Causes and consequences of deforestation on rural household income in Aliero Kebbi state

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Abstract

Deforestation is the removal of a forest or stand of trees where the land is thereafter converted to a non-forest use. The aim of this study is to determine the Causes and Consequences of Deforestation on Rural Household Income in Aliero LGA of Kebbi State. The study employed a descriptive and explanatory design; questionnaires were applied in order to collect data. 200 respondents were randomly selected from the study area and these includes; farmers, hunters and members of the general public. The study area was further divided into two groups of A and B and each of the groups contains two villages of which 50 questionnaires were administered to each village. The SPSS (version 22) of the Statistical Regression tools were used to analyze data using a simple percentage which was presented in frequency distribution tables and percentage. The result revealed that, the respondents were gender sensitive (81.5%) were male and (18.5%) were female. Most of the respondents were married (71%) while (100%) of the respondents were Muslims (Islam) indicating that Islam is the dominant religion in the study area. On age, 16 – 25 years (27.5%) recorded the highest number of the respondents in the study area while (44.5%) have low literacy level attaining only non-formal education. Family size 4 and above recorded the highest (61%) of the total population while farming (71%) is the major occupation of the respondents. However, (88%) of the respondents, earn their income from sales of farm/forest produce. Meanwhile on the effect of deforestation on household income, the result shows that age, educational level and source of income are positively significant (6.759, 0.25 and 1.386 respectively) at $P<0.05$ while gender and family size are negatively significant (-0.547 and -1.004 respectively) at $P<0.05$. Religion, marital status and occupation are not significantly different ($P>0.05$). The F- statistics value of 4.590 is significant at $P<0.05$, while the estimated R-square has the value of 24.355 which means that 24.355% of the variation in the dependent variable is because of the changes in the independent variables. Conclusively, deforestation was identified with the livelihood activities of the respondents in the study area as farming, hunting and sales of forest materials as parts of their major occupation. It is therefore, recommended that government should add more effort on poverty eradication program, and to educate the unemployed members of the community on the dangers associated with deforestation and there is the need for awareness on the effect of deforestation, and government at all level should make alternative cooking fuel(gas) available.

Keywords: deforestation, questionnaires, income and aliero

Introduction

Deforestation is the conversion of forest to an alternative permanent non-forested land due to human actions such as agriculture, grazing or urban development (Bulte, and Van Kooten 2000) [7]. Millions of trees are cut down processing and sold as energy sourcing for cooking fuel (sometimes in the form of charcoal) or timber, while cleared land is used as pasture for livestock, plantations of commodities and settlements. Population increase rate of human and poverty is a lead factor that increases the pressure on distribution of woody plants especially in under developing countries. The removal of trees without sufficient reforestation is a biodiversity threatened that resulted in damage to habitat, economic loss and aridity. It has adverse impacts on bio sequestration of atmospheric carbon dioxide (Barraclough *et al*., 2000) [6].

Subsistence farming and commercial agriculture accounted for 48%-32% while logging estimated 14% and fuel wood removals 5% of deforestation (Barraclough *et al*., 2000) [6]. Other causes of contemporary deforestation may include corruption of government institutions, the inequitable distribution of wealth and power, population growth and overpopulation, and urbanization. Globalization is often viewed as another root cause of deforestation, though there are cases in which the impacts of globalization (new flows of labor, capital, commodities, and ideas) have promoted localized forest recovery.

Several woody plant species are of risk of extinction because of this agitation. Moreover, deforestation contributor to global warming, and is often cited as one of the major causes of the enhanced greenhouse effect worldwide. Tropical deforestation is responsible for approximately 20% of world greenhouse gas emissions. In deforested areas, the land heat up faster and reaches a higher temperature, leading to localized upward motions that enhance the formation of clouds and ultimately produce more rainfall (Barraclough *et al*., 2000) [6]. Inhabitants of Aliero are into deforestation in order to sustain they life without knowing the danger of it directly or indirectly. This aimed of this study is to determine the Causes and Consequences of Deforestation on Rural Household Income in Aliero LGA of Kebbi State.

Materials and Methods

Study area

Aliero Local Government Area created in the year 1991 with a land mass of about 412.25km^2 and with estimated population of about 125,783 (NPC, 2006). Aliero is located in southeast part of Kebbi state on the latitudes 4^{0}23′S, 12^{0}26′40″N and longitudes 3^{0}6′W and 4^{0}27′35″E that shared bordered with Gwandu at Northeast, Southwest and Northwest Jega and Birnin Kebbi Local Government Areas. Aliero people enjoy a tropical climate, which is generally characterized by cool dry air (harmattan) which prevails from May/June and ends in October with the heaviest fall occurring in July and August. The extremely cold harmattan period, which is usually accompanied by dust winds and fogs occur in November through March. The annual temperature varies considerably but usually range between 26^0 and 43^{0}C, while mean annual rainfall is about 787.53 mm (Yahaya *et al*., 2020) [17]. Many people of Aliero engage in agriculture, mainly millet, sorghum, maize, onion, pepper and tomato production. Aliero community is one of the major producers of onion in Nigeria and has one of the largest onion markets in the Northwestern Nigeria (Dogondaji *et al*., 2006) [8].

Ethical consolidation

The ethical approval letter was obtained by the authority (Aliero local government) and introduced to the respective village heads of the study area, stating the purpose/reasons for the research work. The letter was duly authenticated by the researcher's supervisor.

Data collection

Data were collected from 200 respondents with the aid of a semi-structured questionnaire using multi-stage sampling design from four (4) villages in Aliero Local Government Area of Kebbi State. The villages were Kashin Zama, Danwarai, Jiga Birni and Sabiyel. Fifty (50) respondents were selected in each of the four (4) villages and the villages were grouped into two (2) as (group A comprised of Kashin Zama and Danwarai while group B will be Jiga Birni and Sabiyel). The respondents were cut across farmers, hunters and knowledgeable members of the villages. Information sought include, age of respondent, occupation, income from major occupation, family size, religion, educational qualification, information on causes of deforestation, consequence of deforestation on household income, socio-economic factors promoting deforestation and the measures taking to control deforestation by the communities. The distribution of the respondents was presented as shown in a table 1 below:

Table 1: Distribution of the respondents

Groups	Villages	No of Respondents
A	Kashin Zama	50
	Danwarai	50
B	Jiga Birni	50
	Sabiyel	50

Plant collection and identifications

A survey of the plants that are mostly used as firewood by the villagers in the study area were collected, parts of the plant such as the (leaves, stems, and branches) were collected into bunch and were brought to the Department of Plant Science and Biotechnology, Kebbi State University of Science and Technology Aliero for identification and authentication by a Taxonomist.

Data analysis

Data collected were analyzed using descriptive and inferential statistics, a statistical regression were also used for data analysis using SPSS (vision 22).

Results

a) Social characteristics of respondents

The results of the socioeconomic characteristics of the respondents were presented in Table 2. Its reveals that 27.5% of the respondents had the ages between 16-25 years, followed by56 to above (22.0%), 36-45 years 20.0%, 26-35 years (17.51%) and 46-55 years with lowest (13.0%). However, gender distribution, 81.5% were males and 18.5% were females with overall percentage of (100%) Muslims. Also, 142 (71%) respondents were married, 58 (29%) were single and none was divorced. The educational level status shows (44.5%) were obtained with non-formal education while (6.5%) found with Tertiary certificated as presented in (Table 2) respectively.

Table 2: Social characteristics of respondents

Variable	Frequency	Percentage (%)
Age		
16 – 25	55	27.5
26 – 35	35	17.5
36 – 45	40	20.0
46 – 55	26	13.0
56 and above	44	22.0
Total	200	100
Gender		
Male	163	81.5
Female	37	18.5
Total	200	100
Religion		
Islam	200	100
Christianity	0	0
Traditional	0	0
Total	200	100
Marital Status		
Married	142	71
Single	58	29
Divorced	0	0
Total	200	100
Educational Level		
Non-formal education	89	44.5
Primary education	61	30.5
Secondary education	37	18.0
Tertiary education	13	6.5
Total	200	100

b) Economic characteristics of respondents

From the results obtained, farmers constituted 71.0% of the respondents, traders 24.0%, civil servants 5.0% while no hunters that participated in the research. As for the family size, those with 4 and above families had the highest percentage (65%), with one family (16%), 0 family recorded with (14%), with 3 families (7%) and those with 2 family members had the least percentage of (2%) as indicated in Table 3. The major source of income of respondents were found on sale of farm produce (88.0%), salary workers (11.0%) and 1% gained they income by cut trees or processing (Table 3).

Table 3: Economic characteristics of respondents

Variable	Frequency	Percentage (%)
Occupation		
Farmer	140	71.0
Hunter	0	0.0
Trader	48	24.0
Civil servant	10	5.0
Total	200	100
Family size		
0	28	14
1	32	16
2	4	2
3	14	7
4 and above	122	61
Total	200	100
Source of income		
Sales of firewood	1	0.5
Salary	22	11.0
Sales of farm produce	176	88.0
Sales of trees for furniture	1	0.5
Total	200	100

c) Causes, consequences, control and reasons of deforestation

About 94.5% of the respondents were known the causes of deforestation, while 4.5% to 1% had no knowledge or no idea of it (Table 4). In addition, 96.5% realized the consequences of deforestation while 0.5% had no idea. Planting trees are the only means to control deforestation as shown by the respondents (95.0%) while cutting of trees for control of deforestation were observed with 0%. The reasons for the indiscriminate cutting down of trees given showed that poverty (49.5%) was the major reason, secondly farming (29.5%), thirdly building purposes (12.5%) and lastly illiteracy (8.5%). The most affected trees were; *Azadirachta indica* (83.0%), *Pakia biglobosa* (10.5%), *Moringa oleifera* (4.5%) and *Mangifera indica* (2.0%) as shown in table 4.

Table 4: Causes, Consequences, Control and Reasons of Deforestation

Variable	Frequency	Percentage (%)
Cause of deforestation		
Yes	189	94.5
No	9	4.5
No idea	2	1.0
Total	200	100
Consequences of deforestation		
Yes	193	96.5
No	6	3.0
No idea	1	0.5
Total	200	100
Control of deforestation		
Planting of trees	191	95.0
Cutting down of trees	0	0
Building of houses	3	1.5
Clearing of farm land	6	3.0
Total	200	100
Reasons for Cutting Down of Trees Indiscriminately		
Poverty	99	49.5
Building purposes	25	12.5
Farming	59	29.5
Illiteracy	17	8.5
Total	200	100
Scientific Name		
Pakia biglobosa	21	10.5
Mangifera indica	4	2.0
Moringa oleifera	9	4.5
Azadirachta indica	166	83.0
Total	200	100

d) Effect of deforestation on rural household income

The results of the effect of deforestation on rural household income were presented in Table 5. It showed that age, educational level and source of income are positively significant (6.759, 0.25 and 1.386 respectively) at P<.0.05 and gender and family size are negatively significant (-0.547 and -1.004 respectively) at P<.0.05 while Religion, marital status and occupation are not significantly different (P>0.05).

Table 5: Effect of Deforestation on Rural Household Income

Variable	Coefficients	Standard error	t-test	Significance
Age	0.0347	0.137	6.759*	0.000
Gender	-0.074	0.031	-0.547*	0.585
Religion	-0.012	0.067	-0.160	0.873
Marital status	0.000	0.097	-0.002	0.999
Educational level	0.026	0.037	0.257*	0.798
Occupation	0.014	0.097	0.113	0.910
Family size	-0.074	0.016	-1.004*	0.317
Source of income	0.089	0.079	1.386*	0.168
F-statistics (4.590)				
R-square (24.355)				

* Significant at P<0.05

Discussion

Table 2 reveals the social characteristics of the respondents in the study area. The result shows that majority (27.5%) are between the ages of 16-25 years was reported for the respondents. This implies that most of the respondents are at their prime ages and would still have time and energy for forest income generating activities which is a clear indication factors of deforestation. The present work disagrees with the findings of Osoba *et al.* (2019) [14], found respondents with age of 55 that are gradually approaching the threshold of inactive years of their life but still generated their income through deforestation. Furthermore, 81.5% of the respondents

interviewed were male and (18.5%) female. This is harmony with the findings of FAO (2009) [9]. Several males might generate their daily income through forest activities lead to deforestation in order to satisfy their family need compared to female that are domesticated at home.

Education is the cardinal principle that control and guide the life of human beings but 44.5% of the respondents were obtained with highest level of non-formal education. Thus, this might be causal agents that make them into deforestation. In a related study, insufficient or lack of formal education especially in the area of ecology or environmental protection among the populace play a vantage role in promoting deforestation which is biodiversity threatened (Atanda, 2018) [5]. Also, implication for household food security due to size of the family members in the area due to land use intensification and resource depletion increased need for forest income generation to settle large family. Number of the individuals per family prompts the exploitation of the forest in utilized it for money.

This collaborated with the findings of Abdullahi (2002), household size in Nigerian is an indication of the available labour force to most farmers, factors conditioning the level of production and productivity of peasant farm family are therefore, the composition and size of their family. However, (88%) of the respondents depended survived on sales of farm produce as their major source of household income with (11%) of them selling farm land as low earners income. According to Mallay (2000) [12], said that, sales of non-timber forest products (NTFPs) contribute as much as a quarter of total household income in rural settlements.

From the results obtained, 94.5% of the respondents, having prior knowledge to the causes of deforestation in their communities which ranges from clearing of farm land, setting forest ablaze, urbanization, poverty, low literacy (Table 4), this parallel to the findings of Adebayo, (2010) [3] who opined that poor living conditions and illiteracy are essential factors causes environmental degradation. The process of deforestation is conventionally associated with direct causes or factors such as agricultural/pastures expansion and forest products consumption and export. Activities on the farm such as; bush fires, indiscriminate logging and conversion of forest to farmland as the predominant causes of deforestation in developing areas (Insaidoo *et al*., 2012) [10]. Recently, in Nigeria programmes related to afforestation of juvenile plants have been established to cope up with the issues of globally warming (Oluyemi *et al.*, 2014) [13]. This buttressed our present findings. Not withstand, there are very few mature forest plantations to provide fuel wood and sawn timber. Also, very few wood based companies have plantations of their own.

Thus, industrialization and urbanization of the 21st century show the relationship between the environment and the economy. Hence, most cited abundance and cut down economic tree is *Azadirachta indica* due to it ecotype diversity and easy processing. There is a significant differences at (P>0.05) in education, age, religion, marital status and occupation on their income and between gender and family size no significant P<0.05. The F- statistics value of 4.590 is significant at P<0.05; this indicates overall fitness and significance of the regression model used. Thus, the null hypothesis (Ho) which states that "Deforestation has no Effect on Household Income" is rejected. The estimated R-square has the value of 24.355 which means that 24.355% of the variation in the dependent variable is because of changes in the independent variables. This implies a moderately high degree of relationship between the dependent variable and the independent variables.

Conclusions

This study showed that, high level of illiteracy in the study area are the major causes of deforestation in the communities and also, those from the poorer households on the lowest rank of the income ladder depend heavily on their farm/forest products than those from the wealthier families. This could be poorer rural families are resource constrained and deprived of resources that is meant to get to them by corrupt government officials and hence cannot take advantage of more profitable income generating opportunities found around them because of their level of illiteracy, large family size and poverty, thereby leading to resource overdependence.

Recommendation

Government should add more effort on poverty eradication program, and to educate the unemployed members of the community on the dangers associated with deforestation as well as embark on the program of tree planting by enlightening the public to fathom that remain ones we have.

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