Original Research Article

EFFECT OF DEFORESTATION ON RURAL HOUSEHOLD INCOME IN SELECTED FOREST DEPENDENT COMMUINITIES IN ODEDA LOCAL COUNCIL AREA OF OGUN STATE

ABSTRACT

This study was carried out to examine deforestation and rural household income with a view to ensuring conservation. A multistage sampling procedure with a 3-stage design was used for this study. Questionnaire was used to elicit information from 120 respondents in Odeda local council area of Ogun State. Data collected were analyzed using descriptive and inferential statistics. The Foster-Greer-Thorbecke indices of poverty metrics was used to determine the poverty line of households. Smith's saliency was used to determine the livelihood activities in selected communities. The result showed that respondents were gender sensitive, majority (58.3%) were male and (41.7%) female. On age, 41 – 50 (45.8%) years recorded the highest. The mean age was 50 years. Most of the respondents were married (68.6%) while majority, (52.5%) have low literacy level attaining only secondary education. Household size 1 - 5 recorded the highest, (76.7%) of the total population. Mean household size was 5. The study area was dominated by Yoruba (77.5%). Major occupation income recorded a mean of ₦17, 000 while minor occupation income recorded a mean of ₦4308.37. Poverty line of ₦122, 700 was determined with poverty incidence (P_0) of (21.67%). The poverty gap (P_1), (5.09%) indicating that an average respondent requires ₦6, 245.43 to reach the poverty line. The poverty severity (P_2) was (0.02) showing that the respondents were not poor because the value is far from 1. Socio economic factors promoting deforestation were identified among the respondents with marital status as the only significant variable ($P<0.05$) and a negatively coefficient value of -2.281. Conclusively, deforestation was identified with livelihood activities of the people such as hunting, farming and trading of forest products. Therefore, it is recommended that forestry extension programmes should be intensified in rural communities to minimize deforestation activities and promote eco-consciousness among the local people.

KEYWORDS: DEFORESTATION, FOREST, RURAL HOUSEHOLD, COMMUNITIES, INCOME AND LIVELIHOOD

1. INTRODUCTION

Forests and agriculture are an integral part of the farming systems where farmers depend upon them for their livelihood [1].The importance of forests as providers of livelihoods and poverty "safety nets" has received growing attention over the past few decades. Forest resources are the major means of livelihood for the rural populace as majority depends on it for livestock farming, inputs for agriculture and supply for

timber and non-timber forest products [2]. The forest is often perceived as a stock resource, a free good, with the land as something freely available for conversion to other uses without recognition of the consequences on its role of provision of environmental services. Hence many forest ecosystems have been degraded into less diverse and stable ones [3]. Deforestation is defined as a direct, human-induced conversion of forested land to non-forested land [4]. Forest degradation occurs when the ecosystem functions of the forest are degraded but where the area remains forested rather cleared [5]. Deforestation is a conventional environmental challenge substantially affecting the resilience and distribution of forests across different boundaries. It is simply defined as the loss of tree cover usually as a result of forests being cleared for agriculture and other land uses [6].

In Nigeria, forests provide goods such as timber and other non-timber products (e.g. bamboo, chew stick, game) which help most communities to meet the requirements for rural economy [7]. Meanwhile, the forests of Nigeria contribute substantially to the national gross domestic product (GDP) and sustenance of the livelihood of the people. This may be the reason why the trend of deforestation across the country seems to be very high. According to Central Bank of Nigeria (CBN) [8], forestry contributions to Nigeria's GDP vary from time to time. (CBN) [8] reported that forest contribution to GDP in the country are 0.92% in 1981, 0.89% in 1982, 0.97% in 1983, 1.00% in 1984, and 0.91% in 1985. Further observation of (CBN) [8] shows that forestry contributions to GDP of the country were 0.99% in 1986, 1.01% in 1987, 0.96% in 1988, 0.68% in 1989 and 0.45% for the year 1990.

The deforestation and degradation of Nigeria forest resources in indisputable. According to Federal Ministry of Environment, (FMEv) [9] between 1980 and 1990, the annual rate of deforestation averaged 3.5% and the forest area declined from 14.9 million ha.to 10.1 million ha which translates to the loss of 350,000 to 400,000 ha of forest land per annum for the country. The study carried by Forestry Management and Coordinating Unit (FORMECU) [10] on vegetation and land use changes in Nigeria showed that undisturbed forest decreased from 2.9% of total land area of Nigeria in 1976/78 to 1.3% in 1993/95 – (decrease of 1,383,700 hectares); also the disturbed forest increased from 1.6% of total area of Nigeria in 1976/78 to 2.1% in 1993/95 – (an increase of 441,700) hectares. The report also revealed that the Riparian forest decreased from 0.8% to 0.6% - a decrease of 214,800 hectares within the same period [10]. FAO, [11] Global Forest Assessment reported that Nigeria's forests and woodlands, which currently cover about 9.6 million hectares, have been dwindling rapidly over the past decades. It stated that the country's current deforestation rate is estimated at 3.7% and one of the highest in the world. It further stated that between 1990 and 2015, Nigeria lost about 35% of its remaining forest resources and over 50% of another wooded land. This is an alarming trend that suggests that the assertion that the remaining forest area of the country would disappear in the next three decades might become a reality if steps and necessary initiatives are not taken to check this development [10]. However, much of the human-induced deforestation and forest degradation is, in varying degrees, economically wasteful and

environmentally negative, as well as socially undesirable as just a few individuals benefit as reported by [11]. The process usually induces adverse effects on the social condition of weaker sectors of society and leads to the progressive impoverishment of ecosystems. Some types of deforestation and forest degradation result in costs to society that amply exceeds benefits. There is enough evidence that Nigeria is facing an environmental crisis on account of heavy deforestation. For several years, there has been remorseless destruction which must be put under control to avoid some bad consequences associated with deforestation. Nobody knows exactly how much of its tropical forest have already been destroyed and continue to be razed each year. Data is often imprecise and subject to differing interpretations. Population growth and expansion which are the major causes of deforestation usually results to decrease in per capita income thus savings and rate of capital formation remain low, reduction in per capita income, rise in general price level leading to sharp rise in cost of living. No improvement in agricultural and industrial technology, shortage of essential commodities, low standard of living, mass unemployment etc. This underscores the importance of this study with the following objectives: To describe the socio-economic profile of respondents, to identify the causes of deforestation, to identify the livelihood activities in the communities, to identify the socio-economic factors promoting deforestation and to determine the poverty status of the respondents.

2. MATERIALS AND METHOD

2.1 The Study Area

The study was carried out in Odeda local government area (Figure, 1), which shares boundary with Abeokuta North local government area of Ogun State. Odeda local government is one of the twenty Local Governments in Ogun State, Nigeria. The headquarters is 10km from Abeokuta (State capital) at Odeda Township. The council area has an extensive landmass mostly grassland with an area of 99,615km^2 and a population of 222,097 people [12]. Odeda local government is divided into three zones and each zone is sub-divided into settlement/villages. The Local Government Area enjoys tropical climate and enjoy double maximum of rainfall from April to July and September to October. Average temperature is about 32^{o}C and humidity can be as high as 95%. The people of Odeda LGA are predominantly farmers who engage in small scale farming.

2.2 Data collection

Data were collected from a total of 120 respondents with the aid of a semi-structured questionnaire using multi-stage sampling design from three zones in Odeda local council area of Ogun state. The zones were Odeda, Ilugun and Opeji. Twenty respondents were selected in each of the six villages across the three existing zones. The respondents cut across farmers, hunters and knowledgeable members of the community. Information sought include, age of respondent, occupation, income from major and minor occupation, family size, religion, educational qualification, information on causes of deforestation, consequence of deforestation on rural household income and socio-economic factors promoting deforestation. The distribution of the respondents is presented in Table (1).

2.3 Data analysis

Data collected were analyzed using descriptive and inferential statistics, Smiths saliency, regression analysis and Foster-Greer-Thorbecke indices. Descriptive statistics such as table, frequency distribution and percentages was used to analyze socio-economic characteristics of respondents and the causes of deforestation, Smith's saliency was used to determine the livelihood activities of respondents in the selected communities while regression analysis was used determine the socio-economic factors promoting deforestation. Foster-Greer-Thorbecke indices was used to determine the poverty status of the respondents.

2.3.1 Smiths's saliency

Smith's saliency (or smith's) [13] accounts for frequency of mention. Free-list data reveal information about the items people list and the people who list them. The data inherently demonstrate a kind of cultural agreement [14].

Salience = Inverted rank/ Total rank

Inverted rank = Number of time a species is mentioned

Total rank = Total species mentioned

2.3.2 The Foster-Greer-Thorbecke Indices

This was used to determine the poverty line of households in the respondent's communities. The most commonly used index from the family, $\{FGT_2\}$, puts higher weight on the poverty of the poorest individuals, making it a combined measure of poverty and income inequality and a popular choice within development economics. The individual indices within the family are derived by substituting different values of the parameter α into the following equation.

$$P_{\propto} = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{z-y_i}{z}\right)^{\propto}$$

- Where; z is the poverty line
- Two types of poverty lines will be used in this study;
- An absolute poverty line defined as the equivalent of USD1 (i.e. N360) income per head per day; and
- A relative poverty line defined by two-third of the mean per capita household income among all the study respondents.

- N is the number of people in the economy
- H is the number of poor (those with income at or below z),
- y_i is the income of each individual i.
- q = the number of respondents below the poverty line.
- α = FGT parameter, which takes the values 0.1 and 2, with different implications.
- α = 0, measures poverty incidence, the proportion of those that are impoverished.
- α = 1, measures poverty gap, giving more weight to the poorest.
- α = 2, measures severity of poverty
- N = total number of respondents; Yi = Per capita household income.

If alpha is low then the FGT metric weighs all the individuals with incomes below z roughly the same. The higher the value α, the greater the weight placed on the poorest individuals, the higher the FGT statistic, the more poverty there is in an economy.

Table1: Showing sampling plan for the research work

Zone	Villages	No of Respondents
A (Odeda)	Odeda	20
	Oluga	20
B (Ilugun)	Apesin	20
	Olodo	20
C (Opeji)	Opeji	20
	Alabata	20
	Total Six Villages	**120**

Source: Field Survey, 2019

Figure 1: Map of Ogun State Showing the Study area

3. Results and discussion

3.1 Socio-economic characteristics of respondents

Table (2) indicates the socio-economic characteristics of respondents in the study area. It shows that 58.3% were male while 41.7% were females. This is a clear indication of higher participation of male in forest income generating activities compared to females but both contributes immensely to deforestation. This agrees with the findings of [15] that reported that women prefer to engage in domestic chores near homestead rather than exploiting forest resources. The table further reveals that majority (45.8%) are between 41-50. A mean age of 50 years was reported for respondents. This implies that most of the respondents are gradually approaching the threshold of inactive years of their life and would still have time and energy for forest income generating activities which also poses to be a socio-economic factor promoting deforestation in Odeda local council of Ogun state. According to [16], older age group of over 60 years in these activities indicates the passage of knowledge to younger ones and also adaptability to such activities as regular and reliable source of income. The table further revealed that most of the respondents were married 68.6% while 20.3% and 11% were singles and widowers respectively. However, 76.7% of the respondents had between 1-5 persons per household while 23.3% had between 6-10 persons per household. A mean household size of 5 was obtained for respondents in the study area. The implication of this large household size is that more people will have to depend more on forest income generating activities. This has negative implication for household food security in the area due to land use intensification and resource depletion from increased forest income generation drive. The table further shows that majority (77.5%) of the respondents in the study area belong to Yoruba tribe. This is actually due to the fact that the survey was carried out in a Yoruba dominated area. Table (2) further revealed that a larger part of the respondents had low literacy level with majority (52.5%) attaining only secondary school level of education. This often makes them engage in deforestation activities as noted by [17] which reported that formal education improves sustainable management of forest resources. [18] also identified low literacy level among the populace as one of the factors promoting deforestation which is a consequence effect on land use and biodiversity at large. Furthermore, this also agrees with the findings of [19] that farmers with more than four years of education found it easier to adopt new farm technologies thereby creating less negative impact on deforestation of the environment for agricultural/other activities. Table (2) also revealed that majority (69.2%) are farmers while 30% of the respondents had monthly income within the range of ₦16000 - ₦20000 which shows that most of the respondents are low income earners. This prompts them to exploit the forest more often in a bid to supplement their income. This agrees with the findings of [20] which reported that the sales of non-timber forest products (NTFPs) contribute as much as a quarter of total household income in rural settlements.

Table 2: Socio-Economic Characteristics of the Respondents

VARIABLES	FREQUENCY	PERCENTAGE%	MEAN/MODE
Sex			
Male	70	58.3	Male
Female	50	41.7	
Total	**120**	**100**	
Age			
21-30	15	12.5	
31-40	32	26.7	
41-50	55	45.8	50 years
51-60	18	15.0	
Total	**120**	**100**	
Marital status			
Single	26	20.3	
Married	81	68.6	Married
Widower	13	11.0	
Total	**120**	**100**	
Family size			
1-5	92	76.7	5
6-10	28	23.3	
Total	**120**	**100**	

	VARIABLES	FREQUENCY	PERCENTAGE%	MEAN/MODE
217	Tribe			
218	Yoruba	93	77.5	Yoruba
219	Igbo	27	22.5	
220	**Total**	**120**	**100**	
221	Education			
222	Primary	57	47.5	
223	Secondary	63	52.5	Secondary
224	**Total**	**120**	**100**	
225	Major occupation			
226	Farming	83	69.2	Farming
227	Trading	35	29.2	
228	Motorcycling	1	0.8	
229	Teacher	1	0.8	
230	**Total**	**120**	**100**	
231	Income (Monthly)			
232	₦1000-5000	10	8.3	
233	₦6000-10000	28	23.3	
234	₦11000-15000	22	18.3	
235	₦16000-20000	36	30.0	₦17000
236	₦20000 and above	24	20.0	
237	**Total**	**120**	**100**	

238 **Source: Field survey, 2019**

3.2 Causes of Deforestation

The respondent's perception on causes of deforestation is presented in Table (3). The result identified clearing of forest for agriculture, logging for fuel wood, mining operation, setting forest ablaze, urbanization, poverty, low literacy level, expanding global market for timber and natural disaster as the major cause of deforestation in the study area. [21] opined that poor living conditions and illiteracy are causes as well as consequences of environmental degradation. The high level of poverty and illiteracy in Africa particularly Nigeria is directly linked to the current level of environmental pollution and degradation in the continent. The poor and the illiterate are often more interested in issues related to their daily survival than environmental management; this lack of interest and awareness often lead to more reckless environmental behavior which in turn breeds more environmental problems and leads to a vicious cycle of poverty. [22] also noted that the process of deforestation is conventionally associated with direct causes or factors such as agricultural/pasture expansion and forest products consumption and export. This perspective was buttressed by [23] who acknowledge that bush fires, indiscriminate logging and conversion of forest to farmland as the predominant causes of deforestation.

Table 3: Respondents Perception on the Causes of Deforestation

	VARIABLES	SA	A	UN	D	S.D	STD	Mean	Inference
1	Forest is being cleared for farming purpose	19(15.8)	46(38.3)	29(24.2)	24(20)	2(1.7)	1.037	3.47	Agree
2	Logging for fuel wood is heavily practiced in the forest	10(8.3)	44(36.7)	43(35.8)	22(18.3)	1(0.8)	0.901	3.33	Agree
3	Mining operation is very destructive to the forest	14(11.7)	45(37.5)	31(25.8)	28(23.3)	2(1.7)	1.017	3.34	Agree
4	Setting forest ablaze using wildfire to hunt animal is highly intensive	22(18.3)	38(31.7)	28(23.3)	28(23.3)	4(3.3)	1.132	3.38	Agree
5	Urbanization to create more cities and towns is done by clearing the forest	14(11.7)	43(35.8)	30(25)	32(26.7)	1(0.8)	1.019	3.31	Agree
6	Poverty cause most houses to rely on the resources obtained from the forest	17(14.2)	42(35)	36(30)	23(19.2)	2(1.7)	1.008	3.41	Agree
7	Low literacy level among the populace will lead to removal of the forest	14(11.7)	43(35.8)	29(24.2)	32(26.7)	2(1.7)	1.040	3.29	Agree
8	Expanding global market for timber has encouraged forest clearing	12(10)	40(33.3)	34(28.3)	30(25)	4(3.3)	1.039	3.22	Agree
9	Natural causes such as floods and erosion is destroying the forest	13(10.8)	39(32.5)	28(23.3)	36(30)	4(3.3)	1.082	3.18	Agree

Source: Field survey, 2019

3.3 Livelihood activities in the community

Smith's salient value was used to reveal the information about the livelihood activities listed by the respondents in the study area. Table (4) revealed that the respondents were involved in various livelihood activities which were specific to certain areas of study in the study area. According to ranking, it was observed that most engaged in charcoal production (23.3%), handicraft (22.5%), fuelwood (15%), hunting (15%) and firewood collection (13.3%). This is in line with [24] which reports that access to forest products is relatively uncomplicated and that goods and services from the forest are vital for the livelihoods and resilience of the poorest households, acting as safety nets in difficult times.

Table 4: Smith's salient value of respondents in the study area

Variables	Frequency	Percentage	Saliency Value
Firewood collection	16	13.3	0.1333
Lumbering	4	3.3	0.0333
Charcoal production	28	23.3	0.2333
Handicraft	27	22.5	0.2250
Fuel wood	18	15.0	0.1500
Hunting	18	15.0	0.1500
Herbal medicine	9	7.05	0.0705

Source: Field survey, 2019

3.4 Poverty Incidence, depth and Severity

The incidence, depth and severity of poverty among the respondents (Alabata, Apesin, Odeda, Olodo, Oluga, and Opeji, Pooled) were determined using Foster, Greer-Thorbeck method and the results are presented in table (5). According to the results in table (5), it was observed that incidence of poverty (P_o) estimated 21.67%. This implied that 21.67% (34 respondents) fell below the poverty line of N122700, while 78.33%% were above the poverty line. Also, with respects to depth of poverty, P_1, an average person requires 5.09% of N122700 to reach the poverty line. More so, in relation to severity of poverty, P_2 = 0.027.This indicates that the people were not severely poor because the value for poverty severity is far from 1. However, they were resource poor farmers relying more on subsistence farming for survival with heavy dependence on the fragile ecosystem. It was reported by [25] that a strong linkage exists between the economy and environment. Thus, industrialization of the 21st century shows the relationship between environment and the economy. The revolution brought transformation but with consequences on the environment. Therefore poverty status of the respondents was determined to indentify its contribution to deforestation in the study area.

Table 5: Poverty incidence, depth and severity among the respondents in all the areas

Locations	Alabata	Apesin	Odeda	Olodo	Oluga	Opeji	Pooled
Poverty line	87120	125640	134280	126720	123840	138600	122700
Poverty Incidence	10%	30.1%	25%	10%	40%	2.0%	21.67%
Poverty Depth	10%	33.3%	10%	1.4%	34.4%	27.2%	5.094%
Poverty Severity	0.053	0.16	0.016	0.001	0.124	0.182	0.027

Source: Field survey, 2019

3.5 Socio-economic factors promoting deforestation

The result in Table (6) shows there was relationship between socio-economic factors promoting deforestation and the marital status of the respondents; F (1, 118) = 5.204, p = 0.024. The measure of R^2 was 0.042 which means the respondents marital status accounted for 4.2% of the variation in the factors promoting deforestation. The coefficient of the relationship was -2.281 which implies that marital status promotes deforestation negatively. This could be due to necessity of meeting up with varying household needs by the married respondents in the study area. The result of this study corroborate [26] which reported that demographic change is the major driver of land cover change: its primary and most direct impact is through opening new land for agricultural, settlement and infrastructural development. The role of increased population growth and density and urbanization are major factors currently exerting immense pressure on forest resources in rural communities in developing countries

Table 6: Regression of the determinants of the socio-economic factors promoting deforestation

						Unstandardized Coefficients		Standardized Coefficients	
Model	**df**	**Mean Square**	**F**	**Sig**	**R-Square**	**B**	**Std. Error**		**t**
Marital status	1	2.914	5.204	0.024	0.042	-0.285	0.125	-0.206	-2.281*
	118	0.560							
	119								

***Significant at 5% (P<0.05)**

Source: Field survey, 2019

4. CONCLUSION

This study revealed that poorer households on the lowest rung of the income ladder depend more heavily on non-timber forest products than wealthier families. This is so because poorer rural families are resource constrained and thus cannot take advantage of more profitable income generating opportunities, thereby leading to resource overdependence. This situation results in resource overexploitation and ultimately, deforestation and degradation with dire consequences for society.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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