

The State and Future of Indigenous Knowledge System in Nigeria

Okpara, Hannah Udemma
Lax Otti Memorial Library
Babcock University, Ilishan-Remo, Ogun State
Okparahannah@gmail.com,
08064348253

&

Ikokoh, Catherine Enatta PhD
National Institute for Legislative and Democratic Studies, National Assembly.
Cathrine_ikoho@yahoo.com,
08036546364

Abstract

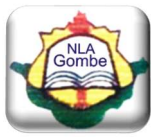
The paper discussed indigenous knowledge systems in Nigeria. It began with introducing the concept of indigenous knowledge system and articulates the definitions for indigenous knowledge. It went further to discuss indigenous knowledge systems, highlighting some indigenous knowledge systems used in Nigeria and listed organizations for indigenous knowledge in Nigeria. It went further to enumerate some of the challenges associated with indigenous knowledge systems in Nigeria and provided a conclusion and recommendation.

Keywords: Indigenous knowledge, Indigenous knowledge system, Culture, Tradition, Knowledge.

Introduction

In recent time the role and contribution of Indigenous Knowledge Systems (IKS) have expanded the scope of studies and education. Indigenous knowledge is home-grown knowledge that enables communities to make sense of who they are and to interact with their environment in ways that sustain life. It is referred to knowledge passed down from generation to generation through words of mouth in the form of folklore, idioms, proverbs, songs, a rite of passage and rituals all arising from life experience. Senanaryake (2006). It covers the broad spectrum of life and therefore there are different types of indigenous knowledge ranging from people's beliefs, medicine, arts and craft etc. An indigenous knowledge system is an accumulation of the knowledge and practice of a society or community. It is the collection of interrelated practices associated with the people of a locality or society. As stated by Adeniyi and Subair (2013) and Pandor (2015), no indigenous knowledge system is superior to the other and areas of application generally include agriculture, medicine, economy, governance, culture, worship and religion, conservation and utilization of natural resources. They manifest as indigenous cultural expressions, are interrelated and impact the way of life of the people. Indigenous knowledge (IK) and an indigenous knowledge system (IKS) refer to the knowledge system that is unique to a given culture chikaire etal (2012).

Indigenous knowledge (IK) can also be defined as a body of knowledge belonging to communities or ethnic groups, shaped by their culture, traditions and way of life. The term is sometimes used interchangeably with traditional knowledge. Knowledge is described as being explicit and tacit, it is mainly tacit as it resides in people's heads and has for the most part not been codified. Indigenous knowledge has several unique characteristics as listed below:



- i. An individual does not own indigenous knowledge because it is a product of the culture, tradition and way of life of a community. It is thus community-owned
- ii. It is usually passed orally from generation to generation; it is not codified or documented anywhere except in the minds of the community and the community's knowledge custodians, such as chiefs, traditional doctors etc.
- iii. It has the potential to provide (and has done in many cases) economic returns either to the community that owns it or to the individuals who may have taken it away.

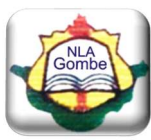
Indigenous knowledge is sometimes referred to as traditional or local knowledge and it refers to the long-standing traditions and practice of a particular regional, indigenous or local communities. Indigenous knowledge also encompasses the wisdom, knowledge, values, norms and teachings of these communities.

Indigenous Knowledge

Indigenous knowledge or Local Knowledge hereafter referred to as IK/LK it has no standard definition (Adedipe, Okuneye, and Ayinde, 2004) but generally accepted themes that constitute IK exist. "It is variously regarded as ethnoscience, folk knowledge, traditional knowledge, local knowledge, people's knowledge, among others" (Adedipe et al., 2004). Grenier (1998) opines that indigenous knowledge (IK) refers to the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular geographic area. IK is defined as "what indigenous people know and do, and what they have known and done for generations- practices that evolved through trial and error and proved flexible enough to cope with change" (Christopher, 2015). By this definition, one can understand that indigenous knowledge involves trial and error of solutions to problems or situation and the working solution becomes an acceptable practice after a while in that society; this is also one of the characteristics of IK. It is defined by IUCN cited in Bisong and Andrew-essien (2010) as "local community-based knowledge, which is unique to a given culture or society and has developed as that culture has evolved over many generations of inhabiting a particular region". It also refers to the collective knowledge of indigenous people about relationships between people, environment, and nature. According to (Ajani, Mgbenka, and Okeke, 2013), Indigenous knowledge has been defined as "institutionalized local knowledge that has been built upon and passed on from one generation to the other by word of mouth". That is, it is the knowledge that is undocumented but passed orally from one generation to another. It is also transferable to the descendants of a culture or society as it provides the connection to their local environment. UNESCO cited by Christopher (2015), defined Indigenous knowledge also as:

"a complete body of knowledge, know-how and practices maintained and developed by people, generally in rural areas, who have extended histories of interaction with the natural environment. These sets of understandings, interpretations and meanings are part of a cultural complex that encompasses, naming and classification systems, practices for using resources, ritual, and spirituality and world view. It provides the basis for local-level decision making about many fundamental aspects of day to day life".

To Haverkort and de Zeeuw (1992) in Adedipe et al.(2004), "IK is the actual knowledge of a given population that reflects the experiences based on traditions and includes more recent experiences with modern technologies". This definition also affirms that IK is dynamic and flexible such that it could adapt to changes as well as enhance coping with changes. While several authors have defined indigenous knowledge, no one definition may be generally accepted as indigenous knowledge varies from one society or culture to another but common



features and themes appear that describe the concept in the various contexts. One can therefore posit that IK is the local knowledge that is unique to a culture or society; an information base developed through experiences over time and in the words of Adedipe et al. (2004), a non-conventional body of knowledge that deals with little theory, but more of beliefs, practices, unintended experiments with errors and technologies, developed without direct inputs from the modern, formal, scientific establishments. It is informal knowledge, owned by a community and it is culture and context-specific (Msuya, 2009).

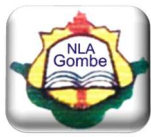
According to Adeniyi and Subair (2013), “IK comprises of many parts ranging from culture, religion, mythologies, economy, governance, medicine, and agriculture to taboos, poetry, art and crafts and many more. It is often related to oral history, oral archives and oral tradition”; what is obvious is that the local people, over the years, have always been knowledgeable about their environment and natural resources as it applies to governance, farming/agriculture (Adedipe et al., 2004; Bisong and Andrew-essien, 2010), medicine (Emeagwali, 2014), natural resources management (Akinwale, 2012; Bisong and Andrew-essien, 2010), religion, etc; and the methods applies can be verified by scientific methodologies.

Indigenous Knowledge Systems

According to Greiner (1998) the development of IK systems, covering all aspects of life, including management of the natural environment, has been a matter of survival to the peoples who generated these systems. Such knowledge systems are cumulative, representing generations of experiences, careful observations, and experiences, careful observations, and trial-and-error experiments. Indigenous information systems according to Masango (2010) cited in Iyoro and Ogungbo (2013), is “the totality of all knowledge and practices established on past experiences and observations that is held and used by people”. IK systems are dynamic, and are constantly influenced by creativity and experiments as well as by contact with other systems. “It is an accumulation of knowledge from previous generations and provides a structure of knowledge that explains the relationship of events in a community; it also serves households, individuals and communities as a base for information processing, and decision making” (Materer, Valdivia, and Gilles, 2002). According to Iyoro and Ogungbo (2013), IK system is seen as a set of perceptions, information and behaviour that guide local community members in the use of the land and natural resources and has been well-known to make significant contributions to the sustainable development of local communities. These perceptions have always guided the acts and practices of the local people for decades and have also suffered social and developmental pressures, but are still relevant to the generations today as they were then.

Although IKS vary from one society to another, they often have a common goal which is to help cope with changes and to survive. According to Materer et al. (2002), “IKS is not transferable but provides relationships that connect people with their local environment and the changes that occur within it”. In other words, the system cannot be transferred to another society as it is unique to its founding society/culture and connects them to their ancestral locality. The reason for this is that the knowledge base uses a specific language, sayings and belief process and therefore permits interactions that cannot be identified in other communities or cultural contexts (Materer et al., 2002).

Indigenous Knowledge Systems were also developed by undocumented experimentation; legalized and strengthened “under suitable institutional frameworks, culture and practices” and have been passed on discriminatorily from one generation to another to enable “indigenous people to survive, manage their natural resources and the ecosystems



surrounding them like animals, plants, rivers, seas, natural environment, an economic, cultural and political organization” (Eze and Ike, 2013).

Indigenous Knowledge Systems in Nigeria

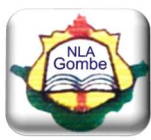
This brings us to linking our beliefs, myth and practices among others to our environment, culture and society as Nigerians based on our geographical region. Indigenous knowledge is expressed in taboos, myths, beliefs and practices; this guard the behaviour and everyday existence of the indigenous people. “ In most African communities, the ancestral spirits are believed to be living in the forests and special trees, caves and ruined homes and water bodies” (Ngara and Mangizvo, 2013), and this belief is passed from one generation to another to prevent misuse or desecrate the land. While doubts and scepticism are still expressed in many quarters about the feasibility and scientific validity of rural knowledge system to aid improve the lives of the local people as well as bring about development, “there is a growing body of evidence that attests to the success (despite some limitations) of community-based forest and natural resource management decisions” towards conservation and preservation of the habitat (Bisong and Andrew-essien, 2010).

The Igbo communities (South-East Nigeria) use traditional taboos (laws) and sanctions to safeguarded cultural values and to preserve “sacred groves” for the ultimate aim of better management and conservation of the natural resources (Anoliefo et al., 2003 cited in Ngara and Mangizvo, 2013). The natural environment and resources are under serious threat but the cultural taboos and sanctions have helped to check abuse of the environment among the local people. This is evident in the farming systems, land and forests care, trees, wildlife and streams management of the people.

The indigenous cropping systems used by farmers in Nigeria include sequential cropping, mixed cropping, mono-cropping, intercropping and border cropping while crop rotation is the soil healthcare practice used to prevent a build-up of common pests and diseases over the years; these methods were applied in maintaining cost-effective and environment-friendly crop yields. Weed management practices also existed where weeds are left to grow alongside the crops, this they saw as a way of preventing heat from excessively drying out the soil; this also promoted crop growth as a positive competition between the crops and weeds existed. Weeds were removed when it is seen as being harmful to the growth of the crops but even at this point, they are left on the surface of the soil as “protective mulch, to recycle nutrients and to allow nitrogen assimilation through the bacteria decomposing the plants; although they did not know the physiological scientific basis of their practices, they knew that their methods sustainably improved yields”(Adedipe et al., 2004; Ajani et al., 2013). More so, “the development and use of local knowledge including agricultural practices are generally believed to conform to ecologically sound land management systems” (Bamigboye, 2015).

In a study by Bamigboye (2015), IK system used in local communities in Ekiti State, Nigeria in the production of vegetables abound in various stages of the cultivation; amongst these, Seeds were treated with ‘ogirisoko’ portion to guard against soil-dwelling insects before panting, organic manure, bush fallowing and cover cropping are practised for soil fertility management, dusting with Iroko wood ash was done to prevent leaves defoliating insects, black local soap and *occimum* portions were used for disease control and damping-off tomatoes and pepper.

In the aspect of education, traditional education processes were carefully constructed around observing natural processes and using natural materials to make their tools and kits; what was taught was entwined with social life. According to Eze and Ike (2013), “Indigenous education



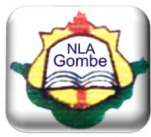
was not only concerned with the systematic socialization of the young generation into norms, beliefs and collective opinions of the wider society but also placed a very strong emphasis on learning practical skills and the acquisition of knowledge which was useful to the individual and society as a whole". In other words, it emphasized social responsibility, job orientation, political participation and spiritual and moral values. To a large extent, indigenous education was holistic as all areas of life were infused into learning.

People in rural communities in Nigeria are endowed with local knowledge of traditional medicine, land use and management, family healthcare, breeding of food crop species, preservation of seeds, and the domestication and use of wild edible plants, this varied knowledge with individuals practices over time becomes a system adopted community wise and becomes domiciled in that community with the individuals who practice it as proponents (Ugboma, 2014). She also reports the proposition of Olatokun and Ayanbode (2009), who posits that Nigerian women are the most knowledgeable and as such are the custodians of knowledge in land use and management, child delivery, family planning, and health care.

In the aspect of medicine and family health, traditional medicine is largely plant-based. Traditional medicine practise, believes that "the human being is both a somatic and spiritual entity, and that disease can be due to supernatural causes arising from the anger of ancestral or evil spirits, the result of witchcraft or the entry of an object into the body; therefore not only the symptoms of the disease that are taken into account but also psychological and sociological factors. Thus the holistic nature and culture-based approach to traditional healthcare is an important aspect of the practice, and sets it apart from conventional western approaches". Traditional medicine practise includes various remedies, approaches, knowledge and beliefs that involve the use of the plant, animal and mineral products, spiritual therapies and charms to diagnose, cure or prevent sicknesses. Women in Isoko communities of Delta State, Nigeria as reported by Ugboma (2014), used *Agbo*; herbal leaves which include pawpaw, guava, mango, etc. for the treatment of fever; *Ologbo mixture* for treatment of stomach ache; *Udeibi* to cure body pains; *Udeibi* mixed with local herbs (*ebe-orise, erhenre, atanene*), as therapy for measles; and *Udu'bi* (locally made pomade) for the treatment of cold and catarrh in infants.

Several other methods were also used for food processing and preservation; these include; *Eru* for yams, *Aha* for fish drying and spices and corn, *Evrui* for the smoking of fresh fish, *Uvu eri* (made of wood and palm fruits) used for drying fishes and meat and *Emoizi* for processing of starch. These indigenous systems have stood the test of time and are still applied in this generation.

Waste management is another aspect of indigenous knowledge is practised in Nigeria. The reuse and recycle system has long been in use by the indigenous people of Nigeria, where food and yard waste are recycled or reused as another food source or for animal feeds. Peels from yam and cassava, weeds from the farm or excess fruits from the farmland are used to feed domestic animals such as goats, rams, pigs and cows. In south-western Nigeria, the peel from yam is processed into yam flour meal popularly known as *amala*. Organic waste is also used as manure where dead plants, dead animals, animal faeces, wastes from food and farmland and junk in a container are left to decompose with some water sprinkles. In Northern parts of Nigeria, Kano precisely, animal faeces are dried and spread on the soil surface as manure for plants. Ash is another waste derived from burnt wood and coal used as fuel. Ash is used in South-Western Nigeria as a major raw material for black soap (*ose dudu*) and generally used in Nigeria to wash off black smoke stains from cooking pots. Metals were



reused to make knives, cutlasses, pieces of jewelry etc. it was taboo to waste anything that costs money, hence the reuse and recycling of every waste material (Ajibade, 2007).

Local communities and farmers in Africa have developed complex systems of gathering, predicting, interpreting weather conditions as well as making decisions that relate to weather. A study in Nigeria by Ajibade and Shokemi (2003) revealed that farmers use their knowledge of weather systems such as rainfall, thunderstorms, windstorms, harmattan (a dry dusty wind that blows along the north-west coast of Africa) and sunshine to predict and prepare for future weather possibilities. “Indigenous methods of weather forecasting are known to complement farmers’ planning activities in Nigeria. The most widely used indicators are the timing, intensity and duration of cold temperatures during the early part of the dry season (November to January). Other forecasting indicators include the timing of fruiting by certain local trees, the water level in streams and ponds, the nesting behaviour of small quail-like birds, and insect behaviour in rubbish heaps outside compound walls” (“IPCC Fourth Assessment Report on Climate Change 2007”).

Organizations for Indigenous knowledge in Nigeria

The following are some organization for indigenous knowledge in Nigeria among others.

- African Resource Centre for Indigenous Knowledge (ARCIK)
- Centre for Indigenous Knowledge on Population Resource and Environmental Management (CIKPREM)
- Centre for Indigenous Knowledge in Farm and Infrastructure Management, (CIKFIM)
- Nigerian Centre for Indigenous Knowledge (NIRCIK).

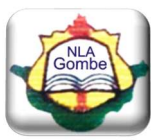
Challenges Faced by Indigenous Knowledge systems

Digital/net age has widened the gap between the older and younger generations in Africa and specifically in Nigeria. This has affected indigenous knowledge sharing as the younger generations see indigenous knowledge systems as primitive and outdated; “however, the net generations could be exposed to the dangers of ignorance about the traditional knowledge of their ancestral environment” (Akinwale, 2012).

Traditional beliefs are rapidly giving way to technological developments worldwide; hence, the collapse of these informal, self-imposed restrictions on land and resources use is threatening species and habitats that were once afforded protection by traditions resulting in extinction (Akinwale, 2012; Ngara and Mangizvo, 2013). Disregard for traditional checks and balances, a characteristic of modern communities is affecting the enforcement of the traditional practices and threatening the natural environmental structures

“Essentially, Africans are expected to align their indigenous knowledge with the modern reality, particularly in the areas of information technology to maximize the sharing of the indigenous knowledge, which can result in creative solutions to environmental problems” (Were, 2011 cited in Akinwale, 2012). Scholars are advocating for reliance and integration of western science in the conservation and management of the habitat. Apparently, indigenous knowledge systems (IKS) are now being unjustly negated. They are viewed in some quarters as somehow inherently primitive.

Africa is a continent that is gifted with an abundance of natural resources, which makes it a potential region for economic development. However, the exploitation of these resources has left the region in serious environmental ruin. Instead of using indigenous practices to deal with these environmental devastations, “African governments and policymakers prefer to



employ strategies and techniques which worked in the developed countries. Unfortunately, these are not suitable to conditions in Africa”. Therefore Government leaders and policymakers should refer back to notable Africa’s wealth of experiential knowledge, norms, taboos and a range of cultural practices that have sustained local ecosystems on the continent for centuries in order to tackle these challenges and restore the environment (Ngara and Mangizvo, 2013).

Bamigboye (2015), reports the challenges faced by the farmers who used IK systems were that the custodians refuse to share the knowledge they have and that most times, a lot of energy is exerted in the application of known local methods of vegetation production. These would pose a setback in the use of indigenous knowledge and its transfer to the next generation.

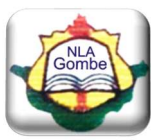
The problem with indigenous knowledge and indigenous knowledge systems is in the difficulty encountered in establishing what constitutes ‘indigenous’ in particular social, geographical and cultural contexts. The difficulty for a society to come to an agreement on what and who is indigenous can be quite high, especially because of establishing a socially and culturally accepted identification of what constitutes the indigenous groupings within a given country or region. The conflict can range from groups that desire to be recognized as indigenous to groups that find paternalistic offence in that identification. Global transcontinental migration drives the mix of peoples of different backgrounds and ethnicities towards greater complexity and the discourse has to dissect whether only communities that are native, aboriginal or tribal should be included or the scope expanded to include other types of residents or migrants. In the process of classifying and providing tangible examples of indigenous knowledge systems, researchers, educators and practitioners have developed a plethora of terms that can be linked closely to IKS. These include such labels as traditional knowledge (TK), indigenous technical knowledge (ITK), folk and local knowledge, environmental or ecological knowledge (EK), and sometimes it has also been called people’s science.

The Future of Indigenous Knowledge Systems in Nigeria

Indigenous knowledge systems are seriously threatened by environmental and social development pressures. It is difficult, if not impossible to ascertain to what extent African indigenous (aboriginal) social livelihoods and applied knowledge systems of today, are reflected by "ancient tradition" rather than the product of the colonial process and the market economy. With the rapid developments in technology and the flight from local communities to cities, no one can predict how much indigenous knowledge would be applied in everyday practices.

Taboos that preserve the natural habitat and wildlife are no longer held sacred as animal species such as “Big Squirrels, Elephants and Monkeys are likely to be hunted to extinction” in the Abomkpang and Butatong communities of Cross-River State, Nigeria (Bisong and Andrew-essien, 2010) if the practice continues.

Before the advent of technology, people depended completely on indigenous knowledge to control their activities, which also translated to harmonious living amongst them as well as within their environments. Indigenous knowledge as practised then covers all forms of knowledge, such as technologies, know-how, skills, practices, and beliefs (Iyoro and Ogungbo, 2013), with the advent and proliferation of technology, the future of indigenous knowledge seem to be unclear as the drive towards technology appears to be of major interest.



So one question that still is unanswered is; what would the future of Indigenous systems be? Indigenous knowledge systems are likely to go extinct shortly. This proposition is made based on evidence from the literature.

In a study by Adedipe et al., (2004), the authors advocate the use of chemicals and agro products for crop production to improve crop yields as they discovered from their study that very few Nigerian farmers are willing to adopt agro-chemicals. They also posit that the use of agrochemicals will increase if the adoption of indigenous knowledge is allowed to decline.

These propositions are made because it is assumed the local communities need development which can only be attained through the application of western knowledge. But Dei (2009) in a paper by (Emeagwali, 2014) reports that there is indeed a direct relationship between indigenous knowledge and development; he states that “development relates to how people use their creativity and resourcefulness to respond to major economic and ecological stressors” and suggests that “development is more likely to be sustainable if driven by indigenous knowledge, growing as it were from local specificities”. In the words of Brokensha et al (1980) cited in Bamigboye (2015), “to ignore rural peoples knowledge is to ensure failure in development”.

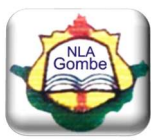
However, in the aspect of climate change management, Ajani et al. (2013), suggests that “indigenous knowledge should complement rather than compete with global knowledge systems” such that integrating indigenous knowledge into climate change conditions should not be done at the expense of modern/western scientific knowledge. United Nations (2003) in Iyoro and Ogungbo (2013) and Akinwale (2012), also opined that “Information and Communication Technology (ICT) should be used to support and encourage cultural diversity and to preserve and promote indigenous languages, distinct identities and traditional knowledge of Indigenous peoples, nations and tribes in a manner which they determine best advances these goals”. One can conclude here that technology can be used to solve the challenges of indigenous knowledge associated with no documentation.

The implication for Library and Information Science profession in Nigeria

One might begin to question the role of the LIS profession in the Indigenous Knowledge System in Nigeria. The International Federation of Library Association (2003 and 2008) cited by Adeniyi and Subair (2013) and Iyoro and Ogungbo (2013), states that libraries could help in “collecting, preserving and disseminate indigenous and local traditional knowledge and also publicizing the value, contribution, and importance of indigenous knowledge to both nonindigenous and indigenous peoples”, to promote and enhance sustainable developments in the country as IK has to be found to be pivotal to development.

Managing and making IK resources available is a challenge to this profession as IK and its innovation are not documented and as such Adeniyi and Subair (2013) found that IK resources are not well represented in Libraries in Oyo State, Nigeria which could be associated with a lack of documentation practice but it is “imperative for information professionals to preserve and manage indigenous knowledge and provide guidance and access to the populace in a way that best suit their needs”(Iyoro and Ogungbo, 2013).

Preservation and management techniques can only be applied where there is the existence of records or documented knowledge, therefore, the members of the LIS profession are to find ways as well as connect with organizations concerned with indigenous knowledge, to promote documentation and digitization. According to Ilo (?)The use of ICT for the acquisition, preservation and accessibility of indigenous knowledge in the library is a step by



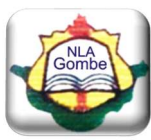
step process, requiring various kinds of facilities at each stage. Kennedy and Davies (2006) emphasize the importance of digital technology in the gathering, storage, evaluation and retrieval of information. The initial step is to gather information on different indigenous activities existing in the communities, of interest. To this effect, it behoves the librarian to implore the use of facilities required for documentation. Dim and Mole (2015) argue that Libraries need to be proactive and promote community publishing so that communities can document their experiences and market as well as share with others. Programmes to repackage traditional knowledge will also help to integrate western and indigenous knowledge to tackle environmental challenges with regards to land management.

Conclusion and recommendation

Local people are nevertheless a repository of knowledge as to the workings of the environment they are dependent upon for livelihood and sustenance. They are best suited to ensure the harmonious working of these systems in their resource use interactions if their knowledge base is solicited and integrated into management plans. Government leaders and policymakers should refer back to notable Africa's wealth of experiential knowledge, norms, taboos and a range of cultural practices that have sustained local ecosystems on the continent for centuries to tackle these challenges and restore the environment as Africa has always been an important source of rich information for knowledge production and as put in the words of Akinwale (2012), the indigenous knowledge of Africans remains a gold mine. Information Policy should include a policy for indigenous knowledge systems to ensure their continuity.

References

- Adedipe, N. O., Okuneye, P. A., & Ayinde, I. A. (2004). The relevance of local and indigenous 1 knowledge for Nigerian agriculture, 1–30.
- Adeniyi, A. I., & Subair, R. E. (2013). Accessing Indigenous Knowledge Resources in Libraries and the Problems Encountered by Librarians Managing IK in Oyo State, Nigeria. *Library Philosophy and Practice (e-Journal), Paper 988*. Retrieved from http://digitalcommons.unl.edu/libphilprac/988?utm_source=digitalcommons.unl.edu/libphilprac/988&utm_medium=PDF&utm_campaign=PDFCoverPages
- Ajani, E. N., Mgbenka, R. N., & Okeke, M. N. (2013). Use of Indigenous Knowledge as a Strategy for Climate Change Adaptation among Farmers in sub-Saharan Africa : Implications for Policy, 2(1), 23–40.
- Ajibade, L. T. (2007). Indigenous Knowledge System of waste management in Nigeria, 6(October), 642–647.
- Akinwale, A. A. (2012). Digitisation of Indigenous Knowledge for Natural Resources Management in Africa, (May).
- Bamigboye, E. O. (2015). Utilization of Indigenous Knowledge Systems for Sustainable Vegetable Production under Tropical Conditions. *Scholarly Journal of Agricultural Science*, 5(2), 63–66.
- Bisong, F., & Andrew-essien, E. (2010). Indigenous Knowledge Systems for Promoting Community Conservation Education in a Nigerian Protected Area, 2(2), 149–157.
- Chikaire, J., Osuagwu, C.O; Ihenacho, R.A; Oguegbuchulam, M.N; Ejiogu-Okereke, N & Obi, K.U.C. (2012). Indegenous Knowledge System: The need for reform and the way forward. *Global Advance Research journal of Agricultural Science*. Vol. 1 (18). P.201-209.Retried from <http://garj.org/garjas/index.htm>



- Christopher, O. O. (2015). Indigenous knowledge storage and access for cultural continuity : the role of the library in nigeria. *International Journal of Innovative and Applied Research*, 3(1), 59–63. Retrieved from http://journalijiar.com/uploads/2015-02-01_090559_124.pdf
- Dim, C. L. & Mole, A. J.C.(2015). Africa Indigenous Knowledge: Call for a Paradigm Shift in nigeria in a changing world. *International Journal of Research in Arts and Social Sciences* Vol 5, No,1. Retrieved from the internet on 26/4/2020.
- Emeagwali, G. (2014). *Intersections between africa's indigenous knowledge systems and history. African Indigenous Knowledge and the Disciplines* (Vol. 2).
- Eze, U. T., & Ike, N. M. S. (2013). Integrating African Indigenous Knowledge In Nigeria ' s Formal Education System: It ' s Potential For Sustainable Development. *Journal of Education and Practice*, 4(6), 77–83.
- Grenier, Louise (1998)working with indigenous knowledge:A guide for researcher..-Ottawa, International Development Research Center.
- Ilo, P.I. (n.d) Acquisition, Presentation and Accession of Indigenous Knowledge in Academic Libraries in Nigeria: The Place of ICT (in) Ikenga. *International Journal in Institute of African Studies*,14(1). Retrieve from the internet on 29/4/2020
- Intergovernmental Panel on Climate Change. (2007). *IPCC Fourth Assessment Report : Climate Change 2007*.
- Iyoro, A. O., & Ogungbo, W. O. (2013). Management of Indigenous Knowledge as a Catalyst towards Improved Information Accessibility to Local Communities : A Literature Review. *Chinese Librarianship: An International Electronic Journal*, 35(2005), 87–98. Retrieved from <http://www.iclc.us/cliej/cl35IO.pdf>
- Kennedy, G. & Davis, B. (2006). *Electronic Communication Systems*, 4th ed. New Delhi: Me Graw Hill Publishing.
- Materer, S., Valdivia, C., & Gilles, J. (2002). *Indigenous Knowledge Systems: Characteristics and Importance to Climate Uncertainty* (No. AEW 2001-03).
- Msuya, J. (2009). Challenges and opportunities in the protection and preservation of indigenous knowledge in Africa (pp. 343–349).
- Ngara, R., & Mangizvo, R. V. (2013). Indigenous knowledge systems and the conservation of natural resources in the Shangwe community in Gokwe district, zimbabwe. *International Journal of Asian Social Science*, 3(1), 20–28.
- Pandor, N. (2015) Protection, Promotion, Development and Management of Indigenous Knowledge Systems Bill, Government Gazette 50–69. Parliament of the Republic of South Africa.
- Senanayake, S.G. J. N. (2006). Indigenous Knowledge as a key to Sustainable Development. Retrieved from http://i1.rgstatic.net/publication/322841658_indonesias_Traditional_Knowledge_Documentation_in_intellectual_property_Ri...
- Ugboma, M. U. (2014). Availability and Use of Indigenous Knowledge amongst Rural Women in Nigeria. *Chinese Librarianship: An International Electronic Journal*, 38, 60–67. Retrieved from <http://www.iclc.us/cliej/cl38ugboma.pdf>