



# Risk Factors Associated with Adherence to Indigenous Epistemologies and Practices in Contemporary Learning for Climate Change Adaptation in Mwandia District of Western Zambia

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**Abstract:** *Indigenous epistemologies and ecological practices have historically guided communities in Zambia's Western Province in navigating the complex dynamics of lacustrine and floodplain ecosystems. However, the increasing impacts of climate change, the dominance of scientific knowledge frameworks, and socio-cultural transitions pose significant risks to the continuity of these knowledge systems. This article provides a detailed examination of the risk factors that hinder adherence to Indigenous ecological knowledge (IEK) within contemporary climate-change learning frameworks. Drawing on secondary data, semi-participant observation, and semi structured interviews, group discussions and contextual insights from Western Zambia to draw conclusions, the paper outlines how environmental unpredictability, intergenerational knowledge erosion, institutional marginalization, economic constraints, and cultural change collectively undermine IEK. The article concludes with practical pathways to strengthen the integration of IEK in modern climate learning, emphasising the role of co-production, educational reform, cultural revitalisation, and adaptive governance.*

**Key words:** *Adaptation, climate change, knowledge erosion, learning.*

## 1. INTRODUCTION

Climate change presents increasingly complex challenges to rural communities whose livelihoods depend on intimate knowledge of local ecosystems (IPCC, 2022; Berkes, 2018). In Zambia's Western Province, communities living in lacustrine and floodplain environments such as those along the Zambezi River have long relied on Indigenous ecological knowledge systems developed over centuries of lived experience (Nakashima et al., 2018; Nyong et al., 2007). These systems include the interpretation of plant phenology, animal migrations, hydrological patterns, spiritual practices, and communal governance structures that collectively guide climate-related decision-making (Berkes, 2018; Gómez-Baggethun et al., 2013).

Historically, Indigenous ecological knowledge has supported community resilience in environments characterised by annual flooding cycles, shifting wetlands, and unpredictable water regimes (Conway et al., 2015; Mapfumo et al., 2017). However, rapid changes associated with globalisation, digitisation, and intensified climate variability increasingly intersect with these long-standing systems of knowing in ways that may compromise their continued use and perceived relevance (Briggs, 2013; Leal Filho et al., 2022).

Contemporary climate change learning systems—including meteorological forecasting services, agricultural extension programmes, and formal environmental education curricula—offer new tools and sources of information but are largely grounded in technical and scientific worldviews (Agrawal, 1995; IPCC, 2022). When such systems are introduced without sensitivity to Indigenous worldviews, they may intentionally or unintentionally create epistemic conflicts, diminish the value placed on Indigenous knowledge, and disrupt intergenerational climate adaptation knowledge transmission (Smith, 2012; Chilisa, 2020; Quijano, 2007).

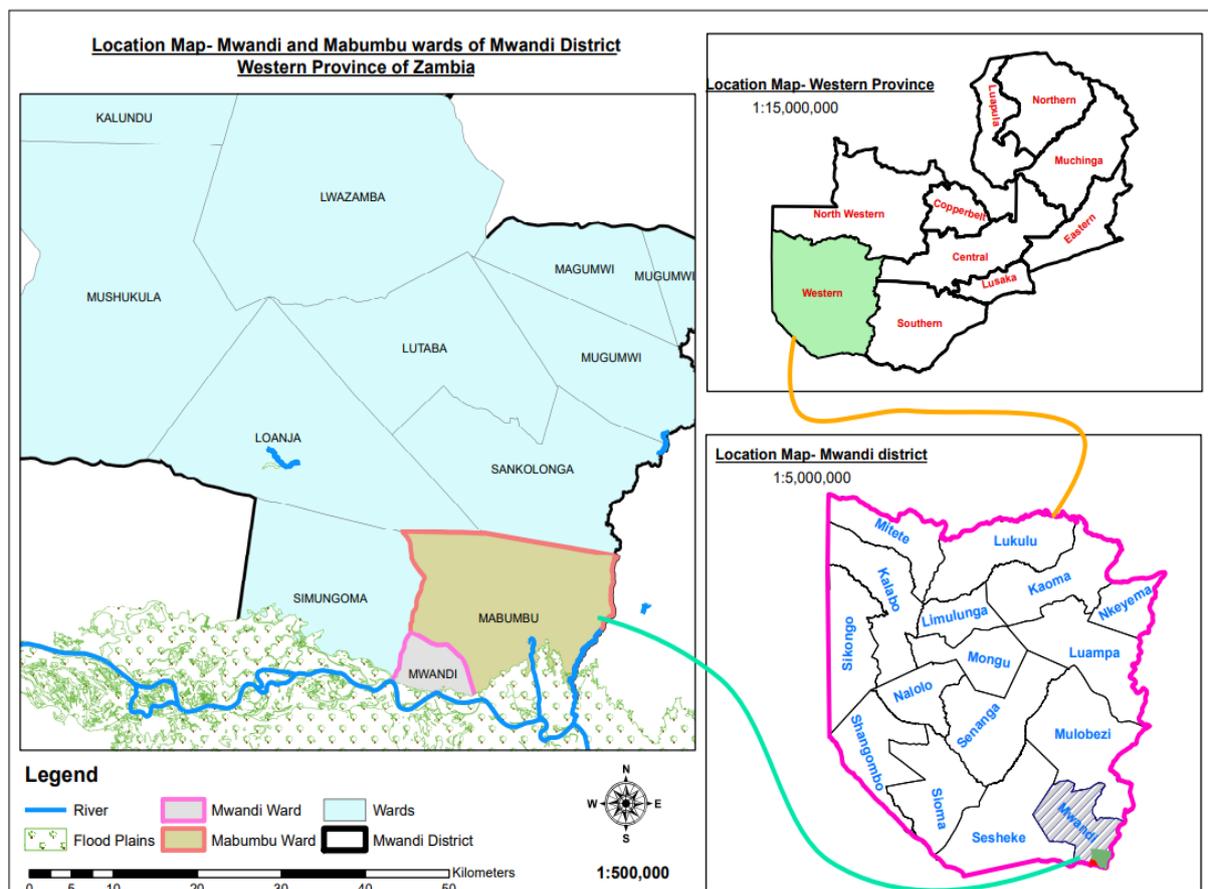
Understanding the risk factors that undermine adherence to Indigenous epistemologies is therefore essential, as local knowledge remains a critical resource for effective climate change adaptation (Whyte, 2017; Nakashima et al., 2018). In regions such as Western Province of Zambia, where communities

face seasonal flooding, erratic rainfall, and livelihood vulnerabilities, Indigenous ecological knowledge and scientific climate knowledge must work together rather than in opposition to enhance adaptive capacity (Hiwasaki et al., 2014; Nyong et al., 2007).

The aim of this study was therefore to provide a comprehensive analysis of the risk factors associated with reliance on Indigenous epistemologies in isolation, while examining opportunities for integrating insights from modern climate learning systems with local Indigenous ways of knowing grounded in the contextual realities of lacustrine environments in Western Zambia. Specifically, the study explored the potential for knowledge hybridisation to strengthen climate change adaptation. This study is relevant in that it provides empirical and conceptual linkages between Indigenous epistemologies and the influences of modernisation on climate change adaptation in lacustrine environments of Western Zambia, with particular reference to Mwandu District

## 2. DESCRIPTION OF STUDY AREA

Mwandu District is located about 120Km to the west of the tourist capital Livingstone town on the banks of the Zambezi river and close to the border with Botswana and Namibia situated in Western Province. It shares boundaries with three Districts; Sesheke on the west, the newly created Mulobezi District in the North East and Kazungula District in the East. It also shares international boundaries with Namibia in the South. Mwandu district covers about 8000 Km<sup>2</sup> of surface area (Mwandu Chiefdom Strategic Plan 2013-2017). It is important to note that the new District of Mwandu was created in 2012 out of Sesheke District of Western province; nevertheless, in traditional setups Mwandu royal village covers the entire political boundaries of Sesheke and parts of Katima Mulilo in Namibia (Mwandu Chiefdom Strategic Plan 2013-2017). Mwandu District sits along the latitudes -17.5169, 17<sup>o</sup> 31'1S and longitudes 24.8093, 24<sup>o</sup> 48' 33E at an elevation of 854m above sea level (<https://www.fallingrain.com/world/ZA/01/Mwandu.html>).



Location of the study area

## 3. METHODOLOGY

The study employed the decoloniality philosophical paradigm lens. Within the context of qualitative research approach, the study utilised the Rapid phenomenological research design. The study population

comprised of 38 participants which were conveniently selected using heterogeneous purposive and snowball sampling methods. Data collection was conducted within five communities namely; Sikuzu, Matoya, Kasaya, Situlu and Mabumbu, using semi – structured interviews, focused group discussions and, participant observation while inductive thematic analysis was used for data analysis.

#### 4. PRESENTATION OF RESULTS

This section sought to present results on risks of adhering to indigenous epistemologies and practices towards contemporary learning for climate change adaptation. During interviews with participants, indigenous knowledge with the emergency of contemporary adaptation measures have lost value and this interrogative study raised critical questions regarding the risks likely to be faced if indigenous knowledge is not recognised in contemporary climate adaptation strategies. The following table summarises themes that emerged with regard to risks of adhering to indigenous epistemologies and practices towards contemporary learning for climate change adaptation.

**Table 1.** Risks of adhering to indigenous epistemologies and practices towards contemporary learning for climate change adaptation

Objective	Theme	Sub-Themes
Risks of adhering to indigenous epistemologies and practices towards contemporary learning for climate change adaptation	Epistemological Risks	-youths get information from phones. -peer influence on climate change. -traditional knowledge is for the old.
	Intergenerational gaps	-church preference to shrines -migration to towns -technological advancements
	Knowledge complementarity and fears	-Strict adherents -Flexible adopters -Opportunistic or indifferent

From the above table, it is indicated that contemporary learning for climate change adaptation possesses epistemological risks to indigenous epistemologies in Western Province. For instance, during interviews, one Participant at Sikuzu SK2 mentioned that *“our children nowadays are calling the traditional knowledge ‘lika zakale’ which meant things of the past. This indicated that, modern adaptation strategies were psychologically deviating local people from their indigenous epistemologies thereby creating conflicts of accepting and rejecting indigenous adaptation epistemologies. Another participant stated that, “in many cases our children spend more time at school ‘kuituta lika zamakuwa’ which means learning things of foreigners, this has made it difficult for them to appreciate our ancestral ways of doing things”.* This has been made worse through an observation made where many youths were always busy online with phones neglecting elders doing certain indigenous practices on their own. This was complimented by one participant who stated that, *‘we have been overtaken as villagers because while we are looking forward to have phones and cars our colleagues in cities are not looking forward to learning our traditional ways, some of us even admire going to stay in the city but we fear that our families may suffer, so we remain here.’*

Apart from epistemological risks, intergenerational gap came out as a strong risk factor to indigenous adaptation actualisation by the contemporary society. Through observations and interviews conducted, the youths were observed not particularly interested in being taken to the shrine for cleansing as church preference was too high as compared to shrines attachments. For instance, SK6 had this to say, *“We used to learn the knowledge from our parents through stories and also through practice such as how to farm, when to farm and what should not be done when there is a flood this also included house thatching and canoes making but today out of all my 5 children only one has managed to learn similar skills the others had preferred to go and stay in Livingstone where some of the relatives are”.* This indicated that, in as much as youths could be willing to participate in the traditional teachings they are swayed by modern technologies and preferences.

Furthermore, Knowledge complementarity and fears came out as a key issue to enhance sustained climate change adaptation. For instance, when asked as to what they thought were best ways for them to co-exist alongside modern knowledge, one of the elders mentioned that from his experience it would be better to harmonize the use of traditional knowledge and contemporary knowledge because older generation do not want to lose their culture while children have preferred modern knowledge therefore

working together would be better. Others also argued that, keeping a place by maintaining the status quo while embracing modern ways of doing things was pertinent.

Furthermore, through an interview with one participant from Matoya, it was revealed that, in most cases, government projects in the community were consultative. This promoted integration of IK in contemporary epistemologies around climate change adaptation. Contrary to this view, one participant stated that, “our own traditional schools such as rites of passage for our young boys and girls have been neglected by the modern schools, moreover, contemporary education systems have diffused our indigenous education systems”.

## **5. DISCUSSION OF RESULTS**

This study critically examines the risks associated with the exclusive reliance on Indigenous knowledge (IK) and practices in climate change adaptation. What was established was that, contemporary learning for climate change adaptation had epistemic risks especially among the youths of Mwandu district. The increasing influence of modern knowledge and lifestyles presents a significant challenge to the continuity of Indigenous epistemologies. Participants consistently noted that younger generations perceive traditional knowledge as “*lika zakale*” meaning things of the past. This observation resonates with Berkes (2009) and Ngigi (2009), who also argued that formal education often unintentionally marginalizes Indigenous ways of knowing by privileging standardized, universal curricula over localized experiential knowledge. This highlights a broader tension between modernity and tradition: while formal education equips youths with technical and scientific literacy, it simultaneously disrupts the mechanisms for transmitting indigenous knowledge, which are largely oral and practice based.

This duality of wanting modern tools such as mobile phones and urban amenities, while remaining reliant on traditional land and water based livelihoods creates an inherent tension that risks weakening the intergenerational transfer of IK. This raises important questions about the sustainability of climate adaptation practices, because, if youth disengagement continues, knowledge of weather prediction, flood management, and local resource governance may erode, potentially diminishing community resilience over time (Thompson & Scoones, 2009). Modern knowledge, therefore, is not inherently incompatible, but its uncritical dominance could inadvertently undermine the very adaptive capacities that Indigenous knowledge has historically provided. This dominance of modern knowledge systems also aligns with the philosophical paradigm of this study as mentioned in chapter four, which is premised on decolonising perspectives and ways of learning ensuring that knowledge is fathomed from the communities of concern instead of imagining knowledge from a perceived superior source (Mignolo, 2011).

Closely related to the influence of modern knowledge is the emergence of intergenerational gaps in IK transmission. The study found that many youths now preferred religious institutions such as churches for spiritual guidance rather than ancestral shrines, which have traditionally played a central role in environmental and agricultural knowledge. This pattern is consistent with Cundill *et al.*, (2014), who noted that intergenerational gaps often arise when Indigenous knowledge is orally transmitted and dependent on prolonged mentorship and participation. The slow-paced, experiential nature of traditional learning does not align well with the speed and structure of modern education systems. As a result, there is a risk that critical skills for sustainable natural resource management skills embedded in rituals, observation of animal behaviour, and environmental indicators may be lost if not intentionally preserved and adapted. This understanding is also in line with the conceptual framework of this study which encourages knowledge amalgamation as a means to strengthen climate adaptation.

It has become evident that the preservation of IK is not merely a matter of cultural heritage but also of practical necessity for adaptive strategies in environments prone to climatic variability. The erosion of IK could reduce local capacity to anticipate floods, manage droughts, and sustain agriculture without external intervention. Hence, the study highlighted a nuanced community perspective on integrating IK with modern knowledge. For instance, elders in Situlu and Kasaya recognized the potential benefits of harmonizing both systems, particularly in contexts such as borehole water management, schooling, and healthcare. This group consisted of people called *Flexible adopters* this group valued a hybrid approach, recognizing that combining indigenous epistemologies with modern scientific knowledge can maximize benefits. Moreover, Modi (2025) had similar ideas and further contributed to this understanding by acknowledging the nexus of science technology and indigenous knowledge as a point of strength for

climate change adaptation. They appreciate innovations such as boreholes, schools, and infrastructure projects while still observing ancestral rituals, rites, ecological indicators, and social norms. Flexible adopters embody a pragmatic perspective that balances cultural preservation with adaptive responsiveness to contemporary challenges.

However, those with deeper roots in cultural traditions often expressed fear that integration could dilute or displace culturally embedded practices this group could be referred to as *Strict adherents* which comprised of people who radically prioritize traditional knowledge and practices above all else. This is in line with what Asrawijaya, (2024), said about traditional knowledge being rooted in a systematic approach to living in harmony with nature an aspect that is also in line with Indigenous wholistic theory which is guiding this study. This group views ancestral wisdom as irreplaceable, especially for managing environmental risks and maintaining cultural identity. For them, deviation from traditional methods is seen as potentially detrimental to both ecological balance and social cohesion. The last category constitutes the *Indifferent or opportunistic* group, this is the most complex group. Those categorized as indifferent, expressed a willingness to engage with any knowledge system that ensures long-term survival and well-being Ok (2025), also mentioned that various belief systems allow for varied outcomes of adaptation. The orientation of this group is guided less by allegiance to tradition or modernity and more by practical outcomes. This group reflects a form of adaptive neutrality, which may indicate emerging shifts in community governance and decision-making, where survival and resilience take precedence over adherence to specific epistemologies.

This tension underscores a broader theoretical discussion in climate adaptation literature. IK is deeply contextual, socially embedded, and reliant on cultural continuity, whereas modern scientific approaches are standardized and externally imposed (Berkes, 2009; Dei, 2010). When these knowledge systems are not intentionally bridged, there is a risk of either marginalizing IK or creating dissonance between generations, which could weaken social cohesion and adaptive decision-making.

Furthermore, participants who had professional exposure beyond their local communities tended to support knowledge integration, suggesting that exposure to multiple knowledge systems increases appreciation for complementarity. This implies that fostering cross-generational and cross-contextual dialogue may be essential for ensuring that traditional knowledge remains relevant and effective in contemporary adaptation strategies. However, disruption of sacred spaces for infrastructure projects was blamed. This practice created ethical, spiritual, and social dilemmas, as sacred sites were integral to Indigenous governance, ritual practices, and collective memory (Archibald, 2008).

This disruption illustrates the complex interplay between development imperatives and Indigenous epistemologies. While modern development may provide material benefits, it can simultaneously erode the cultural foundations that underpin environmental stewardship, community cohesion, and intergenerational knowledge transmission. The literature suggests that ignoring these spiritual and social dimensions risks long-term social conflict and diminishes the effectiveness of IK in guiding climate adaptation (Berkes, 2009).

Furthermore, a synthesis of the findings indicates that several significant risks arise when communities rely exclusively on Indigenous knowledge for climate change adaptation. For instance, this could reduce the predictive reliability of traditional environmental indicators. This was evident by stakeholders acknowledgment that the ecological signs depended on for generations such as tree flowering cycles, bird nesting patterns, and animal behaviour, have become less predictable due to increasing climatic variability. This observation aligns with Ngigi's (2009) argument that climate change disrupts long-established ecological rhythms, potentially leading to mismatches between traditional forecasts and actual weather outcomes. When indicators such as Musangu tree flowering fail to correspond with rainfall patterns, communities risk making agricultural or fishing decisions based on inaccurate expectations. Indigenous knowledge systems rely heavily on oral transmission, mentorship, and practical immersion as forms of learning that are challenged by contemporary social structures. The weakening of these knowledge pathways raises concerns about the long-term continuity of skills such as canoe-making, ritual practices, environmental interpretation, and medicinal preparation. If these gaps widen, the adaptive capacity that has historically sustained communities in the Zambezi floodplain may diminish over time.

Although traditional medicines play an important cultural and therapeutic role, they may not adequately address emergent or complex health challenges such as new infectious diseases or chronic illnesses. Ermine, Battiste, and Barman (1995) argue that Indigenous healing systems are holistic but not designed to replace biomedical interventions entirely. Several participants acknowledged that while herbal mixtures provided relief, some illnesses especially those associated with climate-induced vector change often required modern treatment to avoid fatal complications.

The findings hence shows that, contemporary learning on climate change adaptation risks cultural erosion, and intergenerational epistemological knowledge transfer. Archibald (2008) points out that cultural practices and sacred spaces sustain collective identity and social cohesion but westernisation has eroded African cultural knowledge systems. Taken together, these emerging risks do not undermine the intrinsic value of Indigenous knowledge. Rather, they illuminate its limitations when isolated from contemporary scientific, technological, and institutional support systems. Indigenous knowledge remains vital for local ecological understanding, community cohesion, and adaptive resilience. However, the realities of climate change which are characterised by unpredictability, rapid shifts, and intensifying extremes definitely demand for a strategic integration of Indigenous and modern knowledge systems. This complementary approach ensures that ancestral wisdom is strengthened rather than overshadowed, and that communities are equipped with a diverse set of tools to navigate the complex challenges of a changing climate.

## **6. CONCLUSION AND RECOMMENDATIONS**

Indigenous epistemologies in Western Zambia continue to provide critical foundations for climate-change adaptation within lacustrine and floodplain ecosystems. However, these knowledge systems face multiple threats, including environmental unpredictability, intergenerational knowledge loss, institutional marginalisation, livelihood pressures, and cultural transitions. Strengthening their role in contemporary climate change adaptation learning requires sustained commitment to equitable knowledge systems, inclusive institutional frameworks, and culturally grounded adaptation strategies.

A holistic approach anchored on co-production, educational reform, cultural revitalisation, and policy integration offers promising pathways for building more resilient and inclusive climate-learning systems. These strategies ensure that Indigenous and scientific knowledge systems are not positioned in opposition but are instead recognised as complementary sources of insight and innovation. Ultimately, safeguarding Indigenous knowledge is not only a matter of cultural preservation but also a critical strategy for boosting adaptive capacity and ensuring climate resilience for present and future generations (Berkes, 2018; Nalau et al., 2018).

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