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INCLUSIVE FOREST CONSERVATION PRACTICES AND PROMOTION OF ENVIRONMENTAL SUSTAINABILITY IN CENTRAL SENATORIAL ZONE, CROSS RIVER STATE, NIGERIA.

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Abstract:

Inclusive environmental sustainability is the main thrust of this paper. This was effected through the forest conservation practices among adult inhabitant in Central Senatorial Zone of Cross River State. To achieve the purpose of this study, two null hypotheses were formulated to guide the study. Literature review was carried out accordingly on reforestation and silviculture relative to environmental sustainability. Survey research design was adopted for the study. A sample of six hundred and thirty (1575) respondents was used for the study. The selection was done through multistage procedure of stratified and accidental sampling techniques. Forest conservation practices and promotion of environmental sustainability (FCPPES) questionnaire was the instrument used for data collection. The questionnaire consisted of fifteen items, items 1-5, sought information on reforestation while items 6-10 were for silviculture and items 11-15 sought information on environmental sustainability. The instrument was first validated by the supervisor and two experts in measurement. Data collected was analysed using

one way analysis of variance (ANOVA) as the statistical techniques employed to test the hypotheses under study. Each hypothesis was tested at 0.05 level of significance. The result of the analysis revealed that, practice of inclusive reforestation and silvicultural practice significantly influenced environmental sustainability. It was therefore recommended among others that government agencies concern should intensify efforts on farmers and hunters' enlightenment as well as enforcing policies on the best practices to promoting environmental sustainability.

Introduction:

Forest conservation refers to the wise use and management of forest resources, for example it could be raising of timber crops in such a way that maximum yield resources which wildlife and other benefits are obtained without destroying the forest or the soil structure, in the process. It is also concerned with the quality as well as the basic support of human life [1]. Forests are essential for human survival and well-being. They 1780arbor two thirds of all terrestrial animal and plant species. They provide us with food, oxygen, shelter, recreation, and spiritual sustenance, and they are the source for over 5,000 commercially-traded products, ranging from pharmaceuticals to timber and clothing.

Forest conservation practices aimed to ensure that the goods and services derived from the forest meet present day needs while at the same time securing their continued availability and contribution to future generations [2]. Reforestation involves the establishment or expansion of a forest which was previously destroyed or degraded and is important to restore a forest through reforestation so that it can be sustainably managed in order to help people meet their needs as it regulates climate, habitat for diversity, food security etc. According to Candell [3] to combat deforestation, it is essential to manage forest resources efficiently and restore forest through reforestation so that it can be sustainably managed in order to help people meet their needs. In his view, he sees reforestation as the restoration of the main component of the forest.

Silvicultural practices which is the science of tree management within forest and generation of the forest as this practices helps to maintain environmental values of forest which includes conservation of biological diversity and sustainability of the ecosystem as well as forest health and vitality Florence [4]. [5]highlighted some silvicultural practices as maintaining natural species pattern which are related to texture and structure of the soil, regeneration and growth and development. According to the World Conservation Strategy (WCS) in [6] conservation involves 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 need and aspirations of future generations. That conservation is positive, embracing preservation, maintenance, sustainable utilization, restoration and enhancement of the natural environments. Environmental sustainability allows for the needs of man to be met without jeopardizing the ability of future generations to meet their needs. It is seen as responsible interaction with the environment to avoid depletion or degradation of natural resources and allow for long-term environmental quality. The practice of environmental sustainability helps to ensure that the needs of today's population are met without damaging the ability of future generations to meet their needs. Environmental sustainability as applied to forest is the practice of regulating forest resources to meet the needs of society and industry while preserving the forest's health [7].

The inclusiveness here talks about how different body's ranging from the corporate organizations, non-governmental organizations and even the rural farmers both literates and illiterates and the environmental experts needs to form a strong synergy for this practice to be sustainable and environmental friendly. Humans are constantly involved in a number of activities that tend to reduce the quality of the environment on daily basis. These activities are aimed at meeting their insatiable needs. The relationship between human and the environment has always been beneficial to human at the expense and detriment of the environment. This has resulted in severe damage to the quality of the environment thereby reducing its ability to effectively support human's existence on earth. This has manifested in climate change, global warming, deforestation, flooding, erosion, pollution and

environmental degradation. It is because of this various challenges that were meted out that the researcher wishes to find out how reforestation and silvicultural practices can be used to ameliorate environmental sustainability in Cross River State.

Whenever timber is removed, either by clear cutting, strip cutting or selective cutting the denuded areas must be reforested to ensure a sustained yield, this may be done by natural or artificial method [8]. According to Woodwell and North [9] reforestation is the establishment or expansion of a forest which was previously destroyed or degraded. Reforestation through natural afforestation occurs when seeds from existence of trees are deposited on deforested land through the agency of wind, insects birds or animals while artificial reforestation are carried out by planting trees on deforested or degraded land with species native to the area. According to Reforestation can create new patches of indigenous vegetation and/or increase the size of existing remnant patches of vegetation, and provide butter around them, as well as create liking corridors between vegetation patches [10]. In some parts of the world like in Australia, only indigenous plants are usually used in reforestation propagation materials are collected from within a few kilometers, but in practice seeds, cuttings etc are collected from within same catchment [11]. And budgeting beforehand, adaptive implementation, and then follow up work is often critically important, especially weed control, but also adding more species for biodiversity/ecological complexity.

The depletion of forest has become an important topic in most countries. [12] pointed out that to combat deforestation, it is essential to manage forest resources efficiently and restore forest through reforestation so that it can be sustainably managed in order to help people meet their needs. In appraising the effectiveness of reforestation in Finland, [13] in his article titled “forest” and “climate change” highlights some of the benefits of reforestation to include the following:

Climate mitigation: Forests are an important part of the global carbon cycle because trees and plants absorb Co2 through photosynthesis. Forests are known to double the amount of Co2 in the atmosphere and removes about 30 percent of all Co2 emissions from fossil trees therefore, an increase in the overall forest cover around the world will help to mitigate global warming, Woodwell [13]. Agreeing with [14] in his research titled “carbon emission soaked up by forest growth” stated that 70,000 trees studied across Africa has shown that tropical forest are soaking up more Co2 pollution than previously realized. His research noted that almost one fifth of the fossil fuel emissions are absorbed by forests across Africa.

It is essential to manage forest resources efficiently and restore forest through reforestation so that it can be sustainably managed in order to help local people meet their needs, reforestation restores the main component of the forest, it is been judged by the presence and nature of the young generation of trees, undergrowth, geographical distribution, root success, etc [3]. Teaching and learning happen within the social , cultueal, political environmental and economic contexts of a particular place [15].

Silviculture is the act of proceeding and tending a forest. It is a theory and practice of controlling forest establishment, composition and growth. The name silviculture comes from Latin word silvi meaning forest and culture means as in growing. Silviculture according to [16] defines it as the science of tree management within forests and the regeneration of the forest. This implies that silviculture practices comprises of reforestation and afforestation as well as management existing forest stands. Silviculture is the practice of controlling the establishment, growth, composition, health and quality of forests to meet diverse needs and values. It also focus on making sure that the treatment of forest stands are used to conserve and to better productivity [2]. Generally,silviculture is the science and art of growing and tending forest crops, based on knowledge of silvics; that is, the study of the life history and general characteristics of forest trees and stands, with particular reference to locality factors.

According to [17] silviculture is the theory and practice of controlling the establishment composition and growth of forests. No matter how forestry as a science is constituted, the kernel of the business of forestry is silviculture, as it includes direct action in the forest and in it all economic objective and technical considerations ultimately converge. The kernel of silviculture is regeneration. Suggestions for how best to go about the job, presented by [17] though aimed primarily at the boreal forest in Ontario, merit wider conservation [18]. Says complete regimes for regeneration, tending and harvesting forest are called silviculture system. So, active management is required for silviculture, whereas forestry can be natural, conserved land without a stand level treatment being applied for environmental sustainability. [5]

highlighted some silvicultural practices as maintaining natural species pattern which are related to the texture and structure of the soil, the aspect of slope with affect moisture relations, fertility of the soil and the presence of soil microform such as fung, regeneration which comes from new seedlings, advance growth; and development which occurs in stages.

Theoretical framework:

This study is anchored on the Scientific management theory by [21]. The scientific management theory propounded by Fredrick Taylor in 1911 involves the development of scientific and rational principles for handling people's machines, materials and money to receive optimum benefits for the workers and employers. In his theory, Taylor believes that productivity can be increased or achieved through greater efficiency and increase reward. This theory also emphasizes the creation of harmony and cooperation that will lead to the attainments of maximum output rather than restricted output. The central idea in Taylor's theory is productivity that will lead to effectiveness and efficiency. This theory is relevant to this study in the sense that for the rural farmers of the public to practice the sustainable forest conservation practices, they need some rewards in that regard. In order words, the rural dwellers and the forest stakeholders need to be motivated adequately in some ways to achieve the objectives of sustainable forest conservation. The effective or adequate practice of environmentally sustainable agricultural practice requires incentives as a means of motivating people to practice, reforestation and silviculture to ensure environmental sustainability.

Purpose of the study:

The purpose of the study was to investigate on the forest conservation practices and how it promotes environmental sustainability in central Senatorial Zone of Cross River State.

Specifically, the research sought to;

1. Investigate the relationship between reforestation practice and environmental sustainability
2. Ascertain the relationship between silvicultural practice and environmental sustainability.

Research hypotheses:

The following hypotheses were formulated for the study:

1. Reforestation does not significantly relate with environmental sustainability in central Cross River State.
2. There is no significant relationship between silvicultural practice and environmental sustainability in central Cross River State.

Materials and Methodology:

This study adopts the survey research design. The independent variables in this study are reforestation and silvicultural practices. The dependent variable is promotion of environmental sustainability. This study area is Central Senatorial District of Cross River State, Nigeria. This comprises six local government areas; Abi,Boki, Etung, Ikom, Obubra and Yakurr Local Central senatorial district is bounded on the north by Obudu, Obanliku and Ogoja Local government areas, on the south by Akampka and Biase Local Government Areas, on the west by Abia and Ebonyi State and on the east by Cameroon Republic [19]. The vegetation of the area is largely broad leafed evergreen trees species Cross River State National Park [20]. The population of this study consisted all adults residents in central Cross River State. The sub-groups included farmers and business men and women (timber dealers and non-timber forest product harvesters).

The multistage procedure that involved stratified and accidental sampling techniques were adopted for this study. The criterion for stratification was based on local government areas.The sample for this study consisted of (1575) adult inhabitants (male and female) carrying out economic activities in the study areas. The researcher was assisted with experts in measurement and evaluation to developed the

questionnaire titled forest conservation practices and environmental sustainability (FCPESQ). It was made up of two parts. Part A sought information on demographic variables of the respondent; part B sought information on reforestation and silviculture and environmental sustainability with five items in each making a total of 15 items.The items for the study were developed by the researcher. Reliability refers to the degree of consistency that an instrument demonstrates in measurement. In order to determine the reliability of the instrument, the instrument was trial-tested with 30 respondents.

The questionnaire was administered in each sampled respondent. The respondents were informed of the exercise and essence of giving objective responses to the items.As a key of preparing the data collected for statistical analysis, a key was developed which served as a guide for coding the data collected. The items on the questionnaire were sorted out according to variables they were to measure.

Results and Discussion of finding:

In this section each hypothesis is re-stated, and the result of data analysis carried out to test it is presented. Each hypothesis of the study was tested at .05 level of significance.

Hypothesis one

There is no significant relationship between reforestation and environmental sustainability. The independent variable in this hypothesis is reforestation; while dependent variable is environmental sustainability. To test this hypothesis, reforestation was correlated with environmental sustainability using Pearson product moment correlation analysis. The result of the analysis is presented in table 1. The result of the analysis presented in table 1 revealed that the calculated r-value of 0.503 is higher than the critical r-value of .0662 at .05 level of significance with 1573 degree of freedom.

Table 1: Pearson product moment correlation analysis of the relationship between reforestation and environmental sustainability (N = 1575)

Variables	X	SD	r-value
Reforestation	16.53	2.16	
			0.503*
Environmental sustainability	17.73	1.73	

* Significance at .05, critical r = .062, df = 1573

Hypothesis two

There is no significant relationship between silvicultural practice and environmental sustainability. The independent variable in this hypothesis is silvivultural practice; while the independent variable is environmental sustainability. To test this hypothesis, silvicultural practice was correlated with environmental sustainability using Pearson Product moment correlation analysis. The result of the analysis is presented in table 2.

Table 2: Pearson product moment correlation analysis of the relationship between silvicultural practice and environmental sustainability (N = 1575)

Variables	X	SD	r-value
Silvicultural practice	17.67	1.62	

			0.206*
Environmental sustainability	17.73	1.73	

* Significance at .05, critical r = .062, df = 1573

Discussion of Findings:

The result of the hypothesis indicated that there is a significant relationship between and the environmental sustainability. The finding of this hypothesis is in agreement with the view of Woodwell and North (2016) who observed that reforestation is the establishment of expansion of a forest which was previously destroyed by degraded. Reforestation through natural afforestation occurs when seeds from existence of trees are deposited on deforested land through the agency of wind, insects birds or animals while artificial reforestation are carried out by planting trees on deforested or degraded land with species native to the area.

The result of the second hypothesis showed that silvicultural practice significantly relate with environmental sustainability. The finding of this hypothesis is in line with the study of Cunningham (2016) who sees silvicultural practice as the science of tree management within forests and the regeneration of the forest. This implies that silvicultural practices comprises of reforestation and afforestation as well as management of existing forest stands. Hert (2015) also highlighted some silvicultural practices as maintaining natural species pattern which are related to the texture and structure of the soil, the aspect of slope which affects moisture relations, fertility of the soil and the presence of soil microfloral such as fungi, regeneration which comes from new seedlings, advance growth; growth and development which odours in stages.

Conclusion:

Based on the results of the study the following conclusions were reached. Reforestation significantly relates with environmental sustainability and silvicultural practice significantly influenced environmental sustainability. It is therefore concluded that the general public (farmers, hunters, business men and women timber dealers and even the civil servants) should ensure that their actions and activities reflects environmental sustainability. The practice of reforestation and silvicultural practices is necessary in our society to enhance environmental sustainability.

Recommendations:

On the basis of the statistical analysis and findings of the study, the following recommendations were made:

1. The government should provide incentive to encourage people to practice reforestation
2. That 25 percent of every country's land should be kept as forest because this forest also controls carbon cycles.

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