is based on the best season for tourist activity, considering then about the animals (i.e., the best time for hunting and fishing; in which the flora season is visibly appreciable with fruits and flowers and it is worth mentioning the buriti vegetable as a resource widely used in the making of buildings, costumes for typical celebrations such as parixara dance and other typical manifestations, in the production of handicrafts such as basketwork; moment and ritual for the collection of clay. Despite the easy access to industrialized materials, this ethnic group (i.e., indigenous people) does not despise the abundant resources, IP dominate deep traditional knowledge linked to biodiversity and a vast knowledge about the land, sustaining a strong relationship with nature and influencing the innate responsibility for preservation, therefore, one can associate sustainability. As the largest population with about 22 thousand represent the majority of the Macuxi population and of this universe, about 53% are in IL, these IP are valuing the Macuxi language that belongs to the Karib trunk (i.e., spoken

in the North and Central region. Western Brazil, Bolivarian Republic of Venezuela, Cooperative Republic of Guyana, French Guiana, Suriname and part of Colombia. In strengthening the Macuxi language, the first Intercultural Licentiate course of the Insikiran Nucleus was implemented by the Federal University of Roraima as an incentive to train indigenous teachers, therefore it is a favorable bias in several areas in conducting tourist activities of preparation to receive the tourist in a moment of experience and immersion and musical rhythm known by the generic designation of *forró*, in addition to itineraries where the tourist gets to know the stories, legends, cuisine and indigenous drinks, the natural attractions await the tourist to discover waterfalls and bathing in a rejuvenating freshwater lake these activities are autonomously active in accordance with current legislation (Braga and Bethonico, 2018).

3.2 The Yanomami

The *Yanomami* IP are characterized by high mobility in ecosystems, a cosmovision stems from the understanding that the Earth is central for these IP and goes far beyond the simplistic representation of the environment elements, i.e., plants, animals, air and moon. According to the indigenous leader representing the *Yanomami*, Davi Kopenawa, stating “I am the man (i.e., shaman) of the forest and I defend my people and nature, I eat *Bertholletia excelsa*, *Mauritia flexuosa*, everything we need to live well”, it is clear the strong bond between these IP and mother earth, since for the *Yanomami* everything is interconnected with invisible beings in the eyes of the *pajés* (shamans) (Kopenawa & Davi, 2015).

Isolation in *Yanomami* is called *moxihatetea*, a particular behaviour of this aloof and reclusive South American ethnic group, living in footpaths in Northern Brazil and Southern Venezuela, where they have been cultivating for over two hundred years in gardens (i.e., called *roça*-farm), plantain (*Musa spp*), sweet potato (*Ipomoea batatas*), cassava (*Manihot esculenta*), *buriti* (*Mauritia flexuosa*), and *açaí* (*Euterpe lleracea*), and they feed on small animals such as howler monkey (*Alouatta guariba*), *pacu* fish (*Piractus mesopotamicus*), wild pig and/or peccary (*Tayssu pecari*), curassow (*Mitu tomen*) and other species. Therefore, to understand the territoriality of the *Yanomami*, and despite the contact they have already made with urban society, it is important to understand that they still did not develop strategies for food stocking. Their hunts are made at 1 km from the collective house (i.e., village or multifamily house) called *yano* or *xapono*, to avoid the depletion of hunting resources.

Agriculture was intensified in the last decades to observe edaphic conditions (i.e., not to tire the land) as a means of considering local water availability. This relationship with the land is very respectful to a sustainable culture, as described by Melo et al. (2010). In this complex web, the *Yanomami* plant crops such as fruits, roots and collect seeds in addition to fishing and hunting (Albert & Le Tourneau, 2007; Goulart, 2020). Currently, the *Yanomami* ethnic group is part of the cultural mosaic in the Maturuca IL. The pieces they made of fibre are available in virtual stores and can

be found in the *Përi si* book (Yanomami et al., 2019). The mentioned work explains the fungus that *Yanomami* women use in making basketry. This practice resulted in intercultural research produced by the Socio-Environmental Institute. The work is part of the *Saberes da Floresta* series (i.e., Knowledge of the Forest) and had the collaboration of researchers from the National Institute for Amazonian Research. The innovation of this work made by women is the use of a very strong fabric thread produced by a *Përi si* fungus. It is a rhizomorph structure, with a morphology similar to a mushroom, but which cannot be eaten, proliferating among the fallen leaves and rotten wood in the rainforest litter.

3.3 Initiatives in Favour of Tourism in the Macuxi and Yanomami

In the IL of *Macuxi* and *Yanomami*, the tourism activity is still emerging. However, to reach a desirable sustainable economic level, some initial steps are needed. In this context, some previous initiatives were conducted in the region in the last twenty years. The genesis of this movement in the community occurred in 1998 when the *Macuxi* ethnic group experienced the first workshop of the National Program for the Municipalization of Tourism as a way to encourage cultural recovery, understand tourist concepts and resulting in concomitant socio-economic development, benefiting the entire community. This workshop also stimulated the implementation of a tourism project for the community at the time, an initiative of the State of Roraima and the Brazilian Institute of Tourism (EMBRATUR), an opportune moment in which a group composed of 36 IP registered and made notes based on the worked concepts of “what tourism means and its benefits” and the attractions and rich handicrafts produced. In 2004, an indigenous village of Roraima used tourism as a way to recover the history and millenary traditions of the *Macuxi* people (Folha do Meio Ambiente, 2004), resulting in IP empowerment and social integration.

Recently, the Normative Instruction n. 03/2015 (National Indian Foundation—Funai, 2015) was introduced in support of the National Policy for Territorial and Environmental Management of Indigenous Lands (PNGATI) in the regulatory legislation for tourism visitation. The referred instruction establishes norms for the activity of visitation for touristic purposes, specifying the procedures for visitation plans, obligations, and prohibitions, by imposing state limits on IP and tourists. The legally enforceable PNGATI ensures the sociocultural autonomy of IP resulting from a participatory process of deliberation in the construction and structuring of the following goals: (i) protection of territory and natural resources; (ii) governance and indigenous participation; (iii) protected areas, conservation units and IL; (iv) prevention and recovery of environmental damage; (v) sustainable use of a policy by indigenous organizations to manage natural resources and indigenous productive initiatives; (vi) education, training, exchange, and environmental education highlighting and recognizing the rights guaranteed in Article n. 231 of the Federal Constitution

of 1988 (Brazil 2012; National Indian Foundation—Funai 2015; Supremo Tribunal Federal, 2020).

Based on the legislative instruments that guide the policy to the addressed IP, training courses were held in the TIRSS for handling and counting of fish, reinforcing the partnership with residents of the Sustainable Development Reserve, strengthening and transferring knowledge about the production and marketing of handicrafts, as well as the tourism practice, as required in joint visiting plans. The tourism activity in these regions should be carried out according to the principles of uses, customs and traditions of the ethnic groups recommended by the Normative Instruction n. 03/2015 that states that when an event of overlapping of IL with conservation units happens, the Visitation Plan shall be analysed by agencies such as the Chico Mendes Institute for Biodiversity Conservation and the Funai (Goulart, 2020) (Table 1).

The identified advance shown in Table 1 demonstrates an effort that came from the IP in favour of tourism. Therefore, it considers the non-migratory impact of IP to the city and how to adequately manage (i.e., innate sustainable management) their territories (Díaz et al., 2019).

In accordance with the state tourism policy, developed by the Official Tourism Agency in partnership with the State University of Roraima and the Federal University of Roraima, and in response to community requests converging with the autonomy of IP, workshops and training courses were held resulting in a booklet for the operationalization of tourism that started in 2019, resulting in the execution of the Action Plan and Guidelines for the Development of Tourism in Indigenous Lands, according to the temporality, specificity and needs of each community of the Extreme North of Brazil tourist region. Such actions benefited from the knowledge of the National Funai and the Federal Prosecution Service. Thus, these actions had a wide scope, through subsidized exchanges, knowledge, experiences, and the point of view of the participants, which can be considered an achieved milestone regarding the evolution of the *Macuxi* IP (Table 2).

Among the available courses, Food Handling was the one with the largest number of people who chose to attend it. This course worked on basic principles such as good personal hygiene, sanitary safety practices, with the philosophy of not attacking or underestimating the IP culture, based on millenary mechanisms for the conservation and handling of food (Semeghini et al., 2020). The second most frequented course was the one to make Clay Pots as it is a tradition of the community in TIRSS to commercialize these items. In this sense, there is a whole context in the process of clay collection, of the sacred place with offerings to the clay's grandmother (i.e., *Ko'kono*), and the space where they are produced in absolute silence accompanied by rituals. This production process ends through drying in fires and ovens, so these procedures preserve the pans from cracking. For the training to be effectively carried out, there was an intense mobilization to identify the women mastering the arts involved in these practices, to rescue and consolidate the culture to the youngest (Barra, 2020).

Table 1 Timeline of official advances that favoured the indigenous population in Roraima, Brazil

1970	1998	2012	2020	2021
Indigenous Council of Roraima -CIR	First Tourism Workshop	Decree n. 7747	Leadership training	Projects filed with Funai
The creation of the CIR-to strengthen, defend the rights and autonomy of indigenous peoples	Fax Community (Indigenous Land Raposa Serra do Sol) 36 participants Realization: Embratur/Ger/Seplan-Codetur	Institute the National Environmental and Territorial Management Policy of Indigenous Lands	Partnerships: Ger/Ufrir/Ufam/Seplan-Detur/Sei/Uerr Preparation of tourism operational booklet; Technical visits	Process: 08620.002445/2020-91 Tourist Visit Plan Movie release: The Last Forest-a film that gives visibility to the situation of the Yanomami ethnic group

Table 2 Training of environmental and tourist agents (2019–2020)

Partnerships GER/SEPLAN-DETUR SENAR/UFRR/UFRR/ CBMRR (<i>Short course, Workshop and Technical visit</i>)	Benefited indigenous community	Course offered	Trained IP
<ul style="list-style-type: none"> • Introduction to tourism; • Tourist leading in natural areas; • Basics of first aid; • Welcoming; • Crafts and ethno jewellery; • Recognition of tourist resources; • Formulation of tourist itineraries; • Tourism flow monitoring 	<p>Água Fria, Pedra Preta, Cajú, Chul, Caraparí, Warandá, Flexal, Nova Vida I and II, Arapa, Santa Cruz, Santa Luiza, and Barro</p> <p>Bananal, Boca da Mata, and Nova Esperança</p> <p>Raposa I</p> <p>Guariba</p>	<p>Food handling</p> <p>Food handling</p> <p>Making of clay pots</p> <p>Food handling</p>	<p>115</p> <p>64</p> <p>30</p> <p>24</p>
Total	17	04	233

Source Data collected from the Report of the Tourism Program in Indigenous Lands GER/SEPLAN-DETUR, National Rural Learning Service, State University of Roraima—UFRR, Federal University of Roraima—UFRR, Military Fire Department of Roraima—CBMRR

3.4 Study Limitations

This study is supported in the consultation of official and scientific documents that demonstrate how geotourism and local activities may favour the engagement of IP and promote their recognition and empowerment. Despite this importance, contacting with IP and apply some interviews regarding the citizens experience in these activities will be necessary in the future, to provide accurate information that can be used to understand if the initiatives were effective. However, to conduct research with IP, the normative instruction n. 01/1995 (FUNAI - National Indian Foundation, 1995) must be respected: national or foreign researchers must submit a certified copy of personal documents and/or passport, curriculum vitae, medical certificates of endemic diseases in the area or contagious diseases, copies of curriculum vitae, letter of inquiry to leaders and, if isolated Indians, send correspondence to the Department of Isolated Indians DII-FUNAI. Such documentation must accompany 2 (two) copies of scientific articles in the intended area to develop the research project. These bureaucratic steps take an average of 12 months.

4 Conclusions

The two particular ethnic groups from Roraima, Brazil addressed in this chapter, *Macuxi* and *Yanomami*, are IP with rights and known as promoters of environmental preservation in their territories, constituting a mantle of traditional knowledge. Aiming to conduct professional tourism among the IP community, specific courses were supported by the Brazilian public institutions and made available to communities, art masters and organizations of women who work with handicrafts sustainably, resulting in an empowerment of these groups towards sustainability change in these communities. These courses acted as workshops of sustainable development.

The emphasis on valuing cultures, types of organizations, sustainable ways of life guaranteed by the PNGATI and Normative Instruction n. 03/2015, a deployment tool in support of the tourism policy, established guidelines for the elaboration of the tourist visitation plans. These must have clear objectives and justifications, and a distribution of competences in the community, considering the social and gender aspects, partners involved, delimitation of the itinerary and object of visits, conditions of transport, accommodation, food, business plan, first aid service strategy, manual of good practice conduct for visitors and the community, among other necessary requirements. Consequently, once the visitation plan is approved by the Funai, all these procedures revert to IP income. This specific aspect is extremely important in the context of tourism to be advanced within IP communities, contributing to alleviate poverty (SDG 1) and overall sustainable development. The mentioned partnerships addressed with local authorities (SDG 17) help supporting the sustainability in these communities.

Building bridges between IP and geotourism may be a path to recognize the value of these communities in sustainable development within ethnoregions and IL and to enhance sustainable tourism. Accordingly, geotourism should be seen as a new opportunity that can work in harmony with other tourism activities, assisting in understanding the depth of the Amazon world on a local and global scale through the natural heritage present in indigenous areas and to implement SDGs able to allow to advance sustainable development. It is noteworthy that more research is needed on the subject and that the results can increase the strength of geotourism activities.

References

- Albert, B., & Le Tourneau, F. M. (2007). Ethnogeography and resource use among the Yanomami: Toward a model of “reticular space.” *Current Anthropology*, 48, 584–592. <https://doi.org/10.1086/519914>
- Aleixo, E., dos S. Lima, A., & Aureliano, I. C. (2020). Mortes, invasões e garimpo em terras indígenas no estado de Roraima: entre mobilizações étnicas e conflitos sociais [Deaths, invasions and mining in indigenous lands in the state of Roraima: between ethnic mobilizations and social conflicts]. *Vukápanavo Rev Teren*, 13–36.
- Alonso, V. F. (2013). *Roraima: Movimento indígena, demarcação de terra e conflito social (Roraima: Indigenous movement, land demarcation and social conflict)*. Pontifícia Universidade Católica de São Paulo.
- Barra, M. C. A. (2020). O que cabe na pausa: O sensível no modo de fazer conhecimento das parteiras e parteiros indígenas da região das Serras na terra indígena Raposa Serra do Sol [Sensitive in the way of making knowledge of the indigenous midwives and midwives of the Serras region in the Raposa Serra do Sol indigenous land]. Universidade Federal de Minas Gerais.
- Bortolon, D. M. O. (2014) Terra Indígena Araçá/Roraima: continuidades e transformações envolvendo coletividades Macuxi [Araçá/Roraima indigenous land: Continuities and transformations involving Macuxi communities]. Universidade do Vale do Taquari—Univates.
- Braga, M. G. G., & de M. Bethonico, M. B. (2018). Uso da palha de buriti: Manejo, preservação e tradição do povo Macuxi da comunidade indígena Campo Alegre—Roraima [Use of buriti straw: management, preservation and tradition of the Macuxi people from the Campo Alegre indigenous community—Roraima]. *Rev Percursos*, 19, 177–205. <https://doi.org/10.5965/1984724619392018177>
- Brasil. Ministério do Meio Ambiente. (2020). Instituto Chico Mendes de Conservação da Biodiversidade [Chico Mendes Institute for Biodiversity Conservation]. <https://www.gov.br/icmbio/pt-br>. Accessed November 12, 2020
- Brazil. Presidência da República. (2012). Institui a Política Nacional de Gestão Territorial e Ambiental de Terras Indígenas—PNGATI, e dá outras providências [Establishes the National Policy for Territorial and Environmental Management of Indigenous Lands—PNGATI, and other measures]. Presidência da República.
- da Yanomami, F. C. P., Campos, F. P., & Moura, F., et al. (2019). Përisi : përisiyoma pë wâha oni = Marasmius yanomami : o fungo que as mulheres Yanomami usam na cestaria [Përisi: përisiyoma pë wâha oni = Marasmius yanomami: the fungus Yanomami women use in basketwork]. Instituto Socioambiental.
- de Oliveira, W. V. (2020). Ideality and reality of popular action (Petition N. 3.388/RR) in the sphere of the Brazilian Supreme Court. *Rev Estud Jurídicos UNESP*, 39, 29–58.
- de Souza, N. N. S., Irving, M. D. A., de Souza, C. D. M., & de Lima, M. A. G. (2021). Turismo étnico indígena: Definição conceptual, potencialidades y desafíos en Brasil [Indigenous ethnic

- tourism: Conceptual definition, potential and challenges in Brazil]. *Turismo - Visão e Ação*, 23, 308–328. <https://doi.org/10.14210/rtva.v23n2.p308-328>
- de Spies, I. M. S. (2020). Ser Macuxi e Wapixana na Fronteira: Ausência de Documentação, Identidade e Cidadania [Ser Macuxi and Wapixana on the Border: Lack of documentation, identity and citizenship]. Appris editor.
- Díaz, S. M., Settele, J., & Brondízio, E., et al. (2019). The global assessment report on biodiversity and ecosystem services: Summary for policy makers. Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.
- dos Silva, N. C. S. (2019). Conhecer a História e o Modo de Vida dos Povos Indígenas de Roraima: Etnias Macuxi e Wapichana [Knowing the history and way of life of the indigenous peoples of Roraima: Macuxi and Wapishana ethnicities]. *Revista Eletrônica Casa de Makunaima*, 2, 91-103
- Dowling, R. K., & Newsome, D. (2005). Geotourism. *Geotourism*, 1–260
- Dowling, R. K. (2014) Global geotourism—an emerging form of sustainable tourism. *Czech Journal of Tourism*, 2. <https://doi.org/10.2478/cjot-2013-0004>
- Fakudze, C. (2021). The influence of local worldview presuppositions on learners' conceptions of selected mechanics topics. *South African Journal of Education*, 41, 1–11.
- Fleuri, R. M., & Fleuri, L. J. (2018). Learning from Brazilian indigenous peoples: Towards a decolonial education. *The Australian Journal of Indigenous Education*, 47, 8–18. <https://doi.org/10.1017/jie.2017.28>
- Folha do Meio Ambiente. (2004). Aldeia indígena de Roraima utiliza o turismo como forma de recuperar a história e as tradições milenares do povo macuxí [Indigenous village of Roraima uses tourism as a way to recover the history and millenary traditions of the Macuxis people]. In: *Resgatando o passado pelo ecoturismo*. <http://folhadomeio.com.br/2004/04/resgat101/>. Accessed August 17, 2021.
- FUNAI—National Indian Foundation. (1995). Normative Instruction n. 01/1995. <https://www.ufrgs.br/bioetica/funai.htm>. Accessed November 17, 2021
- Funai. (2021). Fundação Nacional do Índio [National Indian Foundation]. <https://www.gov.br/funai/pt-br>. Accessed August 17, 2021.
- Fundação Nacional do Índio – Funai. (2015). Estabelece normas e diretrizes relativas às atividades de visitação para fins turísticos em terras indígenas [Establishes norms and guidelines relating to visitation activities for tourist purposes in indigenous lands]. Ministério da Justiça e Segurança Pública.
- Goulart, L. T. (2020). Os Yanonami e o projeto Yaripo: transformações e turismo em Maturacá [The Yanonami and the Yaripo project: transformations and tourism in Maturacá]. Universidade Federal de São Carlos—UFSCar.
- Holanda, J. R., Marmos, J. L., Maia, M. A. M. (2014). Geodiversidade do Estado de Roraima [Geodiversity of Roraima State]. CPRM.
- Hose, T. A. (2006). Geotourism and interpretation. In: R. K. Dowling, D. B. T.-G. Newsome (Eds.), *Geotourism: Sustainability, impacts and management* (pp. 221–241). Butterworth-Heinemann.
- IBGE - Instituto Brasileiro de Geografia e Estatística. (2010). O Brasil Indígena [Indigenous Brazil]. <https://indigenas.ibge.gov.br/estudos-especiais-3.html>. Accessed August 16, 2021.
- IBGE - Instituto Brasileiro de Geografia e Estatística. (2021). Bases cartográficas contínuas - Estados [Continuous cartographic bases - States]. <https://www.ibge.gov.br/geociencias/cartas-e-mapas/bases-cartograficas-contnuas/15807-estados.html?edicao=16036&t=sobre>. Accessed August 17, 2021.
- Kopenawa, A., & Davi, B. (2015). A queda do céu: Palavras de um xamã yanomami [Fall from Heaven: Words of a Yanomami Shaman]. Companhia das Letras.
- Mamo, D. (2020). *The Indigenous World 2020*. The International Work Group for Indigenous Affairs (IWGIA).
- Matshusa, K., Thomas, P., Leonard, L. (2021) A methodology for examining geotourism potential at the Kruger National Park, South Africa. *GeoJournal of Tourism and Geosites*, 34, 209–217. <https://doi.org/10.30892/gtg.34128-639>

- Melo, V. F., Francelino, M. R., Uchôa, S. C. P., et al. (2010). Soils in the yanomami indigenous area in the mid-Catrimani river—Roraima. *Revista Brasileira De Ciencia Do Solo*, 34, 487–496. <https://doi.org/10.1590/s0100-06832010000200022>
- Morais, R. P., & de Carvalho, T. M. (2015). Aspectos dinâmicos da paisagem do lavrado, nordeste de Roraima [Dynamic aspects of the lavrado landscape, northeast of Roraima]. *Geociências*, 34, 55–68.
- Newsome, D., & Dowling, R. (2018). Geoheritage and geotourism. In E. Reynard & J. Brilha (Eds.), *Geoheritage: Assessment, protection, and management* (pp. 305–321). Elsevier.
- Niewöhner, J., Biedermann, S., Heitger, A. (2021). More-than-human eating. *Berliner Blätter*, 84, 35–48. <https://doi.org/10.18452/22955>
- Okeke, C. E. (2021). Rethinking the rights of indigenous peoples in international law: Africa in perspective. *African Journal of Law and Human Rights*, 5, 40–54.
- Presidência da República do Brasil. (1992). Homologa a demarcação administrativa da Terra Indígena YANOMAMI, nos Estados de Roraima e Amazonas [Approves the administrative demarcation of the YANOMAMI Indigenous Land, in the States of Roraima and Amazonas]. Planalto.
- Presidência da República do Brasil. (2008). Regulamento Dispõe sobre a Política Nacional de Turismo, define as atribuições do Governo Federal no planejamento, desenvolvimento e estímulo ao setor turístico; revoga a Lei no 6.505, de 13 de dezembro de 1977, o Decreto-Lei no 2.294, de 21 de novembro [Regulation Provides for the National Tourism Policy, defines the Federal Government's attributions in planning, developing and stimulating the tourism sector; revokes Law no. 6505, of December 13, 1977, Decree-Law no. 2294, of November 21]. Presidência da República do Brasil.
- Santafe-Troncoso, V., & Loring, P. A. (2021). Indigenous food sovereignty and tourism: The Chakra route in the Amazon region of Ecuador. *Journal of Sustainable Tourism*, 29, 391–410. <https://doi.org/10.1080/09669582.2020.1770769>
- Satapathy, D. A., & Bhattacharya, P. (2021). Indigenous eco-legends in contemporary North East Indian literature: Lessons in ecological conservation and preservation. *Academia Letters*. <https://doi.org/10.20935/al161>
- Schaeffer, C. E. G. R., do V. Júnior, J. F., & Melo, V. F., et al. (2018). Solos, ambientes e povos indígenas de Roraima: uma etnoecologia entrelaçada [Roraima's soils, environments and indigenous peoples: an intertwined ethnoecology]. In: Batista KD, Lumbreiras JF, Coelho MR, et al. (eds) Guia de Campo da XI Reunião Brasileira de Classificação e Correlação de Solos: RCC de Roraima (pp. 165–182). Embrapa.
- Schröder, P. (2003). Pemongon Patá: Território Macuxi, rotas de conflito [Pemongon Patá: Macuxi territory, routes of conflict]. *Revista De Antropologia*, 46, 289–293. <https://doi.org/10.1590/s0034-77012003000100010>
- Semeghini, M. G., de Menezes, M. A. O., & de Souza, C., et al. (2020). Guia prático: alimentação escolar indígena e de comunidades tradicionais [Practical guide: indigenous school meals and traditional communities]. Secretaria de Agricultura Familiar e Cooperativismo.
- Senra, E. B. (2020) “Santa Maria é floresta igual aqui” : reflexões sobre a mobilidade Yanomae [“Santa Maria is the same forest here”: Reflections on Yanomae mobility]. Universidade de Brasília.
- Supremo Tribunal Federal. (2020). Constituição da República Federativa do Brasil [Constitution of the Federative Republic of Brazil]. Supremo Tribunal Federal, Secretaria de Documentação.
- The International Work Group for Indigenous Affairs (IWGIA). (2020). *Indigenous peoples in Brazil*. <https://www.iwgia.org/en/brazil/3616-iw-2020-brazil.html>. Accessed August 17, 2021.
- The World Bank. (2021). *Indigenous peoples*. <https://www.worldbank.org/en/topic/indigenouspeoples>. Accessed August 16, 2021.
- Therborn, G. (2006). *Inequalities of the World*. Verso.
- UNESCO. (2020). *Man and the Biosphere (MAB) Programme*. <https://en.unesco.org/mab>. Accessed October 13, 2021.

- United Nations. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. Resolution adopted by the General Assembly on 25 September 2015, A/RES/70/1. Geneva
- Veras, A. S. S., Vidal, D. G., Barros, N., & Dinis, M. A. P. (2020). Geodiversidade como recurso do geoturismo: uma experiência na região Central de Roraima, Brasil [Geodiversity as a geotourism resource: an experience in the Central region of Roraima, Brazil]. In: M. Oliveira, N. Carvalho, O. Santos (Eds.), Atas do IV Congresso Internacional Educação, Ambiente e Desenvolvimento (pp. 384–390). OIKOS – Associação de Defesa do Ambiente e do Património da Região de Leiria, Leiria.
- von Seggern, J. (2021). Understandings, practices and human-environment relationships—a meta-ethnographic analysis of local and indigenous climate change adaptation and mitigation strategies in selected pacific island states. *Sustainability*, 13, 1–15. <https://doi.org/10.3390/su13010011>
- World Tourism Organization. (2019). *Recommendations on sustainable development of indigenous tourism*. World Tourism Organization (UNWTO).
- Yamada, E. M. (2008). *International Human Rights Law in the context of indigenous peoples: Moving from legislation to implementation*. The University of Arizona.

Mitigating Gender-Based Violence Through the Economic Empowerment of Women: A Case Study of the Teso Sub-Region in Uganda



Sally Bashford-Squires, Linda Gibson, and Mathew Nyashanu

Abstract This chapter uses a case study of Teso, one of Uganda's most deprived sub-regions, to examine sustainable economic growth and its impact on women's health, specifically in relation to gender-based violence (GBV). We seek to understand whether economic ventures prevent or intensify this critical public health issue. Through the lens of intersectionality, we analyse the mechanisms of change within this community and how economic factors and relationships influence each other. Throughout this process we are self-reflective concerning our roles as Western researchers studying an indigenous population. Our research aligns with key criteria for bringing about sustainable change and gender equality in international development, identified through sustainable development goal 5 (SDG) (SDGS UN, 2021). The chapter concludes that economic projects based on indigenous communitarian ethics, namely Ubuntu in this case, alongside community sensitisation projects are vital in mitigating the impact of GBV.

Keywords Uganda · Gender based violence · Ubuntu · Sustainable · Economic

1 Introduction

Gender based violence (GBV) is a global public health problem with a higher prevalence in developing countries (Muluneh et al., 2020). The United Nations defines GBV as "...physical, sexual, or mental harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty" (Abrahams et al., 2006, p. 177). GBV is widespread globally, with estimates that partner violence affects

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one in three women (WHO, 2021). This figure is based on surveys which do not necessarily determine the number of women who have suffered abuse, but instead, the number of women who reveal abuse. (Ellsberg & Heise, 2005). We argue that to understand the drivers of GBV qualitative studies, designed in participation with members of impacted communities, are needed to capture the voices of women affected.

The projects researched in this chapter are intended to impact the United Nations 2030 Sustainable Development Goal 5 (SDG UN, 2021). Goal 5 aims to achieve global gender equality by 2030 (SDG UN, 2021). However, we agree with Briant Carant's (2017) assertion that the aims within goal 5 are unrealistic. For example, targets 1 and 2, which aim to end all forms of discrimination and violence against women and girls by 2030 are utopian, especially as targets within this goal lack timely and measurable indicators. The absence of measurable outcomes for target setting suggests the UN understand the difficulties of achieving these in the near future.

Sustainability has become a popular word in development (Igoe et al., 2021). Sustainable development can be described in terms of ongoing, improved community wellbeing as well as continuous economic growth (Trudell, 2009). This research sought to find a means of making projects sustainable whilst working towards SDG 5 to bring about enhanced welfare. It examined how projects can be made viable for an indigenous community whilst creating impact.

Despite the breadth of GBV, most studies concerning this issue take place within the minority world with limited evidence focused on sub-Saharan Africa (SSA) (Muluneh et al., 2020). We use the terms 'minority world' and 'majority world' to draw attention to the anomaly that the decisions of countries in the minority high income world affect the majority of people (Alam, 2008). Studies conducted in SSA are small-scale and mostly take place within districts and therefore are not generalizable to the wider population (Abramsky et al., 2011). To date, in Teso, Uganda, one of the country's poorest regions, little research has been undertaken to capture women's lived experiences of GBV or the impact of economic projects on this public health issue.

Women's economic development projects are defined as initiatives that encourage women's financial development towards economic self-reliance (Raniga, 2016). Such projects improve women's agency by encouraging their income-building capacity, education, and rights (Sen, 2013). Improving female empowerment through economics is regarded as 'a magic potion' for women in developing countries, signifying that enabling women through financial development is the solution to GBV (Blumberg, 2005, p.2). However, other studies have shown that it is uncertain whether development projects that purport to empower women economically prevent GBV or lead to more violence by rupturing gender norms (WHO, 2021).

This research is a reaction to this gap in knowledge and understanding of how economic development projects impact GBV in Teso. We argue in this chapter for the use of methodologies that enable listening to the voices of women in Teso to explore the social, cultural and economic intersections of oppression that can lead to GBV. We also acknowledge the importance of author reflexivity due to our positionality

as researchers from the minority privileged world. We claim that an intersectional approach enables us to reflect on our privilege when conducting research with an indigenous population. The chapter explains how we worked in partnership with project leaders in Uganda to conduct the research into indigenous projects. We then thematically detail the results of our study which are discussed in detail using an intersectional framework. Finally, we refer to previous studies to support and strengthen our discussion concerning the impact of economic projects on GBV in Teso.

2 Background

This study was conceived by Sally Bashford-Squires, one of the chapter's authors, under the supervision of co-authors Mathew Nyashanu and Linda Gibson whilst undertaking a postgraduate programme of public health focused through a social model. Nyashanu and Gibson have a long history of global health partnership, research and practice in Africa. Bashford-Squires is the founder and chair of The Mustard Seed Project, Uganda (TMSP). This UK registered charity works in partnership with a community organisation in Teso called the Ekaradali Community Development Initiative (TECDI). The organisations work collaboratively to support sustainable projects that benefit the wellbeing and health of women and girls in Teso. Bashford-Squires' links with Uganda began in 2014 when, whilst working as a teacher in the UK, she was invited by the regional educational co-ordinator to work alongside Ugandan teachers in Teso to develop participatory learning. Bashford-Squires' realisation that there were very few girls attending schools past Junior level led to her interest in gender in this region. Realising that there was no 'silver bullet' to end this social determinant led to this project which has been conducted collectively with project leaders from the TECDI.

Bashford-Squires had intended to visit the Teso sub-region to work with the project leaders of TECDI to collect the data. However, COVID-19 related travel restrictions prevented the initial research plan (GOV.UK, 2021). Consequently, the authors collaborated with the TECDI leaders remotely to design the research methods.

Despite our work in partnership with the TECDI, we are mindful of privileged positions as researchers from the minority world studying an indigenous Ugandan population. This awareness infused each part of the research process. Hence, researcher reflexivity and its impact on data analysis and interpretation were crucial to this work. Self-reflexivity acknowledges the important role that researchers' intersecting identities have in determining an analysis and interpretation of findings (Yuval-Davis, 2006).

As feminist researchers we have questioned how we can navigate cultural concerns regarding GBV and cultural imperialism. Therefore, we applied intersectionality in our discussion and interpretation of the data. Intersectionality is a way of framing the experiences of those impacted by more than one domain of oppression (Hankivsky, 2012). We believe that the use of intersectionality can provide insights concerning sustainable development through the inclusion of marginalised voices.

2.1 *Intersectionality*

According to Adams (2016), an intersectionality that exposes domination and decentres hegemonic discourses is vital for realising the silenced perspectives of people in majority world countries. Adams (2016) calls for a decolonial intersectionality that can challenge Western forms of knowledge through making invisible intersections visible. In this way, intersectionality can also illuminate the privileged positions of the researchers themselves.

Intersectionality can also help negate neo-colonialist doctrines espoused by some Western feminists who homogenise women from the majority world as powerless victims of violence and culture (Mohanty, 2003). Such feminist views have been challenged by African women's rights activists who have advanced an approach to human rights which transverges universalism (Wyrod, 2008). For example, Bedigen, et al. (2021) criticise Western feminist approaches founded on assumptions of agency, which aim to empower marginalised women by assuming a Western concept of liberation. The researchers, with origins and extensive experience in SSA, argue for Africana womanism as an alternative to the Western feminist lens.

Africana womanism is based on interdependent kinship. Through this lens community functions as a strength through which marginalised groups can demand their rights. The researchers advocate this method as it enables a broader interpretation of marginalisation that recognises the undercurrents of ethnicity, class and gender. We believe that this approach to development and rights has much in common with the connectivity of intersectionality. Through exposing intersections of oppression that impact the lives of Iteso women we hope our research will work towards a decolonialisation of hegemonic Western theory and methodology.

2.2 *The Study Site*

The research that informed this study took place in three sites within the Teso sub-region, Uganda (Fig. 1). This geographically marginalised area in North-eastern Uganda has unique geopolitical elements having been affected by conflict and cattle raiding from the nomadic Karamojong tribe (Mootz & Stabb, 2019). A further conflict occurred when the Lord's Resistance Army invaded the Teso sub-region in 2003, committing mass murder, rape, and theft; they displaced the population, burned their homesteads and abducted their children (Norwegian Refugee Council, 2021). GBV escalated due to this social instability following the conflict (Mootz & Stabb, 2019).

Teso has a population of approximately 1.8 million residents (Uganda Bureau of Statistics, 2021). This area has one of the highest fertility rates nationally; six children per woman and the highest percentage of adolescent girls who have given birth (Uganda Bureau of Statistics, 2021). Exposure to GBV is more prevalent in the Teso sub-region (61%) than nationally (56%) (Uganda Bureau of Statistics, 2021).

Fig. 1 A map of Uganda detailing the study site (Tol et al., 2018)



This research sets out to examine the intersections of GBV that give cause to these statistics.

The projects researched were:

- A girls' football team of members aged between 13 and 17 based in Kumi. This project involves girls in agricultural and rights-based projects alongside football.
- Women's and girls' soap, bead-making, and agricultural projects on Tisai Island. These specific economic projects were requested by the women. This island is situated on Lake Bisina in Teso and has approximately 6000 inhabitants (Teso Development Trust, 2021).
- The Morukakise Integrated Development Association (MIDA). MIDA began in 2004 to address the challenges of domestic violence and involves five farmer groups in North Eastern rural Uganda. MIDA helps women gain an income through agricultural, craft, and tailoring skills.

All three projects reflect the indigenous knowledge of the Iteso people. Egeru (2012, p.217) defines indigenous knowledge as 'knowledge accumulated over generations of those living in a particular environment'. Further, indigenous populations have survived the impact of colonialism (Smith, 2005). That is to say that such communities are homogenous, or live in isolation from other societies. As can be seen from our results and subsequent discussion, within such communities there are relations of power which subjugate some whilst privileging others. Despite Smith's (2005) understanding that indigenous groups have endured colonialism, our study details how communities in Teso have been impacted by this period despite aspects of their indigeneity remaining intact.

3 Indigenous Knowledge

The projects researched reflect indigenous practices as they are based on an ethics of communitarianism. Such ethics are found within indigenous communities across SSA (Metz, 2013) and are reflected in Ubuntu philosophy (Barrett, 2008). Ubuntu is an African philosophy that emphasises the importance of ‘being human through other people’ (Mugumbate & Nyangur, 2015, p. 83). The concept of Ubuntu as humanness is found in East and South African countries; each language has its own variant (Mbazzi et al., 2020). For example, in Uganda, ‘Obuntu bulamu’ is described as behaviour that signifies a shared set of values that promote wellbeing and unity (Sambala et al., 2020). Accordingly, Ubuntu is an ideal philosophical basis for indigenous development projects as it emphasises the importance of the community over individuality, as opposed to neo-liberal Western epistemology which prioritises individuals. Neoliberalism is an economic practice that purports to advance wellbeing by liberating individual entrepreneurial freedoms (Harvey, 2005). Hence, neoliberal doctrines which emphasise the role of the individual weaken community solidarity.

The projects researched in Teso avoid neoliberal models through communitarian indigenous practices; these include collecting firewood, cooking shared meals, shared tailoring and agricultural practices. Such projects thus relate to the communal focus of Ubuntu ethics.

4 Methodology

The research model, which was based on The Silences Framework (Serrant-Green, 2011), was shared and discussed with the ECDI leaders using Zoom technology. The Silences Framework (SF) is a valuable tool for examining areas that are little researched or understood. Within this approach, the phrase ‘screaming silence’ describes undeveloped research areas. In this research study, the screaming silence relates to the difficulty of discussing GBV, where Ugandan women’s testimonies are often ignored and their voices silenced (Amnesty, 2007). In this way, the SF is an ideal tool for discovering what shapes GBV within Teso.

The research involved 60 participants in four focus groups, and 15 further participants partook in semi-structured interviews. The focus groups consisted of 15 women (aged 18–70) and girls (aged 13–17) from each project. The majority of the girls involved in this research attended the football focus group. Three local professional women were included to gain a broader perspective (Stewart et al. 2009). Profiles of the participants are detailed in Table 1.

The data collection process which was implemented through the project leaders used photo-voice, focus groups and semi-structured interviews to assess the impact of the economic initiatives on GBV. Photo-voice, enables researchers to see and hear the voices of women who may prefer to communicate through non-verbal methods due to the subject’s sensitivity (Westmarland & Bows, 2019).

Table 1 Characteristics of research participants

Method	Projects	Number	Demographic	Characteristic	Number	Occupation	Number
Focus groups	MIDA	2 (15)	Gender	Male	3	Farmer	34
				Female	72	Tailor	15
	Tisai Island projects	1 (15)	Ages	13–17	20	School Pupil	20
				18–31	19	Nurse	1
Total	60						
Semi-structured interviews	15			32–51	27	Reverend	2
Total number of participants	75			52–70	9	Teacher	2

5 Ethical Considerations

Nottingham Trent University's Ethics Committee gave clearance for the unpublished research from ECDI to be used. The authors and project leaders kept participant information confidentially and anonymised data. The ethics application included letters of consent from ECDI and MIDA.

6 Results

The data was collected and transcribed by the project leaders using notes taken during the discussions and interviews, and from videos which were taken on mobile phones. Where the participants spoke Ateso, the transcripts were translated into English. The transcripts were then sent to the authors, alongside videos for verification. This data was evaluated, explored, and organised by the authors into themes.

Here we contend that the themes in this section are relevant features of the impact of economic projects on GBV in Teso. We have divided the results into two sections: firstly, the community's understanding and perceptions of GBV and secondly, the impact of the projects on this issue.

6.1 *Perceptions and Understanding of Gender-Based Violence*

The participants shared many incidents of violence that are missing from the definition put forward by the UN (Abrahams et al., 2006). Such disclosures included early

marriage, land grabbing, heavy workload, and bride price. Without the use of local researchers, these definitions may have remained hidden.

6.1.1 Economic, Sexual, and Physical Violence

Participants reported on issues concerning the dropout rate of girls in school due to financial issues. A further issue expressed by participants was the amount of work women were expected to do compared to men. The photo-voice drawing (Fig. 2) captures the issue of being over-burdened by work. Participants reported issues concerning early marriage and bride price. Physical violence is also regarded as a serious concern.

Fathers do not want to farm with us. This work is left to only women. But after harvest, they sell off the produce in order to buy local brew. MIDA female aged 18–31.

Girls stop coming to school because of a lot of domestic work at home like cooking and taking care of young children at home. Footballer, female, 13–18.

Carrying heavy jerry cans for long journeys can harm women’s health and girls are often tempted by boys or men on the way to and from the water source. MIDA, female, 18–31.

Fig. 2 Factors that make life difficult in the Teso sub-region (MIDA, female, 18–31). *Source* Authors



Many rural homesteads are polygamous, and for some women, the arrival of a new bride means mental and physical abuse. Wife battering, especially during harvest season, is very common; husbands looking to deplete the family's harvests beat wives who stand in their way. MIDA, female, 32–51.

There is forced and early marriage especially for girls from poor and illiterate backgrounds. They are forced to get married by their parents and to men much older than them. Some parents do this just because they think that marrying off their daughters feels like lifting a burden off their shoulders, while others do it for material wealth got through payment of dowry by the man. Nurse female aged 18–31 (Fig. 3).

Fig. 3 Factors that make life difficult in the Teso sub-region (Nurse, female, 18–31). *Source* Authors



6.1.2 Community Norms

There was a consensus in focus group discussions that community norms concerning women's roles in families and in the broader community prevented women from earning a living. Such community norms also value boys' education over that of girls. Participants felt that GBV was considered normal and an expression of love within families:

Family norms whereby violence is accepted as a form of disciplining women and as a symbol of love. It is highly believed that a home without quarrels or fights never lasts or has no true love. Some family members are as well naturally chaotic. MIDA, female, 32–51.

I have met women, despite having over five children, still giving birth in search of a son. In this case, an heir. Though Ugandan laws recognise female heirs, several families hesitate to hand customary land to women because they believe that they will get married elsewhere and bring strangers to the ancestral land. MIDA, female 32–51.

6.1.3 Erosion of Culture

Participants also regarded erosion of culture through conflicts and colonialism and its effect on male leadership as a cause of violence.

Past conflicts have changed social norms and caused a loss of livelihood. They have caused trauma and more hardships and stripped men of their status as leaders. MIDA, female aged 32–51.

For a young man to get married today, he must struggle to raise the cash to buy cows; back then, relatives just walked to the kraals, and each contributed a cow. The community spirit was alive back then; today, that is slowly fading away, life is more demanding as everything is monetised, and people are mostly closed off. Journalist, female, 32–51.

6.2 *The Impact of Economic Projects on Gender-Based Violence*

The participants provided important insights into how the impact of the economic projects created a fracturing of social norms, which led to greater violence. However, they also recognised that the projects brought about benefits including greater agency. They expressed the need to involve men in future projects.

6.2.1 The Fracturing of Cultural and Societal Norms

The participants showed an awareness that when women became economically empowered, this led to a change in cultural and societal norms resulting in further violence. Participants also expressed that when women earn an income this can lead to men renouncing their responsibilities, leading to a more significant work burden.

When women earn money men will abdicate their responsibilities to women and it can lead to a family break up when men can no longer control the family. Tisai female, 18–32

When faced with educated women, or as they call them here, liberated women, abusive partners have been seen to get more insecure and even more abusive. But the thing about this situation is that at least most victims know that it is abuse, compared to their illiterate counterparts who have been raised to believe that physical violence is a form of love. Journalist, female, 32–51

6.2.2 Greater Agency and Stronger Communities

Economic projects were felt to provide women with greater agency to make decisions, control their lives and improve the lives of their families. The participants recognised that greater agency came from working as a team and through solidarity. Participants spoke of having their eyes opened through the projects, suggesting that the developments have increased their knowledge and broadened their understanding of rights.

The scales have been lifted from our eyes' Tisai female, 18–32, in relation to soap making project.

The girls' football has opened our eyes to see causes of gender-based violence and also to appreciate its effects like school dropout, and its dangers like early marriage. Involvement in sports stops us being stressed and gives us the strength to fight back. Footballer, female, 13–17

The benefits we have registered so far are we have received life skills, we get manure from the sheep droppings which helps improve on our soil fertility, our husbands are no longer hostile since we help in provision of domestic necessities, our hygiene has greatly improved, we're about to pay our children's fees, and we can now make local pesticides. MIDA, female, 18–31

6.2.3 The Importance of Involving Men in Projects

The participants recognised that it was necessary to involve men in economic projects to bring about greater trust and respect. Involving men was also regarded as a means of altering social norms around GBV through negotiation and openness. Participants felt that involving men in projects would garner more respect for women and thus mitigate GBV:

Sensitising men against abuse and economically empowering them together with their spouses brings harmony in a home. Sometimes these men do not know better; they were raised in a patriarchal system and must unlearn so much. So much about Uganda is changing; the transition brings with it many differences. Patriarchy has defined so many traditional rules here, but now as that is slowly being dismantled, GBV cases related to that process will continue to show up. Journalist, female, 32–51.

7 Discussion

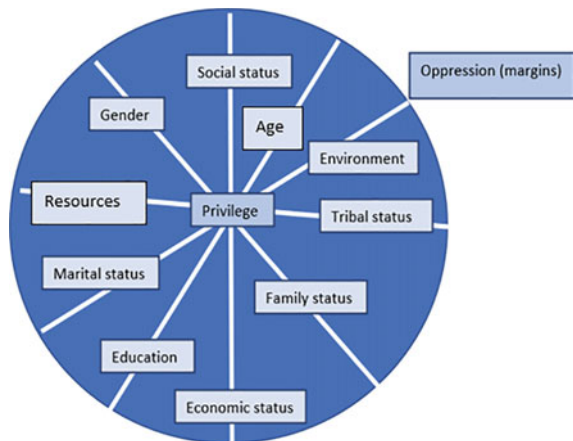
The results evidence that there are multiple intersections of oppression in Teso which impact GBV. In this section we discuss this evidence alongside existing literature and research to support our reasoning concerning the need for sustainable development based on indigenous knowledge to progress SDG 5. We have presented our results in Fig. 4, which we have adapted from Hulko’s (2016) social location diagram to highlight the oppressions specific to women in this peripheral area of Uganda.

Our understanding of the causes of this violence can provide a framework to explore how such determinants might interact with economic projects and how any negative impact might be mitigated to make progress towards SDG 5. Whilst Fig. 4 reveals multiple intersections, we have focused on what we feel are the most pertinent sectors to provide a richer discussion. However, we recognise that all intersections of privilege and oppression are interrelated and fluid.

7.1 Definitions and Determinants of GBV

The research findings suggest that economic hardship has led to the feminisation of poverty, whereby women are burdened by physical work and caring duties, yet men take the proceeds of their labour. The participants felt that their care work, labour and a lack of resources also prevented their decision-making capacity. According to the UN Women’s World Survey on the Role of Women in Development (2014), interventions are needed to include women’s equal involvement as leaders within their own communities if sustainable development and gender equality are to be realised. Therefore, progress towards SDG 5 requires mediations that provide Iteso women with time and resources to develop as leaders.

Fig. 4 Social location diagram detailing the intersections of oppression and privilege in the Teso sub-region, adapted from Hulko (2016)



To afford rural, Ugandan women greater agency, Tuyizere (2017) emphasises the need to develop women's advocacy at all levels within society to enable women to influence political, economic and social decision-making processes. However, social norms dictate that women's activism takes their time away from earning an income or looking after their children and could increase their burden of work (Bedigen et al., 2021). For women's advocacy to succeed, resources need to be directed at the intersections that limit the time for advocacy and subordinate women's status. In addition to impacting women's decision-making capacity, care work often leads to school absenteeism, directly correlating with the findings of UNICEF (2003). Economic strategies to end this subjugation include advocating for the elimination of child labour and sensitising communities to the advantage of sharing educational costs between boys and girls.

The data has made visible how economic, sexual and physical violence in Teso is linked to cultural practices, violent masculine norms, societal disintegration and rivalry over resources. These intersections have led to child pregnancies, early marriage, polygamy, and issues concerning bride price. According to Speed (2009), we should not be complacent about women's oppression due to its indigenous cultural context. Such an argument is based on notions of cultural norms as static and bounded. However, such norms are in a constant state of flux; formed in a dialogue between internal and external social actors and between members of the community who can challenge hegemonic notions of power. Accordingly, gendered norms can be altered as part of this process. This enables us, in our role as researchers, to transgress cultural apprehension regarding GBV and cultural imperialism.

The use of indigenous knowledge alongside sustainable development can be used to alter harmful cultural practice such as bride price. For example, Hague, Thiara, and Turner (2011) advocate reforming bride price through culturally sensitive means. Offering a voluntary gift as a form of validation, rather than dowry payment, would promote women's agency within marriage. To ensure such programmes are trusted by stakeholders it is vital they are led by local community leaders (Mwendwa et al., 2020).

Our data illustrates that such community norms, leading to practices such as bride price, are deeply embedded within patriarchal beliefs in Teso. According to Kandiyoti (1988), patriarchy evokes a homogenous conception of male dominance, which hides the workings of cultural and historical attitudes towards gender that lead to oppressive customs. Examining patriarchy through a framework of intersectionality can begin to make the facets of oppression visible and aid an understanding of how different forms of oppression are intertwined. Consequently, a more nuanced understanding of how patriarchy works in SSA can be achieved.

According to Manne (2019), most people do not use the word patriarchy or understand how it is sustained. Thus, defying a system that many have no name for is a challenge. However, Feminist Alternatives (2011, p.224.) call for women to come together to confront male dominance through a political consciousness instead of a 'culture of silence'. Such activism can help communal growth and lead to a sense of collective power and new possibilities. Hence, we argue that participatory projects that give women a space to discuss their rights and develop activism could impact

patriarchal rule in marginalised areas of SSA. Such advocacy reflects the interdependent kinship of African womanism, discussed in Sect. 2.1, alongside the indigenous ethics of Ubuntu. Consequently, the conditions of patriarchy can start to be alleviated through indigenous knowledge.

As discussed in Sect. 3, Ubuntu is regarded as transformative ethics that can heal those shaped by extreme suffering and oppression (Barrett, 2008). It can encourage individuals to value their own identity within their community through a web of reciprocal relationships. Ubuntu teaches that one person's suffering is everybody's responsibility and that the ability for individuals to flourish is inexplicably linked to a community's ability to thrive (Nyamayaro, 2021). Hence, development infused with the ethics of Ubuntu would aid the growth of successful leadership, build confidence within communities, and create safe spaces where dialogue around ending GBV can be nurtured (Hailey, 2008). Infusing development practices with indigenous knowledge in this way can aid communities' advancement towards SDG 5.

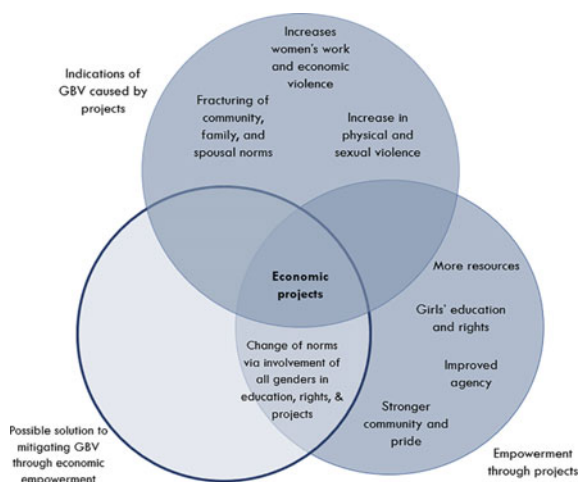
In addition to the structural violence impacted via patriarchy, further cultural changes brought about through the effects of colonialism and more recent conflicts have resulted in GBV according to the results of this study. Therefore, colonialism must not be extended through Westernised neoliberal development practices that obfuscate race, gender, and indigenous culture (Oyěwùmí, 1997). Neoliberal practices often place the burden of poverty on women through sustainable empowerment discourses of personal effort, self-regulation, and competitiveness (Hayhurst, 2014). However, such development initiatives fail to impact SDG 5 because they do not reflect the indigenous culture of those they wish to empower (Bedigen et al., 2021). Indeed, many of the participants expressed how choosing to become economically empowered increased GBV due to a fracturing of cultural norms. Subsequently, we argue that development programmes need to reflect the indigeneity of communities and involve all stakeholders to bring about action which impacts all intersections of subjugation. In this way local development programmes can lead to an expansion of social cohesion, thus strengthening their sustainable impact. Such projects can prevent the erosion of culture and negate the influence of neoliberal development projects that homogenise communities in the majority world and place the burden of poverty alleviation on women.

7.2 *The Impact of Economic Projects*

Our data exposes how economic empowerment is deemed beneficial when it provides more resources to families and leads to improved education and stronger communities, thus lessening one of the pathways towards GBV (Kristoff and WuDunn, 2010). However, the results correlated with Manne's (2019) argument: when women challenge power distribution, it can result in violence. These results are detailed in Fig. 5, which illustrate the intertwined factors of GBV in Teso.

Our study's results indicated that when women became economically empowered it led to a change in cultural and societal norms resulting in further violence. These

Fig. 5 The impact of economic projects in Teso sub-region



issues have been increasingly highlighted in recent papers (Iyanda et al., 2019). For example, Jewkes (2002) found that empowerment through education can lead to more liberal ideas thus enabling women to challenge aspects of traditional gender roles. However, such empowerment carries an increased risk of violence until a high enough level of education is reached for protective effects to predominate.

To offset the fracturing of social norms through women's empowerment, development practices need to consider the intersecting oppressions leading to GBV; these factors interact within a web of complementary influences. Hence, patriarchal ideologies of male superiority legitimise violence against women, alongside transgressions of traditional female gender roles. Thus, a multilevel approach to improving women's agency whilst challenging unacceptable social norms may positively impact SDG 5. However, as discussed previously in Sect. 7.1, it is vital that such approaches reflect the indigenous culture of the community.

Despite a fracturing of social norms, some participants identified how economic projects can be beneficial in developing women's and girls' agency to make decisions and improve conditions for their families. The participants expressed how economic initiatives provided a greater awareness of GBV and justice. Further, the projects provided greater resources for the participants, whilst reflecting indigenous communitarian ethics; the participants shared collecting firewood, cooking, and agricultural tasks. Working in collaboration increases community cohesion and leads to activism towards changing social norms associated with violence (Hailey, 2008).

Through an ethics of communitarianism the projects researched have created a safe space for women and girls. Safe spaces are defined as places where women's physical and emotional safety is valued and where women are 'supported through processes of empowerment to seek, share, and obtain information, access services, express themselves, enhance psycho-social wellbeing, and more fully realize their rights.' (UNFPA, 2021). Such spaces enable women to develop their relational autonomy through concrete actions such as discussion and peer support. Relational autonomy

is the means by which individuals are shaped within a series of relationships to develop their agency (Sherwin, 1998). Hence, possibilities for survival do not just exist within neoliberal economic empowerment initiatives. Viewing Iteso women as agents of change within their own community aligns with the Africana womanist perspective advocated by Bedigen et al., discussed in Sect. 2.1, as opposed to a Western feminism that often advocates for individual success. Furthermore, such relational ethics relate to Ubuntu philosophy which is grounded in an indigenous culture of communitarianism, as we have previously discussed in Sect. 3.

As well as the need for safe spaces for women, participants stated that it is also necessary to involve men in economic projects to bring about greater trust and respect. Involving men was also regarded as a means of altering social norms around GBV through negotiation. Such results correlate with Chant's (2008) research which suggests neglecting men in gender relations has brought about a 'crisis of masculinity' (2008 p.179). Excluding men from development can fuel gender rivalry, which can lead to GBV via drug or alcohol abuse and other forms of alienated behaviour (Molyneux & Razavi, 2002).

According to Rujumba and Kwiringira (2019), projects that discount men are not likely to succeed. Therefore, there needs to be a focus on how men can be involved in achieving SDG 5 and shown that gender equity benefits the entire community. Indeed, Mogale, Burns, and Richter (2012) recommend involving the whole community in discussions that distinguish between appropriate customs, those that support women instead of those that violate women's rights. Involving the community in transforming the process of bride price, as discussed in Sect. 7.1, could help progress towards SDG 5. This signifies Ubuntuism; involving everyone in making a positive change can lead to significant progress.

Ubuntu is critiqued for prioritising patriarchy in SSA, where gender inequalities deny women autonomy (Gouws and Van Zyl, 2015). Thus, Ubuntu philosophy can be deployed to emphasise the concerns of men above women due to women's subordinate status in African communities (Chisale, 2018). However, focusing on the communal ethics of Ubuntu alongside providing women with the facilities to promote their relational autonomy could improve gender equality. Affording women with a female-only space through social enterprise projects is vital to address the oppressive conditions that result in their marginalization.

Our research concludes that although economic activities increase women's capabilities and opportunities, such gains are cancelled out by men's need to assert power. Therefore, attention needs to be paid to involving men in economic projects whilst both recognising and impacting on patriarchal structures which uphold men's advantage. Whilst we recognise that involving men in economic projects is a contested issue because social and economic intersections negatively impact women more significantly in SSA (Rujumba & Kwiringira, 2019), providing spaces for females to engage in concrete action to end their subjugation, whilst involving men in development projects could help towards achieving SDG 5 in this peripheral region. Such a solution recognises the role that indigenous, communitarian ethics can play in development; ensuring that all stakeholders are invested in achieving gender equity.

Furthermore, GBV prevention linked to economic initiatives requires multilevel interventions to benefit men, women, boys and girls in Teso. Multilevel interventions could effectively bring about positive change to communities by impacting on more than one intersection of subjugation; balancing a fracturing of cultural norms against improved education for girls, for example. We argue that economic initiatives could work alongside programmes that sensitise the community to GBV to mitigate oppression and bring about greater gender equity.

8 Conclusion

This research has been infused with a process of self-reflectivity which has been sustained by our use of intersectionality to interpret the results. Throughout our study, which has included working in participation with local project leaders, we have endeavoured to decolonise our research. However, we are aware that as minority world researchers we still have much to learn and to reflect on. In time a greater decolonisation of method and theory could be achieved through a continual process of collaborating with and learning from those in marginalised communities, the wider dissemination of such knowledge and research, and an understanding and reflection of the issues concerning past minority world research and methodology. Thus, we must not see our work towards a decolonisation of research as ever complete. It is a continual and cyclical process which requires broader acknowledgement within global academic communities.

Through prioritising the voices of the women in Teso, our research has shown that embedded inequities regarding power, resources, education, and obligations among men and women in the Teso sub-region create GBV. Our research shows that this pattern can be prevented if sustainable economic projects based on communitarian ethics are introduced. This research acknowledges that economic projects can negatively impact GBV when men are excluded. According to Adichie (2014, p.25) “*We must raise our daughters differently, we must also raise our sons differently*”. Thus, the focus should be on working with communities to address basic needs whilst attending to the harmful social norms and hegemonic patriarchy, which intensifies GBV.

If we are to make progress towards SDG 5 governments, policymakers, NGOs, and community leaders need to invest now in prevention programmes, resources, and economic initiatives that impact the intersectionalities of oppression. Immediate investment into sustainable development can have future capacity to prevent the GBV epidemic from gaining ground and lay foundations to strengthen intersections to mitigate this violence. In this way, patriarchal structures, oppressive community norms, alongside further intersections that lead to GBV can start to be weakened.

9 Limitations

Two main limitations were acknowledged in this research. Firstly, the reliance of the authors on the project leaders' translations. The author recognises that not only is translation itself problematic, but so is the author's understanding of cultural concepts (Temple, 1997). However, the triangulation of the data through photovoice, and the emphasis on reflection within the Silences Framework (Serrant-Green, 2011), provides measures to ensure that the data is accurate and true to the participants' voices.

A further issue relates to the project leaders' failure to recruit a female researcher to interview the women and engage in focus groups as we requested. This could relate to the embedded patriarchy within SSA (Tuyizere, 2017). Despite these limitations, the author agrees with Lewis and Maticka-Tyndale (1999) that the gains of collaborative research outweigh the downsides.

References

- Abrahams, N., Jewkes, R., Laubscher, R., & Hoffman, M. (2006). Intimate partner violence: Prevalence and risk factors for men in Cape Town, South Africa. *Violence and Victims, 21*(2), 247–264.
- Abramsky, T., Watts, C. H., & Garcia-Moreno, C. et al. (2011). What factors are associated with recent intimate partner violence? findings from the WHO multi-country study on women's health and domestic violence. *BMC Public Health, 11*, 109. <https://doi.org/10.1186/1471-2458-11-109>
- Adichie, C. N. (2014). *We should all be feminists*. Anchor Books.
- Alam, S. (2008). Majority world: Challenging the west's rhetoric of democracy. *Amerasia Journal, 34*(1), 88–98.
- Amnesty.Org. (2007). *Amnesty*. [Online]. Available at: <https://www.amnesty.org/en/press-releases/2007/11/uganda-justice-system-fails-victims-sexual-violence-20071130/>. Accessed June 17, 2021.
- Barrett, P. (2008). The quest for ubuntu is a coming-age South Africa: Questions arising from Dietrich Bonhoeffer's latter ideas. *Religion and Theology, 15*(1), 63–69.
- Bedigen, W., Mdee, A., Temlong, R., Thorley, L., & Tshomba, P. (2021). The failure of externally-driven advocacy initiatives to contextualise sub-Saharan marginalised women. *Development in Practice, 31*(2), 259–267.
- Blumberg, R. (2005). Women's economic empowerment as the 'magic potion' of development? Paper presented at the '100th Annual Meeting of the American Sociological Association hosted by The American Sociological Association on 13th August 2005 in Philadelphia [Unpublished].
- Briant Carant, J. (2017). Unheard voices: A critical discourse analysis of the millennium development goals' evolution into the sustainable development goals. *Third World Quarterly, 38*(1), 16–41. Available via: Sage. Accessed January 7, 2021.
- Chant, S. (2008). The 'feminization of poverty' and the 'feminisation' of anti-poverty programmes: Room for revision?. In: N. Visvanathan, L. Duggan, N. Wiegiersma, & L. Nisonoff, (Eds.), *The women, gender and development reader* (2nd ed., pp. 174–197). Zed Books.
- Chisale, S.S. (2018). Domestic abuse in marriage and self-silencing: Pastoral care in a context of self-silencing. *HTS Teologiese Studies/Theological Studies, 74*(2).
- Egeru, A. (2012). Role of indigenous knowledge in climate change adaptation: A case study of the Teso sub-region, Eastern Uganda. *Indian Journal of Traditional Knowledge, 11*(2), 217–224.

- Ellsberg, M. C., & Heise, L. (2005). *Researching violence against women: A practical guide for researchers and activists*. PATH/World Health Organization.
- Feminist Alternatives. (2011). *My dream is to be bold*. Pambazuka Press.
- Gouws, A., Van Zyll, M. (2015). *Care ethics and political theory* (D. Daniel Engster, & M. Hamington (Eds.)). Oxford University Press.
- GOV.UK. (2021). *Travel abroad and coronavirus (COVID-19)*. [Online]. Available at: <https://www.gov.uk/guidance/travel-advice-novel-coronavirus>. Accessed June 17, 2021.
- Hague, G., Thiara, R. K., & Turner, A. (2011). Bride-price and its links to domestic violence and poverty in Uganda: A participatory action research study. *Women's Studies International Forum*, 34(6), 550–561.
- Hailey, J. (2008). *Ubuntu: A literature review*. Tutu Foundation.
- Hankivsky, O. (Ed.). (2012). *An intersectionality-based policy analysis framework*. Institute for Intersectionality Research and Policy, Simon Fraser University.
- Harvey, D. (2005). *A brief history of neoliberalism*. Oxford University Press.
- Hayhurst, L. M. C. (2014). Using postcolonial feminism to investigate cultural difference and neoliberalism in sport, gender and development programming in Uganda. In K. Young, & C. Okada, (Eds.), *Sport, social development and peace* (pp. 45–65). Emerald.
- Hulko, W. (2016). LGBT individuals and dementia: An intersectional approach. In: S. Westwood, & E. Price, (Ed.), *Lesbian, gay, bisexual and trans* individuals living with dementia* (pp. 179–198). Routledge.
- Igoye, A., Karrel, T., & Van Leeuwen, J. (2021). *Listen. Think. Act. Lessons and perspectives in community development*. Global Livingstone Institute.
- Iyanda, A., Boakye, K., Olowofeso, O., Lu, Y., & Salcido Giles, J. (2019). Determinants of gender-based violence and its physiological effects among women in 12 African countries. *Journal of Interpersonal Violence*, 234–245.
- Jewkes, R. (2002). Intimate partner violence: Causes and prevention. *The Lancet*, 359(9315), 1423–1429.
- Kandiyoti, D. (1988). Bargaining with patriarchy. *Gender & Society*, 2(3), 274–290.
- Kristof, N., & Wudunn, S. (2010). Microcredit: The financial revolution. *Half the sky* (pp. 204–220). Virago Press Ltd.
- Lewis, J., & Maticka-Tyndale, E. (1999). *Escort services in a Border Town: Methodological challenges conducting research related to sex work*. Health Canada, Division of STD Prevention and Control.
- Manne, K. (2019). *Down girl* (1st ed.). Penguin Books.
- Mbazzi, B., Femke, R., Nalugya, E., Kawesa, H., T Nambemba, P., Nizeyimana, P., Ojok, G., & Seeley, J. (2020). 'Ubuntu Bulamu'—Development and testing of an indigenous intervention for disability inclusion in Uganda. *Scandinavian Journal of Disability Research*, 22(1), 403–416. Available via ProQuest. Accessed October 9, 2021.
- Metz, T. (2013). The western ethic of care or an Afro-communitarian ethic? Specifying the right relational morality. *Journal of Global Ethics*, 9(1), 77–92.
- Mogale, R., Burns, K., & Richter, S. (2012). Violence against women in South Africa. *Violence Against Women*, 18(5), 580–594. Available via ProQuest. Accessed October 9, 2021.
- Mohanty, C. (2003). Under western eyes. Revisited: Feminist solidarity through Anticapitalist struggles. *Signs: Journal of Women in Culture and Society*, 28(2), 499–535. Available via ProQuest. Accessed October 9, 2021.
- Molyneux, M., & Razavi, S. (2002). *Gender justice, development, and rights*. Oxford University Press.
- Mootz, J. J., & Stabb, S.D. (2019). Strategies and considerations for transnational feminist research: Reflections from research in Uganda. In *Strategies and considerations for transnational feminist research: Reflections from research in Uganda. Transnational psychology of women: Expanding international and intersectional approaches* (pp. 61–90). American Psychological Association.
- Mugumbate, A., & Nyangur, A. (2015). The value of Ubuntu in social work. Exploring African philosophy. *African Journal of Social Work*, 3(1), 34–47.

- Muluneh, M.D., Stulz, V., Francis, L., & Agho, K. (2020). *Gender based violence against women in Sub-Saharan Africa: A systematic review and meta-analysis of cross-sectional studies*. MDPI AG. A.
- Mwendwa, P., Mutea, N., Kaimuri, M., De Brún, A., & Kroll, T. (2020). Promote locally led initiatives to fight female genital mutilation/cutting (FGM/C) lessons from anti-FGM/C advocates in rural Kenya. *Reproductive Health, 17*(1).
- Norwegian Refugee Council., (2021). NRC in Uganda. [online] Available at: <https://www.nrc.no/countries/africa/uganda/>. [Accessed 13 July 2021].
- Nyamayaro, E. (2021). *I am a girl from Africa*. Simon & Schuster UK.
- Oyéwùmí, O. (1997). *The invention of women: Making an African sense of western gender discourses*. NED—New edition ed., University of Minnesota Press.
- Raniga, T. (2016). Participatory experiences of women in economic development cooperatives in Bhambayi, KwaZulu-Natal, South Africa. *Research on Social Work Practice, 27*(2), 215–222. Available via Sage. Accessed May 2, 2021.
- Rujumba, J., & Kwiringira, J. (2019). 'If they beat you and your children have eaten, that is fine...' Intersections of poverty, livelihoods and violence against women and girls in the Karamoja region, Uganda. In: O. Hankivsky, & J. Jordan-Zachery (Eds.), *The Palgrave handbook of intersectionality in public policy. The politics of intersectionality*. Palgrave Macmillan.
- Sambala E.Z., Cooper, S., & Manderson, L. (2020). Ubuntu as a framework for ethical decision making in Africa: Responding to epidemics. *Ethics Behaviour, 30*(1), 1–13.
- SDG UN. *Goal 5: Achieve gender equality and empower all women and girls* [Online]. Accessed November 19, 2021.
- Sen, A. (2013). *Development as freedom*. Anchor Books.
- Serrant-Green, L. (2011). The sound of 'silence': A framework for researching sensitive issues or marginalised perspectives in health. *Journal of Research in Nursing, 16*(4), 347–360.
- Sherwin, S. (1998). *The politics of women's health*. Temple University Press.
- Smith, L. T. (2005). On tricky ground. *The Sage Handbook of Qualitative Research, 3*, 85–107.
- Speed, S. (2009). Gendered intersections: Collective and individual rights in indigenous women's experience. In Mark Goodale (Ed.), *Human rights: An anthropological reader*. Wiley-Blackwell.
- Stewart, D.W., Shamdasani, P.N., & Rook, D.W. (2009). Group depth interviews: Focus group research. In *The SAGE handbook of applied social research methods* (pp. 589–616). SAGE Publications, Inc. <https://doi.org/10.4135/9781483348858>
- Temple, B. (1997). Issues in translation and cross-cultural research. *Sociology, 31*(3), 607–618.
- Teso Development Trust. (2021), Online. Available at: <http://teso.org.uk/>. Accessed November 27, 2021.
- Tol, W., Ebrecht, B., Aiyo, R., Murray, S., Nguyen, A., Kohrt, B., Ndyabangi, S., Alderman, S., Musisi, S., & Nakku, J. (2018). Maternal mental health priorities, help-seeking behaviors, and resources in post-conflict settings: a qualitative study in Eastern Uganda. *BMC Psychiatry, 18*(1).
- Trudell, B. (2009). Local-language literacy and sustainable development in Africa. *International Journal of Educational Development, 29*(1), 73–79.
- Tuyizere, A. (2017). *Gender and development*. Makerere University.
- Uganda Bureau of Statistics. (2021). UBOS. [Online]. Available at: <https://www.ubos.org/>. Accessed June 17, 2021
- UNICEF. (2003). *Girls' education*. [Online] Available at: <https://www.unicef.org/education/girls-education>. Accessed July 8, 2021.
- UNPFA (2021). Gender-based violence. [online] Available at: <https://www.unpfa.org/gender-based-violence>. [Accessed 17.7.21].
- UN Women. (2014). *Gender equality and sustainable development*. World survey on the role of women in development. UN Women. [Online]. Accessed 13th April 2020. <https://www.unwomen.org/-/media/headquarters/attachments/sections/library/publications/2014/world-survey-on-the-role-of-women-in-development-2014-en.pdf>
- Westmarland, N., & Bows, H. (2019). *Researching gender, violence and abuse* (1st ed.). Routledge.

- WHO. (2021). *Violence against women*. [online] Available at: <<https://www.who.int/news-room/fact-sheets/detail/violence-against-women>> [accessed 17.6.21].
- Wyrod, R. (2008). Between women's rights and men's authority: Masculinity and shifting discourses of gender difference in urban Uganda. *Gender & Society*, 22(6), 799–823.
- Yuval-Davis, N. (2006). Intersectionality and feminist politics. *The European Journal of Women's Studies*, 13(3), 193–209.

Interface of Tourism, Basket Weaving and Indigenous Knowledge in the Okavango Delta Panhandle of Botswana



Kgosietsile Velepini and Heseikia Garekae

Abstract Women in the Okavango Delta panhandle of Botswana have culturally engaged in weaving baskets. The Okavango Delta is Botswana's major tourist destination due to rich biodiversity that include the swampy inland Delta, where real fan palm trees grow. Women harvest fibers of palm trees from river banks, boil and use extracted dye as a colorant in dry palm leaves. In 1970s, tourism boom in Botswana valorised basketry for commercial purposes. Framed under the Place-based education (PBE) theoretical approach, the study assessed the role of tourism in preservation of cultural practices in the Okavango Delta panhandle. Specifically, the study examined how tourism development revitalise the indigenous knowledge of weaving baskets in the Okavango Delta. This chapter is in line with SDG target 8.9: By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products. The research employed qualitative methodology which included document analysis, observations, and semi-structured interviews with basket weavers from local communities in the Okavango Delta. Results indicated that cultural tourism in the Okavango Delta preserves indigenous knowledge in basket weaving. Tourism plays an important role in preserving the indigenous basket weaving practices which were under the threat of diminishing. As a result, it is imperative for tourism operators to work alongside the local community members in endeavour to package cultural elements for tourism consumption. This is vital for ensuring authenticity of cultural elements.

Keywords Tourism · Basket weaving · Indigenous knowledge · Okavango Delta panhandle · Botswana

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1 Introduction

Women in the Okavango Delta panhandle of Botswana have culturally engaged in weaving baskets (Cunningham & Milton, 1987; DeMotts, 2017; Milton, 1987). The Okavango Delta is one of Botswana's major tourist destinations in southern Africa region due to the rich biodiversity that includes the swampy inland Delta, where real fan palm trees (*Hyphaene petersiana*) grow (Mbaiwa, 2004; Wolski et al., 2005). Women in the Okavango Delta live close to nature (DeMotts, 2013; Mbaiwa, 2004) and therefore have continued to harvest fibers of palm trees in river banks, boil and use the extracted dye as a colorant in dry palm leaves, design and produce different types of baskets. In the thesis titled, *Basketry and Its Use in a Craft Program*, Potts (1958) stated that "All early people knew where to find a supply of twigs and grasses, for they lived close to nature and their conveniences were made chiefly from vegetable materials" (p. 1). In pre-colonial past, baskets in Botswana reflected lifestyle of San (hunter-gatherers or *Basarwa*), pastoralists (e.g. Hambukushu, Ovambanderu, Ovaherero), and fishing ethnic groups (e.g. Bayei and Hambukushu) who are still found in the Okavango Delta, a UNESCO World Heritage Site (Mosepele & Ngwenya, 2010; Silitshena & McLeod, 1989; Terry & Cunningham, 1993; Tlou, 1985).

Baskets were used in food production such as planting and harvesting, storage, brewing and drinking beer and serving foods in Philippines (East Asia) before tourism commodification (Inocian et al., 2019). In Philippines baskets are called *bakat*, which is the local name of bamboo strips that make baskets. Meilach (1974) suggested that basket weaving is one of the oldest universal crafts that are evident to numerous baskets seen worldwide for thousands of years. According to Meilach (1974), natives of Cebu¹ in Philippines and the Chinese traders used *bakat* to store farm yields during the harvest season. The harvests stored in several *bakat* were transported by a buffalo-drawn sled to the nearest market. Women mostly carried *bakat* on their heads to the market, while men carried *bakat* on their shoulders. The above lifeways in East Asia also reflected cultural lifestyles in southern Africa region, where the Okavango Delta is situated. Terry and Cunningham (1993) wrote, "baskets seldom lasted more than a few years and with rapid urbanisation and cultural change, particularly since the 1960s, some basket styles and skills of past centuries have disappeared without trace" (p.25). According to Terry and Cunningham (1993), the 1970s experienced an increase in international appreciation of African basketry as an art. This led to the export of African baskets to collectors, designers and museums in western countries such as the United States of America, Australia and Europe. Since the early 1970s commercial marketing and an increase in tourism over the past two decades had a tremendous impact on basket weaving in southern Africa region.

This research is in line with Sustainable Development Goal 8, which state as follows: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. More precisely, this research is underpinned by the Sustainable Development Goal target 8.9, which state that by

¹ Cebu is a province of the Philippines located in the Central Vasayas region and consists of a main island and 167 surrounding islands and islets. Retrieved from <https://en.wikipedia.org/wiki/Cebu>.

2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products. Furthermore, in relation to promotion of local culture, SDG target 4.7 also emphasise as follows, “By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development. This research about interface of tourism, basket weaving and indigenous knowledge is focused in the Okavango Delta panhandle and it contributes into the wider research that aims at supporting indigenous and local communities to drive their own development agenda, based on their worldviews and priorities.

In the 1970s, tourism boom in Botswana valorised basketry for commercial purposes by attaching a monetary value. There was international appreciation of African basketry as handicraft production of baskets experienced an upsurge.

Basketry production by private entrepreneurs has expanded considerably to meet the demands of the commercial market and handicraft production has been encouraged as a cottage industry in rural areas due to the attractive combination of low capital input and use of locally available resources and traditional skills (Cunningham & Milton, 1987).

Therefore, increased basketry production also experienced changes in style, design and availability of raw materials. In their paper titled, *Effects of basket-weaving industry on mokola palm and dye plants in north-western Botswana*, Cunningham and Milton (1987) suggested that some of these changes are positive while others are negative. “But there is no denying that commercialisation has had a significant impact on basket-makers and their product” (Cunningham & Milton, 1987, p.25). For all that, basket commercialisation resulted in transformation of artefacts (baskets) in form, shape, design and also decline in availability of raw materials. Consequently, there was impact on basket weavers and artefacts themselves. The decline in demand could expose indigenous skills and old designs in basket weaving to disappear. Against this backdrop, the study assessed the role of tourism in preservation of cultural practices in the Okavango Delta, Botswana. Specifically, the study examined how tourism development revitalises the indigenous knowledge of weaving baskets in the Okavango Delta. There is death of research focusing on indigenous knowledge in basket weaving.

1.1 Context of the Study

The Okavango Delta panhandle is situated in the northwestern part of Botswana. UNESCO World Heritage Centre (1992–2022) stated that the Okavango Delta is an inland delta and “includes permanent swamps which cover approximately 600,000 ha along with up to 1.2 m ha of seasonally flooded grassland. The inscribed World Heritage property encompasses an area of 2,023,590 ha with a buffer zone of

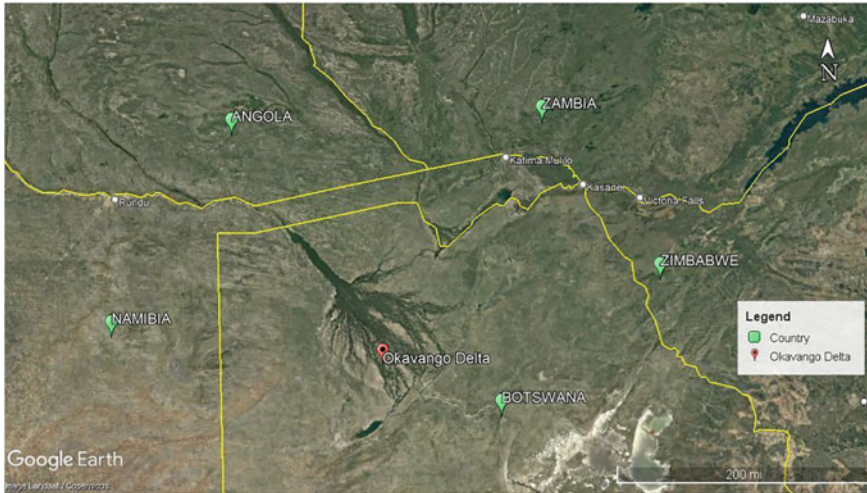


Fig. 1 Okavango Delta panhandle in northwestern Botswana. *Source* Authors' work in Google Earth

2,286,630 ha” (p. 1). The Delta has vast amounts of water, vegetation and wild animals’ species (Wolski et al., 2005). Figure 1 shows the location of the Okavango Delta panhandle in Northwestern Botswana.

The Okavango Delta support diverse human communities in sustaining their livelihoods. The Delta was declared a wetland of International Importance and Ramsar Site in 1997. In 2014, the delta was declared a UNESCO World Heritage Site. The Okavango Delta is suitable for this research because the site has important natural resources and a cultural base, which constitute diverse human community and some having arrived in the past from neighbouring countries such as Angola, Namibia, and Zimbabwe (Parsons, 2008). The Delta is an important tourism attraction site in Botswana.

2 Literature Review

2.1 Basket Weaving in History

Basket weaving is an old age practice, worldwide (Lee, 1948; Meilach, 1974; Potts, 1958). Early civilisations such as the Ancient Romans and Egyptians utilized baskets during the religious and daily chores. Potts (1958) also stated that weaving of baskets goes back to the biblical times. “As mentioned in the Bible, baskets commonly store the fruits for a sacrificial offering to God” (Inocian et al., 2019, p. 446). According to Inocian et al. (2019), indigenous communities such as the Inuit and the Wampanoag

in North America and South America used watertight baskets to hold water. Furthermore, Inocian et al. (2019) wrote that women in Philippines and China carried bakat (baskets) on their heads and walked downhill and uphill to trade their produce in the market.

Basket weaving in East Asia played an important role in lifting the livelihood of weavers particularly women. However, research suggests that “Public knowledge about them in how they weave and how they earn is scant based on the existing literature” (Inocian et al., 2019, 446). According to Inocian et al. (2019), the idea of unveiling the bakat art and craft to the public and the academic community can open the basket industry with many opportunities for business and tourism development.

The lineage of weavers slightly decreases due to modern life attraction. The effect of modernization does not steal away the old traditions of weaving, but rather it modifies them. Plastic replaces the bakat and the weavers have simply no choice but to adapt the fast pace of modernization (Inocian et al., 2019, p.446).

According to Potts (1958) “The baskets of today are the development of an art that has been handed down through hundreds of years” (p. 4). Potts (1958) stated that it is only in the last few years that “the importance of teaching children how to learn by doing has renewed the industry and basket weaving has returned to us as a factor in the promotion of education and industrial ability” (p. 4). According to Potts (1958), the bible also informs that the Israelites were commanded to offer as a sacrifice the first fruits of land in a basket. “It also tells about the basket of bulrushes, coated with mud that served as a cradle for Moses” (Potts, 1958, p. 2). Writing about the Indian contribution in basketry, Potts (1958) stated that in earlier times, the Indians considered basket making a woman’s art and it as a part of her homemaking. Potts (1958) argued that the current Indian designs are not of recent origins because just like other basket designs, Indian art has been transferred down through countless generations. Drawing upon the above synthesis, it is evident that indigenous basket weaving has experienced transformation over time.

2.2 Basket Weaving in Sub-Saharan Africa Region

Retrospectively, the 1970’s indeed experienced an increase in international appreciation of African basketry as an art leading to the export of African baskets, including from Botswana, to western countries. This may also have been due to abundance of locally available resources, mainly in rural areas of Africa. Research suggests that indigenous knowledge in basket weaving is not static; rather it keeps on changing (Inocian et al., 2019; Potts, 1958). According to Ali and Davis (2018), the indigenous technologies of the people of the upper east region of Ghana evolved around weaving (e.g. baskets, hats, and mats) and leather work (e.g. bags, purses, and bracelets) amongst other production. The weavers in upper east region of Ghana usually designed and constructed mathematics-oriented baskets, hats, and mats. This can signify the extent at which basket weavers are also integrating elements of school

subjects in basket weaving processes, thus exemplifying the place-based education approach.

The review of literature in *Basket weaving in history* also reflect the lifestyle of the San (hunter-gatherers), pastoralists, and fishing communities in the Okavango region of Botswana (Silitshena & McLeod, 1989; Tlou & Campbell, 1997). Bock (1998) stated that the Okavango Delta peoples (for example, the Hambukushu, Dxeriku, Wayeyi, Bugakhwe, and Xanikhwe have traditionally engaged in mixed economies of millet and sorghum agriculture; fishing, hunting, and collection of wild plant foods and pastoralism. Research scholars have indicated the dynamism of indigenous knowledge and skills that takes place in the Okavango Delta of Botswana (Bock & Johnson, undated; Mbaiwa et al., 2008). Increased basket production experienced change in designs and availability of raw materials. Commercialisation impacted basket weavers and their products. The degradation of culture negatively affects the traditional nature of basket weaving. Old designs are no longer produced in the Okavango communities (DeMotts, 2017; Mbaiwa et al., 2008). Nonetheless, tourism could revive indigenous practices. The decline in the demand of baskets induced by commercialisation could expose the indigenous skill in basketry to disappear in the near future. Tourism is pivotal in sustaining basketry, transforming its form and function. These dynamics underscores the importance of studies dedicated towards expounding the role of tourism in reviving indigenous knowledge. This has been sporadically understood in literature.

Mbaiwa et al. (2008) discussed the authenticity transformation that takes place in basket weaving and production in the Okavango communities of Shakawe, Xhaoga, and Nxamasera villages. Mbaiwa et al. (2008) emphasized that there has been cultural loss and impacting negatively on the traditional nature of basketry as some of the old designs are gradually disappearing. These authors also inform that changes in design and patterns of baskets produced for the tourism market can also indicate that skills and knowledge are dynamic and not static. In his study on integration of environmental education in the Okavango Delta, Velempini (2016) probed one of the interviewees in Gani village about selling of baskets at 30BWP instead of 120BWP. The response from the interviewee was as follows, “the local buyers who might be interested, they cannot agree. It is only when you go to the Mohembo ferry station and sell to tourists. The tourists are from rich countries and they can buy at a higher price” (Personal interview, July 26, 2014). This response suggests valorisation and that the influx of tourists has impact on basket pricing. Velempini (2016) wrote as follows,

Some of the baskets, similar (in shape and design) to baskets seen from local people in Okavango villages, were found on display at the administration office of the secondary school in 2014. The display of cultural baskets may be aligned with one of the overall objectives of the national education in Botswana, which state: “to improve the partnership between school and community in the development of education” (Republic of Botswana, 1994, p. 5).

The display of elements of indigenous knowledge (e.g. traditional baskets) inside the school building signified the extent at which the local environmental knowledge is integrated in the formal learning environment. Velempini (2016) wrote that it is

not exactly known whether teachers bring students to observe, discuss, critically think and make prospects about basket weaving. Basket production should attract young people and the general public if it is to increase rural incomes and promote sustainable livelihoods. Mbaiwa (2004) stated: “this can promote the preservation of traditional or indigenous knowledge and skills in basket weaving which are otherwise important aspects of cultural tourism” (p. 233). It is important that teachers utilize available learning community sites and centres (e.g. Ngwao Boswa Community Based Organization in Gumare village of Botswana) where baskets are also found to enable young people appreciate the existing indigenous knowledge and think how they can apply the knowledge of weaving baskets during school instruction.

3 Methodology

This research employed qualitative methodology to answer the research question. The methodology included extensive review of existing literature (Marshall & Rossman, 2011), insights from field observations conducted in 2014 and semi-structured interviews with seasoned basket weavers from communities around the Okavango Delta. In this research on basket weaving, some of the protocol guidelines for existing literature review (journal articles) included when the document was published and what does it say about the interface of basket weaving, indigenous Knowledge and tourism in the Okavango Delta. The guidelines help frame inquiry into the history of the research issue to illuminate thick descriptions (Patton, 2002). This research incorporates insights from two (2) observations (in Gani and Sekondomboro villages) made by the lead author in 2014 on a project about environmental education in the Okavango Delta. The lead author observed two basket weavers engaged in weaving baskets. During the interviews for this research, probing was made on some practices of basket weaving that were observed. Bernard and Ryan (2010) affirms that probing is key to successful in-depth interviewing and it has been the focus of qualitative research since the 1920's. Consent to take pictures during the field work in 2014 was granted by basket weavers. In this current research, semi-structured interview questions were prepared in 2021. The questions sought to explore what the basket weavers understand from their lived experiences about the interface of tourism, basket weaving, and indigenous knowledge.

Eight (8) basket weavers responded to semi-structured interview questions. The basket weavers, who are all women, were identified through a snowball sampling by first contacting the representative of the Okavango Community Trust (OCT) in the Delta, who then referred researchers to a key informant (one of the basket weavers), who also referred researchers to other informants. Telephone calls and WhatsApp communication were used during interviews as well as for probing. The villages that were represented in this research included Eretsha, Gunotsoga, Nxamasera, Etsha 6, Etsha 1, Sekondomoro, and Gani (Table 1). Rubin and Rubin (2012) stated that in a semi-structured interview, the researcher has a specific topic to learn about, prepares questions in the form of guidelines in advance and plans to ask follow-up questions

Table 1 Basket weavers and their profile

Pseudonyms of basket weavers	Age	Village name	Year started weaving baskets	Highest educational level
Weaver 1	42	Eretsha	2005	Standard (grade) 3
Weaver 2	39	Gunotsoga	2006	Form (High school) 5
Weaver 3	47	Nxamasera	2008	Form three (Grade 10)
Weaver 4	37	Etsha 6	1993	Higher Education ²
Weaver 5	48	Etsha 1	1983	Did not go to school
Weaver 6	71	Nxamasera	1996	Did not go to school
Weaver 7	42	Sekondomboro	1989	Form (High school) 5
Weaver 8	22	Etsha 1	2010	N/A
Weaver 9 ³	> 40	Sekondomboro	N/A	N/A
Weaver 10 ⁴	> 40	Gani	N/A	N/A

Source Authors' data collection in 2021

(probing). In this research the topic to learn focused on interface of tourism, basket weaving and indigenous knowledge in the Okavango Delta. Comparatively, Kvale and Brinkman (2009) defined semi-structured interview as follows: “an interview with the purpose of obtaining descriptions of the life world of the interviewee in order to interpret the meaning of the described phenomena” (p. 3). According to Stake (2010), one of the advantages of interviews is that unobserved data could also be captured. Table 1 below shows profile of basket weavers in this research.

3.1 Theoretical Approach

The theoretical approach that informs this paper is place-based education (PBE). PBE emphasizes practical skills, real world learning experiences, and also helps learners (participants) develop stronger ties to their local communities, and enhances their appreciation for the natural world. In this research, participants are community members who are capable of acquiring knowledge and skills. Therefore, PBE

² Higher Educational level that is above high school and it includes college, technical institute and university level.

³ Weaver 9 was contacted and observed in 2014 during the PhD study on environmental education in the Okavango Delta. The specific age and highest educational level were not the focus of this study in 2014.

⁴ Weaver 10 was also contacted and observed in 2014 during the PhD study on environmental education in the Okavango Delta. The specific age and highest educational level were not the focus of this study in 2014.

strengthen and reintegrate community members to learn about the local environment. The principles of place-based education are discussed in relation to the ideas that emerge from the book written by David Sobel titled *Place-based Education: Connecting Classroom and Community*. Sobel (2006) explained that place-based education places emphasis on hands-on activities and real world experiential learning activities. The approach helps participants develop stronger ties to their community and natural environment and creates a heightened commitment to serving as active, contributing citizens. PBE emphasizes more attention on the particularities of local place, local climate, existing community organizations, and environmental learning centers in order to enable project-based learning activities and engagement of participants in real world experiential learning activities (Sobel, 2006).

According to Powers (2004), place-based education is “grounded in the resources, issues, and values of the local community and focuses on using the local community as an integrating context for learning at all levels” (p. 17). The approach of place-based education is not new. Smith (2002), for example, explained that “Jim Cummins and Dennis Sayers in *Brave New Schools* refer to the work of French educators in the early twentieth century whose students collected and then compiled information about their own villages” (p. 587). Gruenewald (2003) suggested that place-based pedagogies are important so that the “education of citizens might have direct bearing on the well-being of the social and ecological places people actually inhabit” (p. 3). Place-based education initiates a process of social change by immersing participants in local heritage, culture and landscapes and the rich diversity of community-based opportunities (CBNRM⁵ in the case of Botswana) and experiences where their actions can have the positive impact. The implication in employing the PBE approach in this current research is that it can cultivate a sense of connection to local places and enhance environmental, social and economic vitality amongst basket weavers.

3.2 Data Analysis

Responses from basket weavers were read repeatedly as they were received, as typed messages mostly through WhatsApp (n = 5). Recorded messages (n = 2) and verbal responses (n = 1) through the telephone were transcribed. Transcribed files were transferred and saved in a computer, while typed responses were saved in the smart phone and continued to be read to generate examples, concepts and emerging themes about the interface of tourism, basket weaving and indigenous knowledge. This constituted the first cycle coding (Saldana, 2016). Researchers for this paper engaged in grouping similar emerging themes, through re-reading examples and concepts from basket weavers. This analysis process enabled a thorough coherent analysis of the

⁵ CBNRM stands for Community Based Natural Resources Management. It “is a development approach that incorporates natural resources conservation, the ultimate aim of which is to manage and protect the natural resource base” (Republic of Botswana, 2007, p. ii). According to Republic of Botswana (2007), CBNRM also includes the management of cultural resources as expounded in the 2002 National Ecotourism Strategy.

data and ensuring that it responds to the research question. The Place based education approach also guided the analysis of the data. Therefore, in this research four major themes are reported.

4 Results

The results that are presented below respond to the research question which asks as follows: how is tourism preserving indigenous knowledge in basket weaving? Moreover, the results also respond to the purpose of the paper which explores the interface of tourism, basket weaving, and indigenous knowledge. The following themes emerged from the data that was analysed by researchers:

4.1 *Livelihood Sustenance and Culture Revival Through Basket Weaving*

Respondents explained that they weave baskets to sustain livelihood of family members, revive culture, and for entertainment. The question asked to respondents was, why are you weaving baskets? A 42 year old basket weaver, from Eretsha village said, “I weave baskets for reasons of sustaining myself and also reviving culture”. The other weaver stated that she was able to take her children to school, bought food, and build a house through funds received from selling baskets. Basket weavers sustain family members by selling baskets mainly to tourists. For example, basket weaver in Gani responded as follows in 2014 with regard to the selling and buying of baskets: “the local buyers who might be interested cannot agree. It is only when you go to the Mohembo ferry station and sell to tourists. The tourists are from rich countries and they can buy at a higher price”. The question aimed at exploring why she sell baskets at 30BWP (3 USD) instead of 120BWP (12USD). It could be said that part of the interpretation from the above response is that the weaver understands that tourists have higher income expenditure. Therefore, local people from remote villages such as Gani, have the knowledge of where they can interact with tourists and sell baskets. Figure 2 shows local people, a Safari tourist truck and European tourists boarding a pontoon in Mohembo ferry station and cross to the east side of the Delta’s panhandle. During the informal conversations with one of the tour guides from Zimbabwe, at the Pontoon station, it was learned that the tourists in the photo were from the Netherlands in Europe.

In addition to the use of baskets, one of the basket weavers said, “In the olden days they were for home use as storage. For example, for storing grains and as sieve. Nowadays they are used for decoration, fruit bowl trays, jewelleries”. Figure 3 shows a variety of baskets decorating in an administration building of one of the secondary schools in the Okavango Delta.

Fig. 2 Tourists from Netherlands boarding the Pontoon in Mohembo ferry station in the Okavango panhandle. *Source* Velempini (2016) (used with permission)



Fig. 3 Baskets on display in the administration building of one of the secondary schools in the Okavango panhandle. *Source* Velempini (2016) (used with permission)



Basket weavers mentioned the following tree species that they use in weaving baskets: Bird plum bucks (*Berchemia discolor* or *Motsintsila* in Setswana language), Rhodesian Teak (*Baikiaea plurijuga* or *Mokusi*), Magic gwarri toots (black) (*Euclea divinorum* or *Motlhakola*), Sweet reed (*Ntshe*), Palm tree (*Hyphaene petersiana* or *Mokola*), Blue bush roots (grey) (*Diospyros lycioides* or *Letlhajwa*), Aloe vera (*A. Barbadensis* Miller), *Diospyros chamaethamnus* or *Mokokothi*, *Indigofera tinctoria* or *Mohetsola*, grass (*Eragrostis pallens*). Other items they mentioned include ruler and blade in addition to water. The names that are given to patterns of baskets are Tears of the giraffe (*Keledi ya thuthwa*), Forehead of the buffalo (*Phata ya nare*), Ribs of the giraffe (*Legopo la thutwa*), Urine Trail of the Bull (*moroto wa poo*), and Flower (*sethunya*). Decorations can also be in the shape of goats, cattle, trees, and people. The above placed-based names refer to wild animals and vegetation species found in the Okavango Delta.

4.2 *“When Tourism Develops, It Encourages Basket Weaves Because Tourists Appreciate the Way We Hold onto Culture”*

Tourism development in the Okavango delta region influence basket weaving and the indigenous knowledge that is applied by weavers. One of the weavers stated that tourists encourage her through buying baskets and also including her end-products in the internet so that many customers can see and they can be encouraged to buy. “They are very encouraging since they see it unique, overwhelmed to see that we still maintain our culture and share it with them. They even request to be taught how to make them and ask questions to know about the basket weaving.” This response suggest that weavers perceive that their holding on culture in weaving baskets entice tourists who end up developing interests to learn how to weave baskets.

The influx and interest of tourists has role to play in transformation of patterns, designs and materials for weaving baskets. Responses suggest that both tourism development and suggestions from tourists enables specific patterns, designs and materials. “When tourism develops, it encourages basket weavers because tourists appreciate the way we hold on to culture and then the weavers have ways of increasing their skills and enriching their new ideas to entertain tourists.” “Tourism can control the appearance of baskets because the size will be reasonable to carry and the colors are natural because they fit into nature”. Referring to tourists, one of the basket weavers said, “They are mostly the target market, so weaving is done as business to earn a living. Many people are now involved in weaving and mostly do traditional patterns”.

Basket weavers participate in events to showcase their baskets and consequently reach out to the market as some people buy also to decorate in wedding ceremonies and other community events. Weaver 3 from Nxamasera said, “We always do presentations to our guests and they end up buying our baskets” Indeed tourism, through encouraging basket weavers, play role in reviving indigenous knowledge in basket weaving. The other weaver stated, “Tourists provide encouragement because they are the ones with interests because they like to buy baskets. I see that they are encouraging me to do more”.

Responses suggest that it is clear that tourism development play positive role in basket weaving. For example, one of the weavers said, “If it wasn’t tourism development I couldn’t be weaving”. However, one of the weavers stated that she would continue weaving even if there is no tourism development, but the talent won’t be growing because there won’t be anything challenging to come with new ideas. “We sell baskets mainly to tourists. If there is no tourism, there would be nowhere to sell baskets. If there is no tourism there is no importance of making baskets essentially those for livelihood sustenance. I can only do those that decorate my house”.

“Weaving practice will diminish if tourism activities decrease because tourists are the ones buying a lot”. The other participant said, “if tourism go down, basket weaving will also go down because tourism development is the one that support us a lot, it is the one that lift us up people who make hand crafts. Although weavers experience decline in selling baskets, one

of them said, "it is our culture, we continue to weave even if the baskets are just so many in our houses. Our baskets are the ones that enable us to help our children to go to school. Local people also buy but it is mainly international tourists who buy a lot....since tourism went down, our culture has also gone down" "Advertise my baskets for me. Since corona outbreak my baskets were not bought".

4.3 Reliance on Cultural Materials

Some basket weavers responded that they use indigenous trees and not modern items such as ink when weaving baskets. "Mostly because most of the artificial ones for changing colors fade only the reuse ones can do" The other weaver said that "I use cultural knowledge and modern knowledge, for example like using plastic to avoid littering". This response suggests that some weavers are contributing towards sustainable plastic disposal by using plastics in weaving. In addition to emerging sustainability practices one of the basket weavers said, "By encouraging the use of damaged, dead trees or prune it when taking material no killing it at all so that we can still have them in the future, plant the once that can be planted e.g. Aloe Vera".

4.4 "Basket Patterns Has Changed a Lot"

Responses suggest that patterns of weaving baskets have changed. One of the weavers explained "*Basket patterns has changed a lot, first they were known pattern which seemed like standard but nowadays it is more into drawing everything that you can which depend on how you are used to weaving.*" The other weaver stated that since she started weaving, her weaving skills improved daily on patterns of weaving process. With regard to material used, one of the weavers stated that natural materials are used as long as they do not fade. She stated that they do recycling or reuse through use of plastic bags by wrapping around the grass for the rows. Carbon papers and rust cans are some of the recent materials used by weavers to change colour of baskets. One of the weavers said, "Pattern has changed in the past. It was mainly animal prints but nowadays we use modern infrastructure".

4.5 Processes of Basket Weaving

Basket weavers use hands to make baskets. One of the weavers gave the following description on how to weave a basket:

First of all I cut the palm tree leaves when its long enough but not opened into a fan yet. Then you operate them in the lines where the fan is going to open up, remove the hard thread on the side using a pin like tool and boil in plain water to obtain the white colour as it cut while green. For charging into different colours you dry the leaves after separating and removing

the hard-part on the sides then boil with water and materials like blue bush roots and Aloe Vera. You cut the straight grass that doesn't have joints to use when weaving. For weaving you need all the different colour leaves that you would like to have on your basket and white is the main one your weaving pin grass/ the hard thread you removed on the sides and a bowl of water to keep softening your basket and the weaving threads from palm tree / the middle soft one. There are different ways to start a basket either you tie a knob with a few hard threads, make cross with two threads, make a cross with two threads then weave around it using soft thread. A pin is for making holes for where you insert the thread going around the grass as your lines you keep on changing the colour of threads depending on the pattern you are making and adding more grass for the thickness you want. You keep wetting your grass and the thread to soften them so it's easy to turn it to the shape you want.

Some of the pictures of baskets weaved and shared by participants are given in Fig. 4.

The harvested mokola tree is soaked in water. Grass is used to extend the basket. The other basket weaver stated as follows, "I take barks (*makapi*) of trees such a Mokola, Mohetsola and Motsentsela. I don't take roots, when I take roots these trees will die and there will be no where to find these tree. I use makapi to change colour so that it doesn't get white. I take pot and fill with water and boil. After that I spread



Fig. 4 Pictures of baskets shared by some basket weavers

it out to dry and find a needle for weaving and start advertising to tourist and some nearby shops. I sell so that I can sustain my children.

5 Discussion

The aim of this study was to assess the role of tourism in preservation of cultural practices in the Okavango Delta, Botswana. Specifically, the study examined how tourism development revitalises the indigenous knowledge of weaving baskets in the Okavango Delta. The study employed a qualitative inquiry to capture the lived experiences of basket weavers. The results suggest that basket weaving is an indispensable practice in the lives of people in the Okavango Delta. However, the results suggest a shift in the role and function of baskets, from a primitive utilitarian to an aesthetic artefact. Baskets have now emerged an important source of income for the majority of weavers in the Okavango Delta. This transformation in the function and value of baskets could be attributed to the booming tourism development in the Okavango Delta, where cultural elements such as baskets are now in demand for selling to tourists. As evidenced from the results, 'income generation' was a recurring theme on the reasons for weaving baskets. Therefore, baskets are no longer made for fulfilling domestic functions but for selling to the tourism market, with the income earned crucial for sustaining livelihoods. For example, the income comes handy in fulfilling household basic necessities such as food, paying school fees and building houses. Besides the utilitarian and economic functions, baskets are still important cultural elements in the Okavango Delta. The weavers expressed that the various patterns and styles inscribed in the artefacts are chiefly influenced by the function of the basket as well as the culture of the respective weavers. Therefore, within the Okavango Delta region, the patterns and styles of the baskets differed across cultural backgrounds. This is the case because Okavango Delta is constituted by people from various cultural backgrounds, with some being immigrants from neighbouring countries such as Namibia and Angola (Sunjic, 2004).

The results on the importance of baskets to rural livelihoods are consistent with other similar studies conducted in the Okavango Delta (Lamprecht, 1976; Lenao et al., 2015; Mbaiwa, 2004). Although baskets were not produced solely for selling in the latter studies, baskets were functional in the execution of primary livelihood activities such as subsistence arable farming and fishing. Moreover, baskets could be exchanged for other household necessities in the distant past. Therefore, baskets were not only important in fulfilling household domestic chores but were also valuable artefacts which can be bartered against other goods and services such as grains, animal hide, and hand-held tools. Despite the importance of baskets on rural livelihoods and culture, modernisation and shifting livelihoods at one point posed a threat to the sustenance of baskets in the Okavango Delta. Baskets experienced a stage of dormancy, when they were gradually replaced by modern utensils. Consequently, this impinged on the role and function of baskets on household chores and livelihood activities. Beyond the physical artefact, the indigenous knowledge of weaving baskets

was also on the verge of disappearance. However, the burgeoning cultural tourism in the Okavango Delta resuscitated the practice of weaving baskets which was on the brink of diminishing. The results show that tourism transformed baskets in terms of their form, function and style. In terms of form, the shape and sizes of baskets dramatically changed while function of baskets is no longer for domestic utility but for selling to the tourist in the area. The style denotes patterns, with the weavers now being innovate and coming up with new and imaginary patterns to meet the desires of the tourism market. This is also accompanied by the use of non-plant materials such as plastics, wire and tin, a welcome move for sustainability of plant resources. Therefore, tourism revitalised the basket weaving and made the products more appealing to the potential buyers.

As evidenced from the results, baskets emerged as an important cultural resource to be traded in the tourism market. Therefore, the tourism boom in the Okavango Delta also attached a monetary value to baskets. This was important for diversifying livelihoods but at the same time crucial in rejuvenating basket weaving practice which was on the verge of extinction due to rapid modernisation. Sentiments such as *“if it wasn't for tourism development I couldn't be weaving baskets”* were frequently mentioned by the weavers. This sentiment implies that tourism plays a crucial role in the sustenance of the weaving practice. Therefore, tourism serves as an incentive for cultural preservation, but at the same time deriving co-benefits. This creates an opportunity for the youth to engage in basket weaving, a practice which has been dominated by elderly people. Therefore, tourism is essential for sustaining cultural practices and (re)production of indigenous knowledge. Moreover, the weavers are also constantly renewing their weaving skills as they keep up with the evolving patterns and designs. The results are consistent with studies from elsewhere which found that tourism is pivotal in reviving traditional arts and crafts of the host destinations (Irandu, 2004; Virginija, 2019). This will assist in preservation of the local culture.

Given the small sample size of this study, this might constrain the generalisation of the results beyond the Okavango Delta region. We believe a larger sample size will generate divergent perspectives on how tourism shapes cultural practices in the Okavango Delta, with the possibility of extrapolating the findings to elsewhere. Therefore, this calls for more studies to elucidate on the interface of tourism and basket weaving practice.

6 Conclusion

The research demonstrates that tourism plays a vital role in rejuvenating indigenous basket weaving practice which was once under threat of diminishing. The burgeoning tourism in the Okavango Delta revitalised the basket weaving practice in terms of its form and function. Baskets are no longer a utilitarian product but an alternative income generating strategy for most of the weavers. The contemporary baskets are produced for selling to the tourists, who often influences the pattern and styles of

the artefacts. Therefore, on one hand, the tourism market also enhances weaving skills as weavers get to learn new patterns and styles mostly dictated by the potential buyers. Based on the foregoing, weaving baskets for selling will assist in sustaining basket weaving practice. In order to promote preservation of basket weaving skills, the local community, with the aid of researchers should document the design steps of basket weaving. This documentation is important for other people as well as future generations who want to learn how to weave. Given the central role of tourism in preservation of cultural elements, it is important for tourism operators to work hand-in-hand with local communities to package their tradition and culture for the tourism market. Collaboration between the two actors will ensure that local culture is not negatively transformed in the process. Although transformation of baskets is inevitable, the weavers should ensure that the cultural fabric of baskets retained amid changes in the form and style.

7 Limitations of the Study

This was a qualitative research study limited to the Okavango Delta panhandle. The results are not generalizable. The research design for this study allowed for a thicker description of the interface of tourism, basket weaving and indigenous knowledge in the Okavango delta only. However, it did not provide a basis for making inference about the extent to which other basket weavers in Botswana experiences the same. Researchers in this study ensured steps for credibility, therefore transferability remain with the reader.

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References

- Ali, C. A., & Davis, E. K. (2018). Harnessing indigenous basketry resources for prenumber and early number work. *Journal of Education and Learning*, 7(2), 210–220. <https://doi.org/10.5539/jel.v7n2p210>
- Bernard, H. R., & Ryan, G. W. (2010). *Analyzing qualitative data: Systematic approaches*. SAGE Publications.
- Bock (1998). Economic Development and Cultural Change among the Okavango Delta Peoples of Botswana. *Botswana Notes and Records*, 30, 27- 44. Retrieved from https://www.jstor.org/stable/40980202?seq=1#metadata_info_tab_contents
- Bock, J. & Johnson, S.E. (undated). The Okavango Delta Peoples of Botswana. http://the-eis.com/elibrary/sites/default/files/downloads/literature/The%20Okavango%20Delta%20People%20of%20Botswana_Johnson.pdf

- Cunningham, A. B., & Milton, S. J. (1987). Effects of basket-weaving industry on Mokola palm and dye plants in Northwestern Botswana. *Economic Botany*, 41 (3). 286 – 407. <https://www.jstor.org/stable/4254989>
- DeMotts, R. B. (2017). Weaving a living: Gender, craft, and sustainable resource use in Botswana. *Journal of Political Ecology*, 24, 368–385. <https://doi.org/10.2458/v24i1.20878>
- DeMotts, R. (2013). Good baskets and a well-kept house: Weaving a living in Botswana and Namibia. <https://ssrn.com/abstract=2248712>
- Gruenewald, A. D. (2003). The Best of Both Worlds: A Critical Pedagogy of Place. *Educational Researcher*, 32, 3–12. <https://doi.org/10.3102/0013189X032004003>
- Inocian, R. B., Cuestas, N. J. P., Carin, J. K. L., & Canoy, J. D. E. (2019). Unveiling the indigenous art and craft of Bakat and its economic significations. *Journal of Cultural Heritage Management and Sustainable Development*, 9(4), 445–467. <https://www.emerald.com/insight/content/doi/10.1108/JCHMSD-09-2018-0064/full/pdf?title=unveiling-the-indigenous-art-and-craft-of-italicbakatitalic-and-its-economic-significations>
- Irandu, E. M. (2004). The role of tourism in the conservation of cultural heritage in Kenya. *Asia Pacific Journal of Tourism Research*, 9(2), 133–150. <https://doi.org/10.1080/1094166042000233658>
- Kvale, S., & Brinkmann, S. (2009). *Interviews: Learning the craft of qualitative research interviewing*. SAGE Publications.
- Lamprecht, D. (1976). Basketry in Ngamiland. *Botswana Notes and Records*, 8, 179–187. <https://www.jstor.org/stable/40979467>
- Lenao, M., Mbaiwa, J.E., & Chanda, R. (2015). Impacts of cultural tourism on the domestic utility of traditional baskets: Case of Gumare and Etsha 6 villages in the Okavango Delta, Botswana. *Nordic Journal of African Studies*, 24(3), 301–318. http://www.njas.helsinki.fi/pdf-files/vol24num3-4/5_lenao_mbaiwa_chanda.pdf
- Lee, M. L. (1948). *Basketry and related arts*. D. Van Nostrand Company.
- Marshall, C., & Rossman, G. (2011). *Designing qualitative research* (5th ed.). Sage Publications.
- Mbaiwa, J. E. (2004). Prospects of basket production in promoting sustainable rural livelihoods in the Okavango Delta, Botswana. *International Journal of Tourism Research*, 6, 221–235. <https://onlinelibrary.wiley.com/doi/pdf/10.1002/jtr.477>
- Mbaiwa, J.E., Thakadu, O.T., & Darkoh, M.B.K. (2008). Indigenous knowledge and ecotourism-based livelihoods in the Okavango Delta in Botswana. *Botswana Notes and Records*, 39, 62–74. <https://www.jstor.org/stable/41236634>
- Meilach, D. Z. (1974). *A modern approach to basketry with fibers and grasses, using coiling, twining, weaving, macramé, crocheting*. Crown Publishers.
- Mosepele, K., & Ngwenya, B. N. (2010). Socio-economic survey of Commercial fishing in the Okavango delta, Botswana. Okavango Report Series No. 7. Harry Oppenheimer Okavango Research Centre, University of Botswana, Maun Campus; Bay publishing, Gaborone. https://www.researchgate.net/publication/232560779_Socio-economic_survey_of_commercial_fishing_in_the_Okavango_Delta_Botswana
- Parsons, N. (2008). The pipeline: Botswana's reception of refugees, 1956–68. *Social Dynamics. A Journal of African Studies*, 34(1). <https://doi.org/10.1080/02533950802078897>
- Patton, M. Q. (2002). *Qualitative research and evaluation methods*. Sage.
- Potts T.G. (1958). Basketry and Its Use in a Craft Program. Plan B Papers. 116. https://thekeep.eiu.edu/plan_b/116
- Powers, A. L. (2004). An evaluation of four place-based education programs. *Reports & Research*, 35(4), 17–32. <https://doi.org/10.3200/JOEE.35.4.17-32>
- Republic of Botswana (2007). *Community Based Natural Resources Management Policy*. Government Paper No. 2. Ministry of Environment, Wildlife and Tourism. Gaborone, Botswana.
- Rubin, H. J., & Rubin, I. S. (2012). *Qualitative interviewing: The art of hearing data* (3rd ed.). SAGE.
- Saldana, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). SAGE.

- Sobel, D. (2006). *Place-based education: Connecting classrooms and communities*. The Orion Society.
- Silitshena, R. M. K., & McLeod, G. (1989). *Botswana a physical, social and economic geography*. Longman.
- Smith, G. A. (2002). Place-based education. Learning to be where we are. *Phi Delta Kappan*, 83(8), 584–594. <https://doi.org/10.1177/003172170208300806>
- Stake, R. E. (2010). *Qualitative research: Studying how things work*. The Guilford Press.
- Sunjic, M. (2004). Etsha basket weavers fully integrated: Angolan refugees in Botswana. In V. Gounden, & E. Camara (Eds.), *Special focus on refugees and conflicts in Africa* (pp. 38–39). The African Centre for the Constructive Resolution of Disputes (ACCORD). <https://journals.co.za/doi/pdf/10.10520/EJC15867>
- Terry, M. E., & Cunningham, A. B. (1993). The impact of commercial marketing on the basketry of Southern Africa. *Journal of Museum Ethnography*, 4, 25–48. https://www.jstor.org/stable/40793519?seq=1#metadata_info_tab_contents
- Tlou, T. (1985). *A history of Ngamiland, 1750 to 1906: The formation of an African State*. Macmillan.
- Tlou, T., & Campbell, A. (1997). *History of Botswana*. Macmillan.
- UNESCO World Heritage Centre (1992–2022). *Okavango Delta. Outstanding universal value*. <https://whc.unesco.org/en/list/1432/>
- Virginija, J. (2019). Interaction between cultural/creative tourism and tourism/cultural heritage industries. In: L. Butowski (Ed.). *Tourism—From empirical research towards practical application* (pp. 137–156). InTechOpen.
- Velepini, K. (2016). *The integration of environmental education in the secondary school curriculum: A case study of a 10th grade junior secondary school curriculum in the Okavango Delta, Botswana*. Ph.D. Thesis, Patton College of Education, Ohio University.
- Wolski, P., et al. (2005). Aspects of dynamics of flooding in the Okavango delta, *Botswana Notes and Records*, 37, 179–195. <https://ubrisa.ub.bw/handle/10311/954>

Participatory Action Research: Challenges and Opportunities of Undertaking Indigenous Approach in Examining School Leadership in a Conflict-Affected Zone



Abdishakur Tarah and Krishan Sood

Abstract This paper aims to capture headteachers' authentic voices on how to ensure safeguarding, inclusive environment, and successful attainment of children within the environment of conflict zone of Somalia. The theoretical framework draws on theories of school leadership development programmes and Hofstede's cultural theory. The methodology chosen for this research is qualitative with a participatory action research approach. Semi-structured interviews with headteachers had to be relevant to working in war tone Country. The findings showed participants found the interview questions were challenging, or irrelevant to their local context, so lacked confidence in providing detailed answers. The headteachers had no defined roles and responsibilities due to lack of clarity in the management structure of their schools. They expressed frustrations in answering some of the interview questions, particularly in how they were prepared and developed as headteachers, with lack of professional development opportunities and not really knowing what professional development needs they had. This confusion was likely to do with lack of defined headteacher standards in Somalia. In conclusion, undertaking research in conflict affected zone remained legion. This led to focusing access to participants in only certain areas within the selected regions. Also, the school leaders were discharging their leadership duties with high level of resilience and ensuring safeguarding of children and staff themselves. Future studies could be widened to other regions of Somalia, data compared across other state and private schools across Somalia. The limitations were focused on having appropriate indigenous methods that authentically captured headteacher voices.

Keywords School leadership · Inclusion · Culture · Safety · Authentic voice

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1 Introduction and the Concept

There is a growing global concern on improving quality of education and many countries have made pledges to do so through the globally agreed SDG 4 (Sustainable Development Goals). SDG 4 promotes inclusive and equitable quality education and promotes lifelong learning opportunities for all. In a school context, therefore, there is a high priority in ensuring the permeation of these goals. This offers leadership in schools a good opportunity to foster values of inclusion and fairness among staff and the wider school community. The participants (school leaders) are from a specific indigenous context (Somali) and operate within it.

This chapter considers how leadership in indigenous contexts can inform leadership in non-Westernised educational context like Somalia. We reflect on the key question—is there any value in this, especially in achieving SDG4, within the Somalia context. We start by contextualising the aim of the study located in a war affected country.

Millions of children who are out of school and are pushed towards economic and sexual exploitation are much more than victims of circumstances (Global March, 2021, p. 1). Their conditions are a key challenge to building peaceful and strong society envisioned by the new set of Sustainable Development Goals (SDGs) that affirm every child's right to quality education, to leave no one behind and to “endeavour to reach the furthest behind” (*ibid.*).

When the state collapsed in January 1991, Somalia entered a factitious war, whereby several warlords took over and scrambled it into zones and regions. The Somali education sector was destroyed, and this devastation has been clearly visible throughout the last few decades. The effect of conflict on education is enormous, like the complete destruction of education both in physical and human forms, including death of pupils, teachers and school leaders because of high prevalence of attacks on schools. Although there is increasing literature that deals with relationships between education and armed personnel, there remains a gap in terms of understanding how school leaders experience and navigate both physical and psychological threats and how they trade off their survival in the context of a protracted conflict (Pherali, 2016, p. 1).

The realities of school leadership in Somalia are complex. There are neither any post-secondary educational leadership programmes, nor any school-based apprenticeship programmes in Somalia. This makes it more difficult for school leaders to learn how to enact any type of leadership other than daily unavoidable managerial tasks (Khalifa et al., 2014, p. 236). This leaves headteachers largely untrained and with no professional development programmes available to them. We therefore need further study to understand role of headteachers in post conflict education in Somalia (World Bank, 2018, p. 72). Thus, this Participatory Action Research (PAR) was appropriate approach of collecting their views on what constitutes an effective school leader in conflict and post conflict environment and what factors influence their day-to-day role in managing their schools.

In Somalia, over 65% of schools in Somalia are privately owned (World Bank, 2018, p. 36), for that reason, the research focuses on school leaders in non-state providers. While noteworthy research has been carried out on non-state education in many conflicts and crisis affected countries, few scholars have written on the role, types and ownership of non-state education providers in Somalia.

Globally, there is a growing call for professional development of school leadership in conflict and post-conflict situations, due to poor results in schools which are linked to poor or inappropriately trained headteachers. We use the term headteachers for principals and administrators in this chapter, and proffer that they need appropriate knowledge, skills and attitudes to be effective leaders. Headteachers in this research are from private primary schools in Somalia. They acknowledge the importance of professional development opportunities to improve their leadership practice and overall impact on school effectiveness. This requires “pedagogical competency” (Sahana, 2018, p. 797) of a headteacher, referring to his or her capability to manage the teaching and learning process effectively to ensure inclusive and equitable quality education that promotes lifelong learning opportunities for all (SDG-4). This competency can be gained through experience, upskilling and staged career development in schools. Details of the headteacher population and size (sample group) are described later under methodology section.

2 Theoretical Framework

The theoretical framework is based on Skills-based Model (Mumford et al., 2000) as it examines the relationship between leader’s knowledge, skills and their capabilities (Northouse, 2016). This Skills-based model is relevant to the Somalia context as leadership is less likely about status and position in a hierarchy than the possession of essential competencies, skills and expertise (Khalifa et al., 2014, p. 246; Morrison, 1998, p. 205). Mumford’s Skills-based model has five components: individual attributes, competencies, leadership outcome, career experiences and environmental factors which are discussed next.

2.1 *Individual Attributes*

Individual attributes are further divided into four that have an impact on leadership skills and knowledge: general cognitive ability, established cognitive ability, motivation and personality. Effective leaders learn new skills, understand complex information and communicate with other people through oral and written forms due to established cognitive ability (Connelly et al., 2000, p. 67). Furthermore, when leadership is framed as a set of skills, it becomes a process that people practice improving performance examined in the field by the researcher.

2.2 *Competencies*

The term competence is both complex and contested concept. Competency is a way of doing things better, “*karti*”, in Somali language. Consequently, school leaders must gain the necessary competencies for effective *karti*. These competencies are developed not only through organised training but also through guided practice to be upskilled (Gurmu, 2020, p. 655).

2.3 *Leadership Outcome*

It is worth noting the significant role a headteacher plays in raising educational standards. The headteachers do this through planning the organisational management of the school, planning for effective teaching and learning activities, creating positive school climate, building collaborative organisational learning culture, developing staff and building community leadership (Day & Sammons, 2016, p. 7). It is important to highlight that these outcomes are strongly influenced by leader’s competencies, like, problem solving skills, social judgement skills and knowledge (Northouse, 2016, p. 53).

Leadership is about communicating to individuals and groups with whom leaders interact to build and act on a shared and evolving vision of enhanced educational experiences for pupils (Bush & Glover, 2003, p. 109). In the context of Somalia, cultural and spiritual competency are *additional* essential communicative qualities to embrace largely Islamic faith. Somali school leaders are culturally and spiritually responsive to their students and families (Khalifa et al., 2014, p. 250). They further assert that this spiritualised school leadership has unique expression in Islam and permeates moral vision into specific goals (Khalifa et al., 2014, p. 251). In Islam, an association between religion, knowledge and teaching creates a discourse of educational leadership which elevates teaching/learning to a sacred duty which means that the spiritual aspect of Islam guides all teaching and learning in Somali schools (Shah, 2006, p. 366). The researcher, as an Islamic person, was sensitive to this concept and showed complete respect when meeting the headteachers.

2.4 *Career Experience*

Alongside with other key factors such as professional competencies, knowledge, leadership skills and qualities, career experience is important. Many countries recognise school headship as a distinct professional career that requires its own systematic preparation (Gurmu, 2020, p. 565).

Literature highlights career experiences have an impact on the characteristics and competencies of leaders. Mumford's Skills-based model suggests that the experiences acquired along leaders' career, influence their knowledge and skills to solve complex problems (Northouse, 2016, p. 54). Schools apply number of strategies to support staff develop staged career experience through offering them challenging roles, mentoring, offering appropriate training and hands-on experience in solving new and unusual problems (p. 54). In Somalia, there is no structured opportunity to support staged career experience, and this is one of the key areas which will be further discussed in this study.

2.5 Environmental Factors

Environmental factors relate to internal factors such as working space, communication infrastructure and capability of subordinates, and external factors such as economic, political and social issues (Northouse, 2016, p. 55). In Somalia context, shortage of school places, lack of trained teachers and absence of professional development opportunities for teachers are key environmental factors that headteachers must manage and for some headteachers, impact negatively on their capability of supporting teaching and learning effectively. Conflict, security, political instability and new system of governance -federalism, have hindered the education system's development and these factors contribute to lack of planning of country's education system. For example, the security situation may lead parents to send their children to nearby schools to avoid travelling through potentially dangerous neighbourhoods (World Bank, 2018, p. 63). If school leaders are successfully to respond to the distinctive challenges presented by schools' internal and external environments, their development must be seen in line with the environment in which they have to operate.

2.6 Hofstede's Cultural Theory

Hofstede defines culture as "the collective programming of the mind that distinguishes the members of one group or category of people from another" (Bush, 2020, p. 211; Hofstede, 1992). This implies that each society has their own distinctive culture(s) which offers them their moral/spiritual compass.

Culture may be understood at several levels. Firstly, there are broad societal norms that provide the framework for institutional leadership. These may differ across countries so that leadership is understood and enacted differently, dependent on these cultural norms. Secondly, there is a notion of organisational culture arising from the values and beliefs of teachers, leaders, parents and other stakeholders, leading to what may be a distinctive ethos (Bush, 2020, p. 211). Different cultures influence the

views and expectations with respect to the way things ‘ought to be done’ (Jogulu & Wood, 2008, p. 5).

As a part of their study of culture and leadership, Global Leadership and Organisational Behaviour Effectiveness (GLOBE) researchers developed their own classification of cultural dimensions. These are uncertainty avoidance, power-distance, institutional collectivism, in-group collectivism, gender egalitarianism, assertiveness, future orientation, performance orientation and humane orientation (Northouse, 2013, pp. 387–388). We only focus on the power-distance dimension here due to its relevance to the study.

Power-distance refers to the degree to which members of a group expect and agree that power should be shared unequally. It is concerned with the way cultures are stratified, creating levels between people based on power, authority, prestige, status, wealth, and material position (Northouse, 2013, p. 388). Various studies have also used this dimension to analyse the relationship which exists between supervisors and subordinates and how they differ across countries and sub-cultures (Goolaup & Ismayilov, 2011, p. 40). In an educational context, power-distance may be a particularly significant variable across cultures, and teachers may be preferred more to their leaders in high power-distance contexts. According to Yusuf (2019), Somali culture would be classified as having high power-distance, that is, within organisations, power is distributed unequally and this is legitimised through continual practice. Within this cultural dimension of high-power-distance in Somalia, headteachers tend to enact a top-down approach and maintaining power-distance between teachers and themselves.

In conclusion, the theoretical framework adopted for this study helped the researcher to better understand how the generally applied skills-based model can be effective without understanding Somalia’s high-powered distance and cultural norms that influence the behaviour of headteachers. Thus, the researcher was mindful of maintaining respectful distance with the headteachers in the field.

3 Methodology and Methods

The methodology chosen for this research was qualitative with a Participatory Action Research approach. Participatory Action Research (PAR) is considered a subset of action research, which is the “systematic collection and analysis of data for the purpose of taking action and making change” by generating practical knowledge (Gillis & Jackson, 2002; Macdonald, 2012, p. 35). This participatory approach was chosen because it allowed headteacher’s involved to share their collective knowledge, understanding and authentic voices of key issues that matter to them. The qualitative with a Participatory Action Research approach is linked closely to indigenous methodologies because it ebbs from local tribal knowledge, thus remain distinct. Arguably, it can be seen as meaning making, using story as method, situated in self and culture. Thus, collecting and disseminating knowledge of indigenous population through a focus on oracy helps us to gain a better picture of local populations history

and customs. Indigenous-informed research is therefore important as it broadens the human story, and ensures all cultures are recognised equally and builds public awareness (Kovach, 2010).

The study allowed headteachers to take control of the direction the research was taking including their involvement in leading the conversation. These headteachers are located in conflict ridden zone and face numerous challenges for teaching children and supporting their staff as identified in the previous section. Considering these issues, a key aim and research questions were formulated:

“How do private primary headteachers view about being a professional headteacher”?

Within the aim, these research questions were posed and agreed by the headteachers including:

1. What skills should a headteacher need to lead their school effectively?
2. What personal qualities and attributes should a headteacher possess?
3. In what way does Somali culture influence their role as a headteacher?
4. In what way has the conflict affected them in their role as a headteacher?

The participants in this research were headteachers of private primary schools in Mogadishu, Somalia, and a purposeful sampling method was used to select them. Mogadishu was chosen because of its accessibility to the researcher and the existence of many private schools that were active members of a larger and supportive umbrella association of schools. Recruitment of headteachers was vital to the success of this research. It was the respectful dialogue that took place between the researcher and potential headteachers that gave the researcher access to the sample. It had begun with the identification, targeting and enlistment of headteachers for this research.

Furthermore, the excellent linguistic and cultural understanding of the researcher had played an important role in this successful recruitment of the headteachers. Undertaking research in schools in other regions of Somalia were planned for but these were in potentially high war zone regions making it unsafe for the researcher to travel.

3.1 Processes

Focus group had been selected as a tool to bring headteachers together. It is one of the most dynamic research methods, as it helped the researcher obtain richer and more detailed data, making it stand out from other qualitative research methods (Farinosi et al., 2019; Kumer & Urbanc, 2020, p. 208; Lune & Berg, 2017). The researcher paid close attention to the process of conducting the focus group as a tool to gather headteachers' views, including how the management process was to be developed, through effective researcher-headteachers relationship building (Corral & Hernandez, 2017; Nared & Bole, 2020, p. 209).

The essential part of the process was building on the research questions agreed by the headteachers, including any sub-questions within allocated timeframe of four

hours. For data analysis purposes, audio recording was used to record discussion points, undertaken by following strict BERA (2018) ethical guidelines. Although the questions were written in English, headteachers preferred to use Somali in the discussion. It was important that the researcher ensured that headteachers expressed their views in their own language, which was fortunate as the researcher too was a local Somali speaking national.

3.2 Headteachers Profiles

The selection of the eight headteachers was based on their age, number of years of headship, qualification, teaching or non-teaching experience and looking at their school headship journey. The eight head teachers had given their consent during the initial introductory meeting which was held individually. Important information was provided by the headteachers during this meeting, like their personal data as well as individual profiles charting their career journey.

This information is summarised in Table 1.

Table 1 The profiles of the headteachers

Participant	Age	Qualification	Trained teacher		Teaching experience (in years)	Previous school leadership experience (in years)	
			Yes	No		Assistant	Deputy
HT 01	68	Diploma in ITT	✓		Over 20	11	5
HT 02	51	Degree in Ed	✓		10	5	1
HT 03	62	Diploma in ITT	✓		Over 20	8	2
HT 04	64	Diploma in ITT	✓		Over 15	9	3
HT 05	55	Dip. Business		✓	None	0	5
HT 06	41	Degree in Hospitality		✓	None	0	0
HT 07	31	Business and Mgmt		✓	None	0	0
HT 08	30	Financial Mgmt		✓	None	0	0

ITT Initial Teacher Training; *Mgmt* Management

3.3 Results

Of the eight, four headteachers were trained teachers and four were non-trained teachers. In this study, it had been noted that those with a teaching background seem to have more involvement in managing and supporting their schools' teaching and learning programmes. Their knowledge competency and experience as past teachers were the main reasons for their employment and selected for this research. The successful performance of a task required knowledge-based skill to accomplish it. Thus, their involvement in teaching and learning activities seemed crucial (Victor, 2017, p. 2).

The non-teaching headteachers had indicated they had no direct involvement in the teaching and learning activities in their schools but still had responsibilities for the school's overall performance. These headteachers relied heavily on the judgement of their deputies, assistants or senior teachers regarding the school's teaching and learning programmes. But the deputies and assistants did not have the authority to enforce any changes as this privilege still lay with the headteacher. This absence of authority may have undermined the deputies' or assistants' authority to influence change as Crawford (2014) states "an organisation is a system with a hierarchy and an official structure, in which leaders have power and authority because of their official roles in that organisation" (p. 55). Further study on the role and the decision-making mechanism of deputy/assistant in non-teacher headteacher may be of interest.

Although all schools in the study were private schools, their ownerships varied. The type of ownership made a great impact on the above-mentioned power of authority of the headteachers. The headteachers who were owners of the schools (HT02, HT07, and HT08) indicated that their decision-making process was simpler than those owned by a third party—private companies or foundations. Their decision-making arrangement were consultative, and they considered themselves as participative leaders—leaders who consulted with subordinates, obtained their ideas and opinions, and integrated their suggestions into the decisions about how the group or organization would proceed (Northouse, 2013, p. 143).

In their journey to headship, the four headteachers with a teaching background stated that they had passed through the ranks before they had taken up headship posts. While three of the non-teaching background headteachers (HT06, HT07, HT08) did not have staged career experiences, one participant (HT05) with a non-teaching background served 5 years in deputy headship role before appointment as a headteacher.

In relation to access to professional development opportunities for the eight headteachers, only two (HT03 and HT05), had accessed training prior to their appointment. These were distance learning programmes which were not directly linked to the preparation and development of a headteacher.

3.4 *Headteachers' Role in the Research*

Four key roles were common in this study which are consultation, contribution, collaboration and control (Schneider, 2012, p. 156). The headteachers engaged in initial consultation with their staff, actively contributed to the discussion with staff and other stakeholders and collaborated with the researcher on all aspects of the research, including topic selection, identification of the research question, design of the study, gathering and analysis of data, and dissemination of the findings. Aspects of control were however difficult to identify during the period of study. All headteachers had unanimously felt that their professional development needs could only be known if there was a set of professional standards for headteachers in Somalia.

The key skills needed by all headteachers were instructional, pedagogical competency, staff supervision and appraisal, organisational management and stakeholder engagement. Although there was common agreement among headteachers over their views of the acquisition of certain qualities by school leaders, there were variations noted in their response to the question about the key personal qualities a headteacher should possess to be a leader. The study noted that these variations were mainly influenced by the cultural and spiritual beliefs held by individual headteachers. The majority had mentioned examples of the prophetic leadership qualities of the Prophet Mohamed (PBUH) including trust, resilience, patience, competence and knowledge, courage, spiritual intelligence, compassion, and credibility. Islamic traditions are deeply infused in the personal, political and daily life of most Somalis.

Other ways Somali culture influenced headteacher's role were linked to managing staff, engaging stakeholders including parents, leading staff recruitment and appraisal, fostering a positive headteacher-teacher relationship, as well as headteacher-students relationship.

Many school leaders faced challenges operating in an armed conflict environment, including safety of staff and students. One headteacher shared his experience of negotiating with militiamen to vacate the school premises and agreement to leave the school was a monthly share of 50% of collected revenue. Such turbulences had a knock-on effect on schools' overall subscription as parents could remove their children if a school did not have sufficient teachers to teach them. Another account mentioned assessment challenges. There was clear evidence that school leaders and staff faced repercussions from parents and relatives of students who failed their exams or received low marks. Several heads told the researcher that in some cases staff faced life and death situations when assessing students, particularly those whose parents or relatives were part of a militia group.

4 Ethical Consideration

There were several ethical issues in undertaking field study, including access to schools, safety concerns of school staff and the researcher, data collection and secure

storage and handling of data on encrypted memory stick (BERA, 2018). Travelling between the UK and Somalia to collect data posed considerable security management issue. During the researcher's presence in Mogadishu, two bomb blasts were reported in the City and one of them was in a school. So, the researcher had paid greater attention to the travel arrangements and access to schools, including undertaking risk assessment prior to travel. A local education network had made safety and transport arrangement for the researcher.

Whilst time was limited for the building of relationships, the fact that the researcher was known among the wider education network in Somalia and had experience in education in Somalia, were useful in establishing a level of engagement with headteachers. The headteachers were confidently engaging with the researcher as initial meetings and the focus group session were conducted in Somali which they were fluent in. The researcher had used tokens of \$10 to give to the headteachers to attend a focus group interview which is permissible under BERA (2018, p. 19) guidelines.

5 Discussion

The chapter advances certain reflective observations of the challenges and opportunities for PAR with school leadership in a conflict-affected zone. The researcher immersed himself into the Islamic culture as an insider and was mindful of the potential for biased reporting and interpretation in trying to understand the leadership stories from the indigenous group of headteachers. The co-authoring with a critical friend (the second named author) ensured critical reflective dialogue between the researcher and himself.

The views of the headteachers were divided under two categories: Teacher Headteachers (THTs), with leadership and a teaching background; and Non-Teacher Headteachers (NTHTs), without a teaching background. These headteachers generally agreed with the duties highlighted by Ojo and Olaniyan (2008, in Suaka & Kuranchie, 2018, p. 33) including overseeing the teaching and learning instructions, managing resources and school finances, community and stakeholder engagement. However, some of the headteachers (four) of the NTHTs indicated that they were not directly involved in some of these roles, while others had some involvement in carry out the above-mentioned duties.

The study sought to understand how headteacher's overall management responsibility of their schools was influenced by norms and values held within the Somali culture by observing some of the customs and values held in the society. A significant number of the headteachers emphasised that cultural, traditional and spiritual competencies seemed ideal personal qualities to be possessed by a leader. A specific culture and its impact on school leadership is an under-researched topic that needs further spotlight (Bissessar, 2018, p. 6). The headteachers discussed how Somali culture influenced their role as a leader. Their discussion points reflected some of

the findings of Shire (2010, p. 16), which highlighted clan-based leadership playing a crucial role in politics and governance impacting education.

Headteachers with teaching backgrounds provided detailed descriptions of their involvement in managing and supporting teaching and learning. This oversight was what Sahana (2018, p. 797) called “pedagogical competency”, which referred to a headteacher’s capability to manage the teaching and learning process from planning to the evaluation stage. During the discussion in the focus group, there was clear evidence that the THTs were clearly leading and managing the teaching and the learning in their schools. Their pedagogical competencies enabled them to understand the school’s work and the ability to perform well in curriculum planning and assessment. They could identify school priorities, developed policies, and ensured that resources were efficiently and effectively used to achieve the school’s aims and objectives (Rapp, 2010, p. 336).

The headteachers without teaching background (NTHTs) stated that they were not directly involved in the role of managing and supporting teaching and learning in their schools. They delegated the overall responsibility of this task to other members of the senior leadership team, either deputy or assistant headteachers. This arrangement was necessary because of their lack of teaching background, and they merely relied on the professional judgements of their deputies or assistants who were trained and experienced teachers. The NTHTs also shared with the researcher how they evaluated and monitored teaching and learning of one of the headteachers, suggesting collaborative approach for mentoring and a level of accountability. They met with their deputy headteacher’s on regular basis and discussed overall teaching and learning programmes in the school and this engagement gave the researcher the opportunity to have a deeper oversight of this process.

It was also evidenced that headteachers were not instructional leaders, also noted by Khalifa et al.’s study (2014, p. 253). The headteachers did not support the instruction in the school by supporting the teachers and the learners (*ibid.*). The NTHTs did not provide examples of leadership that encouraged and promoted school improvement and there was little evidence that these school leaders were in fact instructional leaders at all, despite the significance of the application of this model of leadership in the Somali school context. It was worth noting that headteachers acknowledged the importance of the link between the quality of teaching and learning in their schools and the quality of instruction provided by a headteachers. They also acknowledged that they must be culturally and spiritually responsive to their students and families (Khalifa et al., 2014, p. 250). Another view was that this spiritualised school leadership had unique expression in Islam and brought together moral vision informing specific goals (Khalifa et al., 2014, p. 251; Sayani, 2005). In Islam, association between religion, knowledge and teaching creates a discourse of educational leadership which elevates teaching/learning to a sacred duty of the highest order.

It was noted that private schools were key education providers in Somalia, and they existed predominantly in urban areas in the country. Male was the dominant gender in primary school leadership in Somalia, based on the percentage of both surveyed and interviewed headteachers in this study. The highest qualification held by many of the headteachers was Higher Education degree, but it was also important

to note these qualifications vary in different academic fields, including education, business management and other fields.

The majority of the headteachers (six, including non-teacher HT) indicated that a headteacher must have a teaching background, have training and experience as a teacher, and been deputy headteacher. Their views on being professional headteachers were also varied. A few headteachers with a non-teaching background strongly expressed their views and stated that teaching qualifications and experience were not significant factors for being a professional headteacher. Their responses were more on management skills and leadership qualities. Two headteachers with no teaching background emphasised the importance of headteachers having teaching experience so that they could give good quality teaching instructions. The NTHT cohort spent more time in other school management areas, such as strategic management, school's vision, finance and resources management and managing stakeholders. Headteachers with a teaching background tended to spend more time on over-seeing their schools' teaching and learning, including curriculum, teaching policies, performance management of their teaching staff, etc.

Unlike most public Western schools, schools in Somalia had discourses of spirituality and religion throughout their educational experiences; students prayed in school, used religious language, and teachers and administrators used religious concepts to convey knowledge and messages to students (Khalifa et al., 2014 p. 251). Headteachers in this study made similar comments and tended to interpret their own actions to be involved in the school because of their commitment to performing their Islamic commitments and duties. Another headteacher, in Khalifa et al.'s study described his work as "the work of the Prophets" (ibid, 251).

All headteachers emphasised that cultural, traditional and spiritual competencies deemed ideal personal qualities to be possessed by a leader. They also stated that they had no specific training and development that prepared them to become headteachers. Any plan to such programmes had to be culturally and spiritually responsive.

6 Concluding Remarks

What matters most is the context of research, being in conflict zone area, and reflecting on some of the experiences of undertaking first-hand data collection in such a situation. The details presented are views of a researcher which may be thwarted but ethically thought through, which of course, may not be a true representation of the authentic voices of headteachers from the front line. This may be a limitation of the researcher's skills of fully capturing data in harrowing circumstances like a threat of bombing of schools visited or watching children and adults being removed from schools by militia at any time of the day.

What are the lessons for reflection? As regards staff development, this was limited in scale and scope because the headteachers themselves had limited knowledge and understanding about the theories of learning and how to develop staff. They focused

more on managerial activities than pedagogical excellence. The need for precaution for safety at the planning and design stage requiring detailed understanding and compliance of ethical issues. It was important to have effective, open channels of communication between the researcher and the headteachers to be established and this needed prioritising. In terms of methodological reflections, it was important for the researcher to following a strict protocol of timing of events like interviews, observations and feedback meetings to be meticulously executed. When undertaking field-work, safety of all overtook any other planned activities undertaken by the researcher and rescheduled if necessary. This rescheduling remained a huge challenge when there was only a limited window to carry out field work and requesting additional time of busy headteachers was unacceptable. Staying healthy in the field was essential and avoiding drinking local water, if not accustomed to local conditions. The socio-cultural aspects needed to be respected, as was a working knowledge of the education sector, understanding of local language and awareness of cultural etiquettes to be observed.

6.1 Limitations of the Study

The thrust of the study was to create an opportunity for the headteachers to generate ideas on how to prepare and develop them in post conflict Somalia through active participation and discussions. A few limitations and challenges were identified and some of them were to do with country's political, social and economic stability factors. This included lack of government policy on preparation and development of school headship, lack of government guidance on private schools and demand of school places in private schools which many parents could not afford. There were also other challenges including recruitment, safety of the headteachers, lack of clarity in school management structure, particularly those owned by one-owner school typology.

In relation to PAR, several challenges were identified including, headteachers' limited understanding of globally defined roles and responsibility. They also had limited knowledge in research methods and methodologies, and a few even said they lacked confidence in addressing some of these key issues they faced. Many said having lack of direction in their careers' development did not help either. For example, someone must be appointed to headship if they served more than 5 years as trained and qualified teacher. These were complex issues local to the context of the study important to explore during researcher-headteacher's discussion.

6.2 Further Study

The study concludes that further study may be needed to understand how the societal values are linked to school leader's views on quality education. Any future research

should investigate how predominately Western leadership theories are being transferred to developing countries. More studies are required also within post-conflict countries to understand how they are coping with school leadership and addressing the notions of SDG issues (UNESCO, 2016, p. 127).

References

- Bissessar, C. (2018). An application of Hofstede's cultural dimension among female educational leaders. *Education Sciences*, 8(2), 77. <https://doi.org/10.3390/educsci8020077>
- British Educational Research Association (BERA). (2018). *Ethical guidelines for educational research* (4th ed.). <https://www.bera.ac.uk/researchers-resources/publications/ethicalguidelines-for-educational-research-2018>
- Bush, T., & Glover, D. (2003). *School leadership: Concepts and evidence. A review of literature carried out for National College for School Leadership*. National College for School Leadership.
- Bush, T. (2020). *Theoretical of educational leadership and management* (5th ed.). Sage.
- Connelly, M. S., Gilbert, J. A., Zaccaro, S. J., Threlfall, K. V., Marks, M. A., & Mumford, M. D. (2000). Exploring the relationship of leadership skills and knowledge to leader performance. *Leadership Quarterly*, 11(1), 65–86.
- Crawford, M. (2014). *Developing as an educational leader and manager*. Sage.
- Day, C., & Sammons, P. (2016). The impact of Leadership on student outcomes: How successful school leaders use transformational and instructional strategies to make a difference. University of Nottingham.
- Farinosi, M., Fortunati, L., O'Sullivan, J., & Pagani, L. (2019). Enhancing classical methodological tools to foster participatory dimensions in local urban planning. *Cities*, 88, 235–242. <https://doi.org/10.1016/j.cities.2018.11.003>
- Hofstede, G. (1992). Cultural dimensions in people management. In *Globalizing management: Creating and leading the competitive organization*. Wiley.
- Gillis, A., & Jackson, W. (2002). *Research methods for nurses: Methods and interpretation*. F.A. Davis Company.
- Global March. (2021). *Education in Time of War: Harnessing the potential of SDG 4*. <https://globalmarch.org/education-in-the-time-of-war-harnessing-the-potential-of-sdg-4/>. Accessed October 9, 2021.
- Goolaup, S., & Ismayilov, T. (2011). The influence of power-distance on leadership behaviours and styles—Case studies of Japanese and French companies operating in Sweden. <https://www.diva-portal.org/smash/get/diva2:502384/fulltext01>. Accessed October 2, 2021.
- Gurmu, T. G. (2020). (2020) Primary School Principals in Ethiopia: Selection and preparation. *British Educational Leadership Management and Administration Society*, 48(July), 651–668.
- Jogulu, U., & Wood, G. J. (2008). A cross-cultural study into peer evaluations of women's leadership effectiveness. *Leadership and Organization Development Journal*, 29(7), 600–616.
- Khalifa, M. A., Bashir-Ali, K., Abdi, N., & Arnold, N. W. (2014). From post-colonial to new liberal schooling in Somalia: The need for cultural relevant school leadership among Somaliland principles. *Planning and Changing: An Educational Leadership and Policy Journal*, 45(0, 3–4), 235–260.
- Kovach, M. E. (2010). *Indigenous methodologies: Characteristics, conversations, and contexts*. University of Toronto Press.
- Kumer, P., & Urbanc, M. (2020). Focus groups as a tool for conducting participatory research: A case study of small-scale forest management in Slovenia. In J. Nared, & D. Bole (Eds.), *Participatory research and planning in practice*. The Urban Book Series (pp. 207–220). Springer. https://doi.org/10.1007/978-3-030-28014-7_13

- Lune, H., & Berg, B. L. (2017) *Qualitative research methods for the social sciences*. Pearson Education.
- Macdonald, C. D. (2012). (2012) Understanding participatory action research: Qualitative research methodology option. *Canadian Journal of Action Research*, 13(2), 34–50.
- Morrison, K. (1998). *Management theories for educational change*. Sage.
- Mumford, M. D., Zaccaro, S. J., Connelly, M. S., & Marks, M. A. (2000). Leadership skills: Conclusions and future directions. *Leadership Quarterly*, 11(1), 155–170.
- Nared, J., & Bole, D. (2020). *Participatory research and planning in practice*. The Urban Book Series. https://doi.org/10.1007/978-3-030-28014-7_13
- Northouse, P. G. (2013). *Leadership: Theory and practice* (6th ed.). Sage.
- Northouse, P. (2016). *Leadership theory and practice* (7th ed.). Sage.
- Ojo, L. B., & Olaniyan, D. A. (2008). Leadership roles of school administrators and challenges ahead in post-primary institutions in Nigeria. *European Journal of Scientific Research*, 24(2), 172–178.
- Okoko, J., Scott, S., & Scott, D. E. (2015). Perceptions of school leaders in Nairobi about their leadership preparation and development. *International Journal of Leadership in Education*, 18(3), 279–304.
- Pherali, T. (2016). (2016) School leadership during violent conflict: Rethinking education for peace in Nepal and beyond. *Comparative Education*, 52(4), 473–491.
- Rapp, S. (2010). Headteacher as a pedagogical leader: a comparative study of headteachers in Sweden and England. *British Journal of Educational Studies*, 58(3), 331–349.
- Sahana, C. K. (2018) Pedagogical competence: Quality Education for future. *International Journal of Research in Social Sciences*, 8(9), 796–802. ISSN 2249-2496.
- Sayani, A. (2005). Spirituality, school leadership, and Islam. *Journal of School Leadership*, 15(6), 656–672. <https://doi.org/10.1177/105268460501500604>
- Schneider, B. (2012). Participatory action research, mental health service user research, and the hearing (our) voices projects. *International Journal of Qualitative Methods*, 11(2), 152–165. <https://doi.org/10.1177/160940691201100203>
- Shah, S. (2006). (2006) Educational leadership: An Islamic perspective. *British Educational Research Journal*, 32(3), 363–385.
- Shire, C. (2010). Good leadership (1st ed). In Somali (trans.) “Hogaaminta Wanaagsan” (*Daabacaaddii Iaad*). Cirfe Publications.
- Suaka, P. L., & Kuranchie, A. (2018). Head teachers’ professional management needs and concerns: Evidence from an educational district in Ghana. *African Educational Research Journal*, 6(1), 20–29.
- UNESCO. (2016). *Explores school leadership, governance in achieving 2030 targets*. UNESCO.
- Victor, A. A. (2017) Analysis of principals’ managerial competencies for effective management of school resources in secondary schools in Anambra State, Nigeria. *International Journal of Social Sciences, Humanities and Education*, 1, 1–10. ISSN 2521-0041.
- Yan, W., & Ehrich, L. C. (2009). Principal preparation and training: A look at China and its issues. *International Journal of Educational Management*, 23(1), 51–64. <https://doi.org/10.1108/09513540910926420>
- Yusuf. (2019). (no initial cited) UK essays. *November (2018) cultural differences between Somalia and the United Kingdom (UK)*. <https://www.ukessays.com/essays/cultural-studies/cultural-differences-between-somalia-and-the-united-kingdom-uk.php?vref=1>. Accessed October 12, 2021.
- World Bank. (2018). *Study on understanding the role of non-state education providers in Somalia*. Study carried out by Altai Consulting on behalf of World Bank Group.

Transdisciplinary Research for the Sustainability of Indigenous Amate (Amatl) Paper in Mexico



Noé Aguilar-Rivera

Abstract Indigenous agricultural communities in Mexico have developed a close relationship with their ecosystems throughout their history, religion, cosmivision of the universe, traditions and culture generating traditional knowledge about the use of natural resources as inputs for their food, medicine, clothing, trade and exchange of various goods and the manufacture of handicrafts as amate paper from bark of trees. This artisanal production negatively affecting the ecosystem of several regions due to deforestation searching other forest species for bark, so it is necessary apply transdisciplinary research to the attainment of the Sustainable Development Goals (SDGs) industry, innovation and infrastructure, responsible consumption and production and no poverty because currently the sustainability of production of amate paper crafts of the Otomi indigenous groups is low due to excessive use of natural resources mainly water, deforestation use of hazardous chemicals, and poor community organization. The purpose of this chapter was to carry out a review of the transdisciplinary aspects that identify the production process, historical, cultural, and artistic value of amate paper as indigenous handicraft, issues, challenges, and options to increase sustainability. As an alternative to increase sustainability, the production of Tree Free Amate Paper from banana pseudo-stem was developed to conventional tree bark production, according to the indigenous traditional process. The paper obtained presents characteristics like amate paper to be used for artistic purposes for paintings and crafts and contributes to the well-being and sustainable development of rural and indigenous communities reducing the use of tree bark, chemicals, energy, and water.

Keywords Indigenous technology · Forest resources · Agro-industrial waste · Handicrafts · Sustainability

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1 Introduction

Paper is one of the most used objects in modern society, business, communication, art among others, even though its invention as handmade paper and later as a product of modern pulp and paper industry dates back to ancient times by various cultures using various biomaterials as wood, vegetable fibers, by-products, recycled fibers and local technologies have had a significant impact on culture, development of knowledge, technology, in addition to generating environmental impacts on water resources, biodiversity and pollution.

The word “paper” is derived from the name of reedy plant papyrus, which grows abundantly along the river Nile in Egypt. Using of Papyrus in paper is back to 3000 BC in Egypt (Abd El-Sayed et al., 2020). Currently, the artisan paper is an object that allows us to revalue culture mainly in regions where its production is linked to the cosmovision of indigenous people (Meierhusby et al., 1993).

Mexico is one of the most bioculturally diverse countries in the world associated, but not restricted, to indigenous groups linked to ancestral territories, ancient Mesoamerican knowledge, a mega-diverse environment, and multiple forms to conceptualize, manage and use local natural resources for food, dress, medicines, religious objects, and crafts production (Sierra-Huelsz et al., 2020).

Therefore, traditional or artisan products are created by a specific culture, mainly indigenous, through which they express their skills and knowledge transmitted from generation to generation of their identity and cultural heritage (Poméon, 2010). Consequently, it is necessary to revalue the productive processes, the relationship between nature and society with the territory from which they originate, since they reflect the diversity of biological resources, tradition, identity, creativity, and knowledge with a sustainability approach (Fisher & Rucki, 2017; Larson, 2010).

Lugo-Morin et al. (2019) concluded that artisanship or handicraft and various forms of ecotourism may be closely linked to sustainable development due to dynamic axis, continuous, safer, involves fewer risks, and generates greater monetary income than agricultural activities. Artisanship is defined as work done by hand, or primarily manual labor with little or no mechanical intervention with wood, fiber, glass, metals, minerals etc.

However, rural, or indigenous handicraft production presents competitive disadvantages in domestic markets due to its undervaluation and in international markets due to falsification, devaluation of work as it is considered obsolete and even discrimination (Neumann, 1973; Novelo, 2002).

In relation to the role of pre-Hispanic Mexico, paper is the only surviving example of a reading and writing system typical of Mesoamerican cultures. The term “indigenous papers” or “native papers” is used to define the flexible, opaque supports, formed by vegetable fibers not spun or woven, but interlaced, which were used in Mesoamerica to write, record, or draw. Within this group of indigenous papers are the amate paper, obtained from the inner bark of *Ficus* and *Morus* trees, and the maguey paper, obtained from fibers from the leaves of agavaceae. The composition of the raw material was reflected in certain characteristics of the finished product,

such as color, texture, hygroscopicity and resistance to deterioration agents and time (Tirado & Cruz, 2013).

However, it presents constraints and challenges such as growing demand as an artisanal product of indigenous origin, low availability of raw materials, high environmental impact of the production process, and lack of transversal approaches to address its low sustainability.

2 Amate Paper from Bark

Amate paper from Nahuatl word, *āmatl* is soft and light, thin and smooth pre-Hispanic paper of Mesoamerican territory. Currently is a Mexican Popular Art or “Folk Art.” of indigenous communities for Mexican and foreigners emerging artists as a handmade paper with a record that offers evidence of knowledge of the environmental, practice, and craft. Each sheet, is the result of the geography or source of the fiber material, the environmental conditions on the day that the paper was made, the specific tools used, and the expertise of the papermaker craft practices.

Amate is artisanal paper made from the inner bark (phloem fiber) of tropical tree species. This handicraft paper is a forest product; therefore, the craftsmen are mainly depending upon forest resources as Jonote (*Heliocarpus appendiculatus*, Tiliaceae). However, the process of converting bark to paper continues to be totally manual and the step of maceration or cooking of bark fibers has its bases in transmit important events and values cultural (historical and cultural compression):

- Writing surface: its most important use was as a support in codices
- Ritual objects: it was widely used in daily and occasional rituals along with incense, copal, maguey thorns, rubber, among other elements. In celebrations was decorated, rolled up and offered to the local gods. For this purpose, it was elaborated in different measures and thicknesses and used as part of the dress and decorations of gods, priests and for the sacrificed humans. Besides the making of amate was a strictly shamanic affair.

The paper (which in the Hnahnu language is called he’mi) used to be made exclusively by the Badis or “medicine men”. Consequently, it had “powers”, and it was used for rituals, as a direct offering or to cut out figures of deities and spirits. Currently, the cut-out bark paper figures have a strong syncretic character, involving Catholic and pre-Hispanic elements.

- Tax articles: used for economic purposes such as tribute, a type of tax paid by enslaved peoples.
- Inventories of business operations. The paper was used to record the assets of rulers and priests, and to record business transactions and tribute accounts.
- Various records. The bark paper was transformed into books in the form of long rolls, like folding canvases. The names of heroes and gods, maps, historical and religious events, genealogies, and calendars were recorded on them.

The belief system of the Hñähñu indigenous, current exclusive group in the production of amate paper or bark paper, has persisted for many centuries with slight changes over time which is based on positions, uses, and customs of the ethno-linguistic group. Besides they created a system of beliefs, values, traditions, and informal rules, as well as knowledge that has allowed them to continuously re-valorise their environment through their deities (Lugo-Morin et al., 2019).

There are basically two types of bark paper related to its coloring, dark paper, and light paper. The color in the indigenous cosmovision is very important for identifying the deities or spirits represented by the figures that the artisans design. The sheets of dark paper have a threatening connotation whereas white paper is beneficial. Binnqüist (2003) also explains that color is an important symbolical characteristic of the figure or painting. Light color or even White are reserved for the *nzahki* of humans or gods. Dark or black is a significant color for indicating evil characters or for sorcery. In traditional thought the native bark paper relates to bad things such as the Spanish conquistadors.

In beach resorts, magical towns or colonial cities of the country and most cities, tianguis, fairs, handicraft markets, stationery shops, art product stores, large volumes of paper and crafts made with amate paper produced in San Pablito Pahuatlán, municipality of Pahuatlán, in the Sierra Norte of the state of Puebla, Mexico are sold or commercialized.

3 Amate Paper Production

The amate workshop is the courtyard of the artisan's house which allocates a space to place on a stove the saucepan where the bark is cooked with firewood. Then comes the treatment of the bark cooked, washing, making sheets of amate paper. The finishing phase and its design require an outdoor work area. The basic tools are a crusher (volcanic stone), wooden boards and tables. In the decoration they use anilines, paint, and brushes. In the designs, nature and the indigenous worldview are reflected, with various things: the underworld, the god of the mountain, the forest, etc. (Alonso-Barrón, 2007; Castillo & Velázquez, 2019).

The starting point for both begins with the stripping of the bark from certain specific types of trees. The bark is considered the skin of the tree, keeping the tree's energy from seeping out. The tree is thought to take its energy straight from the earth and the start of a new life cycle it is for this reason prefer for its cosmovision its bark for making amate paper.

In previous decades, with the traditional pre-Hispanic process, the bark was cleaned and washed in the waters flowing from the nearby rivers overnight; afterwards, the inner bark was separated from the outer bark to form a sheet of paper. Technically, this means that resins and extractives from the bark were eliminated and moisturized the tissue. After this washing the bark softened was crushed with a polished volcanic stone called *muinto* (Fig. 1) as the main tool used in a transverse sense on a table to produce thin leaves. This crushing released water-soluble starches

Fig. 1 *Muinto* polished volcanic stone (photograph taken in Veracruz, Mexico)



or carbohydrates contained in the cavities of the parenchyma cells and cell elements, functioning as adhesives, in such a way that the fibers were stuck over each other forming a paper completely natural (Quintanar-Isaías et al., 2008).

Notwithstanding in the modern process, to supply the growing market, bark is extracted from branches and trunks of new species (mainly *Trema micrantha*). Strips of the inner bark are separated from the outer bark and are left to dry in the sun to preserve them until use. The bark is soaked for one or two days with ash or lime to soften it, later, it is boiled in water with caustic soda (NaOH), accelerating the delignification processes and shortening the times by almost a half. After rinsing with water, fibers are obtained whose color ranges from brown to straw yellow, and which some producers bleach with chlorine (NaClO). The fiber strips are placed on wooden frames, forming with them a grid that is struck with a volcanic stone. By crushing the fibers, the vegetable matter exudes a series of soluble carbohydrates, which when dried function as an amalgam. To achieve a smooth finish, the sheets are left to dry in the sun and polished with orange peels. However, the high demand for amate is destroying local and nearby forests because trees of any age are cut down. On the other hand, the use of chemical products (soda caustic and chlorine, among others), in addition to contaminating aquifers and the environment in general, has caused serious health problems, a situation that in the short or medium term will not change (Civallero, 2017).

4 Socioeconomic Importance of Amate Paper

The ñahñús artisans are the guardians of an important knowledge about the trees that are used to extract the bark (the leather), about the combination of elements such as fire, water and ash to make it, and the dedication and patience to crush each sheet, smooth it and fix it. On each sheet is the life of the ñahñús artisans and their relationship with their natural environment, their families, and their community.

García (2008), Paganelli (2007) and Sanchez (2021) concluded the popularity of the ancient art of amatl has been increased and popularized since the end of the 1960s by the usage of amate paper by Nahua Indigenous communities in the Alto Balsas in Guerrero such as Ameyaltepec, Oapan, Ahuahapan, Ahuelican, Analco, San Juan

Tetelcingo, Xalitla and Maxela in central Mexico as Mexican Amate painters who had the initiative to decorate the amate paper capturing the paintings with which they traditionally decorated their ceramic pieces each one of them. Them with their own pictorial style.

These painting on amate began before it spread out to sell their paintings to domestic handicraft markets mainly for international visitors and tourists because the bark raw material itself constitutes the main attraction of the amate handicraft for the consumer converting to amate as one of the most widely distributed Mexican handicraft products at national and international levels (Fig. 2).

Currently, the Ñahñús artisans of San Pablito have diversified their production by developing, in addition to the standard size paper sheets (40 cm × 60 cm) destined for the Nahuas of Guerrero, their own products. Its production includes unique designs that handle combinations of paper of different sizes, colors, and fibers (Fig. 3).



Fig. 2 Paintings on paper amate (photographs taken in a handicraft center in Cancun Quintana Roo, Mexico)

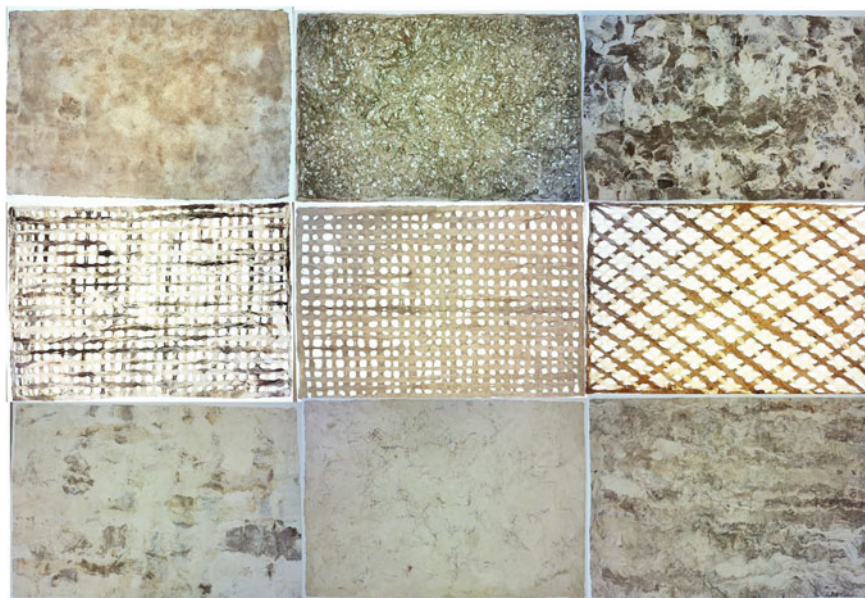


Fig. 3 Papel amate (photographs taken in a handicraft center in Veracruz, Mexico)

Nevertheless, high demands for bark trees as the raw material of amate paper can disrupt the stability of the regional environment because of increase of deforestation, loss of biodiversity, rainfall, and other environmental conditions. Bark is insufficient. The apparent scarcity of trees and the risk of overexploitation and the implementation, coordination of tree nurseries and sustainable tree management are projects had all failed causing changes in the organization for production, manufacturing techniques and pressure on natural resources used in this traditional handicraft.

For Taleat et al. (2021) and Prieto-García et al. (2019) non-wood fiber or agroindustrial wastes, as sources of raw material, offer several advantages for amate paper and could be a way of helping preserve the tradition and increase the sustainability:

1. It is a renewable source (annual) of raw material compared to the long growth cycles for trees for bark;
2. The lower lignin content in non-wood fiber implies that artisanal process will require relative less amount of energy such as firewood and chemicals [NaOH, Ca(OH)₂, NaClO etc.] compared to the bark trees; and
3. Non-wood fiber can be used in making every grade of amate paper and generate other varieties without losing its ritual and craft character.

However, non-wood fiber sources have its own challenges which include: (1) seasonal availability: so various regional by-products must be used or even mixed, (2) handling problem resulting from their high-volume-low-density and humidity and (3) large number of strange materials which must be removed during processing.

5 Sustainability of Amate Paper

In a wider context, the continuity and sustainability of amate as SDGs industry, innovation and infrastructure, responsible consumption and production and no poverty cannot be answered straightforwardly and exclusively based on the existence of a secure stock of raw material. Because, it is linked to the historical background and the present cultural, economic, environmental, and political factors occurring at local, regional, national, and international levels, which are shaping the everyday production of amate and bark harvesting (Binnqüist, 2003).

The exhaustion of the *Ficus* species used for amate production and exploited for longer than other species requires the development of sustainable production programs, including natural resources management, to secure supplies of raw material (bark). Therefore, it is necessary to carry out ecological surveys of tree growth, distribution, density, bark production, and harvesting capacity in relation to actual and future paper demand.

Fuentes Castillo et al. (2015) developed indicators of environmental, economic, and social dimensions for the amate paper production as socio-ecological system and their results show that the current system is less sustainable in relation to the past, due to the scarcity of raw materials in the community, use of chemicals that pollute water resources, poor organization of artisans and stakeholders do not carry out activities to reduce pollution problems and environmental damage.

This is mainly because the artisans have abandoned agricultural systems as sugarcane for non-centrifuged sugar (piloncillo), coffee and others crop that decades ago were linked to the production of amate paper with intensive use and exploitation of bark that was not accompanied by reforestation of new trees of the species *Trema micrantha* (L.) Blume (jonote colorado) for its conservation, protection, restoration, development, and sustainable use.

Currently, the alternative system of amate production requires purchasing raw materials from far away places (Puebla, Hidalgo, and Veracruz), which can originate in the medium term, disputes for the acquisition of raw material. Increased use of caustic soda and sodium hypochlorite for the softening and bleaching of bark, chemicals that generate a serious contamination to rivers of the region, because the process waters are deposited directly on its tributary.

Despite the numerous socioeconomic and environmental impacts of the amate paper process, the artisans show opposition to technify or change the way they produce the bark paper in defense of tradition; since it is a common practice to transmit ancestral knowledge to their relatives although ash and lime have been replaced by soda caustic, which has transformed manufacturing prehispanic, the type and quality of the paper.

The bark paper system keeps five indicators in a high state of sustainability (production volume, cost / benefit ratio, use and transmission of traditional practices, readiness to change, main income generating activity), seven with low level (water consumption, natural resource conservation practices, ethics in management of natural resources, availability of human and

natural resources, intermediaries, dependence on external inputs and community organization). It is necessary to strengthen these seven indicators to elevate the status of sustainability in the system. (Fuentes Castillo et al. 2015)

Jiménez Velázquez et al. (2017) showed that several indicators, predominantly environmental, do not favor system sustainability due to excessive use of natural resources, chemicals in the production process, and poor community organization influenced by the following factors:

1. Productivity Production 68%
2. Benefit/cost 56%
3. Water consumption 71%
4. Stability, Practicing natural resource conservation 17.2%
5. Resilience, Ethics in natural resource management 55.2%
6. Reliability Use and transmission of traditional practices 86.13%
7. Adaptability Natural resource availability and humans 52.57%
8. Willingness to change 33.3%
9. Equality Principal activity generating income 89.0%
10. Intermediaries 66.7%
11. Self-management Dependence on external inputs 63.2%
12. Community organization 24.15%.

Based on the above, Castillo and Velázquez (2019) concluded.

- Environmental conservation projects are necessary to have access to raw materials in the community itself.
- The adoption of new species or waste biomass as a source of raw material.
- The gradual expansion of the bark extraction zone.
- The integration of farmers from the region (jonoteros) as bark extractors.
- It is necessary to promote the use of organic substitutes to avoid the use of chemicals.
- Reduce intermediaries through the organization and marketing of producers that generally benefit all artisans.
- Silvicultural techniques could be used to enhance the regeneration of the original populations of three for amate
- Promote the establishment of nurseries established near San Pablito to plant jonote trees and environmental programs to manage waste and process residues.

González, (2013) concluded that the necessary actions to achieve sustainability are:

- Cleaning the amate paper manufacturing process of all the compounds that negatively impact not only the quality and final durability of the amate, but also the health of the artisans, the inhabitants, and the environment in the region.
- Management and use of traditional or alternative tree species in regional agro-ecological production systems, such as coffee plantations under shade in small properties, supported by an adequate legal framework.
- Promote organization for production and marketing through self-regulation and self-management schemes.

- An economic analysis of the production process is required to account for the cost of producing artisan amate paper and to define mechanisms to obtain added value that contributes to the sustainability of the production process.

6 Tree Free Amate Paper

The amate paper, as part of the cultural heritage of Mexico, must be protected and scientifically supported with indigenous knowledge bases and emerging or novel technologies so that sustainable production is achieved. As a cultural object, it is part of a historical legacy that contains Mesoamerican knowledge about the manufacture, production, use and management of resources. It is essential that producing communities have the openness to transform manufacturing processes and incorporate new raw material as biomass to produce a clean paper (Quintanar-Isaías et al., 2008).

7 Handmade Paper from Agro-Industrial Waste

According to Karimah et al (2021) agro-industrial waste is mainly composed of stems, roots, leaves or other parts of plants such as coffee, sugarcane, bamboo, reed, banana, agave, pineapple, coconut, forest waste etc. These wastes are separated and classified as “useless” materials and constitute an important source of contamination upon degradation.

These wastes have no significant economic value, and they are accumulating in improvised landfills to be burned in the open air in growing areas. As an alternative to the lack of economic income options, some artisans, mainly of indigenous origin as a survival activity, make regional crafts such as handmade paper made from various by-products (Fig. 4).



Fig. 4 Handmade paper made by artisans of various waste (Pineapple crown, banana trunk and coffee pulp) (photographs taken in Veracruz, Mexico)

8 Banana and Waste Production

Banana (*Musa paradisiaca*, family Musaceae) is a major fruit crop of the tropical and subtropical regions of the world which grows abundantly.

Banana plants are known for the potential use of all plant parts – ripe and unripe fruits, flowers, pith are edible; leaves, sap, pseudo-stem fiber for non-edible purposes or as value added products for other applications. The banana is a fruit that takes from 9 to 12 months to be harvested, farmers must cut the plant's bush once the fruit is ripe. On average, the bananas harvested represent 12% of the total weight of the cut plants,

However, the banana crops generate a huge amount of plant waste (pseudo stem), each plant produces fruit only once in its life. The edible part of the fruit represents only 12% of the plant's total weight, the rest is peel represent 30–40% of the total weight of the fruit (Torres-León et al., 2018). For 1 ton of harvested banana fruit, around 4 tons of lignocellulosic wastes (leaves, pseudostem, rotten fruit, peel, rhizome etc.) are generated, being the pseudostem 75% of this residue which has no profitable use to generate a new income for growers and new sources of employment. On the other hand, if banana pseudostem does not remain in the plantations, radically reducing the risk of pests and diseases for plantation and additional environmental problems. Besides, the pseudostem, having no nutritional value for the soil but waste accumulation generates potential problems for the next harvesting (Díaz et al., 2021; Souza et al., 2014).

The banana leaf is frequently used in food processing by the indigenous people of Mexico to produce food tamales (Fig. 5).



Fig. 5 Tamales, pre-Hispanic food cooked steamed wrapped in banana leaves

9 Banana Wastes Properties

Due to its high cellulose content, the pseudostem has been used as an alternative source in pulp and paper industry since the 60s. because it's a natural fiber, ecofriendly nature, peculiar properties physico-mechanical resistance, availability, easy and safe handling, and versatility of use (Khan et al., 2014). Paper made from banana pseudostems is brown with a long-fibers appearance and is often used in paper art and high-quality papers. However, the extraction of fiber from the banana pseudo-stem is not a common practice and much of the pseudostem after the harvest of fruit bunch is marginally used in some regions for livestock feed (Sakare et al., 2020).

Besides banana fibers are now used to make handmade paper, handicrafts, high-quality textiles, garments, ropes, mats, carpets, cushions, cushion covers, bags, baskets, table cloths, curtains, rugs, mattresses, pillows, wallets, yoga mats, sausage casings, tea bags, vacuum bags, cigarette papers, fishing nets, biodegradable dishes, packaging sheets, base material for growing of mushrooms, cardboards, string threads, socks, methane production, polymer composites, biofuels, nanocellulose fibers, bioplastics, and other high-value products etc. (Bonilla-Gutiérrez et al., 2021; Brindha et al., 2019; Karthika et al., 2020; Kavitha & Aparna, 2021).

Therefore, banana pseudostem is a waste biomaterial with high biodegradability, flexibility, availability, easy pulping capability produced via clean technologies, sustainability, low cost of processing and acquisition are few of the factors that make these materials resources to be considered in the production of 'Tree Free Amate paper'.

Consequently, utilization of fibers from banana pseudostem would not only be beneficial to farmers as per extra income but can also be an effective way to alleviate the environmental impact of banana processing. Their utilization for tree free amate paper can reduce pressure on bark, help keep ecological balance in nature and ultimately lead to the expansion of the bio-based economy and sustainability.

The objective of this research was to explore the suitability of banana (*Musa sapientum*) pseudostem fiber as a potential emerging source of raw material in the production of Tree Free Amate paper with the traditional indigenous technology.

10 Production of Tree Free Amate Paper from Pseudo-Stem Banana Fiber

Although the use of pseudostem banana fiber can be considered relatively new in the paper manufacturing industry in Mexico. The utilization of fibers of banana pseudostem for tree free amate paper production can help to minimize the complex problems created by bark supply deficit in the region. It will provide low-cost raw materials creating job opportunities for the youth and would-be entrepreneurs. increase the income of farmers and serve as an efficient waste management process (Arafat et al., 2018; Fagbemigun et al. 2016).

For the elaboration of a craft based on the principles of creativity, and clean technology of the traditional amate paper made for centuries by Otomi indigenous people with the bark of a sacred tree according to their traditions, and based on the Sustainable Development Goals (SDGs) as industry, innovation and infrastructure, responsible consumption and production and no poverty is proposed to use a ligno-cellulosic residue widely available in Mexico generated in large quantities derived from the harvest of a fruit such as the highly consumed banana for its nutritional properties (Table 1; Fig. 6).

Banana wastes are characterized with high amount of cellulose and lower hemicelluloses, moderate of lignin and medium to long fiber length and highly available for industrial or handmade paper (Motaleb et al., 2020).

The technological basis for obtaining emerging fiber to produce an alternative tree free amate paper is based on in terms of the chemical and morphological properties to produce handmade paper. Pulping of waste banana pseudostem chips is carried out by varying alkali charge, and cooking time at the boiling temperature and finally producing handmade paper to obtain a dark brown paper with a rough texture and a semibleached paper with a finer texture as ecological product that promote sustainable development (Asngad et al., 2021).

Table 1 Producción de banana and pseudostem waste in Mexico (*Data from https://nube.siap.gob.mx/avance_agricola/Clases/reporte.php*)

	State	Producing municipalities	Sown area (ha)	Harvested area (ha)	Banana production (t)	Yield (t/ha)	Banana residue (pseudostem)(t) (estimated)
1	Campeche	3	11,500	11,500	124,947	1086	374,841
2	Colima	5	608,924	608,924	20,743,092	3407	62,229,276
3	Chiapas	37	2,337,257	2,322,757	70,144,510	3020	21,043,353
4	Guerrero	31	389,699	379,120	8,912,024	2351	26,736,072
5	Hidalgo	1	1000	1000	5600	560	168
6	Jalisco	6	404,400	404,400	19,736,001	4880	59,208,003
7	México	2	1700	1700	22,475	1322	67,425
8	Michoacán	11	564,900	561,500	17,770,261	3165	53,310,783
9	Morelos	1	900	900	27,720	3080	8316
10	Nayarit	9	251,600	240,750	3,621,279	1504	10,863,837
11	Oaxaca	32	356,525	352,400	7,720,877	2191	23,162,631
12	Puebla	10	249,155	24,1905	381,1893	1576	11,435,679
13	Quintana Roo	4	77,950	77,950	988,127	1268	2,964,381
14	Tabasco	7	11,68442	1,163,442	60,160,889	5171	180,482,667
15	Veracruz	43	1,658,972	1,633,572	32,959,393	2018	98,878,179
16	Yucatán	10	25,250	20,443	145,145	710	435,435
	National total	212	8,108,174	8,022,263	246,894,232	3078	740,682,696

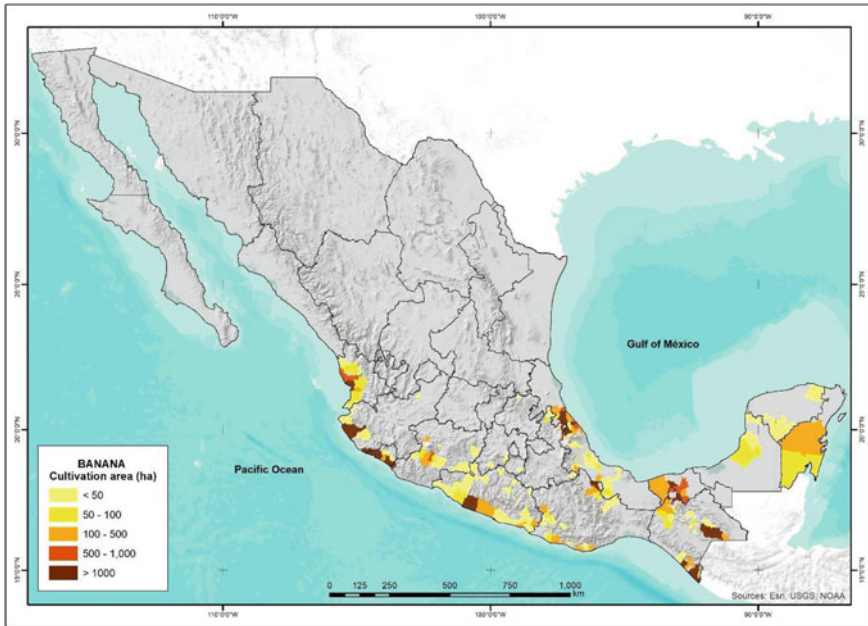


Fig. 6 Banana producing municipalities in Mexico (*Data from https://nube.siap.gob.mx/avance_agricola/Clases/reporte.php*)

The handmade paper products are tools for cultural communication, allowing consumers to feel the cultural charm, the folk in the process of consumption, and realize the unity of tangible objects and intangible spirit. The biggest feature of handmade paper products is that they are traditional handicrafts carrying the spirit of artisans and cultural connotations. The development and design of handmade paper products should promote innovation, sustainability, focus on the public, find cooperation, and achieve the purpose and value of cultural consumption (Li et al., 2019).

11 Manufacturing Process of Amate Paper from Banana Pseudo Stem

The raw material used for Tree Free Amate Paper production was whole length banana pseudostem. collected in Cordoba Veracruz, México. The pseudostem was cut from plant after the banana harvest and chopped in small pieces (4–6 cm) and distributed in a patio to sun for dring for about 2 or 3 days in the open air. The production method was like the traditional one used for the production of bark amate.

The chips were placed in a container and allowed to soak for 24 h and washed before being used. Cooking or softening of banana fibers were done according to

the conventional indigenous knowledge and method of the Sierra Norte de Puebla Mexico, that is, in a metal container using a rustic cooking liquor (small alkali charge) which was prepared from solid $\text{Ca}(\text{OH})_2$ by dissolving them in water in a concentration of 20% (active alkali as OD of fiber) and liquor to feedstock ratio: 5:1 of banana fiber, later it was heated to boiling temperature for cooking for 2 h with butane as fuel. The constant volume of the liquor inside the metal container was maintained by adding hot water. After cooking or softening, banana fiber was washed with tap water till the removal of chemicals and fibers were manually disintegrated. The softened fiber was distributed in a smooth piece of wood to make a lattice or grid and the flattening of the fibers using volcanic stone, called *muinto*. Hitting the fiber on the piece of wood creates a uniform sheet.

For the paper finishing process, the smoothest side of the stone is used, hitting the entire surface of the sheet to give a smoother finish, thus the sheet of tree free amate paper emerges. Finally, the sheet is rubbed with a wooden cylinder to acquire a kind of patina, and conclude the process of making the sheet, which will be exposed to the sun on the piece of wood until it is completely dry.

Bleaching was done after rustic delignification to remove the natural color of the pulp. Banana pulps were deposited in plastic container. Bleaching chemical was hydrogen peroxide (H_2O_2) and commercial NaOH and water were added together into disintegrated pulp and the mixture was heated near to reaction temperature for one hour.

Pulp was then washed by a diluting and dewatering procedure; first, it was diluted to consistency 5% and then dewatered. This was repeated two times. The paper was obtained with the same method for the unbleached paper.

Banana handmade paper share the same characteristics of amate paper in terms of their surface texture and color. The surface texture was rough, and the color was between brown and beige, which is fine for art paper. This rough texture is caused by the long fibers of the banana, which make the fibers bonds solid so that they are difficult to break.

The types of fibers will affect the appearance and texture of paper. Besides, the appearance of fibers can also be influenced by the $\text{Ca}(\text{OH})_2$ as chemical in the separation and termination of the fibers remain visible after the forming process like artisanal amate production (Riter, 2018) (Fig. 7).

The artisan paper made from banana fibers, generated in this research, has properties that make it possible to use it in activities related to the plastic arts, mainly in painting. It presents an adequate handling and behavior in painting techniques where the colors need to be diluted in water, for example: watercolor, acrylic and constitutes an attractive option from the point of view of sustainability of the use of by-products of the banana harvest, especially in municipalities producers with a high level of marginalization and indigenous population (Figs. 8 and 9).



Fig. 7 Process for free tree amate paper from banana pseudostem



Fig. 8 Free tree amate paper from banana pseudo stem

12 Conclusions

The amate paper is a handicraft present for centuries derived from the pre-Hispanic knowledge of Mesoamerican indigenous people, however, due to its traditional process it presents low levels of sustainability affecting the quality of life of the indigenous artisans who produce it, it generates significant environmental impacts



Fig. 9 Paintings made on tree-free amate paper by artists from Veracruz Mexico

and necessarily transversal actions are required for the sustainability of this cultural asset.

Amate paper production can contribute to the attainment of the SDGs if agreements are established between stakeholders, practitioners, and policy makers to develop strategies for the reforestation of amate species, utilization of agro-industrial residues with green technologies to minimize environmental impacts, water and chemicals and produce new types of amate paper for new marketing channels and public policies are established to revalue artisan work mainly of indigenous origin to generate economic income and well-being.

This chapter it was determined that technologically it is possible to obtain a Tree Free Amate Paper from the pseudostem of banana, as an alternative to use these organic plant residues with characteristics like artisanal amate paper obtained from wood bark (jonote). In this way, deforestation, and the usage of chemical like NaOH are avoided without an impact on environmental improvement through the circular economy and contribute to the attainment of the Sustainable Development Goals (SDGs) industry, innovation and infrastructure, responsible consumption and production and no poverty.

The Tree Free Amate Paper obtained provides essential characteristics that facilitate its use in art as support for artistic paintings and numerous crafts without the risk of pollution due to its biodegradability.

Future research should be aimed at improving the traditional process of amate from bark, use of additives of biological origin and local and regional residual biomass as raw material, scheduling it for an annual cycle of availability.

References

- Abd El-Sayed, E. S., El-Sakhawy, M., & El-Sakhawy, M. A. M. (2020). Non-wood fibers as raw material for pulp and paper industry. *Nordic Pulp & Paper Research Journal*, 35(2), 215–230.
- Alonso-Barrón, O. (2007). *La fabricación del papel amate por los indígenas Otomíes un vehículo de contenido religioso y cultural* (Tesis Doctoral Inédita). Universidad de Sevilla, Sevilla. Retrieved October 25, 2021, from <https://idus.us.es/handle/11441/15442>
- Arafat, K., Nayeem, J., Quadery, A. H., Quaiyyum, M. A., & Jahan, M. S. (2018). Handmade paper from waste banana fibre. *Bangladesh Journal of Scientific and Industrial Research*, 53(2), 83–88.
- Asngad, A., Santhyami, S., Pertiwi, A. R., & Rahmitasari, C. (2021). The utilization of sugarcane bagasse, cassava peels and corn husks in handmade paper production. *JPBIO (jurnal Pendidikan Biologi)*, 6(1), 64–75.
- Binnqüist, R. C. L. (2003). *The endurance of Mexican amate paper: Exploring additional dimensions to the sustainable development concept*. Twente University Press. Retrieved October 30, 2021, from https://ris.utwente.nl/ws/files/66873866/thesis_Lopez_Binnquist.pdf
- Bonilla-Gutiérrez, E., Gómez-Merino, F. C., Trejo-Téllez, L. I. I., García-Albarado, J. C., & Hidalgo-Contreras, J. V. (2021). Exploitation of plantain (*Musa* spp.) plantations as an agrotourist element. *Agro Productividad*, (V). <https://doi.org/10.32854/agrop.v14i9.1774>
- Brindha, R., Narayana, C. K., Vijayalakshmi, V., & Nachane, R. P. (2019). Effect of different retting processes on yield and quality of banana pseudostem fiber. *Journal of Natural Fibers*, 16(1), 58–67.
- Castillo, M. J. F., & Velázquez, M. A. J. (2019). Papel amate: tradición y desarrollo. *Desarrollo, disputas socio-territoriales y violencia en México*. Retrieved October 30, 2021, from http://www.eco.buap.mx/publicaciones/libros/dinamicas_productivas_alimentacion_y_politicas.pdf#page=16
- Civallero, E. (2017). Los trazos sobre el ñamatl. *Fuentes. Revista de la Biblioteca y Archivo Histórico de la Asamblea Legislativa Plurinacional de Bolivia*, 11(50), 118–122.
- Díaz, S., Ortega, Z., Benítez, A. N., Marrero, M. D., Carvalheiro, F., Duarte, L. C., & Fernandes, M. C. (2021). Oligosaccharides production by enzymatic hydrolysis of banana pseudostem pulp. *Biomass Conversion and Biorefinery*, 1–12.
- Fagbemigun, T. K., Fagbemi, O. D., Buhari, F., Mgbachiuzo, E., & Igwe, C. C. (2016). Fibre characteristics and strength properties of Nigerian pineapple leaf (*Ananas cosmosus*), banana peduncle and banana leaf (*Musa sapientum*)—potential green resources for pulp and paper production. *Journal of Scientific Research and Reports*, 1–13.
- Fisher, J., & Rucki, K. (2017). Re-conceptualizing the science of sustainability: A dynamical systems approach to understanding the nexus of conflict, development and the environment. *Sustainable Development*, 25(4), 267–275.
- Fuentes Castillo, M. J., Jiménez Velázquez, M. A., García Cué, J. L., & Caamal Cauch, I. (2015). Evaluación de la sustentabilidad del sistema de papel amate. *Revista Mexicana De Ciencias Agrícolas*, 6(1), 125–138.
- García, M. (2008). Half a century innovating tradition. The frontiers of amate bark paper painters. *Voices of Mexico*. Retrieved November 11, 2021, from <http://ru.micisan.unam.mx/bitstream/handle/123456789/18984/VOM-0081-0041.pdf?sequence=1&isAllowed=y>

- González, L. J. N. (2013). *Análisis y perspectivas de la marca colectiva artesanía de papel amate P'ETE-I San Pablito Pahuatlán: hacia una producción sustentable* (Doctoral dissertation). Universidad Iberoamericana Puebla. Retrieved October 27, 2021, from https://www.uv.mx/personal/cilopez/files/2010/09/Tesis-LucilaNeyra_-2013.pdf
- Jiménez Velázquez, M. A., Castillo, M. J. F., & Saldaña, T. M. (2017). Amate paper culture in San Pablito, Pahuatlán, Puebla, Mexico. *Practicing Anthropology*, 39(1), 12–16.
- Khan, M. Z. H., Sarkar, M. A. R., Al Imam, F. I., Khan, M. Z. H., & Malinen, R. O. (2014). Paper making from banana pseudo-stem: Characterization and comparison. *Journal of Natural Fibers*, 11(3), 199–211.
- Karimah, A., Ridho, M. R., Munawar, S. S., Adi, D. S., Damayanti, R., Subiyanto, B., & Fudholi, A. (2021). A review on natural fibers for development of eco-friendly bio-composite: Characteristics, and utilizations. *Journal of Materials Research and Technology*, 13, 2442–2458.
- Karthika, P., Varalakshimi, A., & Babu, S. (2020). Banana pseudo-stem fibre: Processing and applications. *Agri Mirror: Future India.*, 1(2), 4–6.
- Kavitha, V., & Aparna, G. (2021). A review on banana fiber and its properties. *Asian Journal of Pharmaceutical Research and Development*, 9(3), 118–121.
- Larson, J. (2010). Indicaciones geográficas, competencia leal y desarrollo rural. En: *La Jornada del Campo*. Número 29, 13 de febrero de 2010. Suplemento Informativo de La Jornada. México.
- Li, S., Zhong, Z., & Peng, X. (2019, November). Research on design strategy of handmade paper products under the concept of cultural consumption. In *2nd International Conference on Humanities Education and Social Sciences (ICHESS 2019)* (pp. 614–617). Atlantis Press.
- Lugo-Morin, D. R., Garcia-Sanchez, E., & Cruz-Vazquez, R. I. (2019). Beliefs, values, and traditions: Re-thinking sustainable development using the Hñähñu example. *Development in Practice*, 29(1), 95–102.
- Meierhusby, B., Munn, J., Wallis, T., & Wootton, M. (1993). Quality materials: Handmade paper. Taking a closer look. *The Book & Paper Group Annual*, 12, 61–65.
- Motaleb, K. A., Al Mizan, R., & Milašius, R. (2020). Development and characterization of eco-sustainable banana fiber nonwoven material: Surface treatment, water absorbency and mechanical properties. *Cellulose*, 27(14), 7889–7900.
- Neumann, F. J. (1973). A sacred material in Aztec Ritual. *History of Religions*, 13(2), 149–159.
- Novelo, V. (2002). Ser indio, artista y artesano en México. *Espiral, Estudios Sobre Estado y Sociedad*, IX(25), 165–178.
- Paganelli, M. P. (2007). Tyler Cowen, markets and cultural voices: Liberty versus power in the lives of Mexican Amate painters. *The Review of Austrian Economics*, 20, 95–96.
- Poméon, Th. (2010). ¿Retrógrados o vanguardistas? Los productos tradicionales y el desarrollo rural en México. En: *La Jornada del Campo*. Número 29, 13 de febrero de 2010. Suplemento Informativo de La Jornada. México
- Prieto-García, F., Jiménez-Muñoz, E., Acevedo-Sandoval, O. A., Rodríguez-Laguna, R., Canales-Flores, R. A., & Prieto-Méndez, J. (2019). Obtaining and optimization of cellulose pulp from leaves of Agave tequilana Weber Var. Blue. Preparation of handmade craft paper. *Waste and Biomass Valorization*, 10(8), 2379–2395.
- Quintanar-Isaías, A., López-Binnqüist, C., & Vander, M. M. (2008). El uso del floema secundario en la elaboración de papel amate. *Contactos*, 69, 38–42.
- Redondo-Gómez, C., Rodríguez Quesada, M., Vallejo Astúa, S., Murillo Zamora, J. P., Lopretti, M., & Vega-Baudrit, J. R. (2020). Biorefinery of biomass of agro-industrial banana waste to obtain high-value biopolymers. *Molecules*, 25(17), 3829.
- Riter, R. B. (2018). *Artifact, craft, and memory: Recordness in handmade paper*. Retrieved November 16, 2021, from <https://scholarlypublications.universiteitleiden.nl/handle/1887/123146>
- Sakare, P., Bharimalla, A. K., Dhakane-Lad, J., & Patil, P. G. (2020). Development of greaseproof paper from banana pseudostem fiber for packaging of butter. *Journal of Natural Fibers*, 1–9.
- Sanchez, E. (2021). *Materiality in Mexico's arte popular: Amate as a case study* (Doctoral dissertation). University of California, Riverside. Retrieved November 11, 2021, from <https://escholarship.org/uc/item/0dr4c0wn>

- Sierra-Huelsz, J. A., Gerez Fernández, P., López Binnqüist, C., Guibrunet, L., & Ellis, E. A. (2020). Traditional ecological knowledge in community forest management: Evolution and limitations in Mexican forest law, policy and practice. *Forests*, *11*(4), 403.
- Souza, E. L. D., Liebl, G. F., Marangoni, C., Sellin, N., Montagnoli, M. D. S., & Souza, O. (2014). Bioethanol from fresh and dried banana plant pseudostem. *Chemical Engineering Transactions*, *38*, 271–276.
- Taleat, A. A. T., Akanfe, F. A., & Gbadamosi, T. R. (2021). Pulp Extraction and paper production from banana pseudostem and its characterization. *Technology (ICONSEET)*, *6*(18), 129–134.
- Tirado, C. G., & Cruz, C. G. (2013). El papel de maguey como soporte documental: Studio de un códice Huexotzinca del período colonial. *Conserva Rev Cent Nac Conserv Restaur*, *18*, 5–19.
- Torres-León, C., Ramírez-Guzman, N., Londoño-Hernandez, L., Martínez-Medina, G. A., Díaz-Herrera, R., Navarro-Macias, V., & Aguilar, C. N. (2018). Food waste and byproducts: An opportunity to minimize malnutrition and hunger in developing countries. *Frontiers in Sustainable Food Systems*, *2*, 52.