TRADITIONAL ECOLOGICAL KNOWLEDGE IN IGBO SOCIETY: EXPLORING IGBO CULTURE FOR ENVIRONMENTAL SUSTAINABILITY

Anayo Ossai

Abstract
Traditional Ecological Knowledge (TEK) is the collection of indigenous knowledge, customs, and beliefs that have supported ecosystems for many years. A peaceful coexistence of human and the environment in Igboland is fostered by the people's deep grasp of the environment and rich cultural legacy. However, present-day Igboland is delicately faced with a variety of ecological and environmental challenges. These problems pose a major threat to the area's viability and the welfare of its population. This paper uses TEK to delve into the depths of Igbo culture and demonstrate how it is linked to environmental sustainability. The paper adopted Roy Rappaport's Ecological Anthropology Theory to determine how environmental stewardship promote the understanding of ecosystems, biodiversity and interconnectedness of all living things that can foster protection of environment for the present and for the future. The data was collected through primary and secondary sources while qualitative was used in the analysis. The findings reveal that the customary behaviors, ceremonies, and native knowledge systems ingrained in Igbo customs, shows their significant impact on the management of resources, preservation, and ecological equilibrium. The study also discovered that Igbo agricultural methods like crop rotation, diversified farming, and natural pest control systems are also the epitome of peace with the environment. Moreover, the Igbo hold a sense of responsibility for the preservation of specific natural features, like plants, animals, landscapes, and ecosystems since they consider them to be sacred. Through an analysis of the interactions between Igbo communities and their surroundings, this research aims to demonstrate the significant contributions made by TEK towards the development of modern sustainable ecological practices. Investigating Igbo culture reveals a wealth of information that could be used to inform contemporary conservation tactics and generate a greater understanding of the relationship between environmental sustainability and culture. The paper recommend revitalization of TEK, integration of TEK into policy and decision making, combination of TEK and Western science, and promotion of capacity building as critical for environmental sustainability in Igboland.
Keywords: Ecosystems, Environmental Sustainability, Biodiversity, Cultural Legacy and Native Knowledge.

Introduction

Traditional Ecological Knowledge (TEK) is a wealth of information that has been inherited by indigenous cultures over many generations. It provides valuable perspectives on how to live in harmony with the environment. Within the framework of Igbo culture, TEK represents a comprehensive comprehension of the interdependence between people and the environment, influencing customs and viewpoints that promote ecological sustainability. Nestled in the heart of southeast

Nigeria, Igbo society has a rich cultural legacy rooted in a profound respect for the natural world, with ancestors' knowledge having long influenced people's relationships with it. McWhorter (2000) recognized this interdependence, relationship and respect between the indigenous people and their environment. He explained their belief that all living things, including plants, animals, and minerals, are made of consciousness, they developed a universal spirituality that values interconnectedness and respect and forbids taking life in an indifferent or malevolent manner. Igbo culture is a complex tapestry of customs, rituals, and traditional practices, all of which are revealed through an exploration of Traditional Ecological Knowledge (TEK) in Igboland. This investigation goes beyond simple scholarly study; it explores the core of Igbo identity and reveals a deep respect for the land, its resources, and the complex web of life it supports. Igbo TEK offers priceless lessons in environmental care, from farming methods based on harmony with the seasonal cycles to spiritual rites recognizing the sacredness of natural forces. On this backdrop, Mark (2005) write that local biodiversity is populated by indigenous peoples, who are actively involved in conservation efforts. With a long history of consistent utilization of resources, they possess an extensive quantity of knowledge regarding the behavior of intricate ecological systems in their own communities.

A fundamental aspect of Igbo traditional knowledge is the profound conviction that all living things are interrelated. The Igbo people show their respect for nature by carrying out elaborate rituals and group activities including the observation of sacred forests and the worship of deities like *Ala,* the earth goddess. Bhagwat, Ormsby and Rutte (2011) noted that every community have ways of using religion to preserve their environment. According to them, sacred groove, forbidden woodland, evil pond, evil stream, burial site, or evil forest are almost universal in communities. In this instance, a specific area of the surroundings has been set aside for deity worship. In the same development, Ogar Eneji, Ogundu and Ojelade (2019) show how totem are means to express relationship between men and their environment. According to them, a belief system known as totemic or forbidden items holds that humans share a mystical bond or kinship with a spirit-being, such as an animal or plant. It has been suggested that the living thing, or totem, interacts with a particular kin group or individual and functions as their symbol or emblem.

Such rituals are considered necessary for the survival of life itself, symbolizing the reciprocal interaction between humans and nature. Igbo TEK also includes an advanced knowledge of biodiversity and ecosystem management that has been developed over generations of coexisting peacefully with the land. Crop rotation and agroforestry are examples of traditional agricultural techniques that demonstrate a thorough awareness of soil fertility and sustainable land usage. Additionally, indigenous knowledge systems control the ethical collection of medicinal plants, protecting biodiversity and addressing healthcare needs in local communities in Igboland Unfortunately, TEK is today being relegated to the background which result in some of the environmental challenges we have in Igboland. Acknowledging the relegations of TEK and the need to recover it, Deloria (2006) queries, who is going to continue to pay attention to the voices of the trees, animals, birds, and other land features? In the words of Deloria,

Indigenous nations will reclaim their indigenous customs and legacy and rediscover the significance of their ancestors' ancestral lands when Traditional Ecological Knowledge surges to the surface of global consciousness. For all species to continue coexisting, it is crucial that sacred relationships be restored between them and the earth.

Igbo TEK revival and preservation are viable paths forward for tackling urgent environmental issues. For the sake of environmental sustainability, it is imperative to protect and advance indigenous knowledge systems while industrialization and globalization intrude on traditional ways of life. Communities can use the knowledge of their ancestors to help them negotiate the challenges of environmental degradation and climate change by fusing Igbo TEK with contemporary conservation initiatives. Fish & Wildlife (2011) note similar developments in ecological advancements and remarked the need for complementary efforts for ecological development. What they mean is that TEK and Scientific Ecological Knowledge (SEK) are now seen by a growing number of Western scientists and Indigenous communities as complementary "ways of knowing," and integrating the two seems to be working well for resource management. This paper investigate the intricacies of Igbo Traditional Ecological Knowledge (TEK) and its implications for current efforts to preserve the environment by employing a multidisciplinary approach that includes anthropology, environmental science, and cultural studies. Through incorporating indigenous viewpoints and elevating the voices of Igbo communities, our goal is to cultivate a more profound understanding of the priceless wisdom present in traditional ecological knowledge and its capacity to mold a more harmonious coexistence between humans and the natural world.

Theoretical Framework

The idea of Ecological Anthropology Theory developed by Roy Rappaport offers a framework for comprehending how human cultures interact with their surroundings. The notion that human cultures and the environments they inhabit are intricately interwoven is at the heart of Rappaport's theory. The interdependence of all living organisms within an environment is emphasized by Rappaport. People can understand the value of protecting biodiversity more fully when they are aware of the complex web of interactions that exist between different species and their habitats. One of the main tenets of Igbo Traditional Ecological Knowledge (TEK), which represents the native understanding and interaction with nature among the Igbo people is the interconnectedness of all living species within an environment. The interconnection and connectivity of living things are fundamental ideas in Igbo TEK. It includes the understanding that every living thing, no matter how big or tiny, is essential to preserving the harmony and balance of the surrounding ecosystem. Numerous facets of Igbo culture, like as agriculture, mysticism, and resource management techniques, are indicative of this understanding.

In Igbo TEK, the interdependence of all living things within an environment is, in essence, a way of life ingrained in traditional ecological wisdom, not only a notion. It highlights the necessity of coexistence, respect, and reciprocity between people and the natural environment, acknowledging the close connection between human well-being

and the health of the ecosystems they live in. The Igbo people believe that all living things are connected to one another and possess a life spiritual. powers. This spiritual link promotes environmental stewardship and sustainable activities by fostering a sense of reverence and responsibility towards nature.

The idea of "sacred ecology," which is to regard nature as sacred and deserving of respect, was first proposed by Rappaport. This viewpoint promotes awe and reverence for the natural world by encouraging people to form a close spiritual bond with it. Individuals who acknowledge the inherent worth of ecosystems and the organisms they sustain are inclined to give priority to conservation initiatives and embrace practices that foster ecological sustainability. Sacred Ecology appears in Igbo TEK from the Igbo cosmology which hold that there is a close relationship between the spiritual and natural worlds. The concept that rivers, forests, and mountains are home to ancestor spirits and other deities emphasizes how sacred these natural features are. For example environmental conservation which is the value of protecting the environment for next generations is emphasized in Igbo sacred ecology. Igbo culture has a system of taboos and prohibitions that are meant to protect the environment. In order to protect biodiversity and the integrity of natural ecosystems, certain land may be deemed sacrosanct and off-limits to farming or development. It is thought that breaking these taboos will have spiritual repercussions, which emphasizes how crucial it is to preserve ecological boundaries.

Rappaport's theory of ecological anthropology emphasizes the moral requirement to preserve the environment for the benefit of both the current and future generations. People are forced to take action to protect ecosystems and advance environmental sustainability because they understand the interdependence of all living things and the significance of maintaining biodiversity. People may be inspired to support laws and procedures that give the preservation and protection of the environment first priority by this sense of moral obligation. Igbo TEK encourages the notion that people are Earth's stewards, charged with the duty of preserving its natural resources for future generations. Using resources responsibly, abstaining from overexploitation, and maintaining ecological balance are all part of this stewardship ethic. Igbo TEK moral criteria are firmly anchored in social, spiritual, and cultural values that prioritize peace, stewardship, reciprocity, and respect for both traditional knowledge systems and the natural world. The Igbo people's ethical behavior is guided by these moral imperatives while interacting with the environment, resulting in sustainable practices that have supported their communities for many generations.

Traditional Ecological Knowledge (TEK)

The term Traditional Ecological Knowledge (TEK) lacks a widely recognized definition. However, many scholars have provided some definitions from different perspectives. For instance, Berkes, (2012) give a working definition of TEK as a collection of ideas, customs, and knowledge about how living things—including humans—relate to one another and their surroundings that have been passed down through cultural transmission and have evolved through adaptive processes.

Nakashima et al (2012) write that the term "traditional knowledge" refers to the knowledge and abilities that have been handed down through the ages and renewed by each succeeding generation, guiding human societies through the myriad interactions they have with their environment. Traditional Ecological Knowledge (TEK) describes the customs, beliefs, and practices that indigenous and local communities have accumulated through generations due to their interactions with the surroundings. It includes a thorough knowledge of the intricate relationships between the various components of the local ecosystems, such as the plants, animals, landscapes, and natural events. TEK is rooted in cultural and spiritual values and is frequently passed down verbally from elders to younger generations. This was the view of Kimmerer (2011) when she reminds us that ‘’TEK is also inseparable from the social and spiritual context of the culture’’. In her view, one of the main principles of Indigenous environmental philosophy is reciprocity and responsibility.

As a holistic approach, TEK incorporates aspects of human-environment relationships from the social, cultural, economic, and spiritual domains. Among other things, it covers information on medicinal plants, biodiversity preservation, forecasting the weather, sustainable resource management, and conservation techniques. Grant (2013) observed that TEK connects everything. For Grant, living in harmony with nature is the source of Indigenous Science methods. Everything is interconnected. Things and phenomena are not viewed in isolation, but rather in relation to one another. Indigenous Cosmology (a worldview) provides multiple levels of meaning about reality, two of which inform Native Astronomy, Psychology, Agriculture, Ecology, Healing, Spirituality, Rituals, History, and Art.

TEK has established itself as a reliable knowledge resource for sustainable development, conservation initiatives, and natural resource management. When it is taken into account during the decision-making process, environmental management and conservation strategies can become more efficient and suitable for the local culture. Conflicts with the prevailing scientific knowledge systems and issues like language loss and cultural deterioration are some of the difficulties that TEK must overcome. Cultural diversity preservation, cooperation, and respect for one another are frequently the goals of TEK integration with Western scientific methods. The relevance of TEK cannot be over emphasized and as a result, Kimmerer (2002) note that academics, government organizations, scientists, and legislators are looking more and more to TEK as a possible source of concepts for developing models of ecological restoration, conservation biology, and ecosystem management. In fact, TEK recognition, protection, and use are mandated by the United Nations Convention on Biodiversity.

Through centuries of observation and experience, TEK has demonstrated its rationality and dependability. TEK should be regarded as dependable because of its durability, comprehensive perception, ethical perspectives and adaptability to change. Some scholars like Prober, Michael and Fiona (2011) opined to that traditional indigenous knowledge has been shown to be logical and reliable. It developed over time and is founded on experiential thoughts that are in line with natural laws. It is expressed in language and art, derived from experience and passed down from person to person. It is necessary to understand and manage complicated ecosystems with the help of

traditional ecological knowledge, which is logical and trustworthy. We may promote more all-encompassing approaches to environmental preservation and sustainable development by recognizing and utilizing TEK alongside scientific knowledge systems.

Sacred Places, Rituals and Ceremonies for Environmental Protection.
The Igbo people strong regard for the environment and their dedication to coexisting peacefully with nature are demonstrated by their rituals, ceremonies and traditional customs. Igbo rituals and ceremonies have been instrumental in advancing environmental sustainability and peace with the natural world throughout history. The ecological relevance of these rituals and how they promote a harmonious coexistence between the Igbo people and their natural environment was observed in the day to day lives of the people in the traditional Igbo precolonial setting. By these rituals and ceremonies, the Igbo community ensures the future generations will be able to enjoy their cultural heritage and continue to support environmental sustainability by keeping these practices alive. For example, the New Yam Festival which is a celebration of the harvest season and an expression of thanks to the soil for its bounty is one of the rituals. Achebe shows how deeply ingrained the Igbo people are in the land and how they recognize the importance of preserving ecological balance.

Kanu (2021) studied Achebe's work about how Igbo environmental rituals and ceremonies place a strong emphasis on environmental stewardship. Kanu raise concern over the neglect of the environment resulting from the encounter of the Igbo and the Westerners. He writes about the precolonial existence in southeast Nigeria prior to the arrival of the West in the 19th century, as well as the effects of this encounter as narrated by Achebe in his book Things Fall Apart. Among other things, this means that African society no longer possesses the sufficient traditional or indigenous spiritual concepts required for environmental protection. The Igbo perform rites and ceremonies at hallowed locations in order to pay respect to the spirits thought to dwell there and to ask for their protection over the surrounding area. Offerings of food, beverages, or other objects said to be sacred to the spirits are frequently made at these rites. The Igbo use these rituals to protect their communities' well-being and to stay in peace with the natural world. In Igbo communities, sacred sites also function as hubs for environmental education. Generation after generation transmits information about the value of environmental protection through storytelling, rituals, and rites. This promotes a sense of accountability and care for the environment.

Okoro (2020) note that Igbo ancestors developed a philosophy that was compatible with their cosmology and was environmentally friendly. In this context, people regarded water, forests, land, animals, birds, fish, and mountains as sacred. This way of thinking prevented them from mistreating the surroundings. Essentially, the Igbo people's used sacred sites to preserve their environment as a reflection of a deeply ingrained cultural ethos that values peaceful coexistence between humans and the natural world and acknowledged the spiritual significance of nature. The Igbo community helped to preserve and managed their natural heritage sustainably for future generations by maintaining customs and beliefs related to sacred areas. The loss of Igboland's biodiversity signals the beginning of a dangerous period in which life is

becoming more and more delicate. Ecological stability is based on biodiversity, the complex web of life that includes a wide variety of plant, animal, and microbe species. The destruction of biodiversity offers a dire picture in Igboland, where nature's wealth formerly flourished in lush forests, vivid marshes, and diversified ecosystems. In view of this, Pope Francis (2015) note that losing forests and woodlands means losing species that could one day be very valuable resources for food, medicine, and other purposes. Genes from many species may prove to be essential assets in the future for meeting human needs as well as regulating environmental issues. Ecosystems break down as a result of the extinction of species, leaving behind fragmented habitats and disturbed biological processes. Pollination, pest management, water purification, soil fertility, and other aspects of the ecosystem are all impacted by this loss. In the absence of these essential ecological services, water supplies get contaminated, agricultural production decreases, and landslides and floods happen more frequently and with greater severity.

To stop environmental degradation in Igboland, there are certain taboos and prohibitions on activity inside and around sacred locations. For instance, it can be illegal to disrupt particular natural features or cut down particular trees in these places. It is thought that breaking these taboos will have spiritual repercussions, which will discourage environmental damage. Rÿser, (2011) remarked that Africans refrained from employing resources from the environment recklessly, especially whenever it came to sacred locations, forests, and revered animal habitats, African beliefs and taboos helped enforce laws and regulations for environmental preservation and conservation. Another researcher, Okoro (2020) has looked at the ecological effects of Igbo cosmology and draws attention to the fact that Igbo sacredness in protecting of environment entail sanctifying certain nature phenomena for the protection of environment. These support the idea that, in order to preserve their well-being, humans must live in harmony with the natural environment, given Igbo judgment of sacredness, Okoro stresses the significance of protecting holy groves and natural areas, which act as biodiversity hotspots and spiritual sanctuaries. He explained that he Igbo forefathers developed an eco-friendly ideology through the use of symbols that fit their cosmology. In this situation, they viewed water, forests, land, animals, birds, fish, mountains, and other phenomena of nature as sacred. The Igbo people adored natural phenomena given that they were considered sacred. They were prevented from abuse of the surroundings by this point of view.

Igbo cosmology holds that spirits have a major impact on both the material and spiritual domains, and they have power over many facets of nature, including the ecology of water. The Igbo people can draw strength, encouragement, and direction from their belief in Marin spirits to safeguard and maintain the environment of waterways. The Igbo may work toward sustainable coexistence with their natural surroundings for future generations by respecting these spiritual creatures and incorporating traditional understanding into modern conservation practices. Kanu (2021) note how Igbo protect water environment through marine spirits. He write that by preserving the water bodies that are connected to it, Mmuo Mmiri (water spirits) contribute to the preservation of the environment in traditional Igbo civilizations. The taboos connected to this spirit

entity served as a form of protection. The force attached to these taboos was what gave them their potency. People so adhered to these taboos because of their dread for what would happen to this spirit if the taboo was defied.

The Igbo people's respect for aquatic spirits inspires them to adopt ecological practices. For instance, taboos and rituals associated with traditional fishing practices are frequently used to control fishing activity and prevent overfishing of fish supplies. Furthermore, the idea that environmental degradation has spiritual repercussions acts as a disincentive to engage in destructive behaviors like pollution and habitat destruction. In Igbo mythology, sacred trees are extremely important spiritually. They are frequently said to act as bridges between the spiritual and material worlds, housing spirits or gods. Rituals and ceremonies are held beneath the shadow of these esteemed and respected trees in order to pay homage to ancestors or placate mystical beings. Some trees are considered sacred inside the boundaries of their community. Cultural norms and customary rules safeguard these trees from damage and exploitation. The Igbo people indirectly protect the environment by preserving these trees. Sacred groves, which are collections of these sacred trees, frequently function as natural reserves, protecting biodiversity and upholding ecological equilibrium. Dorm-Adzobu, Ampadu-Agyei, Veit, (1991) showed that**; ''**for centuries, local people have adhered to specific guidelines that restrict land use in and around the grove and have performed activities to secure the forest from human interferences''. (p.19).

By offering a variety of ecosystem services, sacred trees support environmental preservation. They promote biodiversity in the area by providing wildlife with food, shade, and shelter. Their vast root systems also aid in stabilizing slopes, preventing soil erosion, and holding onto water, reducing the effects of flooding and enhancing soil fertility. These trees' thick foliage also serves as a carbon sink, regulating the climate and purifying the air. Kanu, I. A. (2021) remarked the relevance of trees in protecting Igbo environment. For him it is more than just a tree; because of the spirits that live within it, they are revered as sacred people. The ecological significance of this idea lies in its ability to help people treat trees and forests with the reverence reflecting their holy personalities. Beyond their religious significance, woods were cultural systems for managing the environment that had the vital function of preserving nature and protecting the environment. (pages 85–86).

Igbo Traditional Agricultural Practices

According to Chukwu, (2015), the Igbo economy is believed to be centered on agriculture, which employs men, women, and children. It was particularly suitable to cultivation because the earth was rich in nutrients and fertile. The Igbo people had an excellent system of land tenure that met everyone's wants for land. The rich agricultural legacy of the Igbo people is all inclusive, farming (crop production and animal rearing), hunting and fishing. It is intricately entwined with their cultural and spiritual beliefs. Throughout ancient times, agriculture has played a crucial role in Igbo culture, both as a source of livelihood and a source of the Igbo people identity. The traditional agricultural expertise of the Igbo people has played a significant role in the development of Igbo communities by guaranteeing food security, protecting cultural

legacy, building community resilience, and encouraging sustainable land use practices. The agricultural growth and standard of living in Igbo land can be further improved by preserving and incorporating this ancient knowledge with contemporary agricultural practices.
There is a traditional Igbo farming systems where villagers work together to cultivate communal farmlands. This cooperative agricultural method encourages community members to support one another and form strong social bonds. Additionally, it makes it possible for labor, resources, and knowledge to be shared, which boosts community output and ensures food security for all.

The flexibility of Igbo agriculture to adapt to the local environment is one of its defining characteristics. Igbo farmers have a thorough awareness of the terrain, climate, and types of soil in their area. Over many years of observation and experimenting, they have created farming methods that optimize yield under the frequently difficult tropical circumstances found in Igbo territory. Their ability to adapt has allowed them to continue farming even in places where access to contemporary agricultural inputs are restricted. Through indigenous knowledge systems that have been passed down through the decades, Igbo traditional farming practices provide insightful information about managing crop pests and illnesses. The management of pests and diseases can benefit from the application of Igbo traditional agricultural knowledge in various ways. Included in this are companion planting, crop rotation, crop diversity, and the use of native species. Yongabi and Deluca (2015) expressed how pests are controlled by farmers through indigenous knowledge. Improving and incorporating traditional knowledge about how to manage pests and insects, prevent illnesses in plants and animals, and preserve food after harvest into the main stream of activities will not only lower the cost of maintaining biosystems but also demonstrate the value and strength of taking cues from nature's wellsprings.

Cultural activities, such as the adoption of particular rites or ceremonies said to protect crops from harm, are also incorporated into traditional Igbo farming. These practices help to manage pests and diseases. Insect and disease control, abundant harvests, and the preservation of the harmony between humans and environment are all made possible by traditional Igbo rituals and rituals. Igbo farmers often commemorate their ancestors and other agriculturally-related deities through ceremonies held prior to the planting of crops. Offerings of palm wine, kola nuts, and other customary goods are made in an effort to obtain their blessings and stay safe from illnesses and pests. The resilience of the soil against illnesses and the health of crop growth depend on its fertility. Igbo farmers practice ritual ceremonies in order to please the earth goddess *Ala,* and obtain her favors for rich land. Offerings are made to *Ala,* such as libations and prayers, in order to secure bountiful harvests and shield crops from pests and illnesses associated with unhealthy soil. Obiakor, Onuora and Nnebedum (2018) explained the Igbo belief in the spirituality of *ala* and its contributions to agricultural prodeuce; ‘’The Igbo man’s level of obedience /submission to the spiritual and physical superiority of the mother earth determines the returns he gets from agricultural produce and the overall harmony he enjoys in his habitat including supply of other natural resources like water’’. (p.72). Again, Obiakor, Onuora and Nnebedum (2018) note how

Igbo people honor land to ensure the welfare of the people; they reflected on Igbo mythology, *Ala,* one of the gods referred to as the earth goddess, is greatly respected and has a significant impact on the prosperity and well-being of the populace. They always defend it against natural and human harm because they are an agrarian people. Pope Francis (2017) in a message to indigenous participants at a 2017 Forum for Agricultural Development remarked the need to protect the earth. He said, you live history with a particular concern for mother earth because of your customs and culture, which is what you contribute to history. I implore you to keep witnessing to the fact that humanity has wasted a great opportunity by not taking care of the planet, and to reject new technologies, which are both valid and beneficial, but reject those that devastate the ecosystem, disrupt the ecological balance, and eventually undermine peoples' wisdom. Through the traditional indigenous knowledge, the Igbo people have extensive knowledge of herbal medicines, which they employ in agriculture to manage pests and diseases in addition to using them for therapeutic purposes. Some plants are thought to have insect-repelling qualities, and others can function as organic pesticides. For example, farms often have *Vernonia amygdalina*, a bitter leaf plant, planted around their perimeters as an insect deterrent. A better environment is also promoted by planting specific trees and shrubs next to crops as natural barriers against pests and as sources of shade. Some of these herbal remedies are frequently applied to crops, sprayed on them, or fumigated as part of agricultural operations.

Generally, Igbo agricultural rituals emphasize the connection between humans, nature, and the divine while serving practical as well as spiritual and cultural reasons. Igbo farmers employ these techniques to preserve a respectful relationship with the soil and the supernatural entities they believe to be in charge of it, as well as to safeguard their crops from pests and illnesses. Again, Yongabi and Deluca (2015) remarked the relevance of TEK for the improvement of agriculture in Cameron which is also applicable to Igboland. They maintained that several traditional agricultural knowledge bases have been gathered and used as a basis for the development, validation, testing, and application of suitable advances in biotechnology for low-cost, low-tech disease and pest management tactics on Cameroonian crops. All things considered, the findings show how many African tribes have a rich heritage of traditional knowledge. Plant and livestock illnesses can be effectively treated with medicinal plants in an environmentally sustainable manner by employing basic biotechnologies.

Incorporating Igbo traditional agricultural knowledge into biotechnology has enormous potential to address modern agricultural issues like sustainable development, food security, and climate change adaptation. Through the use of the centuries-long wisdom gathered by Igbo farmers, biotechnologists can create novel approaches to improve agricultural output and resilience to worldwide challenges. Ogen, (2007), hold the same view that; ‘’Modern approaches to agricultural development will continue to fail unless they take into consideration a society’s indigenous skills and knowledge systems’’. The agricultural techniques of the Igbo people have changed as a result of technology and urbanization, but traditional knowledge is still highly valued and acknowledged for its significance in maintaining food security, cultural retention, and environmental sustainability. Incorporating modern agricultural technologies with traditional

knowledge has the potential to improve Igbo communities' resilience and advance sustainable development.

Indigenous Igbo Medicinal Plants and Healing Practices

Traditional Igbo knowledge of using native plants medicinally has long been a vital component of community healthcare. The Igbo people have a rich history of using herbal medicine. This knowledge was passed down orally from predecessors who relied on the abundance of nature to treat illnesses and keep people healthy. Okonkwo (2012) made reference to World Health Organization (1978) defines traditional medicine as "The knowledge, skill and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in prevention, diagnosis, or treatment of physical and mental illness" Igbo culture has long relied on traditional knowledge about medicinal plants because they believe that the natural world has cures for a wide range of illnesses. Practitioners of herbal medicine, often known as *dibias* or native doctors, are essential in utilizing this knowledge and incorporating it into community healing rituals.

Okwu and Josiah (2006) write that; ''the use of medicinal plants for the treatment of disease and infections is as old as mankind. Therefore, many indigenous plants are used in Traditional medicine to cure diseases, heal injuries and infections''. (p.676). The traditional understanding of Igbo medicinal plants promotes biodiversity preservation. Indigenous healers have extensive knowledge of the uses, growth patterns, and habitats of many plant species. They prevent overexploitation of particular plant species and support the preservation of regional ecosystems by using these plants sustainably. Agroforestry is encouraged because a large number of the medicinal plants used in traditional Igbo medicine are grown or gathered from agroforestry systems. These systems encourage the sustainable coexistence of trees, crops, and occasionally cattle. In order to sustain long-term agricultural output while protecting the environment, agroforestry improves soil fertility, conserves water, and reduces erosion.

Igbo traditional medicine is notable for its holistic approach, which takes into account not only the physical symptoms of disease but also its spiritual and emotional components. Herbal treatments are frequently produced in conjunction with prayers and rituals to call upon spiritual energies thought to increase their effectiveness. Igbo culture makes use of a wide variety of native flora for medical purposes. For example, *Azadirachta Indica* known as *dogonyaro* in Nigeria, bitter leaf, and cashew leaves are used, for instance, to cure fever, malaria, and stomach problems. Another plant with medicinal qualities is utazi (Gongronema latifolium), which is frequently used to ease stomach discomfort and promote digestion. In addition, plants with antibacterial qualities, such as Uziza (Piper guineense) and Nchanwu (Ocimum gratissimum), are prized for their ability to treat infections and enhance general health. The use of these plants are as a result of indigenous knowledge. Cajete (1994) showed that awareness of indigenous people's knowledge about their environment manifest in their use of

medical plants. Indigenous people's understanding of their surroundings is evidence of their inventiveness, resourcefulness, and capacity to learn and pass on a harmonious coexistence with the natural world. From instruments for navigation to the use of plant and animal medicines, from conventional farming practices to an awareness of the distinctive features of specific ecologies

But even though traditional medicine is beneficial and holds great cultural value in Igbo society, there are obstacles to its use in the contemporary world. The employment of conventional medical practices has decreased as a result of urbanization and the development of Western medicine. Additionally, incorporating traditional medicine into official healthcare systems is hampered by the absence of scientific validation and uniformity.

There are initiatives underway to conserve and advance Igbo traditional medicine, such as recording traditional wisdom, conducting scientific studies on the effectiveness of herbal treatments, and fostering partnerships between contemporary medical professionals and traditional healers. Acknowledging the importance of traditional knowledge can benefit healthcare access, biodiversity preservation, and cultural heritage preservation. Okonkwo (2012) observed the argument that practitioners of traditional healing systems lack literacy and an understanding of human anatomy has also been used to critique these systems. Since the prescribed medications and plants do not go through laboratory testing, they may nevertheless contain certain hazardous components that could do more harm than good to the body. Igbo people's utilization of traditional knowledge about medicinal plants symbolizes a strong bond between them and the natural world. It represents an all-encompassing method of healthcare that incorporates environmental, spiritual, and bodily aspects. Communities in Igboland and beyond can benefit from improved healthcare practices and increased well-being if promotion of traditional medicine is taken very important as proposed by the UN. Adachukwu, and Omeh N. Y. (2014) note the promotion of traditional medicine by the UN; ‘’The United Nations through WHO programs sought to promote and develop traditional medicine in Health care systems, to integrate traditional medicine and modern/orthodox medicine and to promote manpower development and research in traditional Medicine (WHO 1978)’’.

Opportunities of the Integration of Igbo TEK into Modern Discourse

Bringing Traditional and Scientific Knowledge Together: Growing awareness of the significance of incorporating Traditional Ecological Knowledge (TEK) into modern conservation efforts has been observed in recent years. As a result of that, including Igbo TEK in modern conservation initiatives offers a chance to bring traditional and scientific knowledge together. Machuga, (2002) remarked that; ‘’both indigenous knowledge and Western science work from a realist premise; that is, they both hold that objective knowledge that is attainable’’.

A more comprehensive understanding of ecosystems can help conservation efforts and increase their efficacy by acknowledging the complimentary nature of various knowledge systems. This can be achieved by encouraging traditional practitioners and

scientific researchers to work together with mutual respect. Combining traditional knowledge with scientific understanding can promote innovation and sustainable practices while providing a more thorough understanding of a variety of phenomena. In fact, promotion of interdisciplinary research that integrates knowledge from conventional and scientific fields can offer fresh viewpoints and answers to challenging environmental challenges in Igboland.

Documentation and Preservation: In areas with a rich cultural heritage, such as Igboland, documentation and preservation are essential to the maintenance and rebirth of ecological knowledge which is indigenous. A multitude of traditional information that has been gathered over many generations is embodied in the complex web of Igbo rituals, beliefs, and behaviors. However, the dissemination and preservation of this priceless knowledge face difficulties in the face of modernity and globalization. Therefore, the need to record and maintain TEK in Igboland becomes an essential undertaking, not only for the protection of cultural heritage but also for the promotion of sustainable development, ecological resilience, and community empowerment. In the context of Igboland's changing sociocultural landscape, there is need for the methodical documentation and preservation of TEK which enhance its importance, relevance, and continuity. And for this documentation to be possible there is need for synergy between the modern and traditional knowledge. Scientific study and cultural preservation can both benefit greatly from this documentation.

Validation and Integration: There is need to use scientific techniques to validate traditional knowledge, and incorporate it into widely accepted scientific frameworks. To comprehend the fundamental concepts and mechanisms, this procedure entails extensive testing and analysis. Reservation of TEK is the culmination of many generations' worth of knowledge about ecosystems, the environment, and sustainable living. In order to protect cultural heritage in this global age, TEK must be validated through documentation in order to be preserved and passed on to future generations. A thorough grasp of ecosystems is possible by fusing TEK with Western scientific knowledge. By combining traditional wisdom with cutting-edge research techniques, this integration has the potential to produce conservation plans that are more successful. Integrating and validating TEK with Western scientific knowledge systems is necessary, as is placing TEK inside a scientific framework.

Education and Awareness: To foster cultural appreciation and increase awareness, there is need to include traditional knowledge into curricula at all educational levels. This may aid in bridging the traditional and scientific worldview divide.
The integration of Traditional Ecological Knowledge (TEK) with contemporary scientific knowledge is greatly aided by education and awareness campaigns. Education aids in people's comprehension of the importance and worth of both TEK and contemporary knowledge systems. By educating individuals about these two knowledge systems' complementary qualities, people would be encouraged to value and integrate each knowledge.

Education exposes people to a variety of viewpoints and knowledge systems, which helps to promote understanding across cultures. Education that integrates traditional knowledge with contemporary understanding, helps people to understand indigenous wisdom and how applicable it is in solving problems. This cultural education and awareness would be faster when forums are set for scientific institutions and indigenous tribes to work together and share knowledge. These would promote communication, reciprocal learning, and knowledge coproduction, which integrates TEK with contemporary scientific thinking. Integration of TEK and contemporary knowledge is mostly driven by awareness and education. They help society to utilize the collective wisdom of multiple knowledge systems for the benefit of current and future generations by fostering respect for one another, cooperation, and understanding across cultural boundaries.

Challenges of the Integration of Igbo TEK into Modern Discourse

Lack of Acknowledgement and Respects: An important obstacle to Traditional Ecological Knowledge (TEK) integration into contemporary knowledge frameworks is the disdain for indigenous knowledge systems. One of the major causes of the disrespect for the TEK is false colonial mentality. Colonial rulers disregarded or intentionally suppressed Igbo and other African's indigenous knowledge systems because they believed Western scientific knowledge to be superior. This is the legacy of colonialism. Igbo indigenous perspectives continue to be marginalized as a result of this mentality. Ude (2004) remarked that; ''knowledge that have held the Igbo society together are being systemically subjugated under Western epistemic paradigms … It should generate serious concern that the system of knowledge which gave meaning and orientation to the Igbo society is fast being eroded. (pp.28-29).

Consequently, Western science has shaped world knowledge systems more than other scientific disciplines, frequently at the expense of other approaches including the Igbo indigenous knowledge. The standards that Western science uses to determine acceptable knowledge such as empirical data and peer review may not match the processes by which Igbo indigenous knowledge is produced and passed down from generations to generations.

Recognizing, respecting, and actively integrating indigenous knowledge systems into popular discourse and decision-making processes are necessary to overcome these barriers. To do this, it is necessary to build deep relationships with indigenous populations, value different points of view, and confront long-standing power systems that support inequity and marginalization. The integration of TEK into contemporary knowledge frameworks will only be possible with sincere cooperation and respect for one another. This will enhance our comprehension of the environment and encourage the development of more fair and sustainable resource management practices.

Barriers to Effective Communication and Collaboration: Barriers related to language and culture: Because Traditional Ecological Knowledge (TEK) is generally passed orally and communicated in indigenous languages, it can be difficult for conservation practitioners and indigenous populations to communicate and work

together. Language limitations restrict indigenous peoples' ability to participate in conservation decision-making processes and impede the accurate transfer of information. Again the Westerners, subdue Igbo language just like other African Languages as means to relegate Igbo culture. Ude (2004) observed that the suppression of the colonial subjects' believed "barbaric" languages was the main component of the colonial powers' "civilizing mission," which included teaching the subjects to speak "civilized" languages and facilitating the replacement of the local culture, since language is one of the most effective means of subjugation.

The integration of Traditional Ecological Knowledge (TEK) with modernity in Igboland, Nigeria, might be significantly impeded by effective communication measures. One of the main obstacles is the language barrier that exists between groups of people with traditional knowledge, such as elders and traditional practitioners, and contemporary organizations or people. People who support modernization could not understand or value TEK, which is frequently taught orally and in Igbo language. The interchange of knowledge and understanding between the two systems may be hampered by this communication gap.

Another problem of communication is culture divide. Understanding cultural contexts and subtleties is necessary for effective communication. The conflict between contemporary ideas and traditional cultural norms in Igboland might produce a rift that obstructs successful communication. It may be difficult or reluctant to share TEK with contemporary organizations or people if modernity is perceived as a threat to traditional ways of life. The transmission of TEK may be greatly influenced by traditional leaders and elders who try to present Igbo culture in a better form, while the modern or the developed who assume their culture to be superior always try to marginalize the TEK. This disparity in culture has the potential to impede information exchange and impede the incorporation of TEK into contemporary behaviors.

Power Dynamics and Equity: Integration of Traditional Knowledge (TEK) can be hampered by power disparities between Igbo indigenous communities and outside conservation actors. The inadequate recognition of indigenous peoples' rights to their native territory and resources frequently results in conflicts on land use and conservation goals. To achieve successful integration, it is imperative to tackle these power dynamics and guarantee fair collaborations.

In Igboland, incorporating Traditional Ecological Knowledge (TEK) with contemporary science comes with a number of difficulties, especially when it comes to equality and power relations. As said earlier, Igbo traditional knowledge is entwined with its ecological awareness and cultural traditions. However, historical power disparities and fairness concerns make it difficult to integrate this knowledge into contemporary scientific frameworks. For instance in Nigeria, Western dominance in scientific institution where universities and research organizations are examples of contemporary scientific institutions frequently give priority to Western scientific viewpoints and methodology. Since Igbo TEK might not meet Western scientific criteria or be accepted as valid information in these organizations, its dominance could result in its marginalization.

Another is knowledge hierarchies where Western science is most often regarded as having greater validity and credibility than Igbo indigenous knowledge systems in a hierarchical perspective of knowledge. The implication of this is that incorporation of Igbo TEK into contemporary scientific discourse may be hampered by this hierarchy since it may not receive the same respect or acknowledgment.

In order to address these issues, it will take a concentrated effort to uphold the dignity of traditional knowledge (TEK), empower indigenous people, and encourage fair collaborations between scholarly researchers and Igbo traditional knowledge keepers. This could entail actions like collaborating with indigenous populations to co-design research projects, setting up forums for discussion and information sharing, and including indigenous viewpoints into scientific curriculum and policy-making procedures. The incorporation of Traditional Ecological Knowledge (TEK) into contemporary science in Igboland can support more comprehensive and sustainable methods of environmental management and conservation by recognizing the value of multiple knowledge systems and encouraging inclusive practices.

Poverty: Poverty can seriously obstruct Igboland's efforts to incorporate Traditional Ecological Knowledge (TEK) into contemporary science; Poverty can lead to limited access to education. In Igboland's rural areas, poverty prevents people from attending formal schools. Without a sufficient education, people could not have the knowledge and means to participate in contemporary scientific endeavors or recognize the significance of their traditional knowledge. Lack of money can make it difficult to obtain the technology, communication tools, and transportation that are necessary to record, conserve, and spread TEK. Opportunities for cooperation between traditional knowledge holders and scientific researchers are often restricted by a lack of financing for research projects.

Poverty disproportionately affects vulnerable populations by exacerbating already existing socioeconomic inequality. Due to lack of resources, social capital, and representation, these communities who are the guardians of TEK may encounter extra obstacles to taking part in scientific research and decision-making procedures. People in poverty are more likely to be exploited because they may feel pressured to give up their traditional wisdom in exchange for quick cash. This risk is further increased by the absence of legislative safeguards and fair benefit-sharing arrangements, which eventually results in the commoditization and disappearance of TEK.

In Igboland, addressing poverty as a barrier to TEK integration into contemporary science necessitates comprehensive strategies that place a high priority on community empowerment, equitable collaborations, and poverty alleviation. Communities' ability to interact with both conventional knowledge systems and contemporary scientific methods can be strengthened by initiatives aimed at expanding access to economic, healthcare, and educational opportunities. Furthermore, by encouraging inclusive and participatory methods of research and decision-making, underprivileged communities can be strengthened and their perspectives and expertise recognized and included into projects for sustainable development.

Recommendations

1. **Advocating and Recognition Policies**: Encourage the acknowledgement and defense of indigenous rights, such as the ability to access and control customary lands and resources. Encourage the inclusion of TEK in the national international environmental frameworks, laws, and policies. Give indigenous people the tools they need to participate in policy discussions and decision-making procedures so that their opinions are acknowledged and heard.
2. **Investigation and Originality**: Promote research projects that link modern science and technology with indigenous knowledge systems. Assist local scholars and professionals to carry out collaborative research initiatives that validate and improve TEK for contemporary issues. Look into creative ways to incorporate TEK into environmental management and research, such as indigenous mapping and community-based monitoring.
3. **Conservation and Resource Management**: Incorporate TEK into strategies for preserving natural resources, such as those pertaining to biodiversity, water conservation, and land use planning. Develop community-led projects which support agroforestry, sustainable agriculture, and TEK-compliant traditional medical practices. Stimulate the renewal of age-old conservation techniques which protect natural resources, such as taboos, sacred groves, and customary laws.
4. **Record-keeping and Conservation**: Place emphasis to archiving indigenous ecological knowledge, that includes customs, beliefs, and understanding about environmental management.
   To ensure that TEK is preserved for future generations, make use of multimedia platforms like written documents, oral histories, and movies. Create community-led programs to help Igbo communities preserve and share their traditional knowledge.
5. **Training and Developing Capabilities**: Develop educational programs to raise awareness and cultivate an appreciation of TEK in the neighborhood's schools and community facilities.
   Incorporate TEK in both formal and informal education programs, emphasizing its connection to environmentally friendly behaviors that are sustainable. To revive traditional skills and traditions, offer youth and community members training and capacity-building programs.

Conclusion

The best way to achieve environmental sustainability in Igboland is exploring Traditional Ecological Knowledge (TEK) within Igbo culture. We may find creative answers to today's environmental problems while recognizing and respecting the rich cultural legacy of the Igbo people by preserving, documenting, and integrating indigenous wisdom, practices, and beliefs.

By highlighting the significance of peaceful coexistence and stewardship, TEK offers an extensive framework that recognizes the interdependence of humans and their environment. Resilience, biodiversity protection, and community well-being can all be improved by integrating TEK into research, teaching, policy, and practice. For TEK to be successfully incorporated into environmental initiatives that are moving ahead,

cooperation, capacity building, and policy advocacy must be given top priority. We can build a more equitable and sustainable future for Igboland by strengthening local knowledge holders, empowering indigenous people, and amplifying their voices in decision-making processes.

Adopting TEK helps to preserve Igboland's ecosystems and natural resources while also reaffirming the Igbo people's cultural identity and legacy. We can create a route towards environmental sustainability that respects the past, enhances the present, and protects the future generations by working together and being dedicated to taking advice from our elders.
Using traditional ecological knowledge (TEK), which is based in indigenous knowledge and cultural values, offers a comprehensive approach for environmental sustainability in Igboland. Fostering resilient ecosystems, dynamic communities, and a harmonious coexistence between humans and the natural environment can be achieved through the integration of TEK into research, education, policy, and practice. For the sake of both the present and the future generations, it is essential to recognize, protect, and celebrate the priceless contributions offered by Igbo culture to environmental stewardship.

Anayo Ossai, PhD
Department of Religion and Human Relations
Nnamdi Azikiwe, University, Awka, Nigeria.
ab.ossai@unizik.edu.ng

References

Adachukwu, I. P. and Omeh N. Y. (2014). A review of the Ethnotherapeutics of medicinal plants used in traditional/alternative medicinal practice in Eastern Nigeria. *International Journal of Current Microbiology and Applied Sciences.* Vol.3, N.1. http://www.ijcmas.com.

Anne Grant, A. (2013) Traditional Ecological Knowledge [and its Application to Ecological Management]. https://www.firescience.gov.>project.

Berkes, Fikret. 2012. *Sacred Ecology. 3rd Edition*. New York: Routledge, Taylor & Francis Group.

Bhagwat S., Ormsby, A.A. and Rutte, C., (2011). The role of Religion in Linking Conservation and Development: Challenges and Opportunities. J. Study Religion Nat. Cult. 5(1):39-60.

Cajete, G. A. (1994). Look to the mountain: An ecology of Indigenous education (1st Ed.) Kivaki Press.

Deloria, Vine, Jr. 2006. *The World We Used to Live In*. Golden CO: Fulcrum.

Kanu, K.I. (2021). Ecological Significance of Mmuo Mmiri (Water Spirits). In Igbo Philosophy and Religion*:* Ecological Significance of Mmuo Mmiri (Water Spirits) In Igbo Philosophy and Religion. Journal of African Studies and Sustainable Development. acjol.org Google Scholar.

Kanu, I. A. (2021). Sacred Trees/Plants: The Greening of Igbo-African Religion *African Indigenous Ecological Knowledge Systems.* Google Scholar.

Kimmerer, R. (2011). Reclaiming the Honorable Harvest. TEDx Sitka. http://www.youtube.com/watch?v=Lz1vgfZ3etE

Kimmerer, R.W. (2002). Weaving Traditional Ecological Knowledge into Biological Education: A Call to Action. *Bioscience* 52 (5) 432-438.

Machuga, R. (2002). *In Defense of the Soul: What it means to be Human*. Grand Rapids, MI: Brazos.

McWhorter, L.V. (2000). *Yellow Wolf: His Own Story*. Caldwell, ID: Caxton Press

Nakashima, D.J. Galloway, M. K, Thulstrup H.D, Ramos C. A, Rubis, J.T (2012). Weathering uncertainty: Traditional knowledge for climate change assessment and adaptation. UNESCO and Darwin, UNU, Paris.

Obiakor E. E., Onuora N.T. and Nnebedum T. N. (2018). Environmental Preservation: The Igbo approach. *Idosr Journal of Humanities And Social Sciences* 3(1): 68-85.

Ogar Eneji, C.V., Ogundu, C.N., I. A. Ojelade, I.A. (2019). Indigenous Cultural Practices and Natural Resources Conservation in Owerri, Imo State, Nigeria. *Advances in Social Sciences Research Journal* – Vol.6, No.8. DoI:10.14738/assrj.68.6381. Google Scholar.

Ogen, O. (2007). Traditional Farming and Indigenous Knowledge System in Africa: A Perspectives from Ikale Yoruba Experience. Researchgate.

Okonkwo, E.E. (2012). Traditional Healing Systems among Nsukka Igbo. *Journal of Tourism and Heritage Studies*. Vol. 1, No.1. Google Scholar

Okoro, K**.** N. (2020). African (Igbo) Traditional Religious Thoughts and Modern Nigerian Environmental Crisis: A Reconsideration. *Middle-East Journal of Scientific Research* 28 (3): 240-253. Google Scholar.

Okwu, D.E., and Jossiah, C. (2006). Evaluation of the Chemical Composition of Two Nigerian Medicinal Plants. *African Journal of Biotechnology*, 5, 357-336. https:www.scirps.org.

Pope Francis, (2015). Laudato Si: On Care for Our Common Home. Vatican City: Liberia Editrice Vatican, no. 32.

Pope Francis (2017). Indigenous Peoples Participating in the Third Forum Held by the International Fund for Agricultural Development (IFAD). Holy See Press Office. http://press.vatican.va/content/salastampa/en/bollettino/pubblico/2017/02/15/170215a.

Prober, S. M., Michael H. O'C. and Fiona J. W. (2011). Australian Aboriginal People's Seasonal

Knowledge: a Potential Basis for Shared Understanding in Environmental Management. *Ecology and Society* 16(2):12. http://www.ecologyandsociety.org/vol16/iss2/art/12.

Rÿser, R. (2011). Indigenous people and traditional knowledge [Internet]. Berkshire Encyclopedia of Sustainability. http://www.academia. edu/841635/.

Takako (2004). Traditional Ecological Knowledge: From the Sacred Black Box to the Policy of Local Biodiversity Conservation.

Ude, D. M. C. (2004).*Endangered African Knowledge and the Challenge of Modernity: An Igbo Response*. London and New York: Routledge Taylor & Francis Group. Google Scholar.

U.S. Fish & Wildlife Service. 2011. "Traditional Ecological Knowledge for Application by Service Scientists." Native American Program, Arlington. http://www.fws.gov.

Yongabi, K. and DeLuca, L. (2015). Potentials of Indigenous Knowledge and Ethnobiotechnology in Sustainable Agriculture in Sub Saharan Africa. Google Scholar.