

THE EFFECTS OF DEFORESTATION ON HOUSEHOLD FOOD PRODUCTION IN AGUATA AGRICULTURAL ZONE OF ANAMBRA STATE, NIGERIA

T. N NWANKWO AND O.C ANAKEBE-OGBU

Federal Polytechnic Oke, Anambra State. Corresponding author : nneamakatemple@yahoo.com
+2348032891247

ABSTRACT

The study specifically examined socio-economic factors of farmers, causes of deforestation and their effects on the quantity of output produced by households in the area. Purposive and random sampling techniques were used to select three local government areas and 90 respondents respectively. Data were collected with the aid of a structured questionnaire and analyzed using descriptive statistics and multiple regression analysis. The findings of the study showed that majority of the respondents were middle aged men (mean age is 43years), illiterates with farming as their primary occupation having an average household size of eight persons. The study also revealed that an increase in farm size exerts more pressure on the available land thus leading to increase in food productivity and availability. Also, the total area deforested increases with an increase in the quantity of firewood used by the household. Result of the regression analysis gave the exponential function as the lead equation with R^2 of 0.911, very high F- statistic value of 46.57 and has the highest occurrence of significant variables at 5% risk level. Finally, the result showed that age, educational level, household size and farm size were the most important determinants of the output level while sex, marital status and occupation of the farmers were non-significant.

INTRODUCTION

The year 2001 was the international year of forests. This designation has generated momentum bringing greater attention to the forests worldwide. Forests cover almost a third of the earth's land surface proving many environmental benefits including a major role in the hydrologic cycle, soil conservation, prevention of climate change and preservation of biodiversity (Sheram, 1993). Forest resources can provide long-term national economic benefits. For example at least 145 countries of the world are currently involved in wood production (Anon, 1994). According to Myers (1992), The annual destruction rates seem set to accelerate further and could well doubt in another decade. However the FAO, FRA 2011 and 2010 reports indicate considerable deforestation in the world during 1990-2010. The struggle to save the world's rainforests continues and there is a great worldwide concern about the issue. In order to save forests, we need to know why they are being destroyed. Distinguishing between the agents of deforestation and its causes is very important in order to understand the major determinants of deforestation. Agents of deforestation are those slash and burn farmers, commercial farmers, ranchers, loggers, firewood collectors, infrastructure developers and others who are cutting down the forests.

Causes of deforestation are therefore that motivate the agents to clear the forests major causes are failure in the working of the economic systems to reflect the true value of the environment, incentives. As the land degrades, people are forced to migrate exploring new forest frontiers increasing deforestation (Wiki *et al* ; (2000), Amor (2005) and Pfaff, (2009). On the other hand, Mining can be labour intensive and take labour away from the forest for subsistence land. Further new migrants in the area increase demand for food and other agricultural products which can induce the farmers of the forest frontier to increase their agricultural products by expanding agricultural land by clearing the forests (Lang, 2002).

MATERIALS AND METHODS

The study was carried out in Aguata. It is one of the four Agricultural zones in the state with a population of 554,592 inhabitants (National Population Census, 2006). The zone is made up of five Local Government Area (LGA) namely ; Aguata, Orumba North, Orumba South, Nnewi North and Nnewi South L.G.As. The rainy season begins in April and ends in November with mean annual rainfall of between 1,162mm – 1,226mm and a relative humidity of 43%. Annual temperatures range between 30°C to 34°C. The favorable climate of the area encourages agricultural activities. The vegetation cover is comprised of mixture of

woody, vegetation (with trunks) and grasses in which trees are ecologically dominant. The predominant soil type in the area is deep well drained sandy loam. The main crops cultivated area cassava, yam, cocoyam, maize vegetables (fluted pumpkin, okro pepper), Melon. Plantain and oil palm while the animals reared are goat, sheep, pig, poultry and fish.

The people in the study area are predominantly farmers, palm wine tappers, hunters, traders but almost all the farmers practice farming at the same level. Purposive sampling method was used to select three local government areas from the zone (i.e. Aguata, Orumba North and Nnewi South). This selection was based on the number of households observed to be farming. Also, simple random sampling method was used to select 90 farmers as follows Aguata 30, Orumba North -30 and finally Nnewi South - 30 farmers. Primary data were obtained using structured interview schedules. Data were collected on socioeconomic characteristics of the farmers such as age, sex, occupation, household labour, education level, household source of meat consumption, household source of cooking fuel. Additional data on household farm size fallow period, household farm product (output), quantity of firewood consumed daily were also collected. Data analyses were done using descriptive statistics such as frequency distribution, percentage and ordinary least squares (OLS) regression for isolating factors that influence deforestation and their effects on output. The OLS regression model is implicitly stated as;

$$Y = (X_1, X_2, X_3, X_4, X_5, X_6, X_7)$$

Where; $\hat{Y}$ = output (N). X_1 = Age (years), X_2 = Sex (during male = 1, female = 0), X_3 = Marital status (during: married = 1; otherwise = 0), X_4 = Level of education (number of years in school), X_5 = Occupation (during farming = 1, otherwise = 0), X_6 = Household size (number of person's in the household), X_7 = Farm size ie Deforested area (hectares), e = Stochastic error term

The model was estimated using form functional forms. They are;

Linear:

$$Y = \Phi_0 + \Phi_1 X_1 + \Phi_2 X_2 + \Phi_3 X_3 + \Phi_4 X_4 + \Phi_5 X_5 + \Phi_6 X_6 + \Phi_7 X_7 + e_i$$

Exponential:

$$\ln Y = \Phi_0 + \Phi_1 X_1 + \Phi_2 X_2 + \Phi_3 X_3 + \Phi_4 X_4 + \Phi_5 X_5 + \Phi_6 X_6 + \Phi_7 X_7 + e_i$$

Semi-log:

$$\ln Y = \Phi_0 + \Phi_1 \ln X_1 + \Phi_2 \ln X_2 + \Phi_3 \ln X_3 + \Phi_4 \ln X_4 + \Phi_5 \ln X_5 + \Phi_6 \ln X_6 + \Phi_7 \ln X_7 + e_i$$

Double -log:

$$\ln Y = \Phi_0 + \Phi_1 \ln X_1 + \Phi_2 \ln X_2 + \Phi_3 \ln X_3 + \Phi_4 \ln X_4 + \Phi_5 \ln X_5 + \Phi_6 \ln X_6 + \Phi_7 \ln X_7 + e_i$$

RESULTS AND DISCUSSIONS

The respondent socio-economic characteristics are summarized in table 1. The result indicated that majority (60%) of the farmers were males and married average age, household size, educational level of 46 years, 8 persons and 12 years respectively were recorded for the farmers. Most (75%) of the respondents are full-time farmers, this implied that the farmers are not literate enough therefore, they have little knowledge of the adverse effects of forest clearing on the quality of food they produce.

Also, most respondents are married with a large family size and primary occupation as farming. The implication is that there are many months to feed and this leads to drastic land clearing so that more land will be available for farming hence increased deforestation. The result should that 77.5% of the farmers have a farm size ranging from 0-2, hectares. Table 2 should that the 56.3% of farmers produced annually ₦170,840 worth of yam while 16.6% and 27% produced ₦50,440 and ₦81,920 worth of cassava and maize respectively. Also, majority (77.8%) of the respondents used firewood as their major source of cooking fuel. This result implied that as more land are being needed cleared for farming to increase output, deforestation increases and also, the large dependence on firewood for cooking increases deforestation. The multiple regression analysis was used to determine the effects of socioeconomic variables on the output of the farmers. The data were fitted with form functional forms of the regression model (ie Linear, exponential, semi-log and double log models). The exponential function was chosen as the lead equation based on some economic and statistical criteria such as the level of R-square (R^2), R^2 adjusted, F-statistic, Durbin Watson statistic and the number of significant variables. The Result of the regression analysis indicated that out of the seven independent variables, only four variables (age educational level, household size and farm size) had

statistical and significant influence of the output of farmers. The other three variables (sex, marital status and occupation) were not significant. From the result, R-square of 0.91 implied that the regression (output) explained about 91% in the variability of the regression the independent variables). The F-statistic value of 46.574 was statistically significant at 5% probability level and indicated that the socioeconomic variables together significantly influenced the output. The value of the Durbin Watson statistic (1.98) indicated the absence of autocorrelation among observations of the independent variables. Age of the farmers was negative and statistically significant at 5% risk level. This means that as one advances in age, his level of output decreases because farming is tedious and requires a lot of energy. The coefficient of educational level was positive and statistically significant at 5% risk level. This is an indication that the higher one's level of education, the more his output because he will have more knowledge on the improved farming methods that can improve yield. In addition, household size was statistically significant. This means that the farmers used more of family labour to increase their output. So the higher the household size, the higher the output and vice versa. Finally, farm size (deforested area) is positively related to the output at 5% which implies that as farm size increases, the output increases.

Conclusion & Recommendations

Deforestation has adverse effects on household food production. Therefore, the farmers should be educated on the adverse effects of deforestation on crops. Both government and rural farmers should place restrictions on the number of trees individuals or groups are allowed to remove, setting aside the over exploited areas for regeneration. Also, an alternative to firewood should be made available and affordable to the farmers for cooking.

REFERENCES

Agbede, O.O., Idris M.B, and M.M. Ari (2004). Mobilizing investors for sustainable agricultural research, development and protection. proceedings of the 23th Annual conference of the Agriculture society of Nigeria held at the college of the Agriculture Lafia, Nasarawa State.

- Amor, D. (2008). Road impact deforestation and jaguar habitat loss into Seba Maya Ph.D dissertation Ecology department, Nicholas School of the environment, Duke University.
- Amor, D and Pfaff (2008) early history of the impact of road investments on deforestation with Mayar forest. Working paper, Nicholas school of the environment and Sanford School of Public policy Duke University, Durham NC, USA.
- Anon G. (1994), Indonesia: Environmental and development the world Bank Washington DC.
- Deforestation technical support package. Third international conference on environmental enforcement, Oaxaca Mexico April 25 – 28 1994 World wildlife fund; US environmental protection Agency and U.S Agency for International Development.
- Chakravarty S, Shukla G Mulla S and Surech C P (2008) farmers rights in conserving biodiversity with special reference to North east India. *Journal of intellectual property rights* 13:225-233
- Hays J (2008) deforestation and desertification in china. Http: factsad details con/churephy? Itemid =389 & catid = 108&CS ubcatid =66
- Lang P (2002) People, dependencies on forests In Technical report, Phase 1997-2001 ITTO project PD 12/97 Rev. ICFD Forests science and suitability, the Bulurgan model forest PP 109-130 CIFOR, Bogor Indonesia.
- Myers (1992) The primary source Tropic forest and own future Norton, New York
- Odii M.A.C.A (2001). The theory and application of qualitative methods, agriculture and business decisions" Unity Press Nigeria. Shemar K 1993 the comital data book; The world bank, Washington DC
- Shemar K (1993) the comital data book; The world bank, Washington DC
- Wikie D, Shaw E, Rotberg F. Morelli G and Auzels P. (200) Roads development and conservation in the Congo Basin *Conservation biology* 14:1614-1622.

Table 1: Socioeconomic characteristics of the respondents

Variable	Means/ Range / made
Age (years)	46 years
Sex	Males (60%)
Marital status	Married (62.5%)
Educational Level (yrs)	12
Occupation	Farming (75%)
Household size	8
Farm size (deforestation	1 hectare

Source: field survey, 2013.

Table 2: Annual farm output of the respondents

Crops harvested	Output	Percentage
Yam	170,840	56.3
Cassava	50,440	16.6
Maize	81,920	27.0

Source: Field survey, 2013.

Table 3: Source of cooking fuel

Source of cooking fuel	Frequency	Percentage
Firewood	70	77.8
Kerosene	15	16.7
Other sources	5	5.5

Source: Field survey, 2013.

Table 4: Determinants of farm output

Variable	Coefficients	Standard Error	T-value
Age(X_1)	-0.078	0.174	-1.994
Sex (X_2)	-0.049	0.063	-0.873
Marital status (X_3)	-0.029	0.069	-0.496
Education level (X_4)	0.032	0.045	1.991
Occupation (X_5)	-0.059	0.076	-0.995
Household size (X_6)	0.147	0.091	2.160
Farm size (X_7)	0.961	0.060	17.814

Source: Field survey, 2013.