

ENVIRONMENTAL CONSERVATION AND USE OF ECONOMIC INCENTIVES TO CONSERVE BIOLOGICAL RESOURCES IN NIGERIA

Greg Ekpung Edame¹

¹Department of Economics, University of Calabar, Calabar, Nigeria

ABSTRACT

This paper analyzes environmental conservation and use of economic incentives to conserve biological resources in Nigeria. Conservation refers to the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations. Its compliments are preservation, maintenance, sustainable utilization, restoration and enhancement of the natural environment. It is concerned with plants, animals, microbes, and with the non-living elements of the eco-systems which sustain them. The varieties of ecological system in Nigeria create an endowment of biological resources of which the nation is justifiably proud of. The conservation of these resources for the benefits of the present and future generations has been practiced with little attention given to develop a crop specialist (ecologists) to handle the subject. Under this situation the urgency of conservation programmes can no longer be denied. The establishment of the National Resources Conservation Council by the Nigerian Government is a welcome idea. Working together, it should be possible to achieve the goal of conservation namely that human survival and sustainable economic development depend fundamentally on proper maintenance of renewable resources; vegetation and forest, water, marine and fisheries resources as well as wild animals and soil resources. The paper finally looks at the values of biological resources, the cost of protecting biological resources and the status of conservation practices.

Keywords: Biological, Biodiversity, Conservation, Ecosystem, Incentives, Resources, Vegetation, Economic development, Preservation, Sustainable development.

JEL Classification: O13, O44, Q56, Q57.

Contribution/ Originality

This study is one of the very few empirical studies which have investigated environmental conservation and use of economic incentives to conserve biological resources in Nigeria. The paper employs descriptive method of analysis on the use of economic incentives to conserve biological resources. The paper's primary contribution is in the area of the existing literature on environmental conservation and resources management.

1. INTRODUCTION

Our forest and waters constitute veritable natural assets providing the right habitat for a myriad of living things that are useful in agricultural and medical sciences. Several attributes of these natural habitats recommend them to ecologists who assiduously promote their protection through sustained yield management. These forests and waters contain resources, some of which are non-renewal (e.g coal, oil materials ores etc), while others are renewal resources (e.g wood, grassland, fish and wildlife).

Closely related to renewable natural resources are ecological services which arise from normal functioning of ecosystems. Renewable natural resources however remain as long as they are removed at rates commensurate with their formation and the ecosystem maintained for their perpetuity or forever. These include clean air, operational watershed, biological diversity and science beauty. These in turn provide to the society valuable services such as regulation of climate, support of economically important species and soil formation (Edame, 1998a).

The combination of renewable natural resources and ecological services described may be considered as the biological resources endowment of the country; the natural capital on which economic growth is based. This endowment is based further on genes, species and ecosystems which have actual or potential value to people. Biological resources are manifested as biological diversity. Thus implying genetic diversity, species diversity and ecosystem diversity (Sabia and Dore, 1991). These three concepts are interrelated. Ecosystems provide the framework for nutrient cycling through the various chemical cycles. To be meaningful, schemes to conserve species must of necessity also conserve the ecosystem in which they are part.

While non-renewable resources on the other hand, are finite so they get depleted overtime, biological resources will increase in value when managed properly. Biological resources not only survive, they have the potential to increase even when they are being used, provided the capacity for sustainable use is not impaired.

Conservation is therefore a prerequisite for socio-economic development and in its fullness should include the control of the physical development which offers the least abuse to the biological communities for continuous benefit to man (Edame, 1998b). Current development of instead of conserving till stock of natural capital of forests, grasslands, wetlands and the living species associated with them is reducing the resources to levels where they may be unable to renew resources to levels where they may be unable to renew themselves. The easiest way to transfer a living renewable resource into a non-renewable resources is through extinction and the rates have increased globally in the last 350 years and Nigeria have equally been affected due to human activities.

2. BENEFITS OF CONSERVAITON AND ECONOMIC VALUES

Conservation has been defined as “The management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generation” (World Conservation Strategy (WSC), 1980). Its compliments are preservation, maintenance, sustainable utilization, restoration and

enhancement of the natural environment. It is concerned with plants, animals, microbes, and with the non-living elements of the ecosystems which sustain them. The major benefits of conservation of our living resources are:

- i. To promote the scientific value of natural eco-systems, the study of which is required to enhance conservation itself to improve the management of man-made systems, and to provide clues of technical innovations in agriculture, medicine and industry;
- ii. To regulate environmental balances in such factors as carbondioxide, radiation levels and the bio-geochemical cycles;
- iii. To maintain genetic diversity in order to ensure permanence in the supply of materials to satisfy basic human needs and thus improve the well-being of society;
- iv. To enhance the amenity values of natural resources, including aesthetic, heritage, religious, sentimental, ethical and recreational values on which tourism may be built; and reversing desertification or re-establishing forests are formidable and surpass benefits which led to the creation of the problems. Other examples like loss of genes through species extinction create problems of substitution or replacement (Sabia and Dore, 1991).

2.1. The Status of Conservaiton Practice

The main focus of natural resources conservation in Nigeria has been on forest resources and to a lesser extent on wildlife and fisheries. In pursuit of the former, forest reserves were created to actually hold timber “in reserve” the rights of native to extract minor products was however recognized. Regardless of the efforts a little less than 10 percent of the total land mass of the country is under forest reservation a far cry from the recommendation area of 25 percent. A lot of variation however exists between the states in the area of land reserved for forestry.

Forest reserve management has usually be restricted to activities relevant to timber exploitation, management for other resources and use types was neither required by law nor practiced. Resource depletion eventually led to the banning of export of indigenous timber species. To meet projected requirements for wood and pulp for paper, fast growing exotic species were introduced-natural forest were then cleared to be replaced by monocultures of teak, eucalyptus and pine. Some of the forest reserves have however been converted into game reserves, a few have made the transition into National Parks. Several others have been de-reserved or converted into farms (Edame, 1999).

The forest zone of Nigeria covers about 130,000 sq k, about 14 percent of the land area. Only 16 percent of this zone is reserved forest. It has been estimated that the rain forest is disappearing at a rate that is over 250km² annually) Okali (1979). Given this rate of destruction it would all be gone by the turn of the century, if conservation measures are not enforced.

The game reserves have suffered equal disability in this country as part of the forest reserve network, for the most of them there is no attempt at resource management.

Resource inventories have never been taken, population densities of animals are not known and even the species composition are not up to date, personnel are not posted to manage these game reserves and enforcement of legal provisions intended to regulate hunting is in abeyance. Under such circumstances there is wholesale poaching (Sabia and Dore, 1991).

The hunting that is done is very intensive encompassing the use of dogs, community drives, fire and hunting at night. It is well known fact that hunters do not discriminate as to their kill. Very little attention is given to the age or sex of the animals, the relative abundance of the species. In this frenzy for bush meat, enforcement staff have been killed and incidents of accidental killing of fellow hunters have occurred.

A list of game reserves reveals that certain critical habitats have not been conserved. These include the mangrove and swamp forests. A comprehensive approach to habitats conservation is long overdue. For effectiveness there should be national and regional strategies. While the national strategy will take cognizance of broad themes of ecological significance, the state and local governments would have to address more germane issues (Edame, 1999).

Wildlife conservation need not be confined to the savanna belt alone. This is for the simple fact that the biological diversity of the resource base is enriched by the diversity of habitat types. The duty of conserving these resources cannot therefore be handled in a haphazard manner any longer. However one significant observation is that in many states there exist wildlife units that are only synonymous with zoo keeping. For states whose rural populations depend on wildlife for their meat requirement, it has to be pointed out that they are consuming the capital without investing in it. The remedy is the quick establishment of functional wildlife conservation agencies (Sabia and Dore, 1991).

3. ECONOMIC INCENTIVES TO CONSERVE BIOLOGICAL RESOURCES IN THE 21ST CENTURY NIGERIA

There are various economic incentives available to us that would be used as productive use value or indirect values of biological resources used for conservation.

A. Productive use value: The resource considered here includes timber, fish, animals skins, ivory, honey, beeswax, rattans, ornamental value, dyes, mushroom, etc, which put together would have a considerable significance on the economy in the 21st century.

Contributions which are not usually reflected in the official economic indicators include;

- a. Contributions of new domestic species
- b. Use of wild species to improve domestic lines
- c. Contribution to livestock industry from wild forage, rangeland,
- d. Crop pollution by many wild species.
- e. Biological control of many pests by wild species.

The loss of revenue from timber export (which has been banned due to inadequacy of local supply), ivory trade (due to declining population of elephants etc) are a pointer to reduced contributions from wild biological resources because of poor conservation attitudes in the past.

- B. Indirect use values: These usually deal with ecological services and present more difficulty in quantifying. Non-consumptive use-while tourism has been known to be an important source of revenue, estimates of the actual contribution made by components of the ecosystem in eco-tourism have only recently been calculated. In Kenya for instance, each lion is estimated to be worth US \$27, 0000 per year in visitor attraction (McNeely, 1988).

The oxygen production capacity of a single tree is being estimated at by natural resources economists.

The economic benefits of protecting habitats include;

- i. Stabilizing hydrological system
- ii. Protecting soils
- iii. Contributing to stability of climate
- iv. Con serving renewable resources
- v. Protecting genetic resources
- vi. Preserving breeding stocks, population rerservoirs and biological diversity:
- vii. Maintain the natural balance of the environment
- viii. Supporting tourism and recreation creating employment opportunities
- ix. Providing facilities for research education and monitoring (Myers, 1988).

4. ECONOMIC IMPORTANC OF BIODIVERISYT AND BIOTECHNOLOGY

While biological diversity remains the undisputed most important environmental issues internationally, this too should gain our national attention; such that the huge sum of over \$55m required for conserving genetic resources of plants alone, not to talk of animal and plant biodiversity combined protection, would be generated in due time for the entire exercise.

We have noticed that commercial conservation is linked to the emergence of new biotechnologies, which have so far transformed global genetic richness into their own raw materials for industrial production needs, and sees conservation in terms of profit. This notion should not allow these predators to erode our genetic diversity for their market gains alone. Rather modern biotechnology linked with biodiversity should be made to change life; by increasing our effectiveness in the area of crop production, animal husbandry, food processing and health care, by cutting costs and improving production. It is believed that biotechnology can provide this nation with potential solutions to the rural poor, the urban hungry and the marginalized ones in our midst (Ukpong, 1991).

5. TOWARDS A MORE PURPOSEFUL RESORUCES CONSERVATION

To meet the demand of dynamic society, a more comprehensive approach to conservation of our natural resources is necessary. Conservation areas as currently established have not been nationally based criteria but have developed piece-meal and in places where the dynamics of competing land use demand was resolved in favour of conservation.

It is desirable that ecological factors be accorded the pride of place by the relevant agency. To meet the challenges of the future, natural resources conservation would have to be more purposeful and take on the challenges posed by a more demanding public. Forests are more than a source of trees, timber, fibre. They are important in hydrological cycles, provide food, fodder, medicinal materials and represent a repository of yet undiscovered genetic materials.

The feature demands that multiple use management be instituted to replaced the current passive single resource management. Forests would have to produce more trees. While being managed for the traditional purpose of timber production the forest management practices of the future would have to provide for national reaction demands, hunting, camping, bird-watching and provision of clean air.

Table-1. Categories of Development and Management of National Resources

	Categories	Purpose/ Management
A	Scientific reserve	Strict Natural Reserves
B	National parks	Provincial parks
C	Natural Monuments	Natural Landmarks
D	Nature conservation reserves	Managed nature, reserves, wildlife sanctuaries
E	Protected landscapes	
F	Resources reserves	
G	Anthropological reserves	Natural biotic areas
H	Multiple use management areas	Managed resource areas
I	World Heritage sites	Natural reserves

Source: National Conservation Strategy for Nigeria (1986)

To address the gap in the conservation programmes for the country and to keep in proper perspective the needs for unity of direction and national focus, the National Conservation Strategy was adopted as the guiding light for conservation in Nigeria. These were followed by the establishment of the Natural Resources Conservation Council as the apex organization for natural resources conservation in Nigeria (Decree No. 50/1989 and (Edame, 1999)).

The functions of the Natural Resources Conservation Council of Nigeria as provided by law shall be as follows:

- i. Coordinate matters concerning the conservation of natural resources in Nigeria'
- ii. Formulate a national policy for natural resources conservation;
- iii. Monitor regularly the activities of the various natural resources conservation agencies with regard to implementation of their respective programmes and projects;
- iv. Resolve any conflicts that may arise in respect of any project implementation;
- v. Cary out many other activities calculated at to facilitate the effectiveness of the performance of the functions of the council under this decree.

The council has further powers to:

- a. Designated sites and species of conservation interests;
- b. Grant honors and give awards for projects that enhance national conservation objectives;

- c. Take fiscal measure to encourage conservation of natural resources in Nigeria;
- d. Provide grants for scientific investigation and study of ecological impacts of projects; and
- e. In collaboration with other bodies and agencies, control coastal zone development to minimize erosion on the national coastline ([National Conservation Strategy for Nigeria, 1986](#)).

6. CONCLUSION AND RECOMMENDATIONS

The variety of ecological systems in Nigeria creates an endowment of biological resources of which the nation is justifiably proud of. The conservation of these resources for the benefit of the present and future generations has been practiced with little attention given to development of a crop specialist (ecologists) to handle the subject matter.

The forest estates are being managed for the extraction of timber as the sole objective, wildlife management is synonymous with hunting, efforts at marine and fresh water fisheries conservation programmes can no longer be denied. For this reason, the government has placed natural resources conservation on the natural agenda by the establishment of the Natural resources conservation council. The council has enormous role such as coordinating, monitoring and promoting conservation activities in Nigeria.

Working together, it should be possible to achieve the goal of conservation, i.e human survival and sustainable economic development which depend fundamentally on proper maintenance of renewable resources; vegetation and forage, water, marine and fisheries resources as well as wild animals and soil resources ([World Conservation Strategy \(WSC\), 1980](#)).

To destroy the resources that can provide for us so bountifully is surely the height of folly. Over 3,000 years ago, God instructed the Israelites to conserve the fruit trees when warring against an enemy city. The reason he gave them was simple: "They provide you with food". Furthermore, "the trees of the field are not men that you should besiege them" (Deutromony 20:19, 20). The New English Bible. The same can be said of the beleaguered rain forest.

Evidently, rainforests, like fruit trees, are worth much more when they are left standing than when they are cut down. Senegalese ecologists Baba Dioum points out that: in the end we will conserve only what we love; we will love only what we understand and we will understand only what we are taught". It therefore implies that if we love our natural resources we must conserve them.

Tischendorf Stole those ancient leaves in the Sinai Desert because he loved antique manuscripts and he wanted to preserve them. Will enough people learn to love the rain forests in time to save them? ([Awake, 1998](#)).

Conserving the creatures of the forests is very essential. We need parks to provide adequate protection. John Terborgh, in his book *Diversity and the Tropical Rain Forest*, calculates that a variable population of jaguars (about 300 breeding adults) needs about 7, 5000 square kilometers". By this criterion there are only a few parks on earth that contain enough space for jaguars", he concludes. Tigers may need even more space. A breeding pool of tigers (400 animals) may require an area as large reserves for predators such as these, whole tracts of rain forest an likewise

be protected. As an added bonus, these animals play a vital role in maintaining the overall health of the animal community (Awake, 1998).

7. RECOMMENDATION

This paper has examined the use of environmental conservation and economic incentives to conserve biological resources in Nigeria. It is recommended that legislation for the conservation of natural resources and the creatures of our forests be fully implemented by the federal government of Nigeria where such legislation has not taken place.

Legislation guiding the use of resources has not always taken into cognizance the need for penalties commensurate with the market value of some of these resources, status of the species or consonance, with the going rate of inflation competition for these resources. Legislation on resource extraction and utilization is often haphazardly enforced or selectively applied. There are also conflicts as to what levels of government and which agencies should have responsibility of implementation of the laws. There is urgent need therefore for a quick review of the situation. The natural resources conservation agencies must evolve innovative legislation that will support a system of incentives for actions that ensure the conservation of the resources.

As has been amply pointed out in the National Conservation strategy for Nigeria ([National Conservation Strategy for Nigeria, 1986](#)) “only in cases where it is desired to reserve an adequate areas of land for its product supply value, for preservation in situation of habitats or sites of particular interest of species that cannot readily survive outside their natural habitat and reservation of land becomes imperative”. Fishing, Animal and natural resources law should then highlight those measures that will favour the conservation of the resources.

REFERENCES

- Awake, 1998. Can our rain forests be saved? The Jehovah's witnesses Publications. Watchtower bible and trade society of New York Inc. May 8 Brooklyn NY. pp: 11201-2483.
- Edame, G.E., 1998a. Urbanization & environmental management in calabar, CRS: A Paper Presented at the 41st Annual Conference on Geography & The Nigerian Environment in the 21 Century. NGA;: 31st May – 4th June University of Uyo. Book of Abstracts. pp: 31-2.
- Edame, G.E., 1998b. Industrial pollution standard & environmental health conditions for industries in the 21st century, pragmatism approach. A Paper Presented at EBAN 98, 8th Annual Conference: Health & Environment in the 21st Century. University of Port Harcourt, 17th – 19th November, 1998.
- Edame, G.E., 1999. Environmental conservation: Using economic incentives to conserve biological resources in Nigeria in the 21st century. A Paper Presented at the 2nd National Conference, Towards Responsible Environmental Development and Resource Exploitation in the 21st Century, July 7-9th .Calabar: The Polytechnic Calabar.
- McNeely, J.A., 1988. Economics & biological diversity, developing and using economic incentives to conserve biological resources. IUCN Gland Switzerland.

- Myers, N., 1988. Tropical forests; much more than stocks of wood. *Journal of Tropical Ecology*, 4(02): 209-221. Available from Published Online 10 July 2009 by Cambridge University Press. Available from <http://journals.cambridge.org/action/display>.
- National Conservation Strategy for Nigeria, 1986. Federal government of Nigeria. Abuja: Natural Resources Conservation Council.
- Okali, D.U.U., 1979. The Nigerian rain forestry ecosystem. In the Proceedings of the MAB Workshop on the Nigerian Rain Forest Ecosystem, Ibadan: University of Ibadan.
- Sabia, A.R.K. and M.P.O. Dore, 1991. Natural resources conservation in Nigeria. Abuja: Natural Resources Conservation Council.
- Ukpong, S.J., 1991. Environmental education basis. Calabar: Saju Institute Research Foundation Press.
- World Conservation Strategy (WSC), 1980. Living resource conservation for sustainable development. IUCN Publication. DOI:10.2305/IUCN:CH:1980.9.en.

Views and opinions expressed in this article are the views and opinions of the author(s), International Journal of Sustainable Energy And Environmental Research shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.