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Consequences of Different Intensities of Deforestation on Total Household Income in Rural Communities within the Tropical Rainforest Areas of Ikom Local Government Area, Nigeria		
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Keywords:		Abstract
Intensities of Deforestation, Total Household Income, Rural Communities, Tropical Rainforests, Deforestation, Tropical Rainforest		This study aimed to identify the causes and consequences of deforestation in the Ikom Local Government Area (LGA) of Cross River State, Nigeria. The objectives included assessing the causes of deforestation, evaluating its impact on rural household income, and proposing solutions to the socio-economic issues related to deforestation. A review of relevant literature provided insights into related variables. Data were collected using a open-ended questionnaire, with 136 copies distributed and 129 retrieved
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	<p>through simple random sampling. The communities studied for income data collection include Alok, Okuni, Alesi and Ekunde. Pearson correlation and Analysis of Variance (ANOVA) were employed to test the hypotheses. The ANOVA analysis shows F-value of 58.24223, P-value (2.567896) and F- crit value of 2.662569. Given the ($p > 0.05$) observation, the null hypothesis (H_0) which states that there is no significant variations in household incomes from tropical rainforests with varying levels of deforestation, was accepted. The Pearson correlations show dwindling correlation values in relations with total household incomes as the level of intensity increases. Data from questionnaire, though not largely included in this study, were utilized for the corroboration of other collected data and information presented. Based on the findings, recommendations include greater involvement of stakeholders, particularly non-governmental organizations, in biodiversity conservation efforts, and the provision of alternative livelihoods for forest communities to reduce their dependence on forest resources.</p>
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Introduction

Until recently, the issue of biodiversity loss had not garnered significant attention. However, factors such as urbanization, intensive agriculture driven by shifting cultivation, infrastructural development, and monoculture for food processing needs have escalated deforestation to alarming levels. This situation has raised concerns both locally and globally. Deforestation is recognized as a major contributor to long-term environmental issues, including global warming, biodiversity loss, and soil degradation (Mahapatra and Kant, 2003:2), as well as increasing poverty among communities living on the forest's edge. The rates and extent of deforestation vary across continents, nations, regions, and localities (FAO and CIRFOR, 2005).

For instance, while Brazil and Indonesia had the highest net forest loss in the 1990s, both countries have significantly curbed this trend in the 2000s. In contrast, Australia faced increased forest loss due to severe drought and forest fires (FAO, 2010:10). The implications of deforestation in tropical rainforest areas are profound, particularly for rural communities in developing nations like Nigeria.

Over the years, human exploitation of forest resources has led to widespread biodiversity destruction, stemming from a non-sustainable attitude toward nature (Katerina and Pearce, 1994). Deforestation has been a persistent issue since around 1700, but current rates are alarmingly higher. According to data from the UNFAO, between 1990 and 1993, forest cover declined by 56.3 million hectares, averaging a global loss of 11.3 million hectares or 0.32 percent annually—four times higher than earlier rates. The World Bank Report (1995) notes that forests are shrinking by approximately four million hectares each year worldwide, particularly in countries like Cameroon, Zaria, Gabon, and Nigeria, especially in the Cross River and southeastern regions.

Research by Adebayo et al. (2021) highlights the economic repercussions of deforestation in Nigeria, demonstrating a significant correlation between forest resource depletion and declining household incomes. Their quantitative analysis revealed that communities reliant on forest resources face escalating financial pressures as deforestation progresses. The findings indicated that households dependent on timber, non-timber forest products (NTFPs), and ecosystem services suffered reduced income opportunities, with the poorest households disproportionately affected.

Similarly, Ojo and Adeyemo (2022) explored the socio-economic consequences of deforestation in Ikom Local Government Area (LGA), identifying that varying intensities of deforestation lead to different impacts on household income. Their categorization of deforestation into mild, moderate, and severe intensities revealed that severe deforestation correlated with a significant drop in household income, largely due to the loss of access to vital resources like fuelwood, food, and income-generating activities associated with forest conservation.

The socio-economic impacts of deforestation extend beyond immediate income loss. Nwankwo et al. (2023) emphasized that communities experiencing higher deforestation rates often face increased poverty and food insecurity. Their research in various rural areas of Nigeria indicated that deforestation reduced agricultural productivity due to soil degradation and climate changes, leading to diminished crop yields and exacerbating poverty in these communities.

Moreover, Ogundipe and Ayoola (2024) examined the long-term socio-economic effects of deforestation, arguing that it contributes to social instability as communities grapple with resource scarcity and heightened competition for remaining forest assets. This competition can lead to conflicts, disrupting social cohesion and further undermining household economic stability. Additionally, Mayers and Vermeulen (2002) and TEEB (2010) noted a growing societal concern regarding the mixed effects of deforestation in the 21st century, balancing socio-economic benefits against negative outcomes. On the one hand, forest loss fulfills household livelihood needs and provides cultural and spiritual benefits, with approximately 500 million to 1.6 billion people relying on forests for their livelihoods.

To mitigate the adverse effects of deforestation on household incomes, researchers advocate for sustainable practices. Eze and Nwosu (2023) proposed alternative livelihood strategies to enhance economic resilience in deforested areas, showing that integrating agroforestry, ecotourism, and sustainable harvesting of NTFPs can offer new income sources while promoting forest conservation.

Effective policy interventions are crucial for addressing deforestation issues. Olatunji et al. (2023) called for comprehensive policy frameworks that encourage community involvement in forest management. Their research highlighted successful case studies where local communities, through participatory approaches, managed forest resources sustainably, leading to improved household incomes and enhanced socio-economic conditions.

In Cross River State, for example, deforestation has resulted in the loss of about 19% of the tropical high forest between 1972 and 1992 (Cross River State Forestry Commission, 1994). Consequently, the tropical rainforests in Ikom LGA—spanning areas from Yala Nkum clan to Bakor clan, Ofutop clan, and Olulumo clan—are significantly affected. These regions, once characterized by dense virgin forests that provided essential resources like food, fuel, building materials, and habitats for flora and fauna, are now succumbing to severe deforestation annually.

The aim of this study is to investigate the consequences of deforestation on household income, with references to tropical rainforests with different levels of deforestation in Ikom LGA, and propose solutions to the associated challenges. The findings are expected to inform environmental resource management practices in Ikom LGA and provide valuable insights for local and international non-governmental organizations focused on forest conservation.

Study Area

The study area is Ikom Local Government Area (LGA) in Cross River State, Nigeria. Ikom is situated in the central senatorial district of Cross River State, located at latitude 5°45'N and longitude 8°30'E. The LGA is bordered to the north by Ogoja, to the northeast by Boki, to the east by Etung, and to the south by Obubra. It lies along the Ogoja-Ikom-Calabar highway, approximately 78 km from the boundary between Ikom and Ogoja, as well as the boundary with Obubra.

Ikom LGA comprises 11 council wards: Abanya, Olulumo, Ofutop I, Ofutop II, Nta/Nselle, Yala Nkum, Nde, Abiginkpor, Ikom Urban, Akparaobong, and Nnam. According to the National Population Commission (NPC) 2006 census, the projected population of Ikom is about 162,383. The predominant religious practices in the area are Christianity and traditional beliefs.

The climate in Ikom LGA features distinct dry and wet seasons. The Ekukunela community, like many others in the region, is located within the rainforest zone, with average annual rainfall ranging from 189.5 to 245 cm. The average temperature typically falls between 27°C and 29°C, with July, August, and September being the coolest months (Duze and Ojo, 1997).

The soils in Ikom LGA are characterized as hardpan lateritic soils, formed due to significant isolation from solar radiation. Evapotranspiration rates are high in this area, resulting in an average daily maximum temperature of about 26°C, with variations of up to 8°C between the hottest month (March) and the coolest month (August) (FAO, 1976).

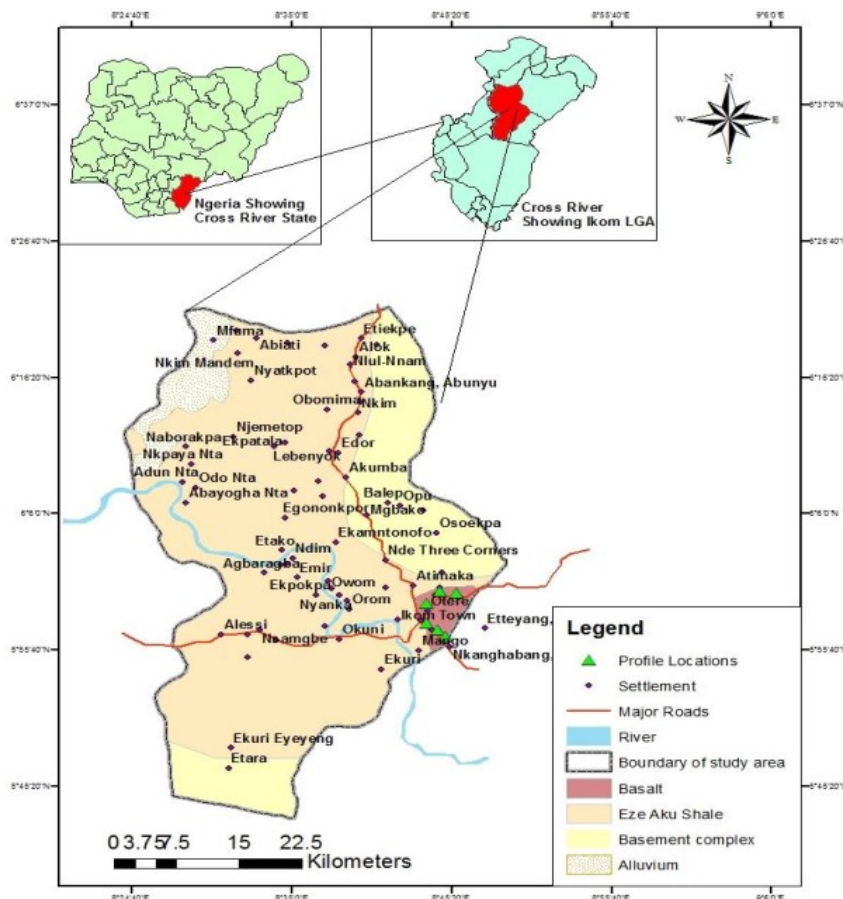


Figure 1: Map of Ikom Local Government Area
 Source: Adopted from Akpan-Idiok, Enya and Ofem (2016)

The vegetation in Ikom LGA encompasses a diverse range of flora, including emergent trees, shrubs, and herbs. Notable tree species in the area include Achi, Cedar, Opepe, white and yellow Apa, and cotton trees. This region also supports various forest snacks and fruits, such as bush mango, alligator pepper, bitter kola, and palms, along with medicinal herbs and grasses used for both selling and treating ailments. The flora is highly diverse, with a single square kilometer potentially containing up to 100 different tree species. Commonly found are thick-

stemmed varieties, epiphytes, and other herbs. Many households rely on these economic plants, classified as non-timber forest products (NTFPs), for their livelihoods. The densely forested environment supports a seasonal presence of wildlife, including various birds and animals. Noteworthy fauna includes pythons, boas, and birds such as parrots, hawks, kites, and eagles.

The socio-economic activities in Ikom LGA are primarily centered around farming, logging, hunting, and gathering. The forest plays a crucial role in the livelihoods of local communities. Ikom LGA hosts numerous markets that operate on specific days of the week, attracting people from different parts of the state and beyond to buy and sell goods. Women in Ikom are especially reliant on agriculture, engaging in farming more frequently than their male counterparts. Agriculture serves as their primary source of income, with many practicing peasant agriculture through slash-and-burn shifting cultivation. Commonly cultivated cash crops include cocoa, plantain, banana, yam, cocoyam, and pear, often through mixed cropping methods. NTFPS collection and sales is a major source of income, especially for women. Some of these NTFPs are shown in Table 1.

Research conducted by Akintoye (2003), Akintoye et al. (2013), and Mfon (2003) has documented biodiversity losses due to logging, while unsustainable collection of NTFPs poses significant threats to forest conservation in Nigeria. Akintoye (2003) examined the impacts of logging on both logged and non-logged species, as well as the socio-economic implications of these activities. Impact of deforestation and biodiversity loss can be devastating even outside the tropical rainforest. For instance, Akintoye (2014) discussed the consequences of biodiversity losses caused by the construction of the Nigeria Liquefied Natural Gas (NLNG) project, this time on riverside communities.

Several scholars, including Hemming (1992), Ridgeway (1987), Gouldie (1984), Hecht and Cockburn (1990), Moore (1990), Park (1992), Balogun (1994), Akintoye (2003), and Akintoye et al. (2013), have addressed the values of rainforests and the challenges posed by large-scale forest loss. The impact of losses of forest diversity, and invariably of NTFPs for collection by household members for income, can be devastating.

Given these considerations, there is a pressing need to assess the causes and consequences of deforestation in developing countries like Nigeria. For this study, selected rural and semi-urban communities in Ikom LGA were chosen due to their location within tropical rainforests that are currently under threat from deforestation. Additionally, a substantial portion of the population relies on NTFP collection from the surrounding forests.

Method of study

This section show cased the methods of data collection. The procedures adapted in obtaining data for this study are thus here presented. This study employs a cross-sectional

Table 1: List and Uses of Non-Timber Forest Products (NTFPs) in Cross River State

S/N	COMMON NAME	BOTANICAL NAME	PERCIEVED USE/PRODUCTS
1	Oil Palm	Elaeis guinesis	Palm oil and Palm kernel, Palm wine, Broom, Black soap, Building Materia, Cooking fire materials
2	Bush Mango (OGBONO)	Irvingia gabonensis	Condiment, Soup thickening
3	Camwood	Pterocarpus	Dyes, Medicine, Tools , Instruments
4	Afang/Salad leave	Gnetum africanum	Vegetable leaves
5	Kola Nut	Garcia kola Cola acuminata	Chewing as stimulant, Medicine
6	Raphia- Wine Palm Banboo Palm	Raphia hookeri Raphia vinifera	Raphia wine, Roofing mat, Beverages, Bamboo for building and instruments
7	Bush Meat Potcupine (Chukuchuku) Dulker Bush Pig Cane Rat/Cutting Grass	Artherusrus africanum Cephalopphus spp Tragelaphus Scriphus Potamochoerus Porcus	Meat Meat Meat Meat Meat Meat
8	Hot leaf/Bush pepper	Piper guinneesis	Vegetable leaves, Spice, Pepper
9	Cane rope	Eremosphatha macrocarpa	Fibre, Tools, Instruments
10	Hot Alligator pepper	Afromomum melegueta	Medicinal
11	Indian Bamboo	Bambusa vulgaris	Tools, Fibre , Instruments
12	Large land snail	Archantina marginata	Meat
13	Rattan Cane	Laccosperma secundiflora	Construction, Furniture making, Cash
14	Chewing Stick (Randia) Bitter Chewing stick	Massullaria acuminata Garcinia mannii	Chewing (For cleaning the teeth) Bitter Chewing Sticks (Foe cleaning the teeth)
15	Editan	Lasianthera africanum	Vegetable leaves, Medicinal
16	Atama	Heinsia crenata	For soup
17	Fish	Clarias species	For food
18	Wrapping leave	Marantaccea	Wrapping food, Building thatching

Source : Atte (1994) and Akintoye, 2002

research design to examine the consequences of different intensities of deforestation on total household income in rural communities within the tropical rainforest areas of Ikom Local Government Area, Nigeria. The focus was on quantifying the economic impacts of non-timber forest products (NTFPs) harvested from areas with varying degrees of deforestation.

The research was conducted in Ikom LGA, characterized by tropical rainforest ecosystems. The selection of study sites considered variations in deforestation intensity, categorized based on the following criteria: canopy gap size, felled tree stump count, NTFP depletion levels, and regeneration duration not exceeding one year. Respondents were required to provide data on their household income from NTFPs collection and sales

Types and Sources of Data

Two types of data were collected and use in this study. These include primary and secondary data. **Primary Data:** These were obtained through personal interview, field observations and questionnaire; **Field observation:** The study required embarking on reconnaissance survey for familiarization with the study environment and forest resources utilization activities in forest communities and environs. This are meant to confirm, if information and data provided by respondents are accurate,

The questionnaire used in this study is open- ended. It is divided into two sections. Section A contains questions on characteristics on sampled respondent, while section B contain question, aimed at obtaining data required in achieving other objectives of the study. In order to corroborate the accuracy of data collected through questionnaire administration, focused group discussions (FGDs) and key informant interviews (KIIs) were carried out using participatory research appraisal (PRA) technique. This is also done to verify the accuracy of information provided by the respondents in the study area. **Secondary Data** on population and other aspects of the study were also utilized. Data on population census from the National Population Commission and climatic data.

Sampling Method

1. **Selection of Communities:** A stratified random sampling approach was employed to select three communities representing, where there exists different levels of deforestation intensities, such as low, moderate, and high intensities.
2. **Household Selection:** Keeping records of income in rural areas is very tedious. Households willing or able to participate were few. Thus, forty (40) households were purposively selected within each community. Households were selected using systematic sampling.

Data Collection

Primary data collection depended on questionnaire administration, checklists used for focused group discussions and key informant interviews of selected people

1. **Income Recording:**
 - Household members were instructed to record the amount of income earned in Naira from NTFP collections over a three-month period. A standardized income diary was be provided to each household to facilitate consistent data recording.
2. **Assessment of Deforestation Intensity:**
 - Deforestation intensity was quantitatively assessed using the following metrics:
 - (i) **Canopy Gap Measurement:** Canopy gaps will be measured using a Densiometer at randomly selected points within each study area to estimate canopy cover percentage.

- (ii) **Felled Tree Stump Count:** The number of stumps in a defined plot (e.g., 1 ha) were counted to determine historical logging activities.
- (iii) **Level of NTFP Depletion:** Surveys were conducted to estimate the availability of NTFPs, including fruits, nuts, and medicinal plants, in each intensity category.
- (iv) **Duration of Regeneration:** Field assessments were conducted to ensure that regeneration time for logged areas does not exceed one year, using visual indicators of recovery.

Data Analysis

- (i) **Statistical Analysis:** Descriptive statistics were used to summarize household income data, while inferential statistics, including Analysis of Variance (ANOVA), was used to assess differences in household income across the three deforestation intensity categories.
 - (ii) Pearson correlation coefficients were calculated to explore relationships between total household income from NTFPs and incomes from forests with different levels of deforestation intensity.
- (d) Ethical Considerations**
- Prior to data collection, informed consent was obtained from all participating households. Participants were assured of the confidentiality of their income data, and the right to withdraw from the study at any time. After consent by 40 households were obtained, with ten (10) rural households from each community, it was considered manageable.
- (e) Limitations**
- This study acknowledges potential limitations, including the reliance on self-reported income data, which may be subject to biases. Additionally, the temporal nature of NTFP availability may influence the results, and factors such as market fluctuations will be considered in the analysis. Another limitation of the study is that Geospatial Analysis was not possible due to lack of digital imagery consistently over a period of five or more years. Thus, Geographic Information Systems (GIS) will be employed to map deforestation intensity across the study area and visualize spatial relationships between forest loss and household income.

Study Population, Sampling Techniques and Techniques of Data Analysis

The study population of this research are the entire communities in Ikom LGA. The study population comprises of the population of Ikom LGA, while the sample population was drawn from four communities, which are Alok Alok, Okuni, Alesi and Ekunde. It comprises of traders, peasant farmers loggers exploiters, NTFPS collection, transporter, Artisans, food processing workers, transporters, Unemployed, forest officers and others, who have lived within the communities for the past ten years and above.

To ensure adequate coverage of the study area the simple random sampling technique was used in selecting the communities, and also the respondents from the four (4) communities. These include Alok, Okuni, Alesi and Ekunde.

The data obtained from the use of the questionnaire, during the study were analyzed and coded for easy understanding and presentation. However, tables, figures, percentages, frequencies, maps, diagrams and photographs were used to bring the research to give meaningful insights into the data sets.

Some of the communities in Ikom LGA include: Ogomogom, Abinti, Manden Nyarankpo, Agba, Alok, Ekimaya-Abayom, Emanghabe, Etikpe 1, Nkonfap, Eleshi, Osibi-Etikpe, Nlul 1, Nlul 2, Abankang, Nkarasi I, Nkarasi II, Nkum- Ntu, Abinti III (Nkum station), Abinti 1, Okoroba, Abinti II, Ikunde- Abangork, Ekunde, Akumaba II, Ekundi II, Edor – Abangork, Akpatala 3 & 4, LibenJork, Njeme Top, Abinti-Nelle, Otigidi, Olakidung, Ejo & others, Enyi & others, Ejeghe– Agoma, Ejeghe & others, Nkoronta & others, Okpodon, Nma, Okokpa, Nkurambong, Ntrigom II, Ntrigom I, Otigidi- Nta, Ngo, and Nkpaya. Others are Ghana plantation & others, Obenjogi plantation, Akamplantation, Okuni, Okokoma & others, Okondi, Yawonde, Mgbabor plantation, Adijinkpor cocoa plantation, Adijinkpor 1, Adijinkpor II, Adijinkpor II plantation and others.

The plantation communities were not considered along with communities not willing to provide certain income related data. Others not selected were communities with no identifiable primary forests. Also the three communities selected include those selling most of their NTFPs to Calabar and environ. It is an axiom that in Ikom LGA, there is a very high level of trade including NTFPs, with the Anglophone section of Cameroun. They are also communities nearest to the base station of the researchers who must monitor periodically the compilation of income data on pre-determined visits.

There is thus, a dire need for more researches to include the far flung communities with large expanse of primary, and deforestation impacted community forests. Only Alok, Okuni, Alesi and Ekunde were selected for income data collection,

Table: 3. Sample framework for the study

S/N	Names of sample villages	Estimated population	Estimated household average size	Estimated number of household	Percentage of sampled household	Total number of sample household	Number of returned questionnaire	Percentage of returned questionnaire
	Alok	2493	6	416	10%	42	40	95.24%
	Okuni	2674	8	334	10%	33	31	93.93%
	Alesi	4184	8	523	10%	52	50	96.15%
	Ekunde	358	4	90	10%	9	8	88.89%
	Total	9709		13		136	129	

Source: Fieldwork (2020)

Discussion of findings

The discussion of findings are presented as follow:-

The relationship between total household income and incomes from tropical rain forests with different levels of deforestation in the study area

To achieve one of the objectives of the study, data were collected on household incomes from the sales of NTFPs collected from the four (4) selected communities (Alok, Okuni, Alesi and Ekunde communities) located within the tropical rain forests. The total household incomes from NTFPs collection, as well as household incomes from lightly deforested, moderately deforested, severely deforested and not deforested/primary forest areas were collected. The total of these forms the total household incomes from the TRFs. These was meant to know if there is no significant relationship among household income from NTFPs collected from tropical rainforests with different intensities of deforestation in the study area. Pearson correlation results in Table 4, shows the results of the Pearson correlation.. Table 3, shows that between household income from unlogged rainforests (x_1), and income from lightly logged forests(x_2).The Pearson correlation shows significant relationships throughout the results with total household income and primary forest area (.933**), lightly deforested (.944**), moderately deforested (.735**) and severely deforested (.647**).

Thus, the strength of the correlation with total household income from NTFPs sales diminishes as the intensity of deforestation increases. The primary areas provided largely strong correlation, showing that as household income from NTFPs collection and sales takes place, more household income is collected from the primary forest areas, than in other forest areas with progressively, higher intensities of deforestation. The higher the intensities of the deforestation, the lesser are the contributions to total household income from NTFPs collection and sales. Consequently any increase in one variable also results in increase in other variables. Normally there is supposed to be an inverse relationship as deforestation increases. This could be explained by the fact that this study, did not consider the size of the geographical areas covered by household members harvesting NTFPs for sale, the number of household members working to carry out the NTFPs collection (manpower), the prices and types of the NTFPs collected, and the prices for those NTFPs, which may be dictated by seasons, inflation rate, preservation level, availability and other factors.

Table 4: Pearson's Correlations Of Data On Household Income From Tropical Forests With Different Levels Of Deforestation In The Study Area

Akintoye, Oluyemi Ayorinde, Olorundami Tokunbo Alaga, Ubong Edet Harrison, Nkpena, Charles Ojong, Ukata Sammy Uka, Omoogun Clemency Ajayi, Omoogun Remi Modupe, Akintoye Taiwo Adesola, Ajila Temilola Oluwatosin, Odey David, Ally Godwin-Joachim Akwagiobe, Okon Eyo Nsa, Ubi Chris Odey Gladys¹

		Undeveloped (X ₁)	Lightly deforested (X ₂)	Moderately deforested (X ₃)	Severely deforested (X ₄)	Total income (Y)
Unlogged (X ₁)	Pearson Correlation Sig. (2-tailed) N	1 40	.854** .000 40	.499** .001 40	.463** .003 40	.933** .000 40
Lightly logged (X ₂)	Pearson Correlation Sig. (2-tailed) N	.854** .000 40	1 .000 40	.646** .000 40	.500** .001 40	.944** .000 40
Moderately logged (X ₃)	Pearson Correlation Sig. (2-tailed) N	.499** .001 40	.646** .000 40	1 .000 40	.624** .000 40	.735** .000 40
Severely logged (X ₄)	Pearson Correlation Sig. (2-tailed) N	.463** .003 40	.500** .001 40	.624** .000 40	1 .000 40	.647** .000 40
Total income (Y)	Pearson Correlation Sig. (2-tailed) N	.933** .000 40	.944** .000 40	.735** .000 40	.647** .000 40	1 40

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

Variation in the household incomes from tropical rainforests with different intensities of deforestation

Efforts to gain insights into the level of variation among household income from tropical rainforest with different intensity of deforestation in the study area necessitated the further analysis of data extracted from data collected on household incomes from NTFPs, were also subjected to Analysis of variance (ANOVA) analysis (as shown in Table 5).

TABLE 5 : Results of Analysis of Variance (ANOVA) of Data in Household Income from Forests with Different Intensities of Logging in the Study Area

Summary						
<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>		
Unlogged (x1)	40	210893	5272.325	3829114		
Lightly logged (x2)	40	140569	3514.225	1826148		
Moderately logged (x3)	40	95912	2397.8	575385.2		
Severely logged (x4)	40	70183	1754.575	290368.7		
ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	284848859.5	3	94949620	58.24223	2.567896	2.662569
Within Groups	254319595.9	156	1630254			
Total	539168455.4	159				

In Table 5, the F-value is 58.24223, the P-values is 2.56786, while the F-crit. is 2.662569. The F-value is the ratio of the two mean squares. When the F- value is larger and the significant level is small (typically), smaller than (0.05 or 0.01) the null hypothesis can be rejected. The significance level (P-values) shows the conditional probability that a relationship as strong as the one observed in the data would be present, if the null hypothesis were true. In this case P-value is greater than the significance level ($p > 0.05$) adopted for the analysis.

Thus, based on results in Table 5, the null hypothesis which states that “there is no statistically significant variation among household income from tropical rainforest with different intensity of deforestation in the study area is accepted, while the alternative hypothesis which states that there is a statistically significant variation in household incomes from forests with different intensity of deforestation is rejected .

Sources of NTFPs according to deforestation intensities

Figure 2, shows the patter of NTFPs collection from tropical rain forests different rains levels of deforestation and primary forests. The graph and Table 6, shows that the primary

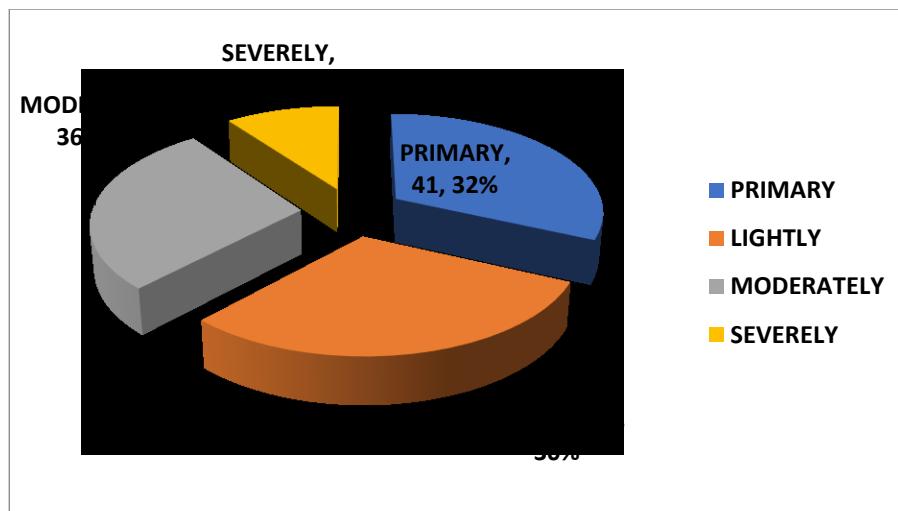


Figure 2: Sources of NTFPs collection according to the intensities of deforestation in the study communities

forests are now the major targets of NTFPs collectors, as indicated on behalf of their households by 41 respondents (31.8%). The least NTFPs harvests are from severely deforested as indicated by 13 respondents (10.08%). With the onslaught and encroachment into the primary forests, which key informant interviews revealed are about the farthest from some community settlements, the frequency of NTFPs collection from the areas and the level of degradation and biodiversity losses will inevitably intensify.

Table 6 : Sources of NTFPs with reference to deforestation intensities in community forests

S/ N	ES COMMUNITI	PRIMARY		LIGHTLY		MODERATE		SEVERELY		TOTA L	
			%		%		%		%		%
1	Alok	7	5.4%	15	11.63%	12	9.30%	6	4.65%	40	31.01%
2	Okuni	14	10.9%	7	5.43%	6	4.65%	4	3.10%	31	24.03%
3	Alesi	18	14.0%	15	11.63%	14	10.85%	3	2.33%	50	38.76%
4	Ekunde	2	1.6%	2	1.55%	4	3.10%	0	0.00%	8	6.20%
	TOTAL	41	31.8%	39	30.23%	36	27.91%	13	10.08%	129	100.00%

Source: Fieldwork (2020)

Summary

The study examined the causes and consequences of deforestation in Ikom Local Government Area, Cross River State. Data was collected from both primary and secondary sources. The study revealed that there is no statistically significant difference among household income from tropical rainforest with different intensity of deforestation in the study area. Also there is no statistically significant difference among household income from tropical rainforest with different intensity of deforestation in the study area. This does not however mean that there are no notable differences in incomes when data is visually perused. Focused Group Discussions (FGDs) and Key Informant Interviews (KIIs) showed that many factors are responsible for deforestation in the study area, which include-, over exploitation of firewood, bush burning and rapid agricultural expansion.

These justify the profound concerns expressed in Rickeway (1987), Aina and Salau (1992), Dunn, Otu, and Wong (1994), Balogun (1994), FAO and CIRFOR (2005). Some of these problems can be combated (Owusu, Nketiah, and Aggrey, 2011). The study also put forward some recommendations which will help reduce the causes and effects of deforestation in the study area.

Conclusion

Deforestation has been noted to contribute greatly to long-term environmental consequences such as global warming, loss of biodiversity and other forms of environmental degradations. As rightly opined by Akintoye (2003), focused Group discussions and key informant interviews during the study confirmed that forest destructions in Nigeria is carried out by poor people, who are denied access to land and these people depend on the forest for their existence. Apart from the need for local people's survival, deforestation has also been a product of settlement expansion and development projects in response to population increase. In view of

the above, there is an urgent need to embark on an aggressive environmental awareness and enlightenment programme to educate the people on the need for sustainable forest exploitation, highlighting the dangers of deforestation which can subject humanity to irreversible doom.

Recommendations

In view of the importance of forests and the consequences of deforestation as already discussed in the study, the following recommendations are made:-

1. All stockholders especially indigenous people and non- governmental organizations should get involved or participate in biodiversity conservation through diverse funding
2. Participatory forest management, that is, involving the local people in forest management, should be encouraged by relevant authorities
3. Forest communities should be provided with alternative means of livelihood in order to reduce their over- dependence on forest resources
4. Afforestation should be encouraged in the study area
5. Logging instructions and guidelines should be recommended, while cultural and silvicultural operations, which promotes considerable regenerate of log yielding trees and NTFPs species should be encouraged.
6. Bush burning should be discouraged and where it is unavoidable, fire should be stopped from spreading beyond the proposed area. Appropriate sanctions should be applied to defaulters.

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Consequences of Different Intensities of Deforestation on Total Household Income in Rural Communities within the Tropical Rainforest Areas of Ikom Local Government Area, Nigeria

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