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SACRED STEWARDSHIP AND DIVINE ECOLOGY: RELIGIOUS DIMENSIONS AND INDIGENOUS KNOWLEDGE SYSTEMS IN BUILDING CLIMATE RESILIENCE IN GHANA

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Abstract

This study investigates the intersection of religious belief systems and ecological knowledge within indigenous communities in Ghana and their potential contribution to climate resilience. Drawing on extensive fieldwork carried out in rural communities across three ecological zones in Ghana, this study demonstrates how sacred stewardship concepts within traditional religious frameworks inform sustainable resource management practices. The findings reveal that indigenous ecological knowledge systems, underpinned by spiritual cosmologies, provide sophisticated adaptive mechanisms that communities employ to respond to increasingly volatile environmental conditions. Through analysis of ritual practices, taboo systems, and traditional governance structures, this study argues for the increase integration of these culturally embedded knowledge systems into formal climate adaptation policies, while acknowledging the epistemological and institutional challenges of reconciling traditional approaches with contemporary scientific frameworks. This study contributes to growing scholarship on pluralistic approaches to climate adaptation that recognise the multidimensional nature of resilience across cultural, ecological, and spiritual domains.

Keywords: Indigenous knowledge system, sacred stewardship, divine ecology, climate resilience, traditional religious beliefs, sacred groves

Introduction

The increasing threat of climate change poses challenges to communities across the Global South, with sub-Saharan Africa particularly vulnerable due to its high reliance on climate-sensitive livelihoods and limited adaptive capacity. In Ghana, shifting rainfall patterns, rising temperatures, and increased incidence of extreme weather events threaten agricultural productivity, water security, and ecosystem stability. Recent climatic projections for Ghana indicate a rise in temperatures by 2050, with notable regional variability in rainfall, leading to increased flooding in the south and prolonged periods of drought in the northern territories (Ghana Meteorological Agency, 2023).

While international climate adaptation frameworks emphasize technological and scientific solutions, there remains a critical gap in recognizing and integrating indigenous knowledge systems that have maintained environmental balance for generations. Contemporary climate policy still discourages or ignores these knowledge systems despite growing evidence of their effectiveness in building local resilience (Makondo and Thomas, 2018). This study investigated how the religious dimension of indigenous knowledge systems in Ghana contributes to climate resilience through practices that embody what can be termed "sacred stewardship" and "divine ecology."

The concept of sacred stewardship refers to culturally embedded responsibilities towards environmental protection derived from spiritual belief systems, while divine ecology encompasses the cosmological frameworks that position natural phenomena within religious worldviews. Together, these concepts provide analytical lenses for understanding how the spiritual dimensions of indigenous knowledge inform climate adaptation practices.

These concepts together offer analytical lenses for understanding how the spiritual aspects of indigenous knowledge can guide climate adaptation efforts. Although international climate adaptation frameworks have overwhelmingly focused on technological and scientific solutions, there is a significant deficit in acknowledging and integrating indigenous knowledge systems that have kept ecosystems in balance for generations. This paper explores the religious dimensions of indigenous knowledge systems in Ghana that contribute to climate resilience through practices involving what may be called sacred stewardship and divine ecology. This study answers three core research questions, namely, what role do religious beliefs play in shaping the indigenous ecological knowledge systems of the people of Ghana? Which knowledge systems relate to climate resilience practices and how? What opportunities or challenges exist for incorporating these approaches into formal climate adaptation frameworks?

Literature Review

Indigenous knowledge systems have gained increasing scholarly attention as valuable repositories of ecological wisdom. Orlove et al. (2010) show how traditional knowledge can offer insight into local ecosystem dynamics that formal scientific approaches often overlook. Their analysis of weather prediction systems in Uganda shows how observational frameworks and well-engineered indicators come from laboratory environments across different ecological domains. In the case of Ghana, Aniah et al. (2019) present how indigenous forecasting techniques in Northern Ghana utilize celestial observations, plant phenology, and animal behaviour to predict seasonal rainfall patterns with remarkable accuracy.

Some scholars have explored the spiritual dimensions of indigenous ecological knowledge. Dei (2000) examines how traditional religious practices in Ghana encode environmental ethics that encourage sustainable resource use, arguing that spiritual perspectives provide normative frameworks that reinforce conservation behaviours. Similarly, Opoku (1978) describes taboos and prohibitions of traditional Akan religious beliefs that act as conservation mechanisms. Awuah-Nyamekye (2014) extends this work by examining the contemporary relevance of sacred groves as repositories of biodiversity in Ghana and showing that religiously protected forest areas sustain significantly higher species diversity than unprotected areas of forest.

Scholars have also examined indigenous knowledge in the specific context of climate change. Nyong et al. (2007) describe how indigenous knowledge informs adaptation strategies in farming communities in the African Sahel, but also emphasize the cultural context in which this knowledge operates. In the context of Ghana, Codjoe et al. (2014) argue that traditional agricultural practices among coastal communities already include adaptive approaches within the context of changing rainfall patterns that are becoming increasingly erratic. Their research shows how native crop selection, land management, and planting schedules have adapted to perceived environmental change.

The relationship between religion and ecology has emerged as a distinct field of inquiry. Golo and Yaro (2013) examine the concept of human-environment relations within traditional African religions in Ghana and how spiritual cosmologies emphasize reciprocity and balance. Extending this work, Diawuo and Issifu (2015) explore the perceptions of Ghanaian environmental stewards operating within the religious domain, mobilizing the capacity for community action through spiritual frameworks that evoke deeper resonance than secular environmental messaging.

Nonetheless, much of the scholarship related to spirituality and resilience is not specifically linked to the religious dimensions of indigenous knowledge systems, thus warranting further exploration of how spiritual conceptual frameworks contribute to individuals' and communities' capacity to deal with the uncertainties of changing conditions on the land. Recent work by Nkrumah et al. (2023) addresses this gap by monitoring ritual practices around rainfall in northern Ghana; the analytical focus is mainly on agricultural implications instead of broader dimensions of resilience. This study seeks to fill this research gap by exploring how religious dimensions of indigenous knowledge inform climate resilience through diverse ecological contexts in Ghana.

Methodology

A qualitative methodology consisting of semi-structured interviews, participant observation and focus group discussions, complemented by participatory mapping exercises and seasonal calendars, was used in this study. Between February 2023 and November 2024, fieldwork was conducted across seven communities in three ecological zones in Ghana: coastal communities (Cape Coast and Elmina), forest communities (Kumasi and Koforidua), and savanna communities (Tamale, Bolgatanga, and Wa). These sites were chosen to reflect the diversity of ecological contexts and associated indigenous ecological knowledge systems across Ghana's primary biomes.

The demographic breakdown included eleven (11) traditional religious leaders (shrine priests, diviners, and traditional healers), eight (8) recognised community elders as knowledge holders, twenty-seven (27) active farmers and fishers whose livelihoods were sensitive to climate change, and ten (10) local climate adaptation practitioners either working with government agencies or local non-government organizations. Purposive and snowball sampling techniques for finding participants with specific knowledge of traditional ecological practices. 47% of total participants were female, as gender balance was emphasized.

The research design centred on participatory strategies that privileged indigenous voices and knowledge systems. Interview protocols were co-developed alongside community representatives and were based on local conceptual frameworks instead of imposing external categories. Research assistants fluent in each of the main local languages (Twi, Ewe, Ga,

Dagbani, Wala, and Frafra) conducted interviews and focus group discussions alongside the researchers. Participant observation encompassed the attendance at seasonal rituals, agricultural activities, and the involvement in local decision-making processes around environmental management.

This was supplemented by a review of relevant historical documents (colonial ethnographic records for the historical period, contemporary policy documents in the climate adaptation domain, and records preserved by traditional authorities). These secondary sources helped provide the historical context needed for understanding changes to indigenous knowledge systems over time and how these systems relate in the present to formal governance structures. Data collection was complemented by a review of relevant historical documents, including colonial ethnographic accounts, contemporary policy documents related to climate adaptation, and records maintained by traditional authorities. These secondary sources provided historical context for understanding changes in indigenous knowledge systems over time and their current relationship to formal governance structures. Data was analysed through thematic content analysis to identify patterns and relationships between religious concepts and ecological practices.

Ethical considerations were paramount throughout the research process. Prior informed consent was obtained from all participants and community authorities. The researchers adhered to principles of indigenous research methodologies, including reciprocity and respect for cultural protocols surrounding sacred knowledge.

Findings

The findings identified three main mechanisms in which the religious dimensions of indigenous knowledge systems promote climate resilience, each influencing more than one scale from individual behaviour to community governance structures.

Sacred Cosmologies as Environmental Frameworks

Sacred cosmologies provide the conceptual foundations in which humans are understood to be stewards of natural resources, not owners. In Akan societies, for instance, the belief in *asase yaa* (Earth goddess) designates the land as a divine being, mandating its treatment with respect. Rituals that recognize this relationship govern agricultural practices, including libation ceremonies before land clearing and harvest offerings. As one elder in Koforidua put it:

> "The land does not belong to us to work as we like. We are only caretakers of *asase yaa*, and she will take away her fertility if we misuse her gifts." Interview, June 2023.

This kind of conception could be seen in the Ewe communities with *anyigba* (Earth deity) traditions, as well as northern communities where the *tingbani* (Earth shrine) is the focal point for ecological governance. These cosmologies fundamentally transform human-environment relationships from utilitarian resource management to environmental stewardship that participants characterized as "sacred responsibility."

Here, climate change becomes a question of cosmology, not just a manifestation of a physical phenomenon, but as an expression of spiritual imbalance demanding ritual

intervention as much as corrective action. After heavy flooding in Cape Coast in 2022, traditional authorities held purification rituals and practical clean-up activities to manifest the blending of the spiritual and material responses to environmental disruptions (Kasanga, 2022).

Ritual Prohibitions as Regulatory Mechanisms

Ritual prohibitions and taboo systems perform relatively complex and outworn regulatory mechanisms for the sustainable use of resources. Sacred days banned from farming or fishing activities (*dabone* among the Fante and *dzifa* among Ewe communities) establish periods of natural resource recoveries.

In some coastal communities, the prohibition against Tuesday's fishing provides weekly replenishment opportunities for marine ecosystems increasingly stressed by climate impacts and overfishing. Traditional authorities enforce these prohibitions through spiritual sanctions, which are thought to be more effective than government laws.

Seasonal rituals provide temporal structures for resource appropriation that reflect ecological rhythms. The *Afahye* festival observed in coastal communities marks the start of the main fishing season, while the *Homowo* among the Ga communities ensures that agricultural activities are regulated. These rituals include climate observations and projections; traditional priests analyse environmental indicators to find the right timing. Adaptation processes within such systems are shown by our study of increasingly erratic rainfall patterns leading to calendar-time changes of ritual events. In forest communities, prohibitions against harvesting particular tree species recognized as housing forest spirits (*suman*) preserve keystone species essential for ecosystem functioning. Similarly, taboos against catching juvenile fish or harvesting particular plant species during reproductive periods establish conservation seasons. These prohibitions demonstrate sophisticated ecological understanding embedded within spiritual frameworks.

Religious Institutions as Knowledge Repositories

Traditional religious institutions are the knowledge repositories and transmission mechanisms of ecological wisdom. Helping them are shrine priests and traditional leaders who also serve as environmental monitors and provide crucial guidance on agricultural timing and weather prediction, as well as how to manage resources through the generational knowledge integrated with spiritual authority.

In northern communities, divination practice involves environmental assessment because diviners read ecological indicators through spiritual frameworks where legitimate observation is nested in cosmological interpretation. One of the diviners in Bolgatanga explained,

> "When I throw the cowries, I am not just reading spiritual messages, I am reading signs from the natural world about what is going to happen in the season to come" (Interview, December 2023).

Developing these knowledge systems helps to provide locally relevant climate information from regions that lack access to meteorological services. These sacred groves hold diverse native species and apply ecological principles under traditional religious institutions, acting as biodiversity reserves, demonstrative areas, and land for conservation. In the forest communities, researchers documented several sacred groves between 0.5 to 12 hectares that

preserve native vegetation increasingly vulnerable to the effects of climate change and land use. These sites act as "living laboratories," where members of the community, particularly youth, engage in ritualized activities that teach ecological principles.

Knowledge transmission occurs through initiation systems, apprenticeships and oral traditions embedded in religious practice. While formal education processes often overlook these knowledge systems, research has documented innovative approaches to intergenerational knowledge transfer, including the integration of traditional ecological principles into community-based projects for climate adaptation led by traditional leaders.

Discussions

The findings show how religious frameworks create cultural bases for specific climate-resilient practices through diverse avenues. Sacred stewardship concepts provide ethical imperatives for conservation that resonate more deeply within communities than external scientific rationales. This aligns with Attuquayefio and Fobil (2005), who pointed out that conservation approaches that align with existing cultural values achieve greater community acceptance and longevity than those imposed through external frameworks.

The divine ecology embedded in traditional cosmologies creates integrated knowledge systems that connect spiritual well-being with environmental health. The integration offers a holistic approach to climate resilience that addresses psychological dimensions often overlooked in technical adaptation frameworks. This finding corroborates that of McLeod et al. (2022), who demonstrate how cultural and spiritual aspects of resilience play a major role in maintaining the well-being of the community during climate disruptions.

These indigenous approaches provide enormous benefits to help build climate resilience. They offer locally relevant solutions tailored to specific environmental contexts; they build on existing cultural systems rather than impose rigid new conceptual paradigms; and they combine resource management and social cohesion mechanisms critical for community resilience. Such practices make this process more sustainable since they are embedded within pre-existing systems of culture. Contemporary challenges are prompting evolution within these knowledge systems. Studies presented adaptive responses to climate change within traditional frameworks, including adjustments to ritual calendars based on changing seasonal patterns, modification of taboo systems to protect newly vulnerable species, and incorporation of scientific information into traditional decision-making processes. A shrine priest in Tamale remarked:

> We have always watched the sky and insects to know when rain will come, but now we also listen to the radio weather forecast and combine this knowledge" (Interview, March 2024).

Despite this, barriers persist in integrating these knowledge systems into formal climate adaptation frameworks. When it comes to co-producing knowledge within formal climate adaptation processes. Policy contexts often regard traditional approaches as marginal due to the differences in power between scientific and indigenous knowledge systems. Ghana's National Climate Change Policy (2013) recognizes indigenous knowledge yet offers few opportunities for a nuanced engagement and integration of this insight into adaptation planning. Epistemological distinctions challenge systems of knowledge translation between systems, as spiritual aspects of indigenous knowledge cannot be quantified within the scientific paradigms.

The continuity of these knowledge systems is also threatened by sociocultural challenges. Conversion to congregationalist forms of Protestant Christianity, especially Pentecostalism, and to reformist forms of Islam has weakened many groups' more traditional spiritual frameworks. A respondent, an elder in Sunyani, lamented:

> The young people today call our culture 'backward' and 'superstitious.' They don't realize that our taboos cared for the forest that is now disappearing (Interview, April 2024).

Likewise, processes promoted by urbanization and formal education systems trivialize indigenous knowledge, leading to a discontinuity in intergenerational knowledge transfer.

Despite these challenges, the study recorded new approaches to knowledge integration. In Cape Coast, a community-based climate adaptation project embedded traditional ecological knowledge in a coastal protection strategy, combining both engineered solutions and restored sacred groves as natural barriers against growing tempestuous storm surges. In northern Ghana, agricultural extension services have recently started working with traditional authorities to co-design seasonal forecasts that combine scientific models with indigenous indicators of local climate, leading to more resilient forecasting systems.

These examples hint at pluralistic paths toward climate resilience that honour the complementary strengths of diverse knowledge systems. As Chilisa (2017) argues, decolonial approaches to climate adaptation require recognition of indigenous epistemologies as valid knowledge systems rather than merely supplementary to scientific frameworks. The findings presented here support Nadasdy's (2003) contention that effective knowledge integration requires institutional transformation rather than simply extracting indigenous knowledge for incorporation into existing scientific paradigms.

Conclusion

This study depicts the vast role that religiously embedded indigenous knowledge systems could play in the contribution to climate resilience in Ghana. Culturally based concepts of stewardship and frameworks of ecological reciprocity help contextualize sustainable resource management practices in local environments that are aware of and responsive to the changing ecological conditions. Such systems of knowledge are complementary to the scientific climate adaptation literature, especially in their capacity to mobilize community action through culturally relevant frames. However, recent findings suggest that while these knowledge systems are still dynamic, capable of adaptation and innovation, they are not truly homogeneous; they can incorporate contemporary challenges into their frameworks, but have an ultimate basis entrenched within religious perspectives. Integrating spiritual and pragmatic ecological management results in holistic resilience strategies that engage the material and psychological elements of climate adaptation.

The study adds to emerging scholarship on pluralistic frameworks of climate resilience that recognize the multidimensional facets of adaptive capacity. This study provides empirical grounding to theoretical frameworks highlighting the cultural dimensions of adaptation (Adger et al. 2013; Crate and Nuttall 2016).

But the promise of these knowledge systems will not be used until major challenges are addressed, power imbalances in knowledge-value formation, epistemological differences between knowledge systems, and sociocultural transformations threatening knowledge transmission. These challenges call for novel ways of integrating knowledge that honours the integrity of indigenous frameworks while cultivating productive conversations with these scientific approaches.

Recommendations

Based on these findings, this study recommends:

1. Better Documentation and Acknowledgment: Increase documentation of indigenous ecological knowledge with attention to religious dimensions, through collaborative methodologies that respect cultural protocols regarding sacred knowledge. In line with this, government agencies and research institutions ought to create formal recognition for knowledge holders, similar to that in place for scientific experts.
2. Institutional Transformation: Strategies to build collaborative governance structures that incorporate both traditional and scientific knowledge systems concerning their equitable epistemologies. This means going beyond token consultation to actual power-sharing in the planning and implementation of climate adaptation. The Ghana Environmental Protection Agency should therefore develop an Indigenous Knowledge Division at a policy level with meaningful authority.
3. Validation of Traditional Institutions: Acknowledge and engage traditional religious institutions as partners in climate adaptation efforts. These include offering legal recognition to sacred natural sites, financing programmes to help transmit traditional knowledge, and incorporating traditional authorities in environmental governance structures. Specific programs towards the ecological dimensions of traditional governance should be curated by the Ministry of Local Government, Chieftaincy and Religious Affairs.
4. Education and Knowledge Transmission: Education efforts that renew more traditional forms of transmission of ecological knowledge while integrating it into modern-day environmental challenges. These efforts include the integration of indigenous knowledge into formal school curricula, support for community-based learning initiatives led by traditional knowledge holders, and development of intercultural education programs that foster dialogue between knowledge systems. Curricula should be revamped by the Ghana Education Service to ensure that place-based ecological knowledge is an integral, context-relevant aspect of each.

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