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Human Activities, Biodiversity Maintenance and Sustainable Development in Ikpe Community of Akwa Ibom State, Nigeria

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Abstract: *The study seeks to examine the consequences of human activities on biodiversity maintenance and sustainable development in Ikpe Community of Ini Local Government Area, Akwa Ibom State of Nigeria. Data for the study were derived from questionnaire administered on one hundred and twenty-five respondents through purposive and simple random sampling methods. Findings show that, human economic activities of dredging of sand and gravels have serious adverse consequences on biodiversitymaintenance. The study confirms that roads, residential quartersand business establishment as well asfarmlands, streams have been destroyed while so many people have lost their lives as a result of these activities. The study recommends among others that, environmental protection laws, proper sensitization, and monitoring and empowerment programmes should be intensified in the area to reduce the rate of damage to the ecosystem.*
Keywords: *Human activities, Biodiversity, Maintenance, Ecosystem, Sustainable development, community.*

I. Introduction

The way natural resources are managed is one of the most important sustainability challenges facing man in recent times. This is because, the expansion of human activities in the last 250 years have been dramatic, leading to major transformation in the biosphere (Bisong, 2007). Also, changes that occurred in the past have been reduced through the use of life – support mechanisms provided through ecosystem functions, many of which have been lost or are currently under threat (Folke, Carpenter and Walker (2004). Incidentally, during the 2005 Millennium Ecosystem Assessment (MEA), scientistshave warned that, human activities have taken the planet to the edge of massive wave of species extinctions that threatened human well-being (MEA, 2005). Several calls have been made for the safeguarding of biological diversity not only for protection of the biosphere but also as a way to battle poverty and improve human well-being (Stoll-Kleeman and Job, 2008). Within this context, the pursuit of sustainable development through biodiversity conservation is indeed a necessity and a welcome development.

In the first instance, biodiversity conservation and maintenance provides substantial benefits to meet immediate needs of man such as clean and consistent water flows, protection from floods and storms as well as stable climate. The loss of biodiversity is dangerous and its consequences devastating. Batten (1957) observes that, protecting the biodiversity is important not only from an intrinsic perspective, but also from economic, social and cultural perspectives. To him, economic benefits includes pollination in plants, soil stability and fertility maintenance.Others include, water quality maintenance, tourism opportunities, food, as well as potentials for commercial and medical uses. But Cunningham to Cunningham ham and Cunning ham (2004), all of man's food comes from other organisms produced within the ecosystem.

The social, aesthetic and cultural benefits of the biosphere include transmission of tradition, knowledge and customs (Odum, 1995). As millions of people enjoy hunting, fishing, camping, hiking, wildlife watching and other nature – based activities, invigorating physical exercise, and contact with nature. In many cultures, nature carries spiritual connotations, and natural species and landscapes may be inextricably linked to a sense of identity and meaning. Observing and protecting nature also has a religious or moral significance for many people (Okurekong et al., 2012). Some religious organizations call for the protection of the environmentsimply because it is God's creation so for many people, the value of wildlife goes beyond opportunity of photography or shoot a particular species. It is not only worthwhile to see that some species of trees, plants and animals exist but, it is also of interests to know that these species have been destroyed by human activities (Wood, 2000). In the light of the above, the present formulation therefore seeks to investigate how human activities in Ini Local Government Area pose serious threat to biodiversity and how such threat could be minimized.

The Problem In Context

The richer our biodiversity, the greater the opportunity for medical, economic and social discoveries (Takacs, 1996). The needs to conserve our natural environment calls for appropriate conservation and sustainable development strategies to help preserve our biodiversity. The continuous exploit of the environment and its natural resources for economic and social reasons result in inevitable conflicts which often threaten

human survival. Economic and social activities by man many a times degrade the environment and deplete the natural resources contained there in. This significantly reduces the environments' capacity to support human life in the future with consequences already visible today, making preservation and conservation of the environment necessary.

In Ini Local Government Area of Akwa Ibom State, the dredging of sand and gravels in and areas around Odoro Ikpe and Ikpe Ikot Nkon in particular has considerably degraded and depleted both the natural resources and the environment in these areas. It has been noted that, apart from being the major provider of food and fibre to the surrounding towns, Ikpe is endowed with gravel and sand which the Ibo businessmen have long recognized and used for the past three decades. This form a major cash economic activity of the people whose secondary occupation is farming, hunting and fishing. Unfortunately, the continuous exploitation of these natural resources (sand and graves) did not comply with any form of standard conservation practice and therefore subjects the environment to serious hazard of degradation. In order to find a lasting solution to this problem, the present study sets to answer the following hypothetical questions:

i) In what ways have human activities endanger biodiversity in Odoro Ikpe and Ikpe Ikot Nkon communities?
ii) What are the consequences of biodiversity destruction in the areas? and
iii) What measures or strategies could be adopted to preserve or reduce the continuous destruction of biodiversity in the area?

II. Materials And Methods

The study is conducted within Odoro Ikpe and Ikpe Ikot Nkon clans in Ini Local Government Area of Akwa Ibom State,where massive gravel and sand dredginghave taken place for decades now. Data were collected using purposive and accidental sampling methods. Both questionnaires and interview schedule instruments were used. The sample size consisted of 125 respondents from the two clans of Odoro Ikpe and Ikpe Ikot Ntuen. The questionnaire was divided into four sections. Section A elicited questions on the personal characteristics of the respondents. Section B elicited questions on the human activities that endangered biodiversity and human environment in the area, section C elicited question on the consequences of human activities andbiodiversity destruction, while section D elicited questions on measures that could be adopted to reduce the adverse consequences of human activities and biodiversity destruction in the areas. Open ended questionnaire were drawn for the respondent to mention all areas in which human activities affect biodiversity destruction as well as impacts and remedies in the areas. Each of the items was awarded some points. Total scores were calculated by adding scores using Likert scale with simple percentage analysis.Content validity was carried out while the reliability co-efficient of r= 0.75 was obtained using test retest method. The study was conducted between January and April, 2015.

III. Literature Review

The earth consists of many millions of distinct and diverse biological species which is the product of over four billion years of evolution. It has been observed also that, the land, air and seas of our planet are home to the tiniest insects and large animals, which make up a rich tapestry of interconnecting and interdependent forces referred to as biodiversity (Udoh, 2012; 2013). According to the United Nations Fact Sheet (2010), biodiversity is the variety of life on earth. It includes all organisms, species, and population, the genetic variation among these; and their complex assemblages of communities and ecosystems. It also refers to the interrelatedness of genes, species, and ecosystems and in turn their interactions with the environment (Stoll-Kleeman and Job 2008). Biodiversity described the variety of biological life in plants, animals, fungi and even micro-organisms. It describes the diversity of ecosystems on land, in water and in the space. It is a term that encapsulates the whole diversity on earth including the diversity within species, and between species from their genetic diversity to the ecosystems they live in (Udoh, 2008; MEA, 2005 and Bisong, 2007).

The Resource Management Act of 2008 sees biological diversity as essential for social; economic, scientific, educational, cultural, recreational and aesthetic values. Without adequate biodiversity, events such as climate change and pest infestation would have catastrophic effects on human beings. It is essential for maintaining long term viability on agriculture and fisheries for food production (Udoh, 2010, Biggs, 1999). It constitutes the bases for the development of many industrial processes and the production of new medicine (keatine and Jing, 2009). Also, biodiversity often provides solutions to existing problems of pollution and diseases. Takacs (1996) describes biodiversity as the processes which create and maintain variation. To him, it is concerned with the variety of individual organisms within populations and communities, as well as ecological roles within ecosystem (Also see Gardner and Paul, 2003). But according to Cawley (1989), there is no agreement on what exactly biodiversity means. It can refer to genetic diversity, species diversity or environmental diversity, whereas others simply refer to it as nature Odum (1995).

The United Nations Environmental Programme (UNEP) describes the levels of biodiversity as: genetic species and ecosystem diversity. Genetic diversity involves all the genes contained in all the living species including individual plants, animals, fungi, and micro-organisms. Species diversity is all the different species as well as the differences within and between different species. On the other hand, ecosystem diversity is all the different habitats, biological communities as well as ecological processes and variations within individual ecosystems. In this study however, ecosystem diversity remains our area of focus since the dredging of gravels and sand take place within the sphere of the ecosystem. It is of note that, biodiversity conservation provides substantial benefits to man, animals and plants. In the first instance, the needs for clean, consistent,water flows, protection from flood, storms, drought and good climate hold much to biodiversity conservation (Batten, 1973). Conversely, loss of biodiversity is dangerous with its attendant consequences.

Scholars such as Fellman, Aurthur and Judith (2005) have observed that, biodiversity conservation reduces pollution and also increase soil stability and fertility. It also maintains water quality, tourism opportunities, as well as other commercial and medical functions. According to Cunningham and Cunning ham (2004), all of man's food comes from the ecosystem. Many wild plant species also make important contributions to human food supplies either as they are or as a source of genetic material to improve domestic crops. I have agued elsewhere that, living organisms provide us with many useful drugs and medicines (Udoh, 2013). Fellman, Arthur and Judith (2005) argue that, more than half of all prescriptions contain some natural productswhile the United Nations Development Programmes (UNDP) estimates the value of pharmaceutical products derived from developing worlds plants, animals and microbes to be more than $30 billion per year.

According to Ekong (2010), social, aesthetic, and cultural benefits in biodiversity preservation includes; recognition and transmission of tradition as well as knowledge and preservation of customs. While Folk, Carpenter and Walker (2004) have noted that millions of people enjoy hunting, fishing, camping, hiking, wildlife watching and other nature – based activities which provide invigorating physical exercise, Enger and Bradley (2006) observe that contact with nature can be psychologically and emotionally restorative. In many cultures, Udoh (2001) has observes that, nature carries spiritual connotations, and particular species or landscape may be inextricably linked to a sense of identity and meaning. For many people also, the value for wildlife goes beyond opportunity to photograph or shoot a particular specie of animal, but the value of knowing that certain species of animal exists, is reason enough to protect and preserve the ecosystem.

Generally speaking, efforts to preserve biodiversity involve a tension between the desire to use biotic resources and the wish to maintain biodiversity. The value of exploiting a resource can also be measured in economic terms whereas; farmland, lumbering and animal products can be given a measurable monetary value by the economic marketplace. On the other hand while it is often difficult to put an economic value on the preservation of biodiversity and the environmental services provided by ecosystemenvironmentalists shouldoften rely on ethical or biological arguments to make their points. Generally, the decisions that must be made should involve a compromise that allows for some utilization of a resource while preserving some of the biodiversity (Enger and Bradley, 2006). In line with the above, Keating and Bibuhu (2009) outline the following threats to our natural world when biodiversity is threatened:

i. **Habitat Loss and Destruction:**Habitat loss occurs when human activities result in the conservation of natural ecosystems to human dominated systems. The resulting changes eliminate or reduce the numbers of species that were a part of the original ecosystem. This is one of the greatest threats to biodiversity. Habit loss is directly linked to human induced pressures on land. It also involves persecution of pest organisms; many large carnivores were hunted in extinction because of their threat to human and their livestock.
ii. **Invasive Alien Species:** Introduction of exotic species can also have significant effect on biodiversity. Often, some species complete with native species and drive them to extinction. Also, the introduction of exotic species that replace local and native species is cited as the second largest cause of biodiversity loss. Alien invasive species replace, and often result in the extinction of native species.
iii. Over-exploitation: Over-exploitation occurs when humans harvest organisms faster than the organisms are able to reproduce. Over-exploitation has driven some organisms to extinction and threatens many others. Over-hunting, over-fishing of over-collecting of species can quickly lead to its decline. Changing consumption patterns of humans is often cited on the key reason for this unsustainable exploitation of natural resources.
iv. Alteration in Ecosystem Composition: Assemblages of special and their interactions with their ecosystems are critical for not only saving the species, but also for their successful future evolution. In the event of alterations, either within species groups, or within the environment, an entire ecosystem can begin to change. Alteration to ecosystems are a critical factor that contributes to species loss.
v. Global Climate Change: Both climate variability and climate change cause biodiversity loss. Species and populations may be lost permanently, it they are not provided with enough time to adapt to changing climate conditions.

vi. Pollution and contamination: Biological systems respond slowly to changes in their surrounding environment. Pollution and contamination cause irreversible damage to species.

In Ini Local Government Area of Akwa Ibom State, human actions both deliberate and inadvertent, modifying or even destroying the environment is perhaps as old as human existence in the area. People have used, altered and even replaced the vegetation in a variety of ways. They have hunted to extinction, vast herds and species of animals and plants. They have, through overused and abuse of the land and its resources, rendered sterile and unpopulated hitherto productive and attractive communities unproductive (Okurekong, Udo and Esin, 2012).

According to Bisong (2001), humanity derives all its food, fibre, medicines, and industrial inputs from both the wild and domestic components of biodiversity for the local residents for whom biological resources often represent their primary source of livelihood, medicine and spiritual values, biodiversity conservation is directly relevant. However, despite the enormous and unquantifiable value of the ecosystem, mass elimination of species and genetic resources is taking place unabated.In Ini Local Government Area, the people of Odoro Ikpe and Ikpe Ikot Nkon have over the years been engaged in gravel and sand dredging for revenue generation. This activity forms one of their major occupations of the people in addition to farming, fishing, hunting and lumbering. The amount of resources taken out in the area has been estimated at ₦50 million per annum (Udoh, 2012). Obviously, the excavation of gravel and sand in the area has rendered the soil unproductive for other economic endeavours. Adversely, the area has been exposed to gully erosion, loss of fertility as well as extinction of terrestrial and aquatic lives.As can also be observed in figures 'a', 'b', and 'c' above,roads leading to other communities have been washed away by gully erosion, while residential houses, business premises and farm lands have also been destroyed. In the light of the above, the study therefore seeks to explain the impact and consequences of biodiversity mutilation and what strategies should be adopted to minimize the ongoing situation.

Plate 1: **A** **B**

A: A stone excavation site at Odoro Ikpe, Ini Local Government Area

B: Partial road collapse – the resultant effect of stone excavation from the site in 'A'

Plate 2: A Stone excavation site at Odoro Ikpe, showing a complete devastation of the source of drinking water and farmlands

Plate 3: **A** **B**
A: Another erosion ditch caused by the excavation of gravels at Odoro Ikpe
A half residential buildings, another example of the effects process destroying farmlands. of the excavation

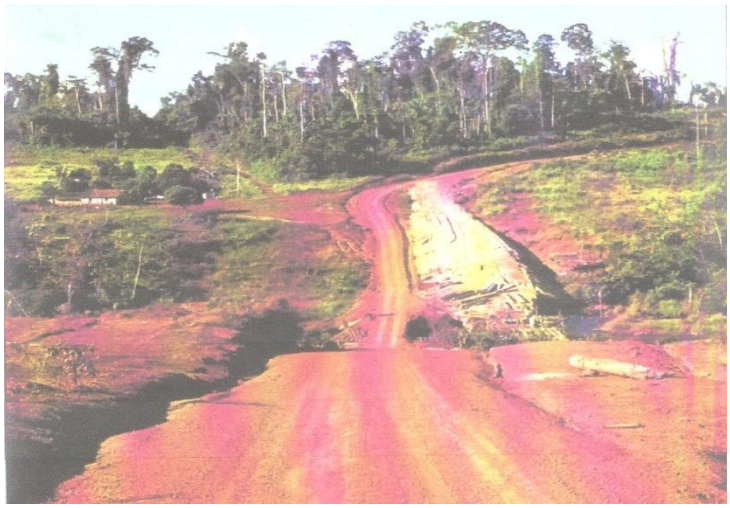

Plate 4: A collapsed road in Ikoe Ikot Nkong of Ini Local Government Area – An adverse consequence of sand dredging in the area.

Theoretical Framework

The present study employs the Ecosystem Development Theory (EST) as its explanatory model. Ecosystem Development Theory was propounded by Eugene Odum in 1963. The theory explains that, an understanding of ecological succession provides a basis for resolving man's conflict with nature. The principles of this theory hangs on the relationship between man and nature. Its framework dwells on the basis for resolving man's present environmental crisis. The theory promotes ecological succession which Odum (1963) defines it in terms of the following three parameters:

- An orderly process of community development that is reasonable, directional and predictable.
- Modification of the physical environment by the community; that is, succession is community-controlled even though the physical environment determines the pattern, and rate of change, and often sets limits as to how far development can go. and
- Stabilization of ecosystem in which maximum biomass and symbiotic function per unit of available energy flow.

The theory argues that, since biotic diversity enhances physical stability in the ecosystem, there exists an important guide for conservation practice. Preservation of hedgerows, woodlots, non economic species, non-eutrophicated waters and other biotic variety in man's landscape could then be justified on scientific as well as aesthetics grounds, even though such preservations often must result in some reduction in the production of food or other immediate consumer needs. Odum (1963) sums it up with the expression, "is variety only the source of life, or is it a necessity for the long life of the total ecosystem comprising man and nature?"Practitioners of this theory stress that, ecosystem development is very relevant to human ecology. They add that, the goal of agriculture or intensive forestry as now generally practiced is to achieve high rates of production of readily harvestable products with little standing crop left to accumulate on the landscape. Nature's strategy on the other hand is directly toward the reverse efficiency and man has generally been preoccupied with obtaining as much product from the landscape as possible, by developing and maintaining early successional types of ecosystem, usually monocultures. But of course, man does not rely on food and fibre alone; he also needs a balanced CO_2 and O_2in the atmosphere, the climate buffer by oceans and masses of vegetation, and clean water for cultural and industrial uses. Also, many essential life-cycle resources such as recreational and esthetics needs, are best provided to man by productive landscapes. In other words, the landscape is just a supply depot but is also the oikos – the home- in which we must live (Andrey 1967).

Odum (1963) concluded that until recently, mankind has more or less taken for granted the gas-exchange, water purification, nutrients-cycling, and other productive functions of self-maintaining ecosystems, chiefly because never his number nor his environmental manipulations have been great enough to affect regional and global balances. It is evident that such balances are being affected, often detrimental, thus the need for some form of ecosystem analysis that consider man as a part of, not apart from the environment.

IV. Results And Discussions

i. **Human Activities and Biodiversity in Ini Local Government Area:**On the question: In what ways has human activities endanger biodiversity in Odoro Ikpe and Ikpe Ikot Nkon communities? In reaction to the above question, more than four-fifth (193.3 percent) of the respondents agree that dredging of sand and gravels in the area have caused serious damages to the environment. Other identifiable human activities by respondents include indiscriminate fishing, failing of unmatured trees, clearing of reserved forest as well as hunting of animals. Findings also show that, areas that were once known for fishing and farming are now depending on other communities for their food and other agricultural needs due to extinction of such crops and animal species in their own areas.

ii. **Consequences of Biodiversity Destruction:** On the question: What are the consequences of biodiversity destruction in Odoro Ikpe and Ikpe Ikot Nkon communities? In an attempt to answer the above question, respondents' opinions were diverse. More than four fifty (92.7 percent) of the respondents agree that dredging of sand and gravels at Odoro Ikpe and Ikpe Ikot Nkon has resulted in terrible road damage due to exposure of land to gully erosion. All the respondents (100.0 percent) agree that erosion adversely affect roads, residential buildings and farmlands. A little more than a half (57.6 percent) also agree that lumbering and indiscriminate failing of trees, fishing as well as hunting have adversely affected the biodiversity composition of species of animals and plants in the community. However, a few respondents (12.3 percent) did not agree that extinction of certain animals and plant is as a result of human activities but as an act of the gods. To these people, the deities are not being appeased by people of this generation as was the case in time past, as such, the deities withdraw their benevolent services of providing these species of animals and plants to mankind.

iii) **Measure that could be adopted to reduce biodiversity destruction in the area:** On the question; what measures could be adopted to prevent further exploitation to biodiversity in the area. To answer the above question, respondents were also diversed in their opinions. However, more than a half (56.4 percent) agree that government should stop people from excavating sand and gravels in the area. 33.2 percept of the respondents mentioned that government should build an industry that will serve as a source of employment to those who depend on sand and gravel excavation as their source of livelihood. Other respondents observe that, while hunting and fishing could not be stopped in the area, if those engaging in sand and growth a dredging in it can be empowered financially to start up small scale business, their dependence on these activities as their major source of income could be reduced. Such reduction could serve the environment from deplations and therefore reduces the incidence of biodiversity destruction.

V. Conclusion And Policy Suggestions

The findings of the present study suggests that, though the people of Ini Local Government see gravels and said business as one of the economic ventures that put food on their tables for some decades now, the adverse consequences of this occupation on biodiversity and environmental degradation has not bee taken into

consideration. Problems ranging from road destruction resulting from gully erosion, destruction of residential buildings, business premises and government quarters as well as devastation of farmlands due to wrong channeling of water is alarmingwhile death toll due to collapsed gravels and sand turnels are cases frequentlyrecorded in the area. In order to minimize further occurrence of these menace, the following policy recommendations are made:

- Governments at the state and local area should set up a sensitization and monitoring team to educate members of these communities on the dangers of sand and gravel dredging as they affect roads and residential areas. They should be made to be aware of the existence of environmental protection laws which make it an offence for people to exploit the environment indiscriminately.
- Empowerment programme institutions as micro-finance banks and co-operative societiesshould be extended to the area in order to mobilize those engaging in sand and gravel dredging to take on other economic ventures. Such opportunity will promote small scale entrepreneurial development among the people an therefore get them out from exploiting the earth. Community Capacity Building Strategy should be adopted in the community, with community development as a driving feature and biodiversity protection as an explicit objective. This will hel*p* to rebuild areas that were hitherto destroyed by human activities of sand and gravel dredging.

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