FOREST RESOURCES EXPLOITATION AND NATURAL RESOURCES DEGRADATION IN ABI LOCAL GOVERNMENT AREA OF CROSS RIVER STATE

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Abstract
This study investigated forest resources exploitation and natural resources degradation in Abi Local Government Area of Cross River State. To achieve this purpose, two null hypotheses were formulated and tested at 0.05 level of significance. There was a review of literature on the variables of the study. Survey research design was employed for the study. Stratified random sampling technique was adopted in selecting the seven communities and two hundred and four respondents used for the study. A questionnaire was utilized for data collection. The questionnaire was validated and tested for reliability. Pearson product moment correlation statistical tool was employed for data analysis. The result obtained from analysis of data and testing of hypotheses in the study revealed that there was a significant relationship between timber exploitation, non-timber forest products exploitation and natural resources degradation in the study area. Based on these finding it was recommended among others that the Forestry Commission should organize skills acquisition training for members of forest communities in order to provide them with alternative sources of livelihood that would reduce their dependence on forest resources.

Key words: Exploitation, Timber, Non-timber products, Natural resources, degradation

Introduction

It has become an urgent need to mitigate the alarming rate of exploitation of timber and non timber forest product (NTFP) on the environment and to provide effective management of forest product for sustainable timber and non timber forest product extraction. Having seen the inestimable value of timber and non timber forest products (NTFPs), it has called for great concern by the government, rural communities, private organizations, stakeholders and individuals to ensure that timber and non timber forest products are protected and preserved.

Due to the forest complex ecosystem and distinctively high biodiversity, the forest has a very high ecological importance to the environment (Adomou, Sinsim and Akoegninou, 2015). The researcher also added that the rationale for forest conservation was simply to sustained the forests' productive role for the timber industry. According to Pawlos (2014) state that Non Timber Forest Product (NTFPs) play a major role in the rural economy of Africa, information on their overall contribution is patchy and incomplete at best, except for a few species and products of commercial importance. Food and Agricultural Organization (2013) opined that the lack of systematic efforts to conserve and manage resource is a major concern and it is only a few cases that efforts have been made to cultivate species that yield NTFPs.

African forests are a source of a variety of NTFPs such as fruits, gums, spices, bush mango, kola, mushroom, Afang, snails, monkey, gorilla, cane, chimpanzee, resins, honey, bees wax, flowers, seed, stem bark, fungi, meat and by product from medicinal and aromatic plants, dying and tonning materials, bamboo, and bush meat. These products are of critical importance to the livelihoods of rural communities and in some of household income as a source of food.

Bicknell, Struebi and David (2015) stressed that, in the past policy makers, forest economists and foresters have viewed forests primarily as a source of national revenue with timber as the dominant product. However, in an era of fast declining old-growth forest, great significance is attached to forest products. Interests in NTFPs was predicted upon a few assumption, these include: commercial exploitations of NTFPs is less ecologically destructive than timber harvesting and thus has greater potential for sustainable forest management: local forest users exploit forest resources wisely and sustainably and NTFPs will more directly benefit people living near forests as compared to timber harvesting (Mclain & Jone, 2017).

Arnold and Perez (2018) opined that there has been increasing recognition of NTFPs contribution to household and national economies and environmental objectives including biodiversity conservation, for instance, a study by NTFPs and services. UNCED (1992) identified sustainable forest management as a key element in sustainable economic development and set out non-binding guidelines for sustainable forest management with specific inclusion of TFPs and NTFPs. Timber forest products include all the timber or wood products harvested from the forest. Non-timber forest product refers to product of biological origin other than timber derived from the forests fauna and floral diversity, which are used by household or sold for income, e.g vegetable, bushmeat, herbs.

Africa numerous medicinal plant species are becoming increasingly scarce due to a rise in trade to meet the demand from growing urban population (Pawlos, 2014). For example, floral species such as African black wood (Dalbergia melanoxylon) have declined in Kenya and South Africa through harvest to supply the wood carving trade. Serious exploitation has caused serious damage to wild population of Prunus African Red stink wood, including trees inside

forests of high conservation value) Arnold et al, 2017). East Africa green wood (Warburgia ugandensis) is another tree species threatened by exploitation (Boswellia papyrifera) is one of the threatened species in Ethiopia due to over exploitation or improper tapping of its frankincense and lack of regeneration (Tadesse, Taketay, Lemenih & Fitwi, 2018). Unless harvesting is controlled, some species will become genetically impoverished or depleted more rapidly than others.

Timber and non-timber forest products cover a wide range of products and are most extensively used to supplement food and household income, especially during particular season in the year, it help to meet medicinal needs, wood-based management, employment opportunities, food, foreign exchange earnings of the countries and they offer a basis for managing forests in a more sustainable way, thereby supporting biodiversity. Historically, early forestry work tended to ignore this fact, it was mainly focused on managing forests for the continued supply of timber. The significant value and importance of NTFPs is felt more in dry land areas where few alternatives of resources exist for supporting the livelihood of local communities because of difficult environmental condition (Shackleton, 2018).

Observation was made in many areas that crop production is no longer the main source of income for poor rural households. Therefore, it is essential for rural households to look for non-farm activities like productive exploitation of timber and non-timber forest products to supplement agricultural production. Africa has 67% of bamboo resources, which is about 7% of the world total. It has about I million ha of highland bamboo. Swift or giant cane (Arundinaria alpine) accounts 150,000 ha, out of which 130,000 ha is natural and 20,000 ha human made bamboo is dominant with coverage of 700,000-850,000 ha. Bamboo provides fodder, food, furniture and building materials (scaffoldings), industrial inputs, medicinal plants and fuel.

In Abi Local Government Area, the available non timber forest products are bush mango, bush meat, mushroom, herbs, fruits, bamboo, kola. The above mentioned flora and fauna are frequently exploit due to poverty and demand in the community, the quantity of flora and fauna exploits is not ascertain but due to the some of the species heading to extinction is what prompt the concern of the researcher. However, they exploit these resources to earn their livelihood, some of these species are used for food, while some for medicinal purpose, etc. these species are sometimes harvested through hunting, indiscriminate bush burning, flooding, setting of trap and clearing of bushes which give rise to environmental problems or biodiversity loose. The overall socio-economic and ecological importance and contribution of NTFPs and TFPs is significant, diversified and valuable. The harvesting, commercialization and transformation of certain NTFPs by the rural is poor and can be a means of shifting effort away from the unsustainable exploitation of ecologically sensitive forest products.

Ecological issues could result in long term and perhaps permanent decline in biological diversity. Several studies have quantified ecological effects of harvesting timber and non-timber forest products from plant species perspective, with the aim of assessing current state of knowledge and illustrated that NTFPs and TFPs harvest can affect ecological processes at many levels, from individual to ecosystem. In this case, it was evidenced that intensive annual harvesting and valuable market fruit or oil seed can gradually eliminate a species from a forest ecosystem. Ecological impacts of TFPs and NTFPs harvest is not only observed in plants but also in animals. Ticktin (2018) stressed that bushmeat, harvesting has the potential to alter ecosystem structure and functioning where one/more important species are depleted. Whereas in socio-economic issues, it is clear that transport systems are reaching into remote area, catalyzing forest and woodland clearing for different purposes resulting in the loss of supplies of wild harvested species as habitat decline.

For this reason, Karki (2017) underlined the need, through coordinated land-use and infrastructure planning, to plan roads in a way that maximizes local and national economic benefits while, minimizing the negative effects road construction has on biodiversity. Since the growing demand from urban areas has catalyzed forest products trade, drawing resources from rural areas to towns and cities for fuel woods, building materials, medicinal or edible wild fruit species (Tadesse et al, 2013). Inspite of the great socio-economic values accrue from the exploitation of timber and non timber forest products, forest is allowed to face a serious threat. This threat is certainly not unconnected with certain anthropogenic activities occasion by harsh economic situation compelled by majority of rural dwellers.

Consequently, urbanization has tended to increase rather than reducing the demand for wild plant resources that stimulates over exploitation. Based on the above facts, the researcher sought to assess the exploitation pattern of timber and non-timber forest products; it socio-economic and ecological implications in Abi Local Government Area, Cross River State. Forest products are of inestimable value, with distinctively high biodiversity and have a very high ecological importance. However, non timber forest products have economic and functional importance which has international and local dimensions. Since these forest products are of the world's most valuable natural resources, unsustainable exploitation of this products, such deforestation at the present frightening rate is one of the most important environmental problems in developing countries in contemporary times (Park, 2019).

The consequence of deforestation and unsustainable exploitation includes loss of biodiversity and possible extinction of species. Others include loss of environmental services, damages to first soils by flooding, increase in acidity and drought related phenomena. Moreover, timber forest products have helped to filter certain atmospheric polluting gases such as carbon dioxide (Co_2), methane (CH_4), chlorofluorocarbons (CFCs) and Nitrous oxide (NO_2). All these have global and regional implication on climate and general quality of rural and urban environment

extending beyond (Gentry and Lopez-Parodi, 2015). According to Park (2018), the consequences of exploiting timber and non forest timber products are mostly suffered by the rural communities. In Abi Local Government Area and other areas covered by tropical rainforest, there is a very high dependence on non timber forest products (NTFPs). The exploitation of timber forest products has significantly reduced the quantity and quality of such natural resources available to rural people. Non- timber forest products are very vital to the rural people of Abi Local Government Area because, they are the major sources of household income, fuel, food items, medicine, construction materials, bush meat animals and raw materials. The use of these is presently not considerably sustainable due to high poverty level, which is an hindrance to the acquisition of manufactured or high redefined materials from urban market centres (Vivero, 2019).

Despite the alarming effects of exploitation of timber and non forest timber products in Abi Local Government Area, the inhabitants are seem not to be aware of the consequences of these unhealthy and unsustainable environmental consequences. Therefore, the researchers are interested in investigating forest resources exploitation and its natural resources degradation in Abi Local Government Area of Cross River State.

Mohammed (2018) reported that non-timber forest products (NTFPs) are commonly grouped into floral greens, decorative, medicinal plants, foods, flavours and fragrances, fibres, saps and resins. Bisong (2017) opined that some of these products may only be harvested from species existing in mature forest, others will be found in greater abundance in immature secondary forest or even in the fallowed bush. For example, the single most important species are sources of non-timber forest products like oil palm tree (Elaeis guineensis). Nepstad (2016) viewed that non-timber forest products exploitation has an extremely diverse forest use. The researchers stressed further that the remaining portion of tropical forest suitable for NTFPs exploitation is significant but depends mostly on the organization of producers, the emergence of new market for non timber and timber forest products and ongoing effort towards forest resource management. It is a truism that many scholars have made useful contributions on the impacts of non timber forest products exploitation on biodiversity. Upong (2018) expressed that the range of biological diversity varies in different parts of the planet according to climate conditions. In a related development, Carline (2018) opined that the greatest causative factor of biodiversity loss is due to the disappearance of the world's tropical forest which is home to 40% of plant and animals species.

Similarly, Adomou, Maman, Missikpode and Sinsin (2017) identified indiscriminate forest exploitation as a major factor responsible for the extinction of a plethora of biological diversity. The author succinctly went further to enumerate some of those biodiversities as; afang (Gnetum africanum), bush mango (*Irvingia gabonensis*), editan (*Telfairia occidentalis*), cane ropes (Genus calamus), Spanish jelly (Mimusops elengi) for the production of edible oil.

Assogbadjo, Glele-kakai, Sinsin and Pelz (2019) discovered that the anthropogenic activities of mankind, which resulted in the sudden disappearance of resource such as food, fishes, timber, wood, resins, fibres and chemical used form variety of purpose is timber and non timber forest products exploitation.

Bisong (2019), Ambe, Eja and Agbor (2015) stated that human activities in the area of hunting, exploitation of timber and non-timber forest produces, farming practices, extraction of firewood by women, have resulted in severe loss of biodiversity and genetic resources. A renowned researcher in tropical forest management remarked that the loss of many earth's species is not only a tragic squandering of the earth's evolutionary heritage but also represents degradation of a significant part of planet genetic reservoirs. The author attributed the cause of biodiversity, loss to timber and non-timber forest products exploitation.

Harvesting and consumption of timber and non timber forest products (NTFPs) for natural forest is known to account for a large population for the livelihood of people living close to such habitats (Springate & Wollenberg, 2016). During famine, timber and non-timber forest products become essential to human survival and at other times they both provide the need for cash expenditure and provide a source of income to cash-poor households (Rist, Shanley, Sunderland, Sheil, Ndoye, Liswanti & Tieguhong, 2018). Between 4000 and 6000 NTFPs have been cited to be of commercial value (Saha & Sundriyal, 2017) at least 150 NTFPs had been documented as important in terms of international trade (FAO, 2014). It is estimated by FAO that the total value of international traded NTFPs is about 1.1 billion US Dollars annually. However, the link between the economic benefits of timber and non timber forest products and their resource base (including local availability and sustainability) and source is poorly understood.

Arnold (2019) have reported that non timber forest products in some cases may contribute to the rural livelihood much better than timber products due to the fact that timber growing has a very long gestation period, whereas NTFPs play an important role in providing seasonal-level gum and resin production and processing related business hosted more than 2-3 times of employee hosted by forest industry (timber – related industries) where forest based industry employment hosted only 9,583 employees compared to 20,000-30,000 employees in the gum and resin production and processing related business. In recent years NTFPs have attracted considerable global interest. This is due to the increasing recognition of the fact that NTFPs can provide important community needs for improved rural livelihood; contribute to household food security and nutrition; help to generate additional employment and income, offer opportunities for NTFPs based enterprises, contribute to foreign exchange earnings and support biodiversity and other conservation objectives (Getachew & Wubalerr, 2016).

In Ethiopia NTFPs plays significant role in subsistence as well as in marketing economy. The country is well known for its rich and vast biodiversity resources that have numerous NTFPs. these rich NTFPs of the country play substantial roles in food security and in poverty alleviation for a large number of communities in the country (Vivero, 2018). On the other hand, a closer assessment of the real socioeconomic significance of the forest and woodland resources of the country clearly reveals their greater importance with regard to the supply of NTFPs. The importance of timber and non timber forest product for people's livelihood with access to markets being the main determining factor which can be grouped as follows;

i. Subsistence: Households extract low-value products like palm fibres, low-value wood carvings, fuel wood, and medicinal plant from forests and fallows, and process and use these mainly within the household for their own use. Income from NTFPs and TFPs in the group is less than 50 percent (50%) of the household's total income (cash and subsistence), but it is their main or only source of cash income.
ii. Supplementary: Households extract fruits and medicinal plants from the wild for local processing, consumption or the regional market. Households in the group receive more than half of their income in cash, but less than 50 percent of that from NTFPs and TFPs.

Methodology

The study employed survey research design. The design ascertains phenomena as they occur at the time of an investigation. The study investigated forest resources exploitation and natural resources degradation in Abi Local Government Area of Cross River State. The purpose of this research can be achieved through the adoption of the survey research design since the researchers are interested in examining the nature of the situation as it existed at the time of this research.

The population of this study comprised all adult residents involved in forest related activities in Abi Local Government Area. The estimated population of this study is about 102,374 persons who are still actively involved in activities that are directly linked with the forest within the area covered in this study.

Two hundred and four (204) respondents that were randomly selected from seven forest communities in Abi Local Government Area of Cross River State, constituted the sample of this study. The selection of communities used for the study was done through stratified random sampling technique. The systematic sampling technique was adopted in selecting the respondents used for the study. The instrument utilized for data collection in the study was a structured questionnaire tagged Forest Resources Exploitation and Environmental Implications Questionnaire (FREEIQ).It was divided into two parts. Part A contained the personal data of respondents while part B was designed using four point modified Likert scale. It contained

twenty items measuring the variables of the study. The study instrument was validated by relevant authorities. It was also tested for reliability using Cronbach alpha method.

Ho1:
Timber resource does not significantly relate with natural resources degradation. The independent variable in this hypothesis is timber resource while the dependent variable is natural resources degradation. Pearson product moment correlation This hypothesis was tested at 0.05 level of significance using Pearson product moment correlation statistical tool was utilized for data analysis. The result of this analysis is presented in Table 1.

Table 1
Pearson product moment correlation analysis of relationship between exploitation of timber and natural resources degradation in Abi Local Government Area of Cross River State= 204

Variable	$\sum x$ $\sum y$	$\sum x^2$ $\sum y^2$	$\sum xy$	Cal-r	P.value
Exploitation of timber resources	1973	4782			
			5016	0.428	0.000
Natural resources degradation	1889	4546			

*Significant at 0.05 df = 202.

The result of data analysis presented in Table 1 revealed that calculated r-value of 0.428 is greater than the p.value of at 0.05 level of significance with 204 degrees of freedom. With this result, the null hypothesis was rejected while the alternate hypothesis was adopted. The implication of this result is that, there is a significant relationship between exploitation of timber resources and natural resources degradation in Abi Local Government Area of Cross River State.

Ho2:
Non-timber forest products exploitation does not significantly influence natural resources degradation in Abi Local Government Area. The independent variable in this hypothesis is non-timber forest product degradation while the dependent variable is natural resources exploitation. Pearson product moment correlation statistical tool was utilized for data analysis. The result of this analysis is presented is presented in Table 2.

Table 2

Pearson product moment correlation analysis of relationship between non timber forest product exploitation and natural resources degradation in Abi Local Government Area of Cross River State (N = 204

Variable	$\sum x$ $\sum y$	$\sum x^2$ $\sum y^2$	$\sum xy$	Cal-r	P.value
Non- timber forest products exploitation	2036	4873			
			5362	0.458	0.000
Natural resources degradation	1889	4546			

*Significant at 0.05 level, df = 202

The result of data analysis presented in Table 2 revealed that the calculated r-value of 0.458 is greater than the p.value of 0.000 at 0.05 level of significance with 202 degree of freedom. With this result the null hypothesis was rejected while the alternate hypothesis was upheld. The interpretation of this result is that, there is a significant relationship between non- timber forest products exploitation and natural resources degradation in Abi Local Government Area of Cross River State.

Discussion of findings

The finding from the first hypothesis revealed that the null hypothesis was rejected. The implication of this finding indicated that there was a significant relationship between timber exploitation and natural resources exploitation in Abi Local Government Area of Cross River State. The cause of this finding could be that there has been an increase in the rate of timber exploitation in the study area over the years without any concerted effort to reclaim these lost tree species. This has led to the loss of various species of tree from the forests in the study area. This has been responsible for the continuous degradation of natural resources in the study area.

The finding of this study is in line with that of Abang (2018) who reported that typical logging operations are quite damaging to the rainforest ecosystem. Problems stem from the nature of limited term timber concessions, which encourage short term resource depletion and poor forest planning and management. Corruption is rife in most tropical timber producing countries, making existing forestry laws nearly unenforceable, while lack of transparency in commercial transactions means that corrupt officials can grant concessions to individuals or firms without regard for the environment or consideration of local people. Selective logging as usually practice degrades forest because the felling of a single large tree can bring down dozens of surrounding trees which are linked to the target tree by vines. The thinning of the protective

canopy exposes the forest to increased sunlight and drying leaves litter and increases the forest vulnerability to fire. The indiscriminate exploitation of timber resources has led to the loss of various species causing endangerment and extinction of rare species of flora from the forest

The finding of this study also supported that of Hussein (2017) who reported that for five trees felled in any area in the tropic rainforest affects over ten other growing trees in the forest. About 7.5 million hectares of closed forest and 3.8 million hectares of open forest and woodlands are cut down annually in the developing countries of the tropics. This situation does not support efforts aimed at conserving the rainforest and therefore militates against sustainable forest management. the loss of many earth's species is not only a tragic squandering, degradations of a significant part of planet genetic reservoirs, the author attributed the cause of biodiversity loss to be due to timber and non timber forest products exploitation.

The finding obtained from the second hypothesis in the study revealed that the null hypothesis was rejected. The indication of this finding is that there was a significant relationship between non-timber forest products exploitation and natural resources degradation in Abi Local Government Area of Cross River State. The cause of this finding could be that the exploitation of non-timber forest products including; bush meat, bush mango, fruits, vegetables, spices, among others has been on a significant increase over the years. Most members of the host communities depend largely on these resources for their livelihood. The uncontrolled exploitation of these resources has increased the pressure on natural resources leading the endangerment and even extinction of most of these resources.

The finding of this study agrees with that of Getachew et al (2016) who found that the exploitation of timber and non timber forest products can improved rural livelihood, contribute to household food security and nutrition, help to generate additional employment and income, offer opportunities for non timber forest products based enterprises, contribute to foreign exchange earnings and support biodiversity and other conservation objective. Non- timber forest products of the country play substantial roles in poverty alleviation for a large number of communities in the country otherwise, poverty can lead people to overuse the forest resources.

The finding of this study also supported that of Tadesse et al (2018) who revealed that in spite of the great socio-economic values accrued from the exploitation of timber and non timber forest products, forest is allowed to face a threat. This threat is certainly not unconnected with certain anthropogenic activities occasioned by harsh economic situation compelled by majority of rural dwellers. Arnold et al (2019), also in support of this study found that non timber forest products in some cases may contribute to the rural livelihood much better than timber product due to the fact that timber growing has a very long gestation period, whereas NTFPs play an important role in providing seasonal level, gum and resin production.

Conclusion

The study investigated forest resources exploitation and natural resources degradation in Abi Local Government Area of Cross River State. The findings obtained from data analysis in the study revealed that there was a significant relationship between timber exploitation, non-timber forest products exploitation and natural resources exploitation in the study area. In conclusion, forest resources exploitation contributes significantly to natural resources degradation in the study area.

Recommendations

The researchers made the following recommendations based on the findings obtained in the study:

i. The Forestry Commission should partner with Forest Management Committees in various communities to regulate the exploitation of timber resources in order to mitigate natural resources degradation in the study area

ii. The Forestry Commission should organize skills acquisition training for members of forest communities in order to provide them with alternative sources of livelihood that would reduce their dependence on forest resources

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