

RESEARCH ARTICLE

For the tree of the field is man's life: Harnessing indigenous principles for achieving REDD+ goals in Nigeria

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ABSTRACT

One of the highest global deforestation rates threatens Nigeria's forests, integral to cultural heritage and biodiversity. The REDD+ framework, designed to combat deforestation through sustainable forest management, has faced challenges in Nigeria due to insufficient integration of indigenous principles. This paper explores the incorporation of Indigenous jurisprudential concepts—interconnectedness, interdependence, and reciprocity—into REDD+ strategies to enhance forest conservation in Nigeria. The study critically analyses existing REDD+ implementations and Indigenous practices using doctrinal and analytical legal methodologies. The results indicate that integrating these principles can significantly improve REDD+ effectiveness by aligning environmental goals with cultural values, fostering greater community participation, and enhancing sustainability. The paper recommends legal reforms to recognise Indigenous land rights, incorporate traditional knowledge in conservation efforts, and develop culturally sensitive policy frameworks. By embedding Indigenous principles into REDD+ strategies, Nigeria can achieve a more resilient and inclusive approach to forest management, ensuring both environmental sustainability and the preservation of cultural heritage.

Keywords: REDD+; indigenous knowledge; forest conservation; Nigeria; sustainable development

1. Introduction

The health of our planet's ecosystems hinges significantly on the preservation of forests, which act as the Earth's lungs by absorbing carbon dioxide and releasing oxygen^[1]. Forests are also foundational to the socieconomic and cultural wellbeing of many communities, where they sustain livelihoods, provide materials for daily living, and serve as sites of deep cultural and spiritual significance^[2]. However, the rampant deforestation in countries like Nigeria poses a significant threat to these invaluable ecosystems. Nigeria's forest cover is diminishing in extent and quality. But reliable data is scarce. For instance, one record indicates that Nigeria's land mass is 910,770km² and forest occupies 110,890km², or 12.8% of the total land mass. Another shows that Nigeria's land mass is 997,936km² and only 10% is under forest reserve. Another report indicates that in 2010, Nigeria had 10.6 Mha of natural forest, extending over 12% of its land area.

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With some of the highest deforestation rates globally, Nigeria faces a critical loss of biodiversity, erosion of indigenous knowledge, and mounting climate change risks^[3].

In response, the REDD+ (Reducing Emissions from Deforestation and Forest Degradation) framework has emerged as a potential solution for mitigating climate change by promoting forest conservation, sustainable management, and the enhancement of forest carbon stocks in developing nations^[4]. REDD+ presents a unique opportunity for Nigeria to align economic incentives with environmental sustainability, enabling forest preservation while fostering socio-economic development^[5]. However, the framework's implementation has faced significant challenges, not least of which is the insufficient integration of indigenous knowledge and principles, which are vital for effective and sustainable forest conservation.

According to Mekonen^[6], Indigenous communities possess a wealth of traditional ecological knowledge that has been cultivated over generations. This knowledge is often deeply intertwined with local cultural practices and a profound understanding of the interconnectedness, interdependence, and reciprocity between humans and the environment^[7]. Despite this, current REDD+ initiatives in Nigeria have largely marginalized indigenous practices, treating them as secondary rather than central to conservation strategies^[8,9]. This paper seeks to address this gap by exploring how the inclusion of indigenous jurisprudence—principles such as interconnectedness, interdependence, and reciprocity—can enhance the effectiveness of REDD+ in Nigeria. Through a critical examination of the REDD+ framework and indigenous practices, this study proposes a model for integrating traditional ecological knowledge into modern conservation strategies, thereby fostering greater community participation, enhancing environmental outcomes, and preserving Nigeria's cultural heritage.

The paper is structured as follows: the introduction outlines the main argument and context; the second section provides an overview of Nigeria's forest resources and the challenges of deforestation; the third section analyzes the REDD+ framework; the fourth section examines the role of indigenous principles in forest conservation; the fifth section proposes legal and policy recommendations for integrating these principles into REDD+; and the final section concludes by emphasizing the necessity of merging scientific and indigenous knowledge for sustainable and resilient environmental governance.

1.1. Research methodology

This study combines doctrinal legal research with analytical approaches to examine the integration of Indigenous principles into Nigeria's REDD+ framework. The methodology includes multiple components to ensure comprehensive analysis and robust findings, aiming to enhance forest conservation while respecting traditional knowledge systems.

The primary methodology involves systematic analysis of relevant frameworks, including international REDD+ protocols, Nigerian environmental legislation, Indigenous customary laws, and traditional governance systems. Comparative legal frameworks from Brazil, Indonesia, and Ghana are examined to draw insights from their experiences. Building on this analysis, a qualitative approach evaluates the effectiveness of legal frameworks, examining challenges and successes in REDD+ implementation, integration potential for Indigenous principles, and barriers to Indigenous knowledge incorporation. Power dynamics and governance structures influencing forest conservation initiatives are also assessed.

The research draws from multiple data sources, including legal texts, policy documents, and Indigenous community records, complemented by peer-reviewed literature and case studies. Indigenous methodologies are incorporated by recognizing the validity of Indigenous ways of knowing, emphasizing circular analytical methods and cultural significance. Data analysis involves thematic categorization, comparative analysis, and

synthesis to develop policy reform recommendations and identify best practices for Indigenous knowledge integration. Despite methodological limitations, such as challenges in documenting oral traditions and limited quantitative data, the approach ensures rigorous analysis while respecting legal and Indigenous knowledge systems.

This comprehensive methodology provides insights into integrating Indigenous principles into REDD+ frameworks, maintaining academic rigor and cultural sensitivity. It thoroughly examines interactions between formal REDD+ frameworks and Indigenous conservation principles, contributing to more effective and culturally appropriate forest conservation strategies

2. The multifaceted drivers of deforestation: Exploring the landscape of Nigeria's forests.

2.1. Ecological and socio-economic contributions of Nigerian forests

Forests are fundamental to ecological stability and economic development worldwide, serving as critical carbon sinks, regulators of the water cycle, and essential habitats for countless species^[10]. Nigerian forests, in particular, hold significant ecological, socio-cultural, and economic value^[11]. These ecosystems provide invaluable services that sustain the livelihoods of millions of Nigerians, making them indispensable for both local and national well-being.

As noted by Mbalisi and Ugwu^[12], Nigeria's forests can be categorized into three primary types: swamp (mangrove) forests, tropical rainforests, and secondary forests. Each forest type offers distinct contributions to the environment and the economy. Swamp forests, predominantly found in the Niger Delta, play a crucial role in stabilizing shorelines, preventing erosion, and buffering against extreme weather events such as storm surges and tsunamis^[13]. These forests also support marine and terrestrial biodiversity and provide essential resources like timber, fuelwood, honey, and medicinal plants. Furthermore, they enhance water quality by trapping sediments and pollutants, creating healthier aquatic ecosystems.

Tropical rainforests, mainly located in the southern regions of Nigeria, are recognized for their rich biodiversity and their vital role in climate regulation^[14]. These forests sequester carbon, help maintain water cycles, and provide vital ecological services. The timber, non-timber forest products (NTFPs), and opportunities for ecotourism that these forests offer contribute directly to local economies^[15]. Indigenous communities rely heavily on these forests for food, medicine, and cultural practices, often utilizing traditional knowledge to ensure sustainable forest management.

Secondary forests, which regenerate after disturbance such as logging or agriculture, also contribute significantly to ecological balance by storing carbon, providing wildlife habitats, and supporting agroforestry systems^[16]. These forests can enhance agricultural productivity by integrating trees with crops and livestock, fostering a more resilient and sustainable agricultural system. Forests also support rural communities by providing tangible goods like timber and fuelwood, which are essential for construction, energy, and various industrial uses^[17]. Additionally, according to Suleiman and others^[18], NTFPs such as fruits, nuts, resins, and medicinal plants are critical for local economies, offering income and food security to rural households. The collection and sale of these products are vital for the socio-economic resilience of communities.

Furthermore, the biodiversity within Nigerian forests plays an integral role in agriculture, medicine, and scientific research. Forests are rich sources of genetic materials, crucial for crop improvement, pharmaceutical development, and environmental resilience. Their services—ranging from flood control to erosion prevention—are foundational to both environmental and economic sustainability.

Culturally, Nigerian forests hold deep significance. They are central to many indigenous peoples' identities, spirituality, and traditional practices^[19]. Sacred groves, for instance, are often regarded as sacred spaces, integral to cultural rituals and community cohesion^[20]. According to Ajayi and Eveso's^[21] study on the Okomu National Park, the growth of ecotourism, with its potential to provide educational and recreational benefits, further underscores the economic value of these forests. Despite their immense contributions, Nigeria's forests face an alarming rate of deforestation, which threatens both their ecological functions and the livelihoods of those who depend on them. The following section explores the primary drivers of deforestation in Nigeria, which stem from a complex interplay of ecological, socio-economic, and anthropogenic factors.

2.2. Understanding the drivers of deforestation in Nigeria

Deforestation in Nigeria is driven by multiple interrelated factors, each contributing to the ongoing degradation of the country's forests. As one of the most pressing environmental challenges globally, deforestation is largely a result of human activity. In Nigeria, it has been exacerbated by agricultural practices, urbanization, industrial development, and resource extraction^[22].

One of the primary drivers of deforestation is agricultural expansion^[23]. Shifting cultivation, characterized by slash-and-burn techniques, involves clearing large swaths of forest to make way for crops and livestock. This practice not only leads to permanent forest destruction but also contributes to soil degradation and the loss of biodiversity. Additionally, the increasing demand for farmland to feed Nigeria's growing population further intensifies the pressure on forest resources. According to Pearce and Brown^[24], urbanization and industrialization also play significant roles in the destruction of forests. As cities expand and infrastructure projects proliferate, vast areas of forest are cleared to accommodate residential, commercial, and industrial developments. Logging operations, often conducted without adequate reforestation efforts, further deplete the country's forest cover, with timber extraction focused on meeting domestic and international demands.

Overgrazing, particularly in areas where livestock farming is prevalent, contributes to the degradation of vegetation, transforming forests into savannahs and disrupting the delicate balance of ecosystems^[25]. Similarly, both natural and anthropogenic fires, often exacerbated by seasonal dry conditions, can turn once-thriving rainforests into barren grasslands, with severe ecological consequences. Mining and petroleum extraction, especially in regions like the Niger Delta, contribute significantly to deforestation^[26]. These industries not only clear forests for resource extraction but also leave behind polluted landscapes that hinder natural regeneration and devastate surrounding ecosystems^[27].

Additionally, the collection of fuelwood, driven by high energy costs and a lack of affordable alternatives, exerts immense pressure on forests, particularly in rural areas where access to modern energy sources is limited ^[28]. The combined effect of these drivers has created a crisis in Nigeria's forest ecosystems, threatening the sustainability of vital environmental services. The next section will examine the potential of the REDD+ framework as a solution to address the drivers of deforestation and promote sustainable forest management in Nigeria. REDD+ aims to mitigate deforestation, enhance carbon stocks, and support the livelihoods of communities dependent on forest resources, presenting a critical opportunity to reconcile development with environmental sustainability.

3. Navigating the REDD+ landscape as an approach to emissions reduction and forest conservation in Nigeria

3.1. REDD+: The international legal framework driving forest conservation and emissions reduction

The United Nations Collaborative Programme on REDD+ was created to address the critical environmental issues of deforestation and forest degradation, major contributors to global greenhouse gas emissions^[29]. Forests absorb carbon dioxide (CO2), and when these forests are destroyed or degraded, their carbon storage capacity is lost, exacerbating climate change^[30]. Introduced at the 11th Conference of the Parties (COP11) in Montreal in 2005, the initial REDD framework focused on emissions from deforestation^[31]. However, by COP13 in Bali in 2007, the concept expanded into REDD+ to include forest degradation, the conservation of existing carbon stocks, and the enhancement of forest carbon stocks^[32]. Over the years, various COPs have adopted a series of decisions that collectively form the "REDD+ rulebook," providing guidelines for implementing, monitoring, and financing REDD+ activities^[33].

The primary aim of REDD+ is to provide financial incentives to developing countries to reduce forest-related emissions, thereby contributing to global efforts to mitigate climate change^[34]. REDD+ also promotes sustainable forest management, ensuring that forest ecosystems are protected and utilized responsibly. By conserving forest resources, the framework not only helps to maintain biodiversity but also supports the livelihoods of forest-dependent communities^[35].

Despite its promise, the implementation of REDD+ requires significant effort to align with national legal frameworks, which often involve complex, and at times fragmented, governance structures. The next section will delve into the specific implementation and impact of REDD+ in Nigeria, highlighting the country's unique challenges and contributions to this global initiative.

3.2. Navigating Nigeria's REDD+ framework: A comprehensive approach to sustainable forest management

Nigeria's REDD+ Framework Strategy is built on key elements guiding its development and implementation at both national and subnational levels^[36]. These include the Vision, Mission, Goals, and Guiding Principles, collectively fostering sustainable forest management and climate resilience^[37]. By 2030, Nigeria aims to manage forests sustainably, reduce emissions from deforestation and forest degradation by 20%, and promote livelihoods that support a climate-resilient economy^[38]. This aligns with Nigeria's Nationally Determined Contribution (NDC) and the Sustainable Development Goals (SDGs).

The mission of REDD+ is to build a green economy, strengthen governmental capacities, and promote sustainable livelihoods as co-benefits of REDD+ implementation^[39]. This involves improving policies, laws, regulations, and law enforcement to create inclusive, transparent, and accountable systems. REDD+ objectives unfold in three phases: short-term (2017-2019), medium-term (2017-2025), and long-term (2017-2030). The short term focused on state-level governance and spatial planning. The medium term targets a 20% emissions reduction by 2025, and the long term aims to turn Nigeria's land areas into a net carbon sink by 2030, integrating policies that foster economic development and climate adaptation^[40].

Stakeholder-driven guiding principles shape REDD+ implementation in Nigeria. These principles prioritize effectiveness in reducing emissions and improving livelihoods, enhancing the green economy, and promoting fairness. Fairness is ensured by incorporating gender-sensitive approaches, respecting human rights, and promoting gender equality in forest management. Efficiency is achieved through long-term actions that yield ecological, financial, and social benefits. Transparency requires open participation and Free, Prior, and Informed Consent (FPIC) from local communities. Accountability ensures oversight from both the

Nigerian public and international bodies, such as the UNFCCC. Inclusivity ensures diverse perspectives and local knowledge influence REDD+ efforts, while sustainability ensures equitable sharing of costs and benefits in forest conservation.

Nigeria's sub-national approach to REDD+ began with Cross River State (CRS) as a pilot^[41]. With over 50% of Nigeria's remaining forest, CRS is ideally suited for REDD+ activities, preserving carbon stocks and promoting sustainable forest management^[42]. This model allows for testing methodologies in a controlled environment that can later be scaled to other regions of the country. CRS also serves as a valuable source of best practices and lessons learned, making it essential for REDD+ innovation.

CRS has shown strong political will and commitment to forest conservation^[43]. Its history of community-based management and conservation initiatives provides a solid foundation for REDD+ strategies. With the necessary administrative and technical capacity, CRS is prepared for effective implementation. By establishing interim Forest Reference Emission Levels (FRELs) and Forest Reference Levels (FRLs), CRS will integrate these systems into a national monitoring and reporting framework, ensuring accurate tracking of emissions reductions^[44].

This study's examination of the framework finds that REDD+ offers Nigeria an opportunity to enhance forest governance and transparency. By adopting accountable forest management practices, Nigeria can ensure the sustainable use of forest resources while benefiting local communities. REDD+ also strengthens institutional capacities and introduces advanced monitoring and reporting technologies to improve forest management nationwide. Moreover, it mobilizes climate finance by attracting international funding for Nigeria's forest conservation projects. Beyond reducing emissions, REDD+ provides co-benefits such as biodiversity conservation, improved water regulation, and strengthened ecosystem services, all contributing to environmental sustainability.

Nigeria's legal and regulatory framework provides crucial support for REDD+ implementation. The Draft National Forest Act (2003) outlines sustainable forest management (SFM) practices, recognizes local community rights, and encourages private sector participation. The National Forest Policy (2006) further supports these goals, aiming to enhance carbon stocks through carbon trading and benefit-sharing mechanisms. The policy also emphasizes decentralizing forest management among public, private, and civil society stakeholders.

Land tenure laws, particularly the Land Use Act (2004), play an important role in REDD+ implementation by regulating land use and ownership, which are critical to forest conservation. The Minerals and Mining Act (2007) and Petroleum Act (2004) also provide environmental safeguards, ensuring that mining and petroleum extraction activities do not interfere with REDD+ goals. The Environmental Impact Assessment (EIA) Act (2014) mandates that any project potentially affecting forests must undergo a thorough environmental review, further supporting REDD+ through enhanced participation and transparency. However, despite its ambitious goals and the existing policy, legal, and regulatory frameworks to support it, the REDD+ framework faces several challenges that will be critically examined in the next section.

3.3. Unveiling the barriers: Challenges in implementing the REDD+ framework in Nigeria

Nigeria's REDD+ efforts are hindered by persistent governance challenges, with corruption being one of the most significant obstacles. Corruption erodes transparency and accountability, undermining the allocation of funds necessary for environmental goals. Bureaucratic fragmentation at both local and national levels further complicates the situation, creating a vulnerability in REDD+ implementation. The decentralization paradox arises: while state-level autonomy allows for localized solutions, it leads to

regulatory fragmentation. Without a unified federal framework, these fragmented efforts weaken REDD+'s overall effectiveness.

According to Korhonen-Kurki et al.^[45], Nigeria's socioeconomic conditions further complicate the REDD+ framework's objectives. The country's development paradox—prioritizing immediate economic benefits from logging and agriculture over long-term environmental goals—often sidelines REDD+. The short-term rewards of deforestation and land conversion are tempting, especially for communities facing immediate livelihood needs. The situation is made worse by unclear land tenure systems^[46]. While customary land rights hold cultural importance, their lack of legal recognition creates jurisdictional confusion, discouraging long-term conservation investment. Communities are reluctant to participate in REDD+ without clear and secure land rights.

In addition to governance and socioeconomic barriers, technical and operational challenges persist^[47]. One key issue is the underutilization of advanced remote sensing technologies, which are crucial for accurate monitoring and carbon accounting. This gap in technical capacity hampers the credibility of REDD+, as reliable data is essential for carbon verification and results-based payments. The limited involvement of local communities in decision-making further exacerbates this problem. Excluding indigenous knowledge in forest management perpetuates a top-down, expert-driven model, neglecting the valuable insights of local communities who are intimately familiar with their environment. This exclusion limits the potential for adaptive, context-specific solutions.

Perhaps the most profound challenge lies in the disconnect between REDD+ and indigenous knowledge systems. Nigeria's indigenous communities have practiced sustainable forest management for generations, rooted in a deep spiritual connection with their ecosystems^[48-50]. Their traditions emphasize the interdependence between humans and forests, recognizing the importance of maintaining ecological balance. However, these traditional practices are often ignored in REDD+ frameworks. This study finds that attempts to integrate indigenous knowledge into conservation policies in Nigeria have faltered due to several interrelated factors^[51]. First, a persistent colonial legacy continues to privilege Western scientific approaches while systematically devaluing indigenous knowledge systems. Second, inadequate documentation of traditional ecological practices has hindered their validation within formal policy frameworks. Third, the absence of structured mechanisms for meaningful community participation has relegated indigenous communities to passive observers rather than active co-creators of conservation strategies. Finally, significant power asymmetries between government agencies and local communities have undermined trust and reciprocity, essential elements for successful knowledge integration.

The absence of indigenous knowledge therefore undermines the legitimacy of REDD+ initiatives and disregards proven conservation strategies that have worked for generations. This cultural disconnect risks alienating communities and reducing the effectiveness of conservation efforts.

In contrast to Nigeria's challenges, both Ghana and Kenya demonstrate more effective approaches to integrating indigenous knowledge into conservation frameworks. In Ghana, the discovery and protection of the sitatunga (*Tragelaphus spekii gratus*), a species previously thought extinct in the region, exemplifies successful integration of traditional ecological knowledge^[52]. Local communities around Avu Lagoon had longstanding knowledge of this species, which was unknown to scientific records in Ghana. Conservation efforts built around this traditional knowledge not only led to official recognition of the species' presence but also strengthened community-based conservation initiatives. The Ghanaian approach succeeded by acknowledging the complexities of traditional belief systems while building mutual trust between researchers and local communities^[52].

Similarly, Kenya has made significant strides in incorporating indigenous practices into formal conservation frameworks. The Maasai's traditional rotational grazing systems have been essential in sustaining wildlife populations and preserving biodiversity in pastoral landscapes. This indigenous knowledge has been formally recognized and integrated into Kenya's conservation policies, contributing to a measured 60% increase in wildlife numbers over recent decades in certain regions^[53]. Kenya's Community-Based Natural Resource Management programs have generated substantial socio-economic benefits through ecotourism while fostering local employment and income generation^[54]

What distinguishes these more successful approaches is their recognition of indigenous communities not merely as stakeholders to be consulted but as active participants with valuable knowledge systems. Both Ghana and Kenya have developed formal mechanisms for including traditional leaders in decision-making processes and have established legal frameworks that explicitly recognize the value of indigenous knowledge. Furthermore, they have created economic incentives that align conservation goals with community benefits, addressing the crucial socioeconomic factors that often undermine conservation efforts in Nigeria.

To overcome these challenges, Nigeria must integrate indigenous knowledge with modern conservation practices. The principle that "the tree of the field is man's life" underscores the deep, reciprocal relationship between humans and the forest. By embracing indigenous knowledge, Nigeria can develop a more inclusive, culturally relevant approach to forest governance. Drawing lessons from Ghana and Kenya, Nigeria should establish formal recognition of traditional ecological knowledge in its environmental policies, create inclusive governance structures that empower indigenous communities in decision-making processes, and develop benefit-sharing mechanisms that align conservation objectives with local livelihoods and cultural values. The following section explores how indigenous principles of interconnectedness, interdependence, and reciprocity can enhance the effectiveness of REDD+ initiatives in Nigeria.

4. Rooted in tradition: Leveraging indigenous jurisprudence for REDD+ success in Nigeria

With a deep connection to nature, Indigenous and traditional peoples have long maintained some of the Earth's most fragile ecosystems through sustainable resource use and a culture-based respect for nature ^[55]. According to Cariño and Ferrari ^[56], Indigenous forest conservation principles, rooted in cultural and spiritual beliefs, emphasise the interconnectedness of all life and the environment. These principles advocate for a sustainable and respectful relationship with nature, aiming to preserve forests for future generations. This section explores the phrase "For the tree of the field is Man's life," underscoring the deep connection between humans and nature. It highlights how human well-being is tied to the health of forests. While many Indigenous principles reflect this idea, this study focuses on interconnectedness, interdependence, and reciprocity, demonstrating their relevance to REDD+ goals in Nigeria. By examining these principles, the study aims to show how traditional ecological knowledge and cultural values can support sustainable forest management, enhance biodiversity conservation, and contribute to climate change mitigation.

4.1. For the tree of the field is man's life: Indigenous african jurisprudence and forest conservation

Indigenous African jurisprudence is deeply intertwined with environmental conservation, particularly in forest management^[57]. Traditional legal and ethical frameworks across African communities reflect a profound understanding of the symbiotic relationship between nature and human well-being^[58]. These principles, rooted in customary laws, have been effectively employed to sustainably manage and protect natural resources. For instance, the Ogiek people of Kenya have used traditional legal principles to safeguard the Mau Forest, one of East Africa's largest montane forests^[59,60]. Through customary laws, they have

established sustainable harvesting practices and designated sacred groves where human activities are restricted. These measures have been crucial in preserving the forest's biodiversity and ensuring it continues to provide vital ecosystem services to surrounding communities.

This approach is not unique to Kenya. In Nigeria, the Yoruba people have historically practiced forest management grounded in their indigenous jurisprudence^[61]. Their concept of "Ayanmo," which emphasizes the interconnectedness of all life, guides the community to treat forests as living entities deserving of respect and protection^[62]. This philosophy has led to the preservation of sacred forests like the Osun-Osogbo Sacred Grove, now a UNESCO World Heritage Site ^[63]. However, it should be noted that while sacred groves like the Osun-Osogbo remain protected, the overall application of such practices has declined in some parts of Nigeria, particularly due to urbanization and the spread of modern agricultural methods. Similarly, in Ghana, certain forests are regarded as spiritual abodes, where activities like tree felling or hunting are prohibited^[64,65]. These cultural norms, supported by indigenous legal principles, have played a key role in conserving forests and maintaining ecological balance. The Ghanaian government has even begun integrating these traditional practices into formal conservation strategies, recognizing their effectiveness in promoting sustainability.

According to studies conducted by McIntyre-Mills et al.^[66] and Policastro^[67], at the heart of indigenous African jurisprudence is the principle that natural resources, particularly forests, are not merely economic assets but essential to communities' well-being, identity, and survival. This is encapsulated in the maxim "for the tree of the field is man's life," which underscores the intrinsic value of nature. The phrase "for the tree of the field is man's life" originates from Deuteronomy 20:19 in the Bible, where it highlights the connection between humans and nature, emphasizing the importance of preserving trees even in times of conflict. This concept resonates deeply with indigenous African jurisprudence, which traditionally recognizes the intrinsic value of nature, including trees, as integral to the community's well-being and survival. African legal traditions often embody the principle that natural resources are not merely commodities but sacred elements that sustain life, reflecting a holistic understanding of the interconnectedness of all living things. Unlike anthropocentric worldviews that dominate Western environmental law, this principle views forests and ecosystems as living entities with inherent worth, deserving of respect and protection. According to Nassar and Barbou^[68], it reflects a holistic understanding of the interconnectedness between humans and the natural world, where the well-being of individuals, communities, and ecosystems are inextricably linked. This perspective challenges conventional conservation efforts, suggesting that success should be measured not just by the protection of species or habitats but by the overall health of the communities and ecosystems involved.

Embedded within this principle is a sense of reciprocal responsibility between humans and the natural world. Indigenous African societies recognize that humans have a duty to care for the environment, not only because it sustains them but also because they are part of a broader community of life. This ethos is exemplified in the concept of "Ubuntu" in South Africa, which emphasizes interdependence and mutual care, shaping approaches to land use and conservation^[69]. Additionally, the principle is deeply tied to spiritual and cosmological beliefs, where the natural world is imbued with sacred significance. This spiritual dimension underscores the need for conservation efforts to address not just ecological concerns but also cultural and spiritual values. Recognizing the sacred status of certain landscapes or incorporating traditional knowledge into conservation strategies can enhance their effectiveness and cultural relevance.

4.2. Analysing the principles of interconnectedness, interdependence, and reciprocity

As stated in the previous section, "For the Tree of the Field is Man's Life" profoundly reflects the Indigenous African understanding of the environment. This section will explore how this phrase embodies

vital principles of Indigenous African Jurisprudence—interconnectedness, interdependence, and reciprocity—and how these principles can be integrated into the REDD+ framework in Nigeria to enhance sustainable forest management, support community well-being, and promote equitable conservation practices.

4.2.1. Interconnectedness: The inseparability of human and environmental well-being

In Indigenous African Jurisprudence, interconnectedness is linked to human well-being and the environment's health^[70]. The phrase "For the Tree of the Field is Man's Life" illustrates this belief, underscoring that the survival and prosperity of humans are intrinsically tied to the forests^[71]. Unlike conventional conservation approaches that often prioritise human needs or economic benefits, the Indigenous perspective values forests as integral to communities' cultural, spiritual, and ecological health^[72].

Interconnectedness is not merely an abstract concept; it is a lived reality deeply embedded in many Nigerian communities' daily practices and belief systems. For example, the Yoruba culture's sacred groves, such as the Osun-Osogbo Sacred Grove, are not merely protected for their ecological value but are also revered as sacred spaces that embody the community's spiritual and cultural identity^[63]. The preservation of these groves reflects the deep-seated belief that the community's well-being is directly connected to the well-being of the forest. Similarly, the Igbo people express this interconnectedness through rituals and communal activities protecting sacred forests and venerating deities like Ala, the earth goddess^[73]. These practices illustrate a broader understanding of forest stewardship, where spiritual beliefs are intricately woven into environmental conservation.

In the context of REDD+, this study posits that the principle of interconnectedness directly supports the framework's goal of sustainable forest management by ensuring that forests are valued for their carbon sequestration potential and their cultural, spiritual, and ecological significance. Yet, it is essential to recognize that the relevance of these practices is not uniform across all Nigerian communities, and some areas may require targeted strategies to reintegrate traditional conservation methods alongside modern approaches For example, protecting sacred groves in Yoruba culture, where the health of the forest is seen as integral to the community's well-being, aligns seamlessly with REDD+ objectives. These groves act as natural carbon sinks while preserving biodiversity and supporting the livelihoods of local communities, thus enhancing the overall effectiveness of REDD+ initiatives. This shift could be operationalised by developing policies that protect forests for their cultural, spiritual, and ecological significance rather than just their economic utility. For example, REDD+ projects could include provisions for protecting sacred groves and other culturally significant landscapes, ensuring that conservation efforts respect and uphold the values of the local communities.

4.2.2. Interdependence: The symbiotic relationship between humans and forests

Interdependence, another core principle of Indigenous African Jurisprudence, recognises the mutual dependence between humans and the environment^[74]. The phrase "For the Tree of the Field is Man's Life" reflects this symbiotic relationship, where forests provide essential resources for human survival. In return, humans are responsible for caring for and sustaining the forests^[75]. Among the Tiv people in central Nigeria, traditional farming practices such as agroforestry and the use of fallows exemplify this interdependence^[76]. Tiv farmers enhance soil fertility, reduce erosion, and promote biodiversity by integrating trees with crops-like shea trees with staple crops^[77]. This practice not only supports the community's economic needs but also maintains the health of the forest ecosystem. Similarly, Igbo farmers have developed adaptive agricultural methods that optimise yield while preserving the environment, demonstrating their deep understanding of the land's capacity and limitations^[78].

In practical terms, this study finds that this principle can be incorporated into forest management by promoting practices that ensure the long-term health of forest ecosystems^[79]. For example, traditional agroforestry systems, which integrate trees and crops to benefit both, can be supported and scaled up. These systems provide economic benefits to communities, enhance biodiversity, and improve soil health. The principle of interdependence, as practised by indigenous communities such as the Tiv people through agroforestry, directly aligns with the REDD+ framework's goals of reducing deforestation and enhancing forest carbon stocks. Agroforestry practices that integrate trees with crops contribute to carbon sequestration, improve soil health, reduce erosion, and support biodiversity. By promoting such traditional practices, REDD+ initiatives can achieve dual benefits: maintaining the ecological balance while ensuring sustainable livelihoods for local communities. This approach reinforces the REDD+ goal of sustainable forest management by demonstrating that human well-being and forest health are mutually dependent. Additionally, REDD+ initiatives could include educational programs highlighting the benefits of interdependent land-use practices, encouraging broader adoption of these methods across Nigeria.

4.2.3. Reciprocity: Mutual obligation and the ethical use of natural resources

Reciprocity is a fundamental ethical principle in Indigenous African Jurisprudence, emphasising that the use of natural resources must be balanced by giving back to the environment^[80]. The phrase "For the Tree of the Field is Man's Life" embodies this principle, suggesting that humans have an ethical duty to protect and nurture the forests that sustain them^[81].

The Igbo traditional system of environmental stewardship exemplifies reciprocity^[82]. Communities observe specific periods during which activities like farming or hunting are restricted, allowing the land and wildlife to regenerate^[83]. This practice ensures that the use of natural resources is balanced by efforts to replenish them, thereby maintaining the land's productivity for future generations. Similarly, the Yoruba people demonstrate reciprocity by conserving and restoring natural resources such as forests, rivers, and sacred groves^[84]. These resources are protected by community laws prohibiting activities like tree felling and animal hunting in these areas, reflecting a deep commitment to preserving the environment. By doing this, they help alleviate the effects of climate change. This, according to Olaleye^[85], is reflected in Yoruba indigenous religion, cultural practices and the conservation of natural resources as viewed by Ogbè Alá rá (Ogbè túá) in Ifá divination system toward environmental sustainability. It is important to note that the enforcement of these traditional restrictions can face challenges in the face of modern economic pressures, such as increased logging and agricultural expansion. However, many communities still adhere to these practices, and there are efforts to strengthen them through community-based conservation initiatives.

The principle of reciprocity, central to many indigenous conservation practices, aligns directly with the REDD+ objective of promoting sustainable livelihoods. For instance, the Igbo practice of restricting activities like farming or hunting during specific periods allows for the regeneration of natural resources, which aligns with REDD+ goals of enhancing forest carbon stocks. By creating benefit-sharing mechanisms that mirror these indigenous practices, REDD+ initiatives can ensure that communities are both incentivised to participate in conservation efforts and empowered to contribute to the sustainability of the forests. This reinforces the sustainability aspect of REDD+ and ensures that conservation efforts are culturally relevant and supported by local populations.

This study's analysis of these principles finds that integrating interconnectedness, interdependence, and reciprocity into the REDD+ framework can profoundly enhance sustainable forest management in Nigeria. These principles, already practised in communities such as the Yoruba and Igbo, emphasise the intrinsic connection between human well-being and environmental health. By recognising the cultural, spiritual, and

ecological significance of forests and supporting traditional practices like preserving sacred groves and agroforestry, the REDD+ framework can move beyond a purely economic focus to a more holistic approach that fosters long-term ecological balance and community welfare.

The study further posits that by recognising the intrinsic value of forests beyond their economic utility, these principles challenge conventional conservation methods and offer a holistic model that emphasises forests' spiritual, cultural, and ecological significance. By incorporating traditional land-use practices, community-driven conservation efforts, and benefit-sharing mechanisms, the REDD+ framework can be enriched with a more inclusive and sustainable strategy that protects forests and supports the well-being of the communities that depend on them. This approach ensures that conservation efforts are not just about preserving carbon sinks but about fostering a deep, enduring relationship between humans and the environment that sustains life for generations to come.

Furthermore, recognising the intrinsic value of forests beyond their economic utility challenges conventional conservation methods and offers a model that highlights the spiritual, cultural, and ecological importance of forests. Incorporating traditional land-use practices, community-driven conservation efforts, and benefit-sharing mechanisms enriches the REDD+ framework with a more inclusive and sustainable strategy. This strategy protects forests and supports the well-being of the communities that rely on them. Thus, conservation efforts extend beyond preserving carbon sinks to fostering a deep, enduring relationship between humans and the environment, ensuring the sustainability of life for future generations.

4.3. Navigating challenges and complexities in indigenous knowledge integration

After examining the role of indigenous principles in forest conservation and before proposing specific legal and policy recommendations, it is essential to acknowledge the significant challenges and potential counterarguments that arise when attempting to integrate indigenous knowledge systems into formal REDD+ frameworks. This balanced assessment strengthens the overall argument by demonstrating awareness of implementation complexities while reinforcing the value of indigenous principles as viable solutions to Nigeria's deforestation crisis

Integrating indigenous knowledge into REDD+ strategies presents significant epistemological challenges. Indigenous knowledge is holistic, context-specific, and orally transmitted, contrasting sharply with REDD+'s reliance on quantifiable, standardized frameworks. This incompatibility risks marginalizing indigenous contributions, not because they are ineffective, but because they don't align with technical methodologies. Bridging this divide requires innovative approaches that respect both knowledge systems without subordinating one to the other.

Power imbalances further complicate integration. Indigenous communities often lack the political, technical, and financial resources to advocate effectively in policy forums. Additionally, the diversity within these communities means no single voice can represent all perspectives, risking oversimplification or tokenization of their contributions. This diversity must be acknowledged to avoid appropriating knowledge without equitable benefit-sharing or decision-making authority.

Institutional barriers also hinder progress. Nigeria's centralized forest governance system, with limited recognition of customary land rights, creates significant hurdles. Bureaucratic resistance to indigenous approaches and the lack of secure land tenure undermine communities' ability to participate in conservation initiatives. Fragmented governance across environmental, forestry, and cultural departments further complicates coordinated policy integration.

Commodification concerns add another layer of complexity. REDD+'s market-based mechanisms risk reducing traditional practices to mere carbon transactions, stripping them of their cultural and ecological

context. Indigenous communities also fear knowledge appropriation, particularly when valuable insights are commercialized without proper attribution or benefit-sharing. Safeguards are essential to protect intellectual property rights and ensure fair compensation.

Scaling indigenous knowledge to broader REDD+ frameworks is another challenge. Indigenous practices are deeply tied to specific ecological and cultural contexts, making direct transferability difficult. Both government institutions and indigenous communities often lack the technical capacity to document and operationalize traditional knowledge within formal frameworks. Sustained investment in participatory research and capacity building is crucial to avoid superficial integration.

Finally, balancing tradition with modern conservation goals is complex. Not all traditional practices align with current sustainability objectives, and some may require adaptation. Climate change further complicates this, as shifting ecological conditions may render traditional methods less effective. Conservation strategies must balance respect for indigenous autonomy with the urgent need for climate mitigation and biodiversity protection.

Acknowledging these challenges does not diminish the value of integrating indigenous principles into REDD+ strategies in Nigeria; rather, it underscores the need for thoughtful, inclusive approaches that address these complexities directly. By recognizing potential counterarguments and implementation barriers, policymakers and practitioners can develop more robust integration frameworks that anticipate and mitigate these challenges proactively. The following section will translate these insights into actionable policy recommendations that can guide the effective integration of indigenous knowledge into Nigeria's forest conservation efforts.

5. Recommendations for integrating indigenous principles into Nigeria's **REDD+** framework

Nigeria's pursuit of REDD+ objectives requires integrating indigenous knowledge, which offers critical insights for sustainable forest management. By embedding traditional practices into policy, empowering communities, and leveraging NGOs, Nigeria can create a culturally resonant and ecologically effective REDD+ strategy.

5.1. Strengthening legislative and policy frameworks

Nigeria must prioritize legal reforms to secure indigenous land rights. Revising the National Forest Policy to incorporate indigenous agroforestry methods would align carbon sequestration goals with cultural heritage. Establishing mandatory FPIC protocols ensures indigenous autonomy in REDD+ decisions, while benefit-sharing mechanisms—modeled on Brazil and Indonesia's successes—should deliver equitable rewards, including healthcare and education access. These reforms lay the groundwork for community-driven conservation.

5.2. Empowering local communities through participation

Community-led conservation committees must oversee REDD+ projects, integrating traditional knowledge like seasonal fire management and sacred grove preservation. Capacity-building programs should fuse modern techniques with indigenous practices, training communities in agroforestry and forest monitoring to enhance self-reliance. Transparent benefit-sharing models, co-designed with communities, must prioritize reciprocity—a core indigenous value—to ensure REDD+ aligns with local welfare. Peru and Cambodia exemplify how such empowerment boosts conservation outcomes, offering Nigeria a roadmap for engagement.

5.3. Enhancing NGOs as mediators and facilitators

NGOs must mediate dialogue between indigenous communities and government bodies, ensuring traditional perspectives shape REDD+ policies. Beyond advocacy, they should document and adapt practices like sacred grove management into REDD+ frameworks, providing technical support for sustainable resource use. Monitoring systems led by NGOs must evaluate both ecological and cultural impacts, as seen in Cambodia, where such frameworks balance biodiversity goals with spiritual values.

5.4. Aligning indigenous practices with REDD+ goals

Indigenous agroforestry systems, such as the Tiv and Yoruba's crop-tree integration, enhance biodiversity while sequestering carbon. Recognizing sacred groves as REDD+ priority zones would protect these de facto biodiversity reservoirs, mirroring India's success in conserving culturally significant forests. Though tensions exist between REDD+'s market-driven approach and indigenous holistic values, co-designed projects—centered on stewardship over carbon credits—can reconcile these differences. Nigeria's REDD+ framework must prioritize reciprocity, ensuring conservation strengthens cultural resilience.

Integrating indigenous principles into REDD+ is both an ecological imperative and a redress of historical marginalization. By legally recognizing traditional knowledge, fostering community leadership, and leveraging NGOs as partners, Nigeria can craft a conservation strategy that honors people and ecosystems alike. The path forward demands policy innovation—a focus explored next in actionable legislative and institutional proposals.

6. Conclusion

Integrating Indigenous principles into Nigeria's REDD+ framework is not merely a strategic enhancement but a fundamental necessity for achieving sustainable forest management. The principle of "For the Tree of the Field is Man's Life" embodies a holistic view of environmental stewardship, where human well-being is intricately linked with the health of forest ecosystems. REDD+ initiatives can move beyond narrow economic goals and contribute to a more resilient and culturally relevant environmental governance model by embracing the Indigenous concepts of interconnectedness, interdependence, and reciprocity. This approach ensures that forest conservation is not just about reducing carbon emissions but about fostering a deeper relationship between communities and their natural environment. The successful integration of these principles will improve environmental sustainability and uphold Indigenous communities' cultural and spiritual heritage, making REDD+ a more inclusive and equitable tool for addressing deforestation. By integrating Indigenous principles, there is also the potential for profound positive impacts on the social and cultural fabric of these communities, strengthening their connection to the land and promoting a shared sense of responsibility for future generations. In the long term, this approach promises to deliver benefits beyond environmental conservation, contributing to economic stability and social equity, ensuring a balanced relationship between nature and people. Adopting these strategies is crucial for Nigeria to achieve long-term environmental resilience, economic stability, and social equity, setting a precedent for integrating traditional knowledge into global environmental policies.

Conflict of interest

The authors declare no conflict of interest.

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