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Leveraging Indigenous Knowledge for Effective Environmental Governance in West Africa

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Abstract

Effective environmental governance is key to achieving Sustainable Development Goals. Environmental sustainability programs in developing countries across West Africa are anchored on western scientific knowledge. This has led to a tendency to marginalize the application of indigenous knowledge in environmental protection in West Africa. Yet, no knowledge system develops in isolation as they cross-fertilize and benefit from each other. Indigenous knowledge systems are as old as the traditional societies having been passed from one generation to another. They are those voluminous, diverse, and highly localized sources of wisdom that are neither specific nor universal. Indigenous knowledge systems such as using animal dung as manure, sighting of the new moon before planting, rain-making rituals, and planting of trees to serve as shades have helped to conserve the wetlands and the forests of most societies in West Africa and are effective in promoting environmental sustainability. Hence, the reason they are considered as important as scientific knowledge which must be integrated through multiple evidence base approaches for effective environmental governance. This article using doctrinal research methodology aims at examining how traditional societies in West Africa can leverage indigenous knowledge to achieve effective environmental governance, mitigate climate change, and promote sustainable development. The article recommends that mainstreaming indigenous knowledge systems into environmental legislation, policy and institutional frameworks will not only help in mitigating environmental issues such as climate change but will help developing countries in West Africa meet the SDG goals and their commitments in the Paris Agreement. The article concludes that the integration of such unique knowledge systems into other evidence or scientific based knowledge systems could be one of the best ways to ensure effective and participatory environmental governance in West Africa.

Keywords

African Indigenous Knowledge Systems, Sustainable Development Goals,

Climate Change

1. Introduction

Over the past centuries, traditional societies in West Africa have enormously used indigenous knowledge to manage environmental issues such as water scarcity or pollution, land pollution, erosion, forest reserves, curbing overfishing, deforestation, and other natural resources (International Labour Geneva, 2022). However, in recent times, various governments across West African subregion have focused on entrenching scientific knowledge in environmental protection to combat climate change and other ecological problems and neglected the application of indigenous knowledge systems, which is the most effective in curbing numerous ecological issues and limiting the global temperature to the global set target of 1.5 degrees Celsius (IPCC Special Report, 2022). Indigenous knowledge systems refer to a body of knowledge and benefits built by a group of people and handed over to generations (The World Bank, 2022). In many traditional societies in West Africa, cultural taboos put restrictions on the excessive use of some plants, killing of some animals considered as an *animal totem* of the indigenous community, or carrying out development in erosion-prone areas, which they refer to as "African shrines/religious worship centers" and "evil forest," preventing overfishing from some waters by tagging the waters "*Owumiri or* '*Mami Water*' dedicated rivers or sea" (Osei, 2022). This natural check mechanism helped to curb the depletion of natural resources, desertification, erosion, and climate change effects such as global warming that we experience today. The mechanism also helped to promote environmental sustainability, which is one of the critical goals of the Sustainable Development Goals (United Nations Department of Economic and Social Affairs, 2022c) and one of the 7 aspirations of the African Agenda 2063 (African Union, 2022).

Further, the application of the Indigenous knowledge system in environmental protection in West Africa developed because of the strong bond and mutual relationship between the traditional societies in West Africa and their environment and the need to pass the knowledge from one generation to another (Eyong et al., 2007). The preservation of this knowledge system has helped local societies understand and accept the advantages and benefits of conserving natural resources and indirectly combating climate change's effects on the environment (Eyong et al., 2007). Some of the advantages enjoyed by these traditional societies ranged from good health, pollution-free environment, benefits from keeping forest reserves, and enjoyment of good old age. For example, in the Northern part of Nigeria (a country in West Africa), the semi-arid zones face various natural hazards, but the major ones are drought and flood (Akpodiogaga, 2010). These invariably cause famine, food insecurity, environmental-induced displacements, environmental-induced conflicts like the farmer-herders conflict,

and abject poverty. However, the communities have devised measures for growing drought-resistant and early maturing indigenous crop varieties, gathering wild fruits and vegetables, and cultivating wetlands, enabling them to survive climatic hazards with little or no support from the outside world. Some traditional communities use local methods to predict disasters they could face. In most cases, they have the knowledge and administrative structures to cope with them because the communities know that a well-conserved environment will help reduce risks associated with natural disasters (Dube & Munsaka, 2018).

Considering the number of environmental catastrophes affecting countries in West Africa, this research focuses on how indigenous knowledge can serve as an effective tool to solve environmental issues such as flooding, desertification, conservation of natural resources, marine pollution, waste management, environmental-induced displacements, and climate change effects. The research also examines how indigenous knowledge can promote sustainable development in West Africa by mainstreaming generational knowledge into domestic or national legal, policy, and institutional frameworks and aiding inclusiveness of the traditional practices that promote environmental protection across the African continent. The paper also seeks to engender environmental consciousness and awareness in the traditional West African Societies to achieve the Sustainable Development Goals, Agenda 2063, and meet the commitments in the Paris Agreement. It is against this backdrop that the paper is divided into five sections. The first section is the introduction, and the second section examines the overview of Indigenous Knowledge Systems' application in protection of the environment in West African subregion. The third section discusses the Overview of Environmental Governance in West Africa. The fourth section will examine the importance of leveraging indigenous knowledge to promote Sustainable Development in West Africa, while the fifth section examines its challenges and prospects. The paper concludes with recommendations in the sixth section.

Overview of the application of indigenous Knowledge Systems in Environmental Protection in the West African Subregion.

West Africa is a subregion of the continent of Africa, according to the United Nations Geoscheme. It is bordered to the west and south by the Atlantic Ocean, to the north by the subregion of North Africa, and to the east by the subregion of Middle Africa (West African Countries, 2022).

There are 16 countries and one dependency in West Africa. The subregion contains two island territories, the independent country of Cabo Verde. The northern portion of West Africa consists of the Sahel region, which is the semi-arid land that separates the Sahara Desert in the north from the savannas to the south. Half of the countries of West Africa are situated in the Sahel, while the other half are in the savanna region, close to the Atlantic Ocean. The region preserved the Sahel and Savannas with indigenous knowledge before colonialism. The subregion comprises of the following countries; Benin, Burkina Faso, Cameroon, Cabo Verde, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia,

Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo as shown in the map of West Africa below figure (West African Countries, 2022).

Traditional societies in the West African countries have used Indigenous knowledge systems (IKS) for many purposes, significantly facilitating environmental protection in those communities and preserve the ecosystem. While IKS is understood at its most elemental to mean the Knowledge of Indigenous peoples, there is no single internationally accepted definition of Indigenous people, and indigenous groups are heterogeneous. However, UNESCO refers to indigenous knowledge as the understandings, skills, and philosophies of Indigenous peoples, developed through long and multigenerational histories of interactions with the natural world and adapting to highly variable and changing ecological and social conditions, including colonization and globalization (UNESCO, 2022). Traditional knowledge systems such as rain-making, sighting of the new moon before planting, protection of forest reserves, mix cropping, protection of animal species by making them *indigenous animal totems* to some societies and cock crow to tell time, were developed through kinship relationships and handed down to generations through storytelling, ritual, and traditional rites performance (Chikaire, Osuagwu, Ihenacho, Oguegbuchulam, Ejiogu Okereke, & Obi, 2012). This knowledge is based on known facts, drawn from assimilated knowledge embraced and passed on to other generations. IKS remains an essential source of information amongst local communities in many parts of West Africa. Rural communities value their IKSs as they appreciate that adaptation and mitigation strategies rely on this existing knowledge Stewart Lee Kugara et al., 2022.

Indigenous knowledge systems are different from scientific knowledge, which is the system of knowledge that relies on specific laws established through applying the scientific method to phenomena in the world around us. The scientific process begins with an observation followed by a prediction or hypothesis, which is then tested. Depending on the test results, the hypothesis can become a scientific theory (Agrawal, 1995). These knowledge systems are considered universal and not peculiar to any community. Despite the development of scientific

knowledge and its wide application, global climate change still persist, hence the call to leverage indigenous knowledge systems that have been effective in conserving the natural environment to promote environmental consciousness and governance in the West African subregion.

Also, scientific studies should target IKS from traditional communities, which can act as a backup for climate forecasting, as there is a scarcity of interventions to counter climate-induced challenges in the West African subregion. IKS has a significant role to play in current existing climate knowledge. Policies should be formulated to develop mitigatory and adapting strategies by integrating scientific climate models with IKSs because IKS is the knowledge that has been developed by carefully studying man's interactions with the environment (Agrawal, 1995).

The use of IKS has been recognized globally as an important source of knowledge on climate change mitigation and adaptation (Mafongoya & Ajayi, 2017). IKS, such as changes in plant, animal behaviour and sacredness of geographical places, have been helpful in seasonal climate forecasting and mitigating climate change in West Africa before the adoption of scientific knowledge. In the case of changes in plants as a means of climate change adaption or mitigation mechanism, a clear example is Ghana, for many years IKS has helped them to identify types of crops to grow depending on the tree phenology. In Ghana, people use a giant forest tree called *Onyina* (Ceiba pentandra), which sheds its leaves early in January, leaving it without leaves by March. If the tree sprout leaves by June or earlier, this indicates good rainfall patterns with good yields (Mafongoya, Jiri, Mubaya, & Mafongoya, 2021), If the tree sprout leaves after June, this indicates a poor season predicting drought and poor yields. This knowledge helps farmers grow drought-resistant crops that adapt better to drought conditions, giving them better yields than crops that do not adapt to drought and helping combat climate change. In Ghana, if the Terminalia ivorensis drops its leaves and starts to sprout, it indicates good rains (Paul, Florence, & Regis, 2016). The volume of rainfall is detected by the volume of leaves produced by the tree. If the tree sprouts more leaves quickly, this indicates a high rainfall, and if the tree grows few leaves, it shows a low rainfall (Paul, Florence, & Regis, 2016). This information has been used by indigenous people for many years and helps them to identify types of crops to grow depending on the tree phenology.

In the use of the behavior of animals to predict climate changes, for example, In Ghana and Nigeria, where centipedes are seen climbing to high levels above ground it signifies pending floods (Retiro, Mashoko, Tshuma, & Rurinda, 2012). The croaking of frogs together indicates the start of the rainy season. Farmers can use the behavior of frogs to prepare for a better farming season because when they make sounds throughout the night, they indicate heavy rainfall in a few days (Mugabe, Mubaya, Nanja, Gondwe, Munodawafa, Mutswangwa, & Murewi, 2010). If frogs are not heard croaking from October to November, it indicates late rainfall. And this allows farmers to choose drought-tolerant crops, giving them better yields and protecting the environment (Muguti & Maphosa,

2012).

Further, the movement of some birds in areas where people live indicates climate change; for example, the sounds of the Fish eagle bird across West Africa and the entire African continent suggest that the rainy season is about to start, which warns people to prepare for the season. If the bird is not seen when rainfall is expected, it means the rainy season is not yet ready, and this agrees with the movement of birds like the Merops gularis, which lives in dry areas. When these birds are seen moving in places where people live, it is a sign that rainfall is not yet ready and when they are seen moving out of communities, it indicates that the rainy season is ready, so this helps people to prepare for the farming season.In some African countries such as Malawi though not part of West African subregion, the appearance of the Qualia birds means rains are at hand, and farmers need to prepare their lands (Jiri, Mafongoya, Mubaya, & Mafongoya, 2016). In Tanzania also, local people use the libido of donkeys to forecast climate change; if donkeys' libido increases, this indicates pending drought, and this allows farmers to plant for better options such as the use of rainwater harvesting techniques to store surface runoff and increase soil moisture (Kugara et al., 2022). This will help farmers to overcome drought and improve yields. Knowledge from the slaughtering of animals is also not left out, for example, empty stomachs when goats are slaughtered indicate drought, and if goat matings increase with more births of twins or triplets, it is an indication that good rains are coming (Hijazi, Chang, Liwenga, Kanemba, & Nindi, 2013). IKS has been used widely in most West African and African countries to forecast climate change, and in selecting farming activities, people can venture into to promote food security in West Africa. Various indigenous methods of mitigating and adapting to climate change have the potential to be eroded if not documented or mainstreamed into national laws and policies. Many trees have adapted to local climatic changes due to propagation by natural means, compared to those available nowadays.

Also, the sacredness of forests and shrines is an identified method in conserving and managing forest resources. Researchers are of the view that a sacred place is a location which is revered and reserved for the cultural expression of a society' (Chikaire, Osuagwu, Ihenaco, Oguegbuchulam, Ejiogu-Okere, & Obi, 2012). In that regard, the prohibitions practices enforced moral order, and the community members sternly observed them. Such practices have preserved and conserved the ecosystems. "*Taboos and myths*" are central in managing climate risks and disasters across African indigenous communities (Chikaire, Osuagwu, Ihenaco, Oguegbuchulam, Ejiogu-Okere, & Obi, 2012). Cultural beliefs based on IKS shaped the indigenous people's perceptions and knowledge about disasters, natural resources, agriculture activities, and many other aspects of life. In most indigenous communities, like Nigeria, it is believed that some forests or big trees, like the iroko tree, ought to be conserved for different reasons linked to the deity (Jaya, 2018). In other places, "ancestral spirits are also notorious for hiber-

nating, taking refuge or taking rest in such trees" This is like what is followed in some rain-making events that are often performed near or under big fruit trees. In that way, the climate risk and disasters are avoided through the induced fear of sanction by the gods if one cuts trees for no valid reasons or without authorization. The avoidance of deforestation was culturally instilled, and community members through IKS ensured that they followed protocols if they wanted to cut trees (Kugara et al., 2012). This helped check environmental problems such as erosions, desertification, and flood.

IKS plays a significant role in avoiding, reducing, and mitigating climate risks and disasters through water conservation. Similarly, it is important to note that "to protect water bodies from contamination, indigenous communities use certain taboos" (Cheserek, 2005). These taboos cover the following: not washing in or near the river or stream, lactating mothers are not allowed to come to water points, preventing overfishing by making some waters sacred waters and throwing objects into water bodies. The underlying reason for such taboos is to avoid marine pollution.

IKS is also very useful in promoting food security. In West African countries, for instance, a study of IKS is used to enhance food security and simultaneously diminish climate risks and disasters. Chicken manure, cow dung, and crop residues are used as fertilizer to increase crop yields. Using indigenous manufactured mixtures as pesticides for pest control is common among indigenous farmers and reduces climate risks and disasters. This assists indigenous communities in preserving the environment and minimizing climate change's dangers (Age, Lugangwa, Obua, & Kambugu, 2008).

Many people have used these indigenous Knowledge systems across the West African subregion, and they have yielded better results than scientific knowledge. Indigenous farmers in the West African subregion value these IKS as they have problems with scientific methods of forecasting climatic changes, which do not give forecasts for each area (Jiri, Mafongoya, Mubaya, & Mafongoya, 2016). Considering the analysis above, Indigenous Knowledge is a cost-effective mechanism that needs to be mainstreamed into domestic laws of West African countries to help combat climate change while promoting sustainable development in the subregion.

2. Overview of Environmental Governance in West Africa

The concept of governance predates human civilization. Governance according to United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP, 2022) is "the process of decision making and the process by which decisions are implemented." There are, however, formal and informal actors involved in a governance system. Environmental governance refers to the socio-political aspects of making a participatory decision over the use and management of natural resources (Osawe & Magnu, 2016). Environmental governance is concerned with the political and legal rights, regulations and responsi-

bilities of every member of the society, civil society, private sector and the government. Governance, defined broadly, means the norms and decision-making processes by which society and its organisations are controlled and coordinated, while governance is habitually associated with official regulation by States (Osawe & Magnu, 2016).

There is no gainsaying that West African nations lack effective environmental governance structure. This is because the countries in the West African subregion have limited institutional and technical capacities to tackle environmental issues. In recent times, it is becoming apparent that the age-long influence of colonisation, globalisation, and urbanisation negatively impinged on environmental ethics, indigenous and local knowledge systems across the subregion. The eras of state colonialism, post-independence growth trajectories, urbanisation, and globalisation have redefined the accessibility, management and governance of natural resources across the subregion. The West Africa environmental sustainability challenges are not unconnected to collapsed and faded indigenous and local knowledge system (Ibrahin Ayoade Adekunle, 2021). However, with colonialism environmental governance structure that exists with IKS was abandoned and plagued by poor enforcement of environmental policies, regulations, standards, and laws that were hinged solely on scientific knowledge (Ijaiya & Joseph, 2014). However, in the past two decades, environmental protection has grown to become central to every governance regime across West Africa. This is a result of The Economic Community of West African States (ECOWAS) Revised Treaty of 1991. The ECOWAS Treaty is a multilateral agreement signed by the member states that made up the Economic Community of West African States (ECOWAS Treaty, 2022). Article 29 of the ECOWAS Revised Treaty of 1991 enjoins member States to promote environmental protection by adopting policies, strategies and programs at national and regional levels and establishing appropriate institutions to protect, preserve and enhance the environment. To this end, in Nigeria, a country in the West African subregion, a plethora of laws has been enacted to protect the air, water, ecosystems, flora and fauna, natural resources, and human well-being from the various forms of environmental pollution, and hazardous waste disposal (Environmental Law Research Institute, 2022). Efforts have also been made at the various levels of government to promote environmental sustainability in a bid to achieve the country's commitment to the Sustainable development goals and the Paris Agreement (Sustainable Development Goals, 2022).

Despite the efforts put in place to establish institutional, legal and policy frameworks it is undeniable that the government's efforts to provide effective environmental governance for the citizens are yet to produce significant environmental transformation and better quality of life, especially in the oil-endowed and mining communities of Nigeria (Matemilola & Elegbede, 2017). This is a result of the attitude of governments as most governments lack continuity after the transition to a new government, and poor legal and policy implementation mechanisms, hence the need to mainstream indigenous knowledge into the legal

and policy frameworks to facilitate effective and all-inclusive environmental governance across West African States as similar cases exist among all the States in the sub-region. This will help bring forth inclusiveness of the local communities where this knowledge system is reposed and the development of our indigenous knowledge to ensure sustainable development and effective environmental protection across countries in the West African subregion (Matemilola & Elegbede, 2017).

3. The Importance of Leveraging Indigenous Knowledge to Promote Environmental Governance and Sustainable Development in West Africa

Environmental problems and Climate Change is projected to harm the attainment of sustainable development goals (SDGs) in Africa (Osman-Elasha, 2022). Its impact is expected to be extremely severe in the West African subregion that depend on rainwater agriculture and have limited resources to mitigate and adapt to climate change. In recent times much of the climate awareness on climate change in the West African subregion comes from scientific knowledge and mode is that have not been so effective in combating climate change in the subregion. This is because there are still extreme weather conditions experienced in the subregion. These extreme weather conditions include floods, droughts, and erosions that have led to food insecurity and loss of lives (UNDRR, 2022). These led to the call to integrate indigenous into scientific knowledge models to promote environmental sustainability in the subregion (Osman-Elasha, 2022).

Thus, from the United Nations Conference on the Human Environment in Stockholm in 1972 to the United Nations Conference on Environment and Development in Rio in 1992, the concept of sustainable development has been topmost on the agenda of the international community (United Nations, 2022). This agenda is still topmost on the agenda of the African Union and the international community considering the adoption of the African Agenda 2063 in 2013, the SDGs in 2015, and the Paris Agreement in 2015. In 1987, the World Commission on Environment and Development, which developed the Brundtland report titled "*our common Future*" sought to address the problem of conflicts between environment and development goals by formulating a definition of sustainable development which is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Kohade, 2022).

It is, generally accepted that sustainable development calls for harmony between the three pillars of economic development, social equity, and environmental protection. Sustainable development is a visionary development paradigm. Since the Stockholm conference in 1972, governments, businesses, and civil society have accepted sustainable development as a guiding principle in achieving developmental goals, and Africa is not left out in this decision. However, the peculiar problem of the African continent made achieving sustainable

development a difficult task hence the adoption of the African Agenda 2063 to promote sustainable development in Africa through the African way. Further, African countries have also committed to achieving the Sustainable Development Goals and the Paris Agreement of 2015.

It is notable that Agenda 2063 shares some similar provisions with the SDG goals. The similarities are centered on environmental inclusion in the goals and aspirations. Despite these similarities in Agenda 2063 and SDGs, West Africa and the entire African continent still faces numerous environmental challenges ranging from erosion, floods, desertification, food insecurity, poverty, scarcity of water, and environmentally induced displacements. Further, Africa is considered most vulnerable to climate change impact despite contributing little to greenhouse gas emissions which is the primary cause of global warming. This led researchers to seek means of returning to their roots, the culture that preserved environments in Africa before the advent of scientific knowledge through colonialism. The vulnerability of the West African subregion to climate change and the various environmental challenges led to the quest to leverage n indigenous knowledge solutions to promote sustainable development in the subregion (Kanu & Ndubisi, 2020).

Though, indigenous knowledge systems have been largely misunderstood or even dismissed by development planning experts in the past. They are regarded sometimes as irrelevant, fetish, and nonsensical (Kanu & Ndubisi, 2020). However, many researchers associated with the formulation of development assistance policies are now beginning to recognize and also leverage on the positive role that indigenous peoples and their knowledge of the ecosystem, can play in the success of development projects and policies (Kanu & Ndubisi, 2020). It is reasonable to assume that crucial global development assistance activities, including local participation, capacity-building, and sustainable resource management, can be enhanced in cost-effective programs and strategies which understand and work with indigenous knowledge systems. Hence, Indigenous knowledge systems (IKS) are gradually being recognized as an imperative source of information that can help combat climate change and preserve and restore the ecosystem that human activities have destroyed.

The General Assembly of the United Nations adopted the Declaration on the Rights of Indigenous Peoples on 13 September 2007, constituting a seminal document in the field of Indigenous knowledge (Joffe, 2022). Article 31 of the declaration (United Nations, 2022) states that:

"*Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestation of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literature and designs, sports and traditional games and visual and performing arts. They also have the right to maintain, control, protect and develop their intellectual property over such cul-*

tural heritage, traditional knowledge and traditional cultural expressions."

It is important to note that in 2017, the Africa Union, through a consultative workshop, attempted to work towards integrating Indigenous culture and knowledge systems into the modern and formal development approaches for the realization of the Agenda 2063 ideas (African Union, 2022). The process though commendable needs to be fully achieved as it is the most viable approach to operationalizing Agenda 2063 and the SDG goals in Africa.

Although indigenous knowledge has not been widely utilized in formal adaptation efforts in West Africa and has often been neglected in governance and research, these indigenous people have long recognized the importance of their knowledge systems, especially in protecting their environment. They are documenting and transmitting them from one generation to another (Senanayake, 2006). The indigenous knowledge systems are a significant resource that would contribute to the increased efficiency, effectiveness, and sustainability in environmental conservation in West Africa. They form the basis for community-level decision-making in food security, environmental protection, and, more importantly, natural resource management (Senanayake, 2006). Indigenous knowledge, such as a change in plants, animal behaviour, and the sacredness of shrines and water, can be mainstreamed into environmental governance in the West African subregion to operationalize the climate goals of Agenda 2063 and the SDGs. This will help mitigate the negative impacts of climate change while ensuring environmental protection.

Given the above, it is noteworthy that leveraging indigenous knowledge systems by integrating or mainstreaming them into conventional environmental governance and management plans will promote sustainable development in the West African sub-region. Law and policymakers in the subregion must draw on the best available knowledge in the face of global climate change. This calls for participatory decision-making between policymakers, implementers, indigenous people, and all stakeholders. With the above in mind, the West African subregion may blaze the trail in integrating indigenous knowledge with development planning techniques.

4. Challenges and Prospects of Leveraging Indigenous Knowledge Systems to Promote Effective Environmental Governance in West Africa

This research identified many challenges and prospects in leveraging indigenous knowledge systems to promote effective environmental governance in the West African subregion, and they are as follows;

1) Preservation of Indigenous Knowledge System: it is notable that indigenous knowledge is mostly stored in people's minds and passed on through generations by word of mouth rather than in written form, which makes it vulnerable to change. Several factors contribute to the loss of indigenous knowledge. For example, development processes, like rural/urban migration and changes to population structure because of famine, epidemics, environmental displacement

or war, may all contribute to the loss of indigenous knowledge. Documenting and teaching the indigenous knowledge systems, having a database of indigenous knowledge, or integrating them into domestic laws and development plans will help preserve the indigenous systems and enhance leveraging indigenous knowledge to promote effective environmental governance and sustainable development in the sub-region (Raath et al., 2018).

2) The attitude of governments: Lack of continuity and attitude of governments after transitioning to power also affects the development of indigenous knowledge systems and their application in environmental sustainability. Also, most governments are more interested on economic policy than environmental protection policies and this has exacerbated environmental problems across the West African sub-region.

3) The cultural diversity of the different ethnic people in the uplands reflects the diversity of Indigenous knowledge systems. Considering that indigenous knowledge systems are not uniform, like scientific knowledge, they vary from one community to another. There may be a need to harmonize the indigenous knowledge systems in West Africa for preservation, especially the knowledge that promotes conservation of the environment, that is, to stop them from being eroded and to integrate them into school curriculums for educational purposes. This will help create awareness, promote wide acceptance, and ensure the usage of indigenous knowledge to promote sustainable development in West Africa (Raath et al., 2018).

4) The need to give recognition or status to Indigenous knowledge: Indigenous people across Africa have accumulated valuable traditional knowledge about nature and sustainable practices that can help combat global climate change and promote sustainable development in Africa. However, this knowledge is not recognized as an important tool to protect the environment and enhance resilience. Applying indigenous knowledge systems and nature-based solutions to climate change can help promote sustainable development in West Africa (Senanayake, 2006).

5) Misuse and inappropriate use of Indigenous Knowledge systems: it is often feared that the abuse and misappropriation of Indigenous Knowledge systems can cause severe physical or spiritual harm to the custodians of the knowledge or the entire community and also affect environmental governance. Hence, the fear of releasing it to non-indigenous members of the societies for preservation. Also, indigenous people believe that their knowledge systems, such as traditional agricultural practices that are used to enhance agriculture sustainability and mitigate climate change effects and droughts, should be kept sacred as they protect their existence as people when unwritten and orally transmitted across generations (Mawe, 2011).

6) Dangers of Migration on Indigenous Knowledge Systems in West Africa: Migration is considered as one of the factors eroding indigenous knowledge systems because when indigenous people or their children migrate to other continents, they neglect their indigenous practices and embrace scientific knowledge.

The incline to scientific knowledge has contributed to the eroding of most indigenous knowledge systems in West Africa, especially the indigenous knowledge on environmental sustainability as they embrace scientific knowledge (Das Gupta, 2022).

Further, teaching, creating awareness, harmonizing, and documenting indigenous knowledge systems and converging indigenous knowledge with scientific knowledge, especially the knowledge systems on environmental sustainability, will not only help preserve Indigenous knowledge systems in the West African subregion but mitigate climate change and promote sustainable development within the subregion.

5. Recommendation and Conclusion

5.1. Recommendations

The paper proffers both general and policy recommendations as follows: ECOWAS Union needs to leverage indigenous knowledge systems to achieve the SDGs, African Agenda 2063 and effective environmental governance in the subregion by developing a strategy to enhance the collection and documentation of indigenous knowledge systems in the subregion. West African States also known as ECOWAS member states are to integrate Indigenous Knowledge systems into school curriculums to engender teaching and learning of various Indigenous Knowledge systems in the subregion. The paper also recommends the need to preserve and revive Indigenous Knowledge Systems by empowering local communities in the subregion and rediscovering the values of the indigenous people. Building and strengthening national institutions relating to indigenous knowledge and converging Indigenous knowledge with scientific knowledge systems and mainstreaming them into national development planning and sectoral development policies and programs, especially poverty reduction and environmental protection programmes; Promoting and enhancing IKS through the development of partnerships and stakeholder networks should be encouraged; The need to promote research in eco-friendly indigenous practices for sustainable development. Indigenous people and local communities should be included in environmental governance to draw from their knowledge. Finally, indigenous knowledge systems and modern resources can strengthen each other to respond to the current climate crisis and reduce the vulnerability of the west African subregion to climate change.

5.2. Conclusion

Several challenges bedeviling the environment in the West African subregion have been attributed to human activities. It has been proved that indigenous groups are often better placed than scientists to provide information on local biodiversity conservation (IPBES, 2019). Indigenous knowledge systems have proved effective in combating climate change and promoting environmental protection across the West African subregion. Though misunderstood and neg-

lected, the knowledge systems have been preserved over time as they have been established to offer nature-based solutions to environmental challenges across the subregion. The reason may be because indigenous communities have a close human-nature connectedness. They hold traditional, environmental, and local knowledge, which is increasingly recognized as a valuable contribution to sustainable environmental management. They provide an indigenous solution to environmental problems in the subregion. In this sense, it is crucial to converge indigenous knowledge systems with scientific knowledge systems and promote the integration of the mixed knowledge systems from an early stage in the design and implementation of environmental management projects and environmental governance. This will be achieved through mainstreaming these knowledge systems into domestic frameworks to achieve the goals of African Agenda 2063 and the SDGs. Also, strengthening the legal framework to protect such resources and ensure that the West African subregion has a relatively rich body of indigenous knowledge and related technology. Effective utilisation of indigenous knowledge is critical for biodiversity conservation, sustainable use and prospecting, increasing food production, and eradicating environmental degradation. Academic institutions, government, private sector and stakeholders at both continental, regional and domestic levels, should enter into partnerships to ensure the preservation of indigenous knowledge and integration of indigenous knowledge into environmental governance across countries in the West African subregion (ECOWAS), as this will promote sustainable development in the subregion (Chiwanza, 2013).

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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