Journal of Environment and Earth Science
ISSN 2224-3216 (Paper) ISSN 2225-0948 (Online)
Vol.6, No.2, 2016

Impact of Forest Encroachment on Rural Livelihood in Akamkpa Division of Cross River National Park, Nigeria

[1]Yaro, Margaret A.; [2]Okon, Asuquo E.; [3]Bisong, F.E. & [4] Ukpali Obongha
[1&5] Department of Urban and Regional Planning, Cross River University of Technology, P.M.B 1123, Calabar, Nigeria,
[2&3]Department of Geography & Environmental Sciences, University of Calabar, P.M.B 1115, Calabar, Nigeria

ABSTRACT
Protected area system has been used as one of the effective means of sustaining forest ecosystems and other natural landscapes. While sustaining the environment, the human well-being was not to be compromised. However, the protected area system has faced daunted challenges such as encroachment by support zone communities. This study was therefore aimed at assessing the various forms of encroachment on the forest resources of Cross River National Park and its impacts on rural livelihood. Simple random technique was used in selecting 5 communities for the study which constitute 20% of the support zone communities for the study. Participatory Rural Appraisal (PRA) tools and questionnaire survey were used in data collection. The result indicates that the collector of NTFPs constitute the highest number of Encroachers depicted by 32.0% response, farming was the second constituting 19.5% response. Further analysis indicates the dwindling of livelihood opportunity indicated by 45.5% response, while the major reason given for the encroachment is lack of provision of alternative livelihood. The hypothesis tested using spearman's ranked correlation analysis shows a positive and a significant relationship (rho=82.9%). The study therefore, recommended for the provision of alternative livelihood to the communities that depend on forest for their livelihood.
KEYWORD: Protected area, Encroachment, forest, resources, livelihood, support communities

1. Introduction

The rate at which forests of different types are disappearing for years now is alarming and the trend remains unprecedented. Globally, the high demand for timber and other forest products has resulted in the high level of forest encroachment and high rate of deforestation and forest degradation. Deforestation is the total removal of the forest or the cutting down of trees and other forms of vegetation cover from a particular site without any of replacement (Aina and Salau, 1992; Anijah-Obi, 2001). While forest degradation on the other hand is the decimation of the forest cover with the loss of valuable species.
Protected Area System (PAS) have been used as a strategy to protect biodiversity from extinction especially those on the brink of extinction. Protected areas are areas of land and/or sea exclusively dedicated to the protection and maintenance of biological diversity, natural and associated cultural resources which are managed through legal or other effective means Rotich (2012, Vreugdenhil et.al. 2003). Protected areas include the parks, reserves, strict nature reserves, wilderness among others. Globally, PAS arises out of the need to curtail the loss and degradation of biodiversity. The most serious problem behind PAS is habitat loss around the edges of forest and other protected areas caused largely by the expansion of agriculture [Kamau, 2004]. As opined by Yaro (2015), the increasing human activities at the edge of the parks has influence on the distribution of species. The cumulative effect of this problem affects plants and animals at the primary forest. Some areas of the tropical forest have been colonized by shrubs and other alien species, this may continue to intrude into the inner part of the park.

Despite the strict conservation framework of protected areas, deforestation is still in progress. Deforestation is a severe environmental problem owing to its negative consequences such as climate change, biodiversity loss, erosion, flooding, siltation, landslides and soil degradation. Although this phenomenon started since the dawn of civilization and evidence in several areas have shown that it is on the increase due to incessant tree exploitation and increase in socio-economic activities and is a function of the growing human population and activities prompted mainly by such factors as poverty, demography, land tenure systems, inadequate conservation status, development policies and economic incentives [Gandiwa et.al, 2011].

The rapid depletion of environmental resources through human activities especially in the forest areas led to the use of intervention by the United Nations and other environmental stakeholders by admonishing nations of the world to balance the exploitation of the environment through the sustainable development concept. The adoption of protected area system is hoped to curtail the rate of species degradation and extinction. Tropical rainforest is one of the world richest ecosystem containing at least half of the plants and animal species that is it is home to

almost half of the different plants and animals in the word (UNEP, 1993) between 80% of Nigeria original forest have disappeared and consequently, the area occupied by forest has reduced to twelve percent 12%. A more recent studies indicates -3.3% in annual deforestation rate between 2000 and 20010 (Burtler 2005, FAO 2005, FAO 2010, Bisong, 2011). FAO (2006) report on Global Forest Resources Assessment ranks Nigeria 4th globally among countries with the highest annual deforestation rate (3.3%) and net annual area change (410,000 Ha).

A greater part of the country's remaining rainforest and watershed covering about 700km^2 is located in Cross River and greater proportion of it is found in Akamkpa Local Government Area (World Rainforest Movement, 2002). The forest provides millions of people with food, fuel, medicine, building materials among others. However, the rate of forest cover change between 2000 and 2008 in the Cross River was disturbing. Studies by Flasse (2002) and Bisong (2011) shows that the rate of deforestation in natural forest within the region and the period was between 12.1% and 17.64% respectively. This unprecedented loss in forest area no doubt affected the biological diversity and livelihood of the forest communities.

The major driver of deforestation is attributed is as a result of increased economic activities characterized by population growth, accelerated urbanization trends, agricultural practices, logging, hunting and other forms of natural resource exploitation (World Bank, 2005, Kissinger et.al, 2012; Oduntan, Soaga,. Akinyemi & Ojo, 2012). In addition, activities such as hunting, farming, NTFP extraction are sources of livelihood for the communities. Support zone communities of Cross River Nationl Park mostly depend on these forest resources like timber, leaves, seeds, bush meat, mushrooms, and snails for their livelihoods. These products are used for subsistence requirement through direct consumption and sales for income generation. With the current rate of deforestation in the forest and around protected area, the livelihoods of the community is threatened. The different types of activities impinge on the sources of livelihoods. This study is therefore geared towards assessing the types of encroachment and the impacts on livelihoods.

2. Problematic

Protected area such as parks and forest reserves are geographically defined area, which is designated or regulated and managed to achieve specific conservation objective [CBD, 2010]. Human activities usually take place around the protected forest area and even the buffer zones.
However, the high degree of utilization of these resources by the communities critically threatens the forest, biodiversity and livelihoods [Obong, Aniah, Okaba and Effiom, 2013]. This destruction, takes different forms such as degradation, fragmentation or outright loss.
Human activities have also increased the rate of soil fertility deterioration, desertification, erosion among others. All these problems are exacerbated by unsustainable agriculture, commercial timber logging and fuel wood collection for industrial and domestic uses. The conservation of the forest that restrict people from utilizing resources within the forest is perceived by the people as an obstacle to secure their livelihoods. Conservation is important in sustaining the productivity of natural vegetation, protecting wildlife, maintaining genetic diversity and avoiding forest soil destruction but at the same time not compromising human welfare. The people around the Cross River national park are predominantly farmers, and also engage in other activities such as extraction of Non-Timber Forest Products (NTFPs) and hunting. These activities though at some point was at subsistence level but the increasing human population and demand have triggered pressure on the natural vegetation to meet these daily needs directly through the biomass for example food items, fuel fodder, medicinal herbs etc. which are becoming scarce today (Agarialal, 1985).
Though there is existence of policies, laws and regulations governing forest use and management under the state government, some activities are unsustainable increasing the impact on the forest. At the community level, forest management committees (FMCs) are present, while in some communities without FMCs the youth vigilante discharge the responsibility of monitoring the forest. They noted that FMCs are responsible for regulating and managing use of the forest, by issuing permits and creating and enforcing laws. The cumulative pressure of human activities on the forest and the concomitant impact on the resources no doubt have reduced the livelihoods of the communities that depend on the activities. Farmlands have encroached into the park buffer zones, while collection of NTFPs is increasing. There is also the impoverishment of the local people who rely on forest resources for their livelihood. A livelihood is said to be sustainable when it maintains or enhances the local and global assets on which livelihood depends, and has no beneficial effect on other livelihoods (Chambers, Robert 2010). With the current conservation scenario of restricting access, while encroachment is on-going, the study is geared towards assessing the impact of the encroachment on livelihood.

3. METHODOLOGY

3.1. Study Area

The Cross River National Park is located between latitude 5° 05[1] and 6° 29[1]N and Longitude 8° 15[1] and 9° 30[1]E, in the Southeastern corners of Nigeria. It covers a total of about 4, 000 km^2, most of which consist of the coastal zones (Figure 1). The climate is a tropical humid, while annual rainfall ranges between 2, 500mm and 3, 000mm. (Bisong and Mfon, 2006). The rainy season lasts from March to November, the temperature ranges from 25°C to 27°C in January, but in July, it rises above 30°C Relative humidity is about 75 to 95% in January, but towards the end of the year, it lowers gradually as a result of harmattan. The vegetation of the area is evergreen tropical rainforest, and it is regarded as the last stronghold of tropical rainforest in Nigeria (Yaro, 2015). The terrain is rough and elevation rises from the river valleys to cover 1,000 m in the mountainous areas. The soils are ferralitic and sandy, and steadily become shallower with increasing elevation. The soil is highly vulnerable to leaching and erosion where stripped of plant cover.

The Park is noted for its high diversity of species but inspite of its great diversity and richness, the area is prone to degradation through human activities ranging from hunting and poaching, agriculture, logging to unguided exploitation of Non-timber Forests Products (NTFPs). Typical tree species found there includes Belinia Confusa, Coula edulis, Hannoa klaineana, among others. There are about 1, 568 plant species, of which 77 are endemic to Nigeria. There are at least 75 mammal species, including Africa buffalo, the endangered African forest elephant, common chimpanzee, 42 species of snakes. Many plantations such as Oil Palm, Gmelina, Teak and Rubber are also within the area. Moreover, many quarry companies operate in the area.

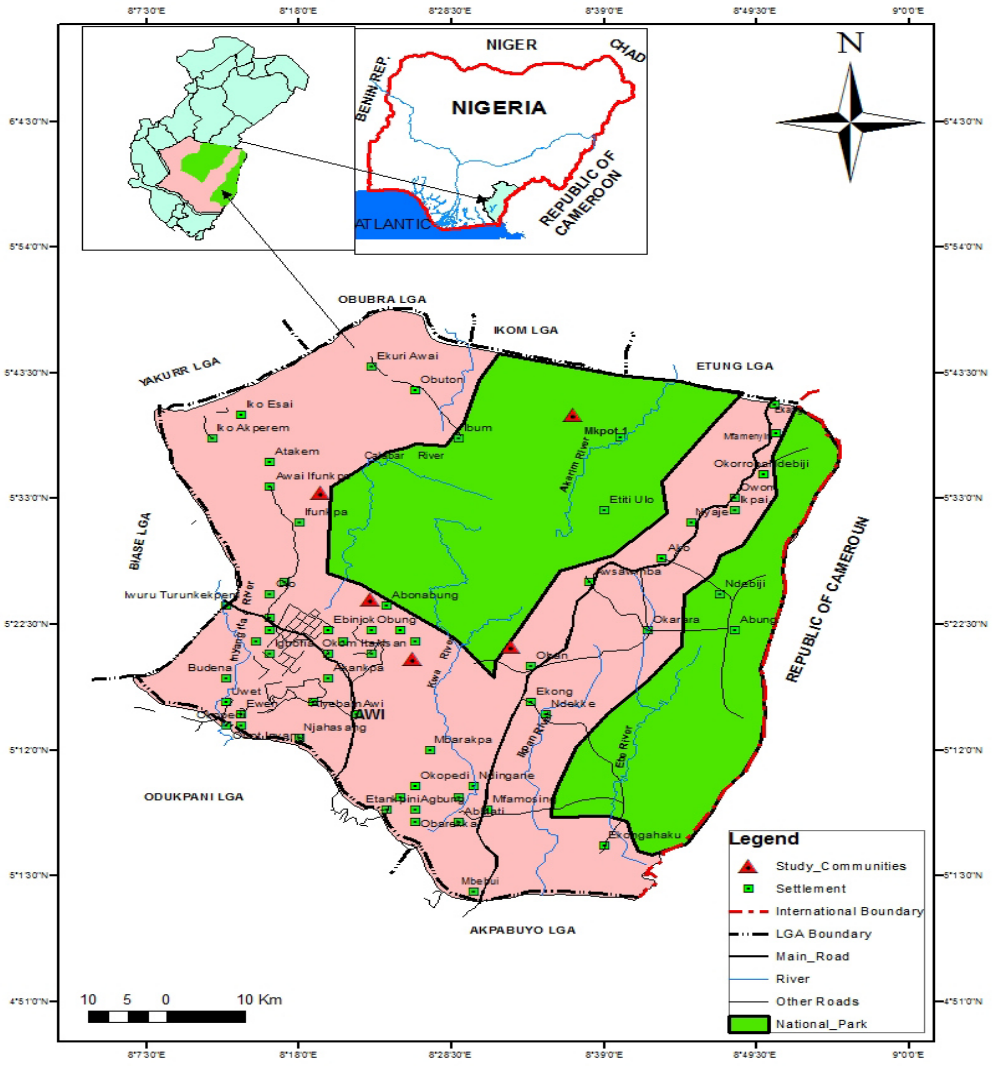

Figure 1: The Study Area

The study utilizes a combination of methods for data collection. The methods include inventory, questionnaire survey and selected Participatory Rural Appraisal (PRA) tools such as Focused Group Discussion (FGD) and transact walk and observation etc. Simple random technique was used in selecting 5 communities for the study which constitute 20% of the support zone communities for the study. The communities included four support zone (Obung, Ekong, Ifumkpa and Akamkpa) and one enclave communities (Mkpot). Numbers were assigned to the communities, while the number randomly picked represents the communities. Participatory Rural Appraisal (PRA) tools and questionnaire survey were used in data collection.
The population of study is homogenous and include the farmers, collectors of NTFPs, hunters, tappers, and local miners among others. The total population of the study area was obtained from National Population Commission. Taro Yemeni formula was used in selecting the number of respondents for the administration of questionnaire (sample size) (Eqn.1). While the Baurley's proportion allocation formula was used to determine the number of questionnaire to be allocated to each selected community (Eqn. 2).

A total 400 respondents was extracted using the formula. However, to accommodate non-response, 20% of the total number was added. A total of 480 copies of questionnaire were sent out for the study (400 extracted from the population using taro Yameni Formula and the 80 from the additional 20 percent). The views of the people were captured to identify the types of encroachment and impact on livelihoods. The sample size adjustment increases sample size required for precision reasons in order to have sufficient units in the sample to yield the desired outcome (Organization for Economic Co-Operation and Development, 2003). Israel, (1992) noted that between 10 to 30 percent of copies of questionnaire can be added to compensate for nonresponse. The copies of questionnaire for distribution can be substantially larger than the number required. Therefore, 480 sampled individuals within the study area randomly selected from the total number of people in the support zone communities.

Taro Yemeni formula is given as

$n = N/1+N\ (e)^2$---------- Eqn. 1

N = Sample Population

R = Sample Size

e = Tolerable error (5 percent).

Baurley's proportion formula is given as

N= P1/P x N ---------- Eqn. 2

Where:

P1 = Proportionate Population

P = Total Populatio

N = Sample Size

N = Sample Allocation

Key informant interviews was used to elicit information from the people on the types of activities going on within the buffer zones of the park as well as the species that are mostly utilized. Moreover, a Focus Group Discussion was held with the different resource user groups on the nature of their activities and then triangulation was carried out to ascertain how their activities impinge on the Park.

The data were analyzed using simple percentage, while nonparametric correlations (spearman rank) was used to establish relationships. Spearman rank was used because the data were collected on ordinal scale.

4. Results and Presentation

4.1 Characteristic of respondents:

Out of the 480 copies of questionnaire distributed, 416 were retrieved which depicts 86.7% response. The data obtained on the various characteristics of the respondents in table 1 indicates that more female (50.7%) were

available and selected for the study. Moreover, the population of the study area is youthful constituting 27.9% of people between the ages of 18-29 years. For the size of household, 29.1% of the households are made up of 5 to 7n persons. In terms of occupation, NTFP collectors constitute 30.3% of the respondents among others.

Table 1: Demographic characteristics of Respondents

S/n	**Sex**	**Frequency**	**Percentage (%)**
1	Male	205	49.3
2	Female	211	50.7
	Total	416	100.0
	Age(years)	**Frequency**	**Percentage (%)**
1	18-29	116	27.9
2	30-39	109	26.2
3	40-49	107	25.7
4	50-59	40	9.6
5	Above 59	44	10.6
	Total	416	100.0
	Household size of respondents	**Frequency**	**Percentage (%)**
1	<2	43	10.3
2	2-4	113	27.2
3	5-7	121	29.1
4	8-10	112	26.9
5	Above 10	27	6.5
	Total	416	100.0
	Marital Status	**Frequency**	**Percentage (%)**
1	Single	104	25.0
2	Married	272	65.4
3	Widowed	31	7.5
4	Divorced	9	2.2
	Total	416	100.0
	Religion	**Frequency**	**Percentage(%)**
1	Christianity	342	82.2
2	Muslim	2	0.5
3	African Traditional Religion (ATR)	49	11.8
4	None	23	5.5
	Total	416	100.0
	Level of Education	**Frequency**	**Percentage (%)**
1	None	67	16.1
2	Primary	86	20.7
3	Secondary	184	44.2
4	Vocational/Technical	23	5.5
5	Tertiary	56	13.5
	Total	416	100.0
	Occupation	**Frequency**	**Percentage (%)**
1	None	25	6.0
2	Farming	119	28.6

3	Hunting	15	3.6
4	Fishing	6	1.4
5	NTFP collection	126	30.3
6	Civil Servant	63	15.1
7	Artisan	31	7.5
8	Petty trading	31	7.5
	Total	416	100.0

Source: Authors' fieldwork, 2015

4.2 Activities that drives deforestation:

Table 2 indicates human activities that directly drives encroachment into the forest in the study area. Collection of NTFPs is the activity with the highest impact on forest with the highest percentage of response (32%). Also, farming activity is the second in the list, with 19.5% response. This is the primary occupation of the people. The response further indicates that logging is also one of the drivers indicated by 17.1% response. Others include hunting, buildings among others.

Table 2: Human activities that drives deforestation

S/n	**Activities**	**Frequency**	**Percentage**
1	Farming	81	19.5
2	Hunting	45	10.8
3	Fishing	16	3.8
4	Collection of NTFPs	133	32.0
5	Buildings	44	10.6
6	Logging	71	17.1
7	Grazing	8	1.9
8	other infrastructural development	18	4.3
	Total	**416**	**100.0**

Source: Authors' fieldwork, 2015

4.3 Community's perception of the consequences of deforestation on the socio-economic activities of the people

The findings on the perception of the people on the environmental impact of deforestation indicates that loss of plants is the highest perceived impact of deforestation as indicated by 23.80% of respondents. This is followed by loss of medicines/herbs with 20.67% response. Others include decrease in soil fertility 11.06%, soil erosion 9.46% among others (Table 3)

Table 3: Community's perception of the consequences of deforestation on the socio-economic activities of the people

S/N	Option	Frequency	Percentage
1	Soil erosion	40	9.62
2	Decrease in soil fertility	46	11.06
3	Loss of medicines/herbs	86	20.67
4	Loss of plants	99	23.80
5	loss of Animals species	19	4.57
6	Flooding	52	12.50
7	Drought	29	6.97
8	Climate change	45	10.82
	Total	416	100.00

Source: Authors' fieldwork, 2015

4.4 Indirect Drivers

Other factors that indirectly drive encroachment into protected areas include lack of alternative means of livelihood as the highest driver. This is indicated by 22.8% response; high rate of unemployment is also among the indirect drivers (17.3% response). Others include high demand for forest product (13.7%), available market for forest products (11.1%), increase population (10.8%) and others such as presence of private sector, mining activities, access system etc. (Table 4)

Table 4: Indirect drivers of forest encroachment

S/n	Indirect drivers	Frequency	Percentage
1	Available market for products	46	11.1
2	High demand for forest product	57	13.7
3	weak laws on forest	10	2.4
4	Lack of alternative means of livelihood	95	22.8
5	Lack of involvement of communities in forest protection	38	9.1
6	high rate of unemployment	72	17.3
7	increase population	45	10.8
8	**others**	**53**	**12.7**
	Total	**416**	**100.0**

Source: Authors' fieldwork, 2015

4.5 Socio-economic impact of forest encroachment

The encroachment of human activities into the forest impinge on the socio-economic benefits of the people in the area. The findings indicates that dwindling of source of livelihood/employment is the highest impact of forest encroachment as indicated by 45.4% response; loss of income also followed in the list with 14.9% response; while reduction in the source of food signified by 9.6% is the third socio-economic impact. Others include loss of buildings, loss of source of protein and others (Table 5).

Table 5: Socio-economic impact of forest encroachment

S/n	**Socio-economic Impact**	**Frequency**	**Percentage**
1	Loss/Reduction in income	62	14.9
2	Dwindling of livelihood source/employment	189	45.4
3	Reduction in source of food	40	9.6
4	loss of building materials	24	5.8
5	loss of source of medicine	23	5.5
6	Loss of source of water	21	5.0
7	Loss of source of protein	19	4.6
8	Loss of market	20	4.8
9	Others	18	4.3
	Total	416	100.0

Source: Authors' fieldwork, 2015

4.7: Nonparametric Correlations for relationships between socio-economic impact and drivers

Table 6: Correlations between socio-economic impact and drivers of deforestation

			Socio-economic impact	Major drivers	Indirect drivers
Spearman's rho	Socio-economic Impact	Correlation Coefficient	1.000	.821**	.912**
		Sig. (2-tailed)	.	.000	.000
		N	416	416	416
	Major drivers	Correlation Coefficient	.821**	1.000	.892**
		Sig. (2-tailed)	.000	.	.000
		N	416	416	416
	Indirect drivers	Correlation Coefficient	.912**	.892**	1.000
		Sig. (2-tailed)	.000	.000	.
		N	416	416	416

**. Correlation is significant at the 0.01 level (2-tailed).

The nonparametric correlations between the socio-economic impact of encroachment and the major drivers as well as indirect drivers indicates that the relationships are positive and significant. The rho-value obtained between major drivers and socio-economic impacts is positive and significant (rho=0.821; $p< 0.05$), it implies that as these drivers increases, socio-ecomic impact increases. In the same vein the relationship between the indirect drivers and socio-economic impact is positive and significant (rho=0.912; $p< 0.05$). Thus, as these drivers increases, socio-economic impact also increases. Figure 2 shows the indicators associated with the different types of activities (drivers).

Figure 2: Indicators of drivers

5. Discussion

From the foregoing, the study reveals that NTFP collectors dominate other occupation (30.3%) followed by farmers. The availability of leaves such as *Gnetum africanum*, *Lesianthera africana*, *Piper guinensis*; seeds such as *Irvingia gabonensis*, *Tetrapleura tetraptera, Afromosia afromomo* etc. bark such as *Sacoglottis gabonensis* among others as well as the high demand for these products drives many people into collection of NTFPs. Other NTFPs include, snails, mushrooms. This finding substantiates with the earlier findings of Hunn, et al. (2003) that the over- dependence of rural livelihood on their traditional resources is the driving force behind deforestation.

In addition the study identified NTFP collection as the highest driver of deforestation within the park as indicated by 32.0% response. This is quite unfamiliar and deviation from various studies (Oduntan, et.al, 2012; Geist and Lambin 2002; Bisong, 2010) that confirmed agriculture as the major driver of deforestation. Agricultural expansion has been determined as the key driver of deforestation in the tropics, particularly commercial actors such as those involved in mechanized agriculture play a significant role in the expansion of agriculture into the forest, For instance, the study by Geist and Lambin (2002), identified agriculture as the cause of 73% of all deforestation. The reason behind the emphasis on NTFP is that more people are involve and also the method of extraction. Collection of NTFPs is easier than other forms of resource utilization. From the interviews conducted it was gathered that extraction of NTFP is an unperturbed activity that is not easily noticed, unlike farming and logging that are easily noticed. Collectors can ostensibly encroach into the park, extract these resources and come out unnoticed. This is in tandem with the findings by Rudel et al (2009) that drivers of deforestation vary regionally and change over time. In areas close to the park, the major driver of deforestation within the park is extraction of NTFPs. Motel et al. (2009) showed that the higher the price of agricultural commodities, the higher the deforestation rate. The higher the price and demand for forest products portends high rate of extraction.

Moreover, loss of plants has been identified as a severe environmental consequences of encroachment and deforestation. The response indicates that 23.80 of the people acknowledged that loss of plant is a major consequence. Loss of medicinal herbs is second to plants. The assertion by Hope (2007) indicates that environmental degradation made people poorer through lack of availability of natural resources. The scarcity of these resources affect the people capacity to provide for their needs such as food and medicine.

Everything on our planet are interconnected and while the nature supplies the valuable environmental services necessary for human existence, deforestation also affect the capacity of the forest to provide such services as clean air, moderation of climate, control of flood etc. Deforestation patterns are strongly related to forest endowment: different drivers of deforestation have different impact in sign and intensity (Leplay and Thoyer, 2011)

The study further revealed lack of alternative source of livelihood as indirect drivers which has increased the rate of encroachment. A larger percentage (22.8%) of people opined that limited source of livelihood drives most people to encroach into the forest. The level of income and endowment of a household from the available resources within and outside the park compel others to resort to encroachment. Thus it becomes self-employment opportunity for households to extract food, generate income and medicine and their capacity to provide basic needs. Anyadike (2009), opined that deforestation, over grazing, bush burning, and unplanned development have a grave impact on climate change and environmental sustainability

7. Recommendations

With the increased of encroachment into protected forest, it is therefore recommended that:

a. The boundary of the park and that of the buffer zone should clearly demarcated and protected.
b. Biodiversity conservation should be given high priority
c. Alternative livelihood should be provided to reduce or totally exterminate encroachment into the protected area
d. Promoting small-scale forest based enterprises that will support local entrepreneurship and rural development.
e. Monitoring programmes should be strengthened and capacity of park officials to monitor encroachment should be built.

f. Collaboration with and involvement of support zone communities in conservation should be given high priority to curtail conflict and increase a working relationship for conservation.

8. Conclusion

Encroachment into the protected forest is a daunting challenge to conservation of biodiversity and sustainability of livelihoods. Deforestation has been widely acknowledged as one of the environmental problems in developing countries leading to loss of biodiversity, soil erosion, decrease in soil fertility, change in local climate etc. The continuous human interference within protected forest if uncheck may result in extinction of many species of plant and animals.

The importance of forest resources cannot be over-emphasized. However, tropical deforestation and its negative consequences such as climate change, biodiversity loss, reduced timber supply, flooding, siltation, and soil degradation and the protected area system requires synergy to sustain forest and people. Understanding these complexities remains a key area of interest in global environmental sustainability

REFERENCES

Anijah-Obi, F. N. (1996) “Environmental crisis: An overview” in P. Alozie Technology, Science and Environment: A current overview, Calabar: Emilis Computers.

Anijah-Obi, F. N. (2001). Fundamentals of Environmental Education and Management. Calabar. Clear Lines Publication.

Anyadike R. N. C. (2009), Climate Change: Causes and Consequences, paper presented at CEMAC, UNEC, public lecture.

Awake Magazine (2001) who will protect the web of Nigeria: Watch tower publishers.

Awake Magazine (2003) who will save the rainforest of Nigeria: Watch tower publishers.

Bisong F. E. (2010); Nigeria Strategic Investment Framework (NSIF) For Sustainable Land Management (SLM): Phase 1, Cross River State (2011 -2020), Draft Report, National Fadama Development Office, Abuja

Bisong, F. E. (2001). Environmental Science and Management in a changing world. Calabar. Tabson Global Resources.

Bisong, F. E. (2001). Nature Resource use and conservation for sustainable Rural Development Calabar Baa, International Computer Limited.

Bisong, F. E. and Mfon, P. (2006). Effect of Logging on Stand Damage in the Rainforest of South-Eastern Nigeria. West African Journal of Applied Ecology. 10 (1):1-10

Bisong, F.E, and Andrew-Essien E.E. (2010) Indigenous Knowledge Systems for Promoting Community Conservation Education, International Journal of Biology, Canadian Centre for Science and Education. Vol. 2, No. 2.

Bisong, F.E. and Arokoyu, S.B. (2003). Agricultural Land Use Modeling and Deforestation: An analysis of proximate drivers in South-Eastern Nigeria. Ghana Educational Media and Technology Association Journal. 5: 47-64

Bisong, F.E; Animashaun, A.I.; Andrew-Essien, E.E.; and Utang, P.B. (2008). Land Tenure and Resource Use Patterns in the Common Lands of South-Eastern Nigeria. Journal of Food, Agriculture and Environment. 6 (3&4): 524-528

Burtler, R. (2005). World Deforestation rates and forest cover statistics 2000-2005 Available online at http://news.mongabay.com/2005/1115-

CBD (2010b). Global Biodiversity Outlook 3. Secretariat of the Convention on Biological Diversity, Montreal Biological Diversity Programme of Work on Protected Areas. Secretariat of the Convention on Biological Diversity, Montreal, Technical Series no. 18, 108 pages

Cross River State Forestry Department (1994). “A strategy for sustainable development conservation and management to the forest of Cross River State”, O. D. A. Assisted Calabar, Nigeria.

Cunningham, W. P. and Saigo, B. N. (1999): Environmental Science, USA. McGraw-Hill Companies.

Fakoner (1991). The history of deforestation in Nigeria Calabar-1990 CRNP/CRSFP.

FAO (2005). Deforestation data for Nigeria, 1990- 2005. Available online at from http://news.mongabay.com/2005/1115- forests

FAO-World Bank (2010). AFOLU sectors and Climate change in Nigeria: Appraisal of the baseline scenario using Vision 20-2020.

Gandiwa, P., Matsvayi, W., Ngwenya and Edson, G. (2011); Assessment of Wildlife and Human Settlement Enccroachment into the Northern Gonarezhou National Park, Zimbabwe. Journal of Sustainable Development in Africa. 13(5)

Geist H and Lambin E 2002 Proximate causes and underlying driving forces of tropical deforestation BioScience 52 143–50

Geist, H. J. and Lambin, E. F. (2001). What Drives Deforestation? A meta-analysis of proximate and underlying causes of deforestation based on sub-national case study evidence. LUCC Report Series No. 4, University of Louvain, Belgium.

Geist, H.J. and Lambin, E.F. (2001). What drives Tropical Deforestation? Belgium: LUCC International Project Office University of Louvain

Hope, K R (2007) Poverty and Environmental Degradation in Africa. Journal of Environment and Sustainable Development, 6 (4) 451-472.

Hope, K R (2007) Poverty and Environmental Degradation in Africa. Journal of Environment and Sustainable Development, 6 (4) 451-472.

Kaimowitz, D. and Angelse, A (1998). ECONOMIC MODELS OF TROPICAL DEFORESTATION A REVIEW. Indonesia: Center for International Forestry Research

Kamau P (2004). Forage Diversity and Impact of Grazing Management on Rangeland Ecosystems in Mbeere District, Kenya. LUCID Working paper No. 36. Int. Livestock Res. Institute. Nairobi

Kissinger, G., M. Herold, V. De Sy. (2012) Drivers of Deforestation and Forest Degradation: A Synthesis Report for REDD+ Policymakers. Lexeme Consulting, Vancouver Canada

Leplay, S. and Thoyer, S (2011). Synergy effects of international policy instruments to reduce deforestation: a cross-country panel data analysis. France: LAMETA

Mayer, J. R. (1990). Connections in Environmental Science: A case study approach. New York, McGraw-Hill Companies.

Mayer, N. (1984). The primary source: Tropical Forests and Future, New York: Norton.

NEST (1991). Nigeria's Threatened Environment: A National profile, Ibadan: Niser, pp. 12.

Oduntan, O. O. Soaga, J. A. Akinyemi, A.F. and Ojo, S. O.(2012). Human activities, pressure and its threat on forest reserves in Yewa division of Ogun State, Nigeria. E3 Journal of Environmental Research and Management Vol. 4(5). pp. 0260-0267, June,

Oduntan, O. O. Soaga, J. A. Akinyemi, A.F. and Ojo, S. O.(2012). Human activities, pressure and its threat on forest reserves in Yewa division of Ogun State, Nigeria. E3 Journal of Environmental Research and Management Vol. 4(5). pp. 0260-0267

Philip M. F. and William F. L. (2004). Tropical Deforestation and Greenhouse-gas Emissions. Ecological Applications, 14 (4), 982-986

Rotich, D. (2012). Cocept of Zoning Management in Protected Areas. Journal of Environmental and Earth Science. 2 (10): 173-183

Rudel T K, De Fries R, Asner G P and Laurance W F 2009 Changing drivers of deforestation and new opportunities for conservation Conserv. Biol. 23 1396–405

Strategy for sustainable development (1994). Conservation and management of Cross River State Forest

UNEP (1993). United National Environmental Programme. Global Biodiversity England. World Publications.

Vreugdenhil, D., Terborgh, J., Cleef, A.M., Sinitsyn, M., Boere, G.D., Archaga, V.L., Prins, H.H.T., (2003). Comprehensive Protected Areas System Composition and Monitoring, WICE, USA, Shepherdstown

World Rain Forest Movement (2002).

Yaro, M. A. (2015). The Impact of Encroachment on the Distribution of Tree Species in Cross River National Park, Oban Division, Nigeria. Journal of Environmental Protection, 6, 744-754