

Environmental Literacy for Sustainable Forest Resource Management in Central Senatorial District of Cross River State, Nigeria

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Abstract

The study investigated the relationship between literacy and environmental conservation in the Central Senatorial District of Cross River State, Nigeria. A total of 300 young adults drawn from six randomly selected villages in six local government areas of the Central Senatorial District of Cross Rivers State responded to 20 items questionnaire on environmental literacy, human activities, deforestation, forest resource utilization and forest resource sustainability. The data collected were subjected to frequency, percentages and ANOVA analyses using the Statistical Package for Social Science (SPSS) version 21. The results in this study revealed that the literacy level of people living in Cross Rivers State is significantly related to their activities in the region. Also the study illustrates that the level of environmental literacy is a determinant of the level of forest resource utilization in Cross River State; and significant relationship existed between environmental literacy and forest resource sustainability in Cross River State, Nigeria. It is therefore advocated that environmentalists, government NGOs and CBOs should employ various strategies such as enlightenment campaigns, provision of jobs, social security allowed and enforce environmental legislation to ensure the sustainability of forest resource management.

Keywords: Environmental Literacy, Resource Sustainability, Education, Forest Resource, Utilization, Management, Cross River State, Nigeria.

INTRODUCTION

Forests are, of course, far more than simply timber - producing plantations. For many people, particularly in developing countries, forests are source of mushrooms, nuts, fruits, herbs, fodder for livestock, and materials such as raffia and cane used for building and crafts (Cunningham & Cunningham, 2005). FAO (1987) echoes this view by asserting that several studies in Africa, Latin America and South-East Asia have shown the importance of forests in the provision of

goods and services to rural people. Kemp (1980) identifies the high demand for forest products to include poles for fencing and house construction, fruits and leaves for human consumption, fodder for cattle, thatch, building materials and medicine.

There are vast numbers of edible products gathered from the tropical rainforest in Cross River State, including seeds and nuts, leaves, fruits, roots and tubers, fungi and salt (Omorodion & Ebana, 1994). The tropical rain forests, according to Falconer (1990) provide important sources of income for many rural dwellers. FAO (1978) reports that the income of villagers in Philippine and India is dependent on the gathering of forest products. Similar studies by Rodder (1991) held the same view. In a World Bank study of 105 major world cities, it was found that more than one third, including New York, Tokyo, Barcelona, and Melbourne, get much of their water from protected forest (Cunningham & Cunningham, 2005). The authors see the forest as an ecosystem which provides habitat for wildlife, recreational opportunities, and havens for biodiversity and evolution. Forests produce oxygen and sequester carbon, thus reducing global warming. Preserving these forests reduces landslide, erosion and sediment runoff. They also improve water purification and filtration of pollutants. Many natural forests capture and store water. Forests also act as carbon sink for atmospheric carbons.

The rainforest eco-system remains the source of supply for non-timber forest products (NTFPS) to the rural population. However, the need to wrest a living from the available natural resources has in turn resulted to environmental degradation, whereby the forest ecosystem, which is most adversely affected suffers a reduction in diversity of fauna and Flora with little or no effort made to conserve the resources for future generations. The forests have extensively been depleted through bush burning, wanton falling of trees and poor farming methods in the Central Senatorial District where the people's predominant occupation is farming. These hazards are, thus, apparently caused by human activities as a result of ignorance by the people, especially on the need to conserve these resources for future generations.

Among obvious results of environmental degradation are flooding, drought, ozone layer depletion, global warming desertification, deforestation, pollution, disease irregular climate conditions, among numerous other adverse effects (Inyang-Abia, 1995).

THEORETICAL BACKGROUND

This study is predicated on the cognitive dissonance theory of social action. The theory was developed by Leon Festinger (1957), modified by Brehm and Cohen (1962), Festinger (1964), and Aronson (1968). The theory has also been experimented by a whole generation of social psychologists.

The dissonance theory deals with relation between "elements". These elements are in terms of knowledge, information, attitude, or belief that a person holds about himself or his surroundings. Two elements can either be consonant with each other (that is, compatible or consistent), or dissonant (inconsistent irrelevant). The definition of a dissonant relationship is that, the opposite of one element would follow from the other element; that is, X and Y are dissonant if none-Y follows from X. what "follows from" a cognitive elements is determined by the person's expectations.

Thus dissonance can be the result of logical inconsistency, of the person's past experience concerning what things go together, or of cultural norms and values. The basic principles of the theory are that:

- Dissonance, being psychologically uncomfortable will motivate the person to try to reduce the dissonance and achieve consonance (and to) avoid situations and information which would likely increase the dissonance;
- The magnitude of the dissonance (or consonance) increases as the importance or value of the elements increases;
- The strength of the pressure to reduce dissonance is a function of the magnitude of the dissonance (Festinger 1957).

For example “I know I hunt” is consonant with the cognition “I know I enjoy hunting” but dissonant with “I believe hunting is bad for the environment. Faced with such a dissonant situation, if the elements are important to him, the person will try to reduce the dissonance in one of the following ways:

- He may change cognition about the environment for instance by giving up hunting or by deciding “I only hunt a little”;
- He may change cognition about the environment for instance by deciding that hunting is not harmful to the environment;
- He may add new cognitions to bolster one or the other of the dissonant elements, for instance “I know most people hunt”, or “I believe the evidence linking hunting and extinction isn’t conclusive” or “I know the dangers of deforestation”;
- Since the amount of dissonance depends on the importance of the cognitions, an individual may reduce dissonance by deciding that one or more cognitions are less important e.g. “It is really very possible that hunting is bad for the environment. I am going to stop hunting”. Though it is not always possible to reduce dissonance, successfully, if the amount of dissonance is great enough, one or more cognitive elements will be changed.

The implication of the above theory places environmental literacy within a sound theoretical foundation by specifying how educational activities can impact environmental conservation efforts. A meaningful programme of environmental education must be able to present alternative behavioural patterns to existing negative behaviours

REVIEW OF LITERATURE

Human Activities and Deforestation

It was the United States (US) spaceship, Apollo 8, which first provided the primary data that alerted man about the very small and delicate nature of the planet. These data depicted the earth as a close support system in which the primary constituents of water, air pressure and temperature were maintained in such a manner as to ensure a system of delicate balance for the purpose of sustaining life (Lawal, 1995). A scientific account of the earth’s evolution suggests that, it took nature several billion years for the earth to evolve as a planet (Edward, 1968). However, man has taken less than a century to destroy it. For the most part, man has destroyed the forests, polluted the air, land and the seas and substantially decimated the population of wild-life through his various activities. In Nigeria, over sixty percent (60%) of the tropical forests disappeared between 1850 and 1960 (Morakinyo, 1991). In Cross River State, it is

estimated that as much as twenty percent (20%) of the tropical rain forest was lost between 1972 and 1992 (Dunn & Otu, 1994).

Various human activities have contributed to the declining forest resources such as:
Agricultural expansion: According to FAO (1982) and Bisong (2005), shifting cultivation is said to be the leading cause of deforestation in both tropical West Africa and semi-arid Africa, accounting for seventy(70%) percent of woodland area converted. The quest for high forest soils is predicated on the lack of sustained soil management or improvement techniques which leads to soil fertility decline and a corresponding drop in agricultural productivity.

Overgrazing: According to Gullet (1979) and Soladoye (1990), overgrazing is another important cause of tropical woodland degradation. They further emphasize that over grazing; along with fuelwood gathering are the main forms of deforestation.

Fuelwood gathering: Adeghehin (1992) records that in Nigeria as well as other parts of the tropics; the rate of fuelwood extraction primarily from the natural forest has led to a situation where forest increment is far less than growth by natural regeneration. Bisong (2001a) identifies fuelwood gathering as the fifth most important factor that leads to forest clearance,

Commercial logging: FAO (1982) has estimated that between 4—5 million hectares of commercially productive closed forests are logged annually. In Nigeria, particularly in the Cross River State, direct logging damage on residual stands is more in areas with high selectivity, where large forest areas are open to shifting cultivators (Bisong, 2001b).

Fire: In Nigeria, the use of fire is detrimental to the stability of the natural forests. In the semi-arid areas, frequent fire leads to a breakdown of biomass formation. The impact of indiscriminate use of fire is a deterioration of the ecological process.

Plantation Establishment: The deliberate conversion of forest reserves to plantations of fast growing exotics from the 70's is undoubtedly a plausible reason for the massive deforestation of the tropical forest in Nigeria.

Johnson (1991) has identified an excessive rate of population growth as relative to development capacities of the pattern of land ownership, and simple ecological ignorance as indirect causes of deforestation.

Literacy and Forest Sustainability

Ekong, (2001) observes that education is an instrument per excellence for affecting national development. To enhance the attainment of national goals therefore, the Federal Government of Nigeria devised a National Policy on Education in order to guarantee citizens' rights to the acquisition of desired knowledge and values. The United States of America became the first industrialized nation to seriously consider the preservation of its natural environment during the great depression of the 1930s. In that period, president Franklin Roosevelt, as Wheeler and Martin (1975) reveal, undertook massive land, forest and water resources development and conservation projects throughout the states. Roosevelt equally ensured the introduction of conservation studies into the American school system. This is in recognition of the vital role which education plays in the indoctrination of goals in individuals in any given society. It is not therefore, surprising that every society, as Oden (2002) observed, education as a key factor in social mobilization, evolution and progress.

According to Agboola (2004) formal education is an organized curriculum which transmits what is worthwhile to those who are committed to it in an organized environment, schools, colleges and universities. The things which are worthwhile include desirable skills,

knowledge, attitude, aptitude and other capacities which are hoped will promote individuals usefulness to themselves and the society. Knowledge of environmental education is very useful in the sustainable management of the forests (Locke, Russo, & Montoya, 2013; Hares, 2006).

Isu (1993) defines Environmental Education as a process of transmitting environmental awareness for a change of values and attitudes for a sustainable use of the immediate environment and proper management.

Noibi and Lawal (1991), conceptualize environmental education in terms of; education from the environment, about the environment and for the environment. Education from the environment refers to the experience we gain or acquire from our surroundings or physical environment. Education about the environment has to do with the knowledge we acquire about the environment and inter-relationships therein. Education for the environment deals, with our commitment to environmental protection, conservation and sustainable development.

Environmental education is a field of study which seeks to promote among citizens not just awareness and understanding of the environment, but man's relationship with it and the responsible actions necessary to ensure his survival while improving the quality of life (Ogon, 2003). Afibi (2000) sees environmental education as education that helps man to develop efficient and effective environmental management skills and strategies for the survival of the present and future generations.

The growing impetus given to environmental education derives from the hope that mass education on the environment and public health matters are capable of engendering sustainable management of the earth's resources.

As Helmer (1997) aptly puts it, sustainable development requires us to be aware of ecological rules and to assume full responsibility for our common future. He avers that, communication is a vital instrument of social change, and that, there can be no social change without communication. Communication can only take place through information exchange and also through literacy and education. We cannot alter people's behaviour without adequate environmental literacy. This places the task of attaining environmental quality in the hands of environmental educators.

One of the goals of *National Policy on Environment* is to raise public awareness and to promote the understanding of essential linkages between environment and development and to encourage individual and community participation in environmental improvement effort (FEPAS 1989). The implementation of this policy therefore will lead to the publication and dissemination of relevant environmental data.

In the foreword to NEST (1991) definitive study of the Nigerian environment, Dr. Bukar Shaib, Chairman of the Covering Board of the Federal Environmental Protection Agency (FEPA) makes a point that, the aim of environmental education would be achieved only if there is adequate communication. Emeh et al. (1995) argued that all environmentally sound development policies require an environmentally sound literate person engaged in production, consumption and policy formulation. He further emphasizes the need for participatory adult education based, on productive activities of the adult, and on helping them to restructure needs and goals and informing policies for the future.

To make the transmission from our present way of using the earth's resources to more sustainable practices requires adequate information on the state of the environment and public education on the state.

Education is essential to the attainment of sustainable development. The philosophy of education in Nigeria is based on the perception of education as the instrument per excellence

affecting national development (Anijah-Obi, 2001). The national policy on education based on this philosophy, defines education and by implication literacy, as a process that helps to develop the whole man to enable him function effectively in whatever environment he may find himself. She posits that, social, political, economic, moral, intellectual and even environmental decadence can overwhelm the society if ignorance is allowed to thrive. The society is not static; it is dynamic. Consequently, changes in the society and the environment pose serious challenges to the nation. There are problems of overpopulation; posed by technological inventions, pollution, poverty, unemployment deforestation etc. these problems cannot be solved without adequate dosage of environmental literacy.

The researchers therefore hold the opinion that given a proper attitudinal orientation, people are likely to pursue environmental conservation through sustainable use of forest resources. Such sustainable use would ensure that the resources meet the needs of the present and future generations.

Education according to Ekong (2001) enhances goal attainment. The Jomtien Declaration and Framework of Action on Education for All (1990) also sees education as a mechanism for awakening an all-round development of the human potential. Since formal education is measured by the ability to read and write. It is the conviction of the researchers that a literate person would have access to ideas that would enhance his capacity to use forest resources sustainably.

Purpose of the Study

The purpose of this study therefore was to ascertain whether educational level has any significant relationship with sustainable forest resource management in Cross River state. Specifically, the study tends to evaluate:

- Environmental literacy, human activities and deforestation in Cross River State.
- Environmental literacy and forest resource utilization in Cross River State.
- Environmental literacy and forest resource sustainability in Cross River State.

Hypotheses

The research questions posed to guide the study are:

- There is no significant relationship between environmental literacy, human activities and deforestation in Cross River State.
- There is no significant relationship between environmental literacy and forest resource utilization in Cross River State.
- There is no significant relationship between environmental literacy and forest resource sustainability in Cross River State.

METHODS

Study Area

The research area for this study is the Central Senatorial District of Cross River State, Nigeria which lies in the tropical rain forest of the South-South geo-political zone of Nigeria. The

Central Senatorial District stretches between longitude 7.00° to 8.58E and latitude 5.00° to 5.29N. It is bounded in the East by the Republic of Cameroon and West by Ebonyi and Abia States of the South-East geo-political zones, and in the North it is bounded by Yala, Ogoja, Obudu and Obanliku Local Government Areas of the Northern Senatorial District of Cross River State, while in the South it is flanked by Biase and Akamkpa Local Government Areas of the Southern Senatorial District of Cross River State. There are six local government areas in the Central Senatorial District of Cross River State, they include: Abi, Yakurr, Obubra, Etung, Ikom and Boki Local Government Areas.

Central Senatorial District of Cross River State has a projected population of 775,256 and a land area of about 7538.119km (National Population Commission, 2005). The vegetation of the area is of large broad leafed layered tree canopies. The rainforests form good habitats for wild animals and birds.

The forests are also veritable habitats for timber and non-timber forest products (NTFPS), such as bush mango, alligator pepper, kolanut, hot leaves, cocoyam, cocoa and other medicinal trees and herbs. The climatic conditions are characterized by the four observed seasons which include; the long rainy season (March to July), the short dry season (August break), the short rainy season (September to October) and the long dry season (October to February). Rainfall varies within this region from about 450mm to over 3.500mm within the year.

The socio-economic activities of the people are predominantly on commercial and subsistence levels. The crops farmed include; plantain, banana, cassava, yam, cocoyam and maize which are processed and sold to generate revenue. The hunting of bushmeat in forest animals is done using local traps, bows, arrows and guns. Animals commonly hunted include; monkeys, porcupines, bush pigs, chimpanzee, drills, cutting grass, etc.

Worthy of note, is the fact that a reasonable number of civil servants reside in the study area, together with a sizeable number of businessmen and women. Their presence and the location of most of the towns along the highways provided for favourable markets for the disposal of forest products.

Population and Sample

The population consisted of all indigenes of the Central Senatorial District of Cross River State Nigeria. The sampling technique used was stratified random sampling. This sampling technique was used to choose the villages used for the study; the sample was made up of 300 respondents stratified and randomly selected from the selected villages in the Central Senatorial District of Cross River State.

Instrumentation

The instrument used for the study was a 20 item questionnaire, which was designed to elicit information on willingness or unwillingness to use forest resources sustainably. The first part of the instrument required respondents to state their educational status. To establish the reliability of the instrument, it was trial tested on 30 respondents who were not part of the sample. The computed reliability coefficients are: environmental literacy and human activities and deforestation in Cross River State (.83), environmental literacy and forest resource utilization in Cross River State (.81) and environmental literacy and forest resource sustainability in Cross River State (.89). The range of the liability coefficients showed a high degree of consistency in

the responses for the respondents on the instruments. The literate ones personally filled in the questionnaires, while the illiterate ones were assisted by the researchers.

Data Analysis Procedure

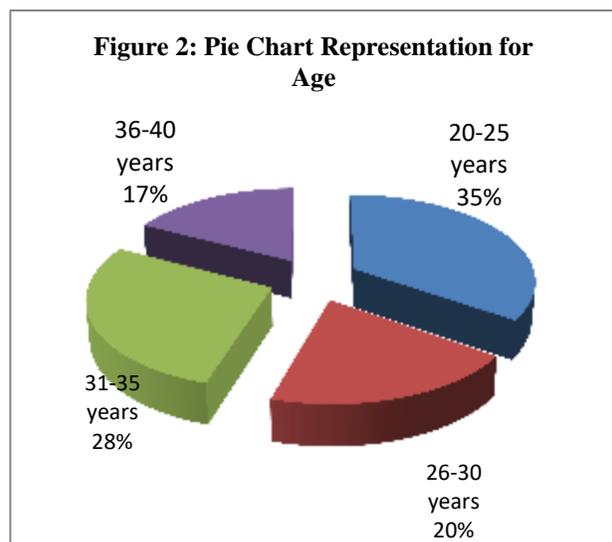
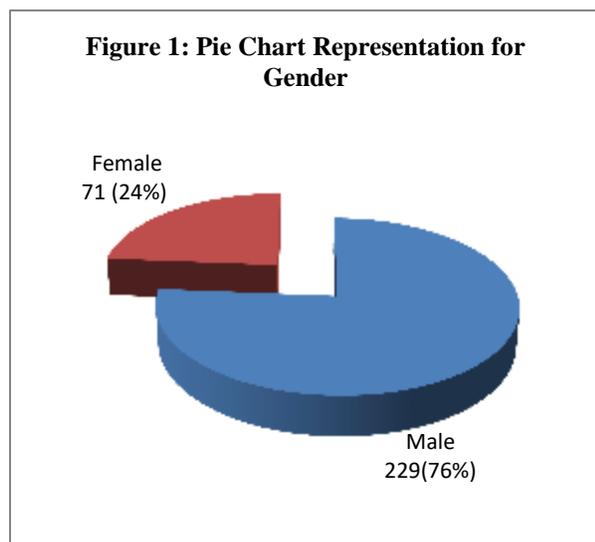
The data collection instrument used for this study was a Five Point-Likert scale questionnaire of 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree and 5 = strongly agree. The subjects were stratified and randomly selected from public servants, farmers, self-employed and from the private sector. The data collected were subjected to statistical analysis using frequency and percentage distribution and One-way Analysis of Variance (ANOVA). ANOVA was chosen to determine the relationships between variables.

RESULTS

The first analysis conducted was to determine respondents information based on age. The results revealed that 229(76%) were male and 71(24%) were female. Respondents information based on age revealed that 104(35%) were aged between 20-25 years, 60(20%) were aged between 26-30 years, and 84(27%) were aged between 31-35 years, while 52(17%) were aged between 36-40 years. See table 1, figure 1 and 2 for chart details.

Table 1: Analysis for Respondents information based on Gender and Age

Respondents Information		Frequency	Percent
Gender	Male	229	76
	Female	71	24
Total		300	100.0
Age	20-25 years	104	35
	26-30 years	60	20
	31-35 years	84	28
	36-40 years	52	17
Total		300	100.0



Hypothesis 1: Environmental Literacy, Human Activities and Deforestation

Hypothesis one, which states that ‘There is no significant relationship between environmental literacy and human activities and deforestation in Cross River State’ was aimed at determining if environmental literacy have significant relationship with human activities and deforestation. The result in table 2 revealed that the literacy level of people living in Cross Rivers state is significantly related to their activities and the deforestation in the region at $F=3.942$ and a significant level of $p < .048$. Issues of environment are dependent on their low level of exposure and education on the impact of their activities and deforestation.

Table 2: ANOVA analysis of relationship between environmental literacy and human activities, and deforestation

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.278	1	7.278	3.943	.048
Within Groups	550.042	298	1.846		
Total	557.320	299			

Hypothesis 2: Environmental Literacy and Forest Resource Utilization

Hypothesis two states that ‘There is no significant relationship between environmental literacy and forest resource utilization in Cross River State’. The hypothesis was aimed at determining if significant relationship exists between environmental literacy and level of forest resource utilization in Cross Rivers State. The result in table 3 illustrates that the level of environmental literacy is a determinant of the level of forest resource utilization in Cross River State. This is as shown in the $F=37.240$ at a significant level of $p < .000$. Forest resources are under-utilized and a lot of waste is noticed.

Table 3: ANOVA analysis of relationship between environmental literacy and forest resource utilization

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	53.784	1	53.784	37.240	.000
Within Groups	430.386	298	1.444		
Total	484.170	299			

Hypothesis 3: Environmental Literacy and Forest Resource Sustainability

Hypothesis three, which states that ‘There is no significant relationship between environmental literacy and forest resource sustainability in Cross River State’ was meant to determine if significant relationship exist between environmental literacy and forest resource sustainability in Cross River State. The results obtained in table 4 revealed that significant relationship existed between environmental literacy and forest resource sustainability in Cross River State at $F=9.016$ and a significant level of $p < .003$. The poor forest resource sustainability is as a result of their poor level of environmental literacy. Forest resources are degraded at an alarming rate without recourse to replenishing the degraded forests.

Table 4: ANOVA analysis of relationship between environmental literacy and forest resource sustainability

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.937	1	9.937	9.016	.003
Within Groups	328.450	298	1.102		
Total	338.387	299			

CONCLUSION

This study has evaluated the relationship between environmental literacy, human activities and deforestation; forest resource utilization and sustainability in Cross Rivers State, Nigeria. The result presented in this study revealed that the literacy level of people living in Cross Rivers State is significantly related to their activities and the deforestation in the region. Also the study illustrates that the level of environmental literacy is a determinant of the level of forest resource utilization in Cross River State; and significant relationship existed between environmental literacy and forest resource sustainability in Cross River State, Nigeria.

Sustainable management of forests needs a holistic approach. The ability to adjust forest management practices is a key to a successful and sustainable forest resource management. To achieve this requires local people participation and the understanding of their environment. However, forest management activities are usually faced with problems of forest utilization and protection.

They therefore advocated that environmentalists, government NGOs and CBOs should employ various strategies such as enlightenment campaigns, provision of jobs, social security allowance and enforce environmental legislation to ensure sustainable forest resource management.

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