Osun Geographical Review
Department of Geography, Osun State University,
State of Osun, Nigeria

INDIGENOUS AND MODERN KNOWLEDGE SYSTEMS OF BIODIVERSITY CONSERVATION IN AFRICA: ISSUES, CHALLENGES AND PERSPECTIVES

***Ajibade, L.T. and Ajadi, B.S.**

Department of Geography and Environmental Management,
Faculty of Social Sciences, University of Ilorin, Nigeria.
**E-mail: Edabijalt2001@yahoo.com*

Abstract

Indigenous and modern knowledge systems are vital for sustainability of natural resources and biodiversity including forests, water, and agro-ecosystems across landscapes. In the last few decades, man has been faced with the exceptional challenges of eroding natural resources and declining biodiversity due to a multitude of threats due to increasing human populations. The consequences of these challenges are the loss of the biodiversity and the sustainability of the essential ecological processes and life support. The loss of biodiversity is an issue of profound concern for sustainable development. Indigenous and modern biodiversity systems are both phenomena essential to human development. This study therefore focused on comparative overview of the indigenous and modern knowledge systems, challenges and the needs for their integration for effective biodiversity conservation and sustainability.. The study reviewed the extant literature in covering the contemporary issues, challenges and perspectives on indigenous and modern knowledge systems in relation to biodiversity conservation in Africa. The options of integrating these forms of knowledge systems and their role, limitations and implications for biodiversity conservation were considered. The study calls for the integration of both indigenous and modern knowledge systems for effective biodiversity conservation and sustainability. This is expected to enhance the capacity of local communities to use, express and develop their indigenous knowledge on the basis of their own cultural and institutional norms for the protection of biodiversity. However, the modern or scientific approach for nature conservation has been observed to have serious flaws resulting in the failure to achieved biodiversity conservation objectives.

Keywords: Indigenous; Modern, Biodiversity; Conservation; Sustainability; Africa.

Introduction

There is abundant evidence of indigenous and modern knowledge and practices involved in the promotion of biodiversity across Africa. The importance of indigenous or traditional knowledge for the protection of biodiversity and the achievement of sustainable development is slowly being recognized internationally (Ajibade,2008; Osunade, 2004; Gedgil,1993). For example, Article 8 of the Conservation on Biological Diversity made provision to "respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional life styles relevant for the conservation and sustainable use of biological diversity ....."(United Nations, 1992).In addition, traditional or indigenous knowledge has been rediscovered as a model for a healthy interaction with the environment, and as a rich resource to be tapped in order to gain new perspectives about the relationship between human and nature.

Declining biodiversity is a major environmental problem today in Africa. This loss of biodiversity has immediate and long term effects on human survival. The majority of the world's human population including Africa still depends on wild plants and animals for their food, medicine, housing and household materials, agriculture, fodder, fuel wood and intellectual stimulation. Currently the biodiversity of many areas in the world is too poorly known for conservation decisions to be made and subsequently monitored effectively. To preserve these diverse biological species, conservation measures have been

undertaken either in situ or ex-situ. Scientific and indigenous knowledge constitute different paths to knowledge on conservation of biodiversity; but they are rooted in the same reality (Laecarino, 2003; UNESCO, 2006). In this study, indigenous knowledge (IK), local knowledge(LK) and traditional knowledge (TK) were used interchangeably, generally refer to knowledge systems embedded in the traditions of indigenous or local communities.

Loss of biodiversity is real. However, there is no universal indicator that accurately reflects changes in biodiversity in different ecosystems at different spatial scales, At the global level. the best - known groups of animals are mammals and birds, of which 24 and 12 % are extinct, threatened, or near-threatened respectively (IUCN,2006). Much less is known about other groups of species, but they may be even more endangered. In Africa according to IUCN (2004),40-70% have been classified as extinct, threatened or near-threatened. Hence, the need to understand the significance of strict conservation and ecological restoration through the scientific and the traditional knowledge systems in Africa. Moreover, several vivid examples from Africa show that modern knowledge systems have been more effective (WWF,2006; Berke *et al* 1996) argued that IK system has been intentionally and significantly contributing to conservation of biological diversity.

This study therefore examined the issues, challenges and perspectives in indigenous knowledge and modern biodiversity conservation systems with a view to conducting a comparative analysis and the gaps created therein.

Indigenous Knowledge Systems

The indigenous knowledge has received an increase attention by academia and the development institutions but has not yet led to a unanimous perception of the concept of indigenous knowledge. None of the definitions is essentially contradictory; they overlap in many aspects. Warren (1991) and Flavier (1995) present typical definitions by suggesting:

> *Indigenous knowledge (IK) is the local knowledge–knowledge that is unique to a given culture or society. IK contrasts with the international knowledge system generated by universities, research institutions and private firms. It is the basis for local-level decision making in agriculture, health care, food preparation, education, natural-resource management, and a host of other activities in rural communities…… (Warren 1991).*
>
> *Indigenous Knowledge is the information base for a society, which facilitates communication and decision-making. Indigenous information systems are decision-making.Indigenous information systems are dynamic, and are continually influenced by internal creativity and experimentation as well as by contact with external systems…….....(Flavier et al. 1995).*

The term 'indigenous knowledge' is used to describe the knowledge systems developed by a community as opposed to the scientific knowledge that is generally referred to as 'modern' knowledge (Ajibade, 2003). Indigenous knowledge is the basis for local-level decision-making in many rural communities. In contrast, World Bank (2003) defined traditional knowledge as the information base for a society which facilitates communication and decision-making. It has value not only for the culture in which it evolves, but also for scientists and planners striving to improve conditions in rural localities. Sophisticated knowledge of the natural world is not confined to science. Human societies all across the globe have developed rich sets of experiences and explanations relating to the environments they live in. These 'other knowledge systems' are today often referred to as traditional ecological knowledge or indigenous or local knowledge. They encompass the sophisticated arrays of information, understandings and interpretations that guide human societies around the globe in their innumerable interactions with the natural milieu: in agriculture and animal husbandry; hunting, fishing and gathering; struggles against disease and injury; naming and explanation of natural phenomena; and strategies to cope with fluctuating environments (Nakashima et al.2000; World Bank 2004).Other terms used interchangeably to describe it include: 'local knowledge', 'folk knowledge', 'people's knowledge', 'traditional wisdom' or 'traditional knowledge'.

It can therefore be summed up that indigenous knowledge as the knowledge of an indigenous community accumulated over generations of living in a particular environment. A concept that covers all forms of knowledge- technology, know-how, skills, practices, and beliefs that enable the community to achieve stable livelihoods in their environment. Indigenous knowledge is still intact among indigenous (or local) communities in many parts of

Africa especially countries such as Kenya, Tanzania, South Africa, Swaziland, Zimbabwe, Ghana and Nigeria.

Modern Science: Development and Philosophy

Modern knowledge system is deeply rooted both in the philosophy of Ancient Greece and the Renaissance and traditional knowledge system have developed radically different strategies to create and transmit knowledge, and it is exceedingly difficult to analyze one form of knowledge using the criteria of another tradition (Lacarino2003).

There is a vast body of literature on such comparisons between modern science and indigenous knowledge system, which has identified various characteristics and opposing views. Modern science favours analytical and reductionist methods as opposed to the more intuitive and holistic view often found in indigenous knowledge. In addition, modern sciences is positivist and materialist in contrast to indigenous knowledge which is spiritual and does not make distinctions between empirical and sacred (Nakashima and Roue,2002). Furthermore, UNESCO (2002) noted modern science is seen to be open, systematic, objective and quantitative. It is dependent very much on being a detached centre of rationality and intelligence, while traditional knowledge is seen to be closed, parochial, unintellectual ,primitive, emotional subjective and qualitative.. (Agrawal, 1995; UNESCO, 2002; Warren,1992).Scientific knowledge has long held a cultural role and attained a dominant position in other developed societies, but we cannot ignore the fact that other valid knowledge systems exist. The imposition of western scientific ideas and methods not only causes disruption to existing social and economic relationships, but also might spoil the local knowledge (Kideghesho, 2008;EMBO, 2006).

Indigenous and Modern Knowledge Systems: The Challenges

Knowledge erosion is a threat ,as it becomes not only difficult to conserve what we do not know. Hence, the option values decline if the probability of finding a resource useful in the current generation is lower because of the loss of knowledge about the resource. Conserving biodiversity without conserving associated knowledge systems is just a short-term sustainability solution, as future generations will not benefit from centuries of experimentation and knowledge accumulation by indigenous people. Indigenous knowledge system is distinct from the modern knowledge system and it is easier for people to integrate this local knowledge into existing scientific procedures assuming local people's knowledge definable body of knowledge is geared for extraction and incorporation (ICSU, 2002; Boven et al 2003). However, it had been pointed out that local peoples' knowledge like scientific knowledge is always fragmenting, partial and provisional in nature. It is never integrated in terms of an underlying natural logic or system of classification (Pidatala and Khan, 2003). Although there are apparent attractions in a meaningful dialogue between modern knowledge and indigenous knowledge, in reality there remain tensions. Chokor and Odemerho (1994) suggested that conflict associated with traditional and modern land conservation measures in Africa will be considerably reduced if they are integrated..

The problem for the integration of modern and indigenous knowledge is that the former searches for knowledge of universal significance which is not context-related, whereas the latter is a social product closely linked to a cultural and environmental context. Recent empirical work has served only to emphasize the tensions. Attempts to integrate modern and indigenous knowledge systems with regard to soil classification and use have proved to be extremely problematic, either because of the huge practical difficulties involved in trying to integrate farmers' cognitive soil maps held by a GIS, or because of the persistent fundamental methodological and epistemological differences between the two traditions.(Warren,1992;Oudwater and Martin, 2003).In a study of forest management in Mexico, Klooster (2002) concludes that both bodies of knowledge, in their different ways, are really quite limited in their abilities to inform the social practice of environmental management. This is because the indigenous knowledge is inadequate for monitoring the bigger picture of the forest's response to woodcutting and scientific knowledge simply lacks the institutional flexibility to deal with the socio-economic consequences of woodcutting.

In a different context, Ajibade (2001), Osunade (1989), WInklerrins and Sandor (2003) concurred and suggested that perhaps the problem might be related to the fact that local soil knowledge comprises a combination of both knowledge and skills, and the difficulty in separating these has led to the undervaluing of local soil knowledge as real knowledge by outsiders, and therefore by modern or scientific knowledge. There is an implication that,

because skills are so entangled with the production of indigenous knowledge, its production is a trial-and-error process, with none of the reasoning or controlled experimentation of scientific knowledge.

Researches, debates and interventions have indicated growing interest in the indigenous environmental knowledge for the insight they offer into conservation of biodiversity and for the potential they hold in increasing natural resources management, productivity and ecological resilience. Despite repeated calls and debates for increased use of indigenous (traditional) knowledge in conservation planning, management and development, integration of traditional knowledge remains nominal or negligible at best when compared with the planned conservation techniques through the establishments of national parks, forest reserves, biosphere reserves, sanctuaries, game reserves, among others (Jimoh et al, 2012; World Conservation Union, 2008; Nganje, 2012; UNESCO – ICSU, 1999; EMBO, 2014).

A few available studies are based on sustainable forest production systems based on a multiplicity of produces; comparative analysis between the scientific and indigenous knowledge, particularly on traditional knowledge of plant resources and their manipulation and exploitation as a complex tapestry of natural history and technical skills developed through traditional instruction methods (e.g, storytelling) and experience (both apprenticeship and self-directed learning – while - doing). For example, Nganje (2012) found that in Ghana, favourable conservation culture and related events should be captured in conservation plans and integration of cultural criteria in biodiversity management, For instance, Nmgoli et al, (2015) investigated on evaluation of traditional seed conservation methods in rural Malawi and discovered that farmers a wide range of indigenous seed saving techniques that include burning animal manure and covering seeds with the resulting ashes to being stored in cloth of ceramic containers in order to conserve it. Similarly, Masere (2013) found that in Zimbabwe, indigenous knowledge have been despised and pejoratively labeled by the western hegemony and imperialism, they have potential to ease the environmental problems resonant of most developing country in Africa and beyond. The study suggested active involvement of local communities and serious considerations for indigenous knowledge. Msuya and Jafari (2009) in their investigations of Tanzanian west Usambara conducted using focus group discussions, interviews, observation and survey methods. They found that traditional management practices have a significant role in the conservation of biodiversity in Tanzania and developing countries.

Though, most researches in biogeography have been seen primarily conventional, adopting and adapting the western systems. However, some have diverted their attention to indigenous knowledge (Salami and Orimoogunje, 2011). For instance, Osunade (1989) considered how classification of physiographic and land use types are carried out by indigenous farmers He considered the traditional system of land uses among Yoruba speaking ethnic nation of southwestern Nigeria. He found that land cover, tenure, and specific uses constitute the major criteria used in developing classification scheme. The design of the classification scheme employed the logical subdivision method whereby the culture and landscape could be successfully subdivided into smaller indivisible units based in specific activity is achieved. According to his funding, two basic terms provide the key to the classification of the kaleidoscopic land use types named and described in the study areas. A further subdivision of the two classes was made on the bases of land cover, tenure and the specific uses (Salami and Orimoogunje,2011).

Results and Discussion

A synergetic relationship between the indigenous and the modern knowledge systems is widely accepted and relatively well documented. For example, a study carried out in Xishuangbanna, Southwest China from 1993 to 1999 revealed that reduction of taboo practices resulted in decline in revered plant species, despite the legislations for their conservation (Hongmao et al; 2003 cited by Nganje, 2009). Similar findings were reported by Nganje, (2009) in his study carried out around the Ankassa, Bia and Kakum forest conservation areas in Ghana. The study revealed that neither the scientific knowledge system nor taboos alone conserved biodiversity; rather, their combination achieved what neither could alone. Similarly, Stevenson,(2005); Fitzgerald et al.(2009); Cobb, (2011) and Kajembe et al.(2010) insisted that the indigenous and the modern knowledge systems do complement each other on their strengths and weaknesses and their integration would achieve more than neither in their separation. Indigenous knowledge is not only the most important knowledge system for many local peoples but it is also an essential component in sustainable

biodiversity conservation management.

The existence of the indigenous knowledge has been acknowledged in international conventions such as the Brudtland Convention (WCED, 1987), the Biodiversity Convention, Agenda 21 and the Rio Declaration and the World Summit on Sustainable Development. Several other studies have been done in many countries to mention a few, Straku-Lartey (2014) and Hens (2006); in Ghana on indigenous knowledge, Tamuno (2013); Berkes et al 1998; Gegil at. al 1993, Berkes et,al 2009; Ruheza et al.(2012), among others in other parts of Africa and the world. In Nigeria several studies have been carried out with a focus mainly on the roles and threats to traditional ecological knowledge. Such studies include Rim-Rukeh, et al.2013; Babalola, 2012; Ajibade, 2003; Ajibade, 2001; Jimoh, 2012; Osunade, 2004; Atte, 2004. For example, the integration of the indigenous into biodiversity conservation methods and practices in the South Nguru mountain forest for sustainable management and use of biodiversity has been limited by lack of official recognition, valuation, promotion and capacity building of the indigenous social structures from which the indigenous knowledge system got evolved, enhanced and sustained over years. Moreover, lack of reciprocal relationships between pioneers of the biodiversity conservation methods and practices and the indigenous people in their socio-economic and political contexts, has been limiting the wide use and application of the indigenous knowledge systems, and of its integration into biodiversity conservation methods and practices in Africa.

Implication for Conservation and Biodiversity Management in Africa

The two systems appear to possess strengths and weaknesses depending on the institutions that are handling them. Modern or the scientific techniques may be robust and sound in its drafting but may become weak at the stage of implementation whereas indigenous knowledge may appear broad based and all inclusive, but it operations may be characterized with secrecy and cultural norms. How indigenous knowledge can best be integrated with scientific knowledge is one of the important questions facing indigenous communities in Africa in line with empirical evidence. The more the scientific forecasting deviates from traditional knowledge the less it is used for planning proposes purposes by the indigenous communities in Africa.

In conclusion, without doubt, many scholars suggest that the indigenous and the modern knowledge systems are synergetic and do complement each other on their strengths and weaknesses, and their integration might achieve what cannot be achieved by either in their separations. This we believe ensure sustainable conservation of biodiversity in Africa.

The following recommendations are made:

- United Nations, governments of African countries and non-governmental organizations should give official recognition, motivation, capacity building and promotion to indigenous social structures from which indigenous knowledge system becomes relevant for conservation of biodiversity. If this is evolved, enhanced and sustained it will lead to successful conservation of biodiversity.
- Synergy between the two knowledge systems in biodiversity conservation should be sustained generally, and specifically indigenous knowledge system should be used based on its own ways of knowing, teaching and learning to facilitate its wide use, application, sustainability and its integration into other knowledge systems.
- Biodiversity decline is at the center of household-poverty, and for sustainable management hence, use of biodiversity cannot be realized, unless otherwise, household-poverty is dealt with in Africa: poverty has been compelling people to abuse their knowledge system just to make a living.

References

Agrawal, A. (1995). Dismantling the Divide Between Indigenous and Scientific Knowledge. .Journal of Development and Change :26(7) :413-439

Ajibade , L.T (2003).Knowing the Unknown through the Known: The Case for Indigenous Knowledge in Sustainable Development, Proc,Engabu Za Tooro (Toroo Youth Platform for Action Conference, Fort Portal, Uganda, August 4-9,2003.

Ajibade, L.T. (2008). Knowing the unknown through the known: The case for Indigenous Knowledge in Sustainable Development. African Research Review 2(2):218-233

Babalola, F.B.,(2014). Potential and Challenges of Indigenous Knowledge in Conservation of Biodiversity in Oshogbo Sacred Grove, Nigeria. Journal of Science and Nature (5 (2) 353-358

Babalola E. O. (2012). The Scientific Basis of African Traditional Medicine. The Yoruba Example. Journal of Religion Studies; 6 (1): 1-12.

Berkes F. and Folke, C.(1996). Indigenous Knowledge and Local Level Development. World Bank Discussion Paper Number 127, Washington DC

Berkes, F..(1993).Traditional Ecological in Perspective. In Inglis, J.T(ed) Traditional Ecological Knowledge: Concepts and Cases. International Program on Traditional Ecological Knowledge and International Development Research Centre Ottawa, Ontario, Canada.

Berkes, F; Colding, J and Folke, C (1998). "Rediscovery of Traditional Ecological Knowledge as Adaptive Management". Ecological Applications 10:1251–1262.

Berkes, F, Moller, H., Lyver, P.O and Kistailogu, M. (2009). Combining Science and Traditional Ecological Knowledge: Monitoring Populations and Co-Management. Journal of Ecology and Society 9(3): 35-46 (online). (Accessed on March 2017).

Boven, V., Leaf, M., Gilovich, T. (2003). To Do or To Have? Journal of Personality and Social Psychology, 85 (6):1193-1202

Cobb, A. (2011). Incorporating Indigenous Knowledge Systems into Climate Change Discourse. Colorado Conference on Earth System Governance: Crossing Boundaries and Building Bridges.

Chokor, B and Odemerho, F. (1994) land degradation assessment by small-scale Traditional African Farmers and Implications for Sustainable Conservation Management. Geoforum, 25(2):, 145-154

EMBO Reports (2014). What Should Every Citizen Know about Ecology, Wiley online Retrieved 16 February, 2016.

EMBO Reports (2015). Ecosystems and the Environment. Wiley online Retrieved 2 February, 2015.

Flavier, J.M, De Jesus, A. and Navarro, C. (1995) The Regional Program for the Promotion of indigenous Knowledge in Asia. In warren, D.M , Slikkerveer, L..J. and Brokensha, D (eds). The Cultural dimension of Development: Indigenous Knowledge Systems. London Intermediate Technology Publications.

Fitzgerald, A.L. and Stronza, L.A. (2009). Applied Biodiversity Science: Bridging Ecology, Culture and Governance for Effective Conservation. Interciencia 34 (8): 563-570.

Gadgil, M., Berkes, F., and Folke, C. (1993). Indigenous knowledge for biodiversity conservation. Ambio 22(1):151-156.

Hens, L. (2006). Indigenous Knowledge and Biodiversity Conservation and Management in Ghana. Journal of Human Ecology 20(1): 21-30.

ICSU (2002).ICSU Report on Science and Traditional Knowledge. http://www.portal.unesco.org (Accessed 12/04/2017).

ICSU (1999).UNESCO and ICSU: International Scientific Programmes on Environment. Available: http://unesdoc.unesco.org (Accessed 24 May,2007).

IUCN (World Conservation Union). (2006). Habitats authority file. Version 1.0. IUCN Species Survival Commission, Cambridge, United Kingdom. Available from http://iucn.org/webfiles/doc/SSC/RedList/AuthorityF/habitats.rtf(accessed (February 2017).

Jimoh,S.O; Ikyaagba, E.T; Alarape, E.E; and Adeyemi, A.A (2012). The Role of Traditional Laws and Taboos in wildlife Conservation in the Oban Hiill Sector of Cross River National Park (CRNP), Nigeria, Journal of Human Ecology 39(3):209-219

Kajembe, G.C. Mbwambo, J.S; Mwakalobo, A; Kimaro, D. N. and Njana, M. A. (2010). The role of indigenous knowledge in climate change adaptation and mitigation: Prospects and challenges. A paper presented at 2010 Africa Environmental Day under the theme 'Africa Resilience to climate change: Protecting Biodiversity loss and Enhancing Traditional Knowledge at Arusha International Conference Centre (AICC), March 3-4/ 2010.

Kideghesho, J. (2008). Co-existence between the traditional societies and wildlife in Western Serengeti, Tanzania: Its relevancy in contemporary wildlife conservation efforts. Biodiversity Conservation 17(1):1861-1881.

Klooster D.J (2002). Toward adaptive community forest management: integrating local forest knowledge with scientific forestry. .Economic Geography 78 (1)43-70

Laccarino,. M.. (2003). Science and Culture. EMBO Report 4(1) 220-223,London, U.K.

Mawere Munyardzi (2013). Traditional Conservation Strategies in Pre-Colonial Africa: Lessons for Zimbabwe to Forget or To Carry Forward into the Future? Afro Asian Journal of Social Sciences. 4 (4) 1-23

Mngoli, M.B., Mkwabisii, D.D., and Fraser, E.G. (2015). An Evaluation of Traditional Seed Conservation Methods in Rural Malawi. Journal of International Development 27, 85–98

Msuya ,T.S. and Jafari, R.K. (2009). The Role of Traditional Management Practices in Enhancing Sustainable Use and Conservation of Medicinal Plants in West Usabara Mountains, Tanzania. Tropical Conservation Science. 2 (1):88-105

Nakashima K, Shinwari Z.K, Sakuma Y., Seki M., Miura S., Shinozaki K., and Yamaguchi-Shinozaki K (2000). Organization and Expression of two Arabidopsis DREB2 genes Encoding DRE-binding involved in Dehydration and High–salinity Responsive gene Expression. Journal of Plant Molecule Biology 42 (1) 657-665

Nganje, M. (2009). Harnessing Traditional Ecological Knowledge for Conservation of Forestry and Biodiversity. XVII World Forestry Congress, Buenos Aires, Argentina 18 -23, October 2009.

Nganje, M. (2012). 'Justification for Streamlining Traditional Ecological Practices in Conventional Forest Conservation Planning and Management. 'A paper presented at the IUFRO-FORNESSA International Conference Held Between 25-29 June, 2012, Nairobi, Kenya

Oudwater N and Martin A (2003) Methods and issues in exploring local knowledge of soils. Geoderma 111,387-401

Osunade,M.A (2004).Community Environmental knowledge and land resource surveys in Swaziland. Singapore Journal of Tropical Geography

Osunade, M.A.. (1989). Nomenclature and Classification of Traditional Land -Use Types in Southwestern Nigeria. Ife Research Publications in Geography, 3(1):13-33

Pidatala, K. and Khan AR. (2003). Women and Indigenous knowledge: A South=South Perspectives'', IK notes 63

Rim-Rukeh, A.,Irerhievwie, G. & Agbosu I.E. (2013). Traditional Beliefs and Conservation of Natural Resources: Evidences from Selected Communities in Deltas State, Nigeria .International Journal of Biodiversity and Conservation. .5(7):427-432

Roue, M. Knowledge and foresight: The Pridictive Capacity of Traditional Knowledge. International Social Science Journal: 54 (173) :337-347

Salami, A.T. and Orimoogunje, O.O. (2011). Environmental Research and Challenges of Sustainable Development in Nigeria. Obafemi Awolowo University Press, Ile-Ife, Nigeria.

Stevenson, M. (2005). Traditional knowledge and sustainable forest Management; Sustainable Forest Management network; Edmonton, Alberta, pp 18

Tamuno, T.T. (2013). Indigenous Knowledge in Geography: A Case Study of Okoloba, Bayelsa State. Nigeria Geographical Journal, 9(2):146-162

United Nations (1992). The Earth Summit- The United Nations Conference on Environment and Development, June 3-14, Rio Jenerio, Brazil.

UNESCO (2006). UNESCO and indigenous Peoples: Partnership to promote Cultural Diversity: http://unescodoc.unesco.org (Accessed 25 July, 2017)

UNESCO (2002). Cultural Diversity and Biodiversity for Sustainable Development http://unescodoc.unesco.org (Accessed 30 July, 2017)

Warren, D.M. (1991). Using Indigenous in Agricultural Development: World Bank Discussion Paper No. 127. Washington, D.C: The World Bank

Warren D.M. (1992). Strengthening indigenous Nigerian organizations and associations for rural development: The case of Ara Community. Occasional Paper No.1, African Resource Centre for Indigenous Knowledge, Ibadan; 1992.

World Bank Report (2003) Report on Indigenous Group ,2003.

World Bank (2004). Indigenous knowledge: local pathways to global development, Africa Regional Office, World Bank.

World Conservation Union (2008). Wildlife in a Changing World: An Analysis of the 2008 IUCN Red List of Threatened Species. Available from (Accessed 23/06/2017)

World Widelife Fund (2006). No Place to Hide ; Effect of Climate Change on protected Areas. In: WWF Climate Change program. Berlin, German Online URL: http:www.panda.org/about_wf/what_we_d/climate/index.cfm