SOCIO-ECONOMIC ANALYSIS OF INCOME EFFECTS OF FOREST PRODUCTS ACTIVITIES AMONG RURAL HOUSEHOLDS IN ENUGU STATE, NIGERIA

Nzeh C.E.P and Eboh E.C.
African Institute for Applied Economics (Aiae), Enugu, Enugu State, Nigeria

ABSTRACT

This study examined the economic importance of exploiting forest products in Enugu State. This study shows that majority of the household heads were between the age of 31 and 50 years. From the study it was found that more of the household heads are males. They engage mainly in different combined operations in forestry enterprises like gathering, processing and marketing. However lack of access to modern technology and the forms in which forest products are marketed were major reasons that weaken income generation from the forest products. From regression results, access to credit (Cr), access to forest extension services (Fx) and relative composition of forest output (Or) were statistically significant at 5% level in explaining the observed variability in the dependent variable income (I) based on double logarithmic model. From the study, we recommend that government should encourage the stakeholders that are involved in forest product activities to import the required machinery without any form of restriction. This will lead to value added in their product and attract more income to both households and government.

Keywords: wood products; non-wood forest products; income; rural households; Nigeria

INTRODUCTION

In Nigeria and Enugu State in particular, rural households depend on forest resources to meet a variety of livelihood objectives. These objectives include food security, social security, income generation and risk management. Forest activities provide household with lots of inputs, such as fuel woods, fodder and food that are used directly by them and these inputs are also sources of income to households. Generally, forest products are categorized into woods and non-woods. Wood products are timbers, charcoal, fuelwood among others, while non-wood products which add to the economy of the rural households in Enugu State are fibre products; food products; animal products; medicinal and cosmetic plant products including extractive products among others.

Historically in many developing countries like Nigeria, people have had relatively unrestricted access to forest. Poor people have thus been able to exploit the forest for food, fuel and marketable products. While forest product gathering, processing and marketing activities are not restricted to the poor, they do depend on these activities to a great extent. These forest-based activities often require low establishment cost and are characterized by easy entry and open market access; although many rural households undertake them as part time activities to provide supplemental income.

In Enugu State, forest and forest products can generate income in the rural area in addition to provision of insurance against drought and crop failure, thereby diversifying crop production as well as spreading harvest across the season but yet economic productivity of this enterprise is still at predominantly subsistence level as reported by Iloeje (1981). This study was designed to investigate the economic importance of forest product activities (gathering, processing and marketing) of rural people in Enugu State and their implications for rural poverty alleviation.

METHODOLOGY

The study was carried out in Enugu State of Nigeria, which was created out of the former Anambra State in 1991. The state is located between latitudes $5°56^1$ and $7°06^1$N and longitudes $6°53^1$ and $7°55^1$E (Ezike, 1988). Enugu State is bounded on the East by Ebonyi State, on the North by Benue and Kogi States, on the south by Abia State and on the west by

Anambra State (Ezike, 1988). The State occupies an area of about 8,022.95km² (Ezike, 1988) and has a population of about 2,452, 996 (NPC, 1992). Enugu State with seventeen local government areas is divided into three agricultural zones namely: Awgu, Enugu and Nsukka Zones.

In the sampling procedure a multistage random sampling was employed to ensure a good spread of respondents for the study. The first stage was the selection of two local government areas from each of the three agricultural zones in Enugu State, giving a total of six local government areas for the study. The second stage was selection of two communities at random from each of the selected six local government areas. This gave a total of twelve (12) communities. Third stage was the selection of twelve household heads from each of the twelve communities, making a total number of 144 household-heads. Out of the 144 household-heads interviewed, 24 of them could not give comprehensive answers to the questions in the data collection instrument and therefore they were discarded and only 120 respondents were used for the analysis.

Data Collection and Analysis

Data for this study were collected with the aid of questionnaires administered to household heads. In all, a total of 144 questionnaires were administered in the state, but only 120 questionnaires were used for the analysis. Descriptive statistics and multiple regression analysis were used in analyzing the data.

Modelling the determinants of the level of rural households income generation by forest product activities

The general structure of this model is after the pattern of those of Pani (1966), Siamwalla (1990) and Bell (1990). The multiple regression analysis was used to establish the relationship between the variables. The model is implicitly stated as:

$I = f(C_r, F_x, M_k, T_a, A_e, E_d, B_z, E_r, O_r) + U.$

where;

I = Amount of Income provided by forest-based activities (gathering, processing and/or marketing) (in naira).

C_r = Access to Credit (in naira).

O_r = Relative composition of forest output (percentage of forest output accounted for by wood products).

U = Error term F_x = Access to forest extension services (access = 1, otherwise 0).

M_k = Market access (percentage of total forest product that is sold for cash).

T_a = Access to modern forest product harvesting/processing technology (access = 1, otherwise 0).

A_e = Age of household heads (years).

E_d = Educational attainment of household heads (years of formal schooling).

B_z = Number of years in forest product business (years)

E_r = Relative importance of forest-based employment in total household employment (ratio of percentage contribution of household income from forest activities).

RESULTS AND DISCUSSION

Table 1 indicates that 75% of the sampled size is within the age bracket of 31 – 50 years while the rest are either equal to or below 30 and above 50 years showing 11.67% and 13.33%, respectively. According to Nair (1995), the respondents' age is at a stage at which marginal productivity and productive efficiency, physical energy to work, managerial ability and interest are assumed to increase with age. From the above table, the youths appear uninterested in forest product activities. However, the proportion of people engaged in these forest product activities (gathering, processing and marketing) with respect to age should favour income generation.

Table 1. Distribution of respondents according to age.

Age range (years)	Frequency	Percentages
≤ 30	14	11.67
31 – 50	90	75.00
51 and above	16	13.33
Total	120	100

Source: Field survey, October 2005

Table 2 shows that 64.17% of the sampled respondents were males, while the rest 35.83% were females. The greater number of males does not presuppose out-rightly that males outnumber the females in the study area. Rather, this can be attributed to the fact that males seem to have more access to forest activities like gathering, processing and marketing. This supports the finding of Falconer and Arnold (1991) that generally men have greater access to the cash economy from forest product activities. This can be agreed upon because from the result shown in Table 2 more males have access to forest products than females in Enugu state.

Table 2. Sex distribution of sampled size.

Sex	Frequency	Percentages
Male	77	64.17
Female	43	35.83
Total	120	100

Source: Field Survey, October 2005.

Nzeh C.E.P and Eboh E.C.

Table 3 shows that 27.5% of the respondents admitted have access to modern forest technology while 72.5% have no such access. This lack of access to modern technology is one of the constraints to the further development of forest-based enterprises, and this leads to low productivity of the enterprise thereby resulting in the lower income accumulation from the forestry activities.

Table 3. Distribution of respondents according to access to forest modern technology (e.g. saw machine, wood carving tools, bee harvester, etc), (harvesting/processing).

Access	Frequency	Percentages
Yes	33	27.5
No	87	72.5
Total	120	100

Source: Field Survey, October 2005.

Table 4 indicates that 10% of the respondents in the study area have access to wood forest products only, whereas, 30% have access to non-wood forest products while the remaining 60% have access to both wood forest products and non-wood forest products.

Table 4. Distribution of respondents according to forest-products access.

Forest products	Frequency	Percentages
Wood forest products	12	10.00
Non-wood forest products	36	30.00
Both	72	60.00
Total	120	100

Source: Field Survey, October 2005.

Table 5 shows that 7.14% of the sampled size has access to timber product only, 28.57% have access to fuelwood only. The remaining 64.29% have access to different wood products in combination. The highest combination is timber, charcoal and fuelwood with 39.29%. According to Iloeje, (1981) these wood products especially fuelwood is collected by rural households from nearby forest and carried to nearest towns for sale, and they act as most important source of fuel energy especially in the rural area. There is also special type of hardwood locally called "*icheku*" (velvet tamarine) that is used by black smith.

Table 5. Distribution of respondents according to wood products obtained.

Wood forest products	Frequency	Percentages
Timber	6	7.14
Fuelwood	24	28.57
Timber and Charcoal	7	8.33
Charcoal and Fuelwood	4	4.76
Fuelwood and Timber	10	11.91
Timber, Charcoal and Fuelwood	33	39.29
Total	84	100

Source: Field Survey, October 2005.

Table 6 shows that fibre and animal products each has 5.56% as the respondent that has access to such non-wood products Meanwhile only 23.15% of the respondents have access to food products, but 18.52% have acess to non-wood forest products such as fibre, food and animal. The remaining 47.21% respondents were those with access to non-wood forest products other than ones discussed above. Moreover, only 22.22% of the respondents has access to both animal and food products. These non-wood products according to Richardson. (1995) also add to the economy of the rural households. Also according to Obaidullahkhan (1995) non-wood forest products provide considerable opportunities for local income generation especially in developing countries like Nigeria.

Table 6. Distribution according to non-wood products obtained in area of study.

Non-wood forest products	Frequency	Percentages
Fibre products (*bamboos, grasses, leaves, etc*)	6	5.56
Food products (*nuts, mushroom, oilseeds, fruits, etc*)	25	23.15
Animal products (*honey, bush meat, shell eggs*)	6	5.56
Medicinal and Cosmetic products	4	3.70
Fibre, Food and Animal products	20	18.52
Fibre and Food products	13	12.04
Fibre and Animal products	10	9.25
Animal and Food products	24	22.22
Total	108	100

Source: Field Survey, October 2005.

Table 7 shows that gathering and processing of forest products each has 2.5% as the respondents' highest income earning from forestry activities. Meanwhile 10% of the respondents stated that their highest income earning through forest products is by marketing of the products. Furthermore 15% of the respondents shows gathering and processing constitutes their own highest income earning from forest activities, while 30% of the respondents indicates that their highest income earning is gathering and marketing. The remaining 40% of the sampled population agrees

that gathering, processing and marketing were their own highest income earning from forest product activities. The implication of the above result is that activities which earned the highest net returns were those that were with value added.

Table 7. Distribution of respondents according to activities with highest income.

Activities	Frequency	Percentages
Gathering only	3	2.50
Processing only	3	2.50
Marketing only	12	10.00
Gathering and processing	18	15.00
Gathering and marketing	36	30.00
Gathering, Processing and Marketing	48	40.00
Total	**120**	**100**

Source: Field Survey, October 2005

From the results in Table 8, only 7.5% of the respondents market processed forest products; 40% of the respondents market unprocessed forest products, while 35% market both processed and unprocessed forest products, but the remaining 17.5% of the sampled size did not market any of their forest products. The lower percentages of respondents that market only processed products have indicated that higher percentage of respondents do not have access to forest modern technology (Table 3). This affect the income generation from these products because according to FAO (1995), Falconer and Arnold (1991), only processed forest products generally serve urban and occasionally export markets.

Table 8. Distribution of sampled size according to forms of products marketed.

Forms	Frequency	Percentages
Processed	9	7.50
Unprocessed	48	40.00
Both	42	35.00
None	21	17.50
Total	**120**	**100**

Source: Field Survey, October 2005.

Regression results

To ascertain the determinants of amount of income provided by forest based activities (gathering, processing and marketing), a multiple regression analysis was carried out. The four functional forms – linear, double-log, semi-log and exponential were used. The double logarithmic was chosen since it provided higher number of variables with significance to levels and also based on its record of having best R^2, F-ratios and also the best coefficients when signs

and significance are considered. The results of the multiple regression analysis are shown in Tables 9.

Table 9. Double logarithmic regression results of the determinants of the level of income provided by forest product activities.

S/N	Explanatory Variables	Coefficients	t-ratios
1.	Access to credit (Cr)	0.177369	(1.91)
2.	Access to forest extension service (Fx)	-0.364038	(-2.64)
3.	Access to market (Mk)	0.041768	0.38
4.	Access to modern forest product harvesting/ processing Technology (Ta)	0.125722	1.41
5.	Age of household (Ae)	0.014660	0.36
6.	Educational level (Ed)	-0.068502	-0.26
7.	Number of years in forest product business (Bz)	0.112047	0.51
8.	Relative contribution of forest based employment in total household employment (Er)	0.174432	0.88
9.	Relative composition of forest output (Or)	0.509881	(2.03)**
10.	Constant term	4.58664	
11.	R2	0.4726	
12.	F – Value	(12.21)**	
13.	N	120	

** Significant at 5%
Source: Computer Analysis of the field survey Data. (October, 2005).

From the result as shown in the Table 9, the R^2 value of the model is 0.4726 and this means that the independent variables in the model explained only about 47% of the variability in income effect. This may mean that outside the tested variables, some variables, which may be relevant in the regression model, were omitted. Such variables may include physical proximity of the forest to the household residence, size of the household, marital status, dependency ratio of household, etc. Outside the above factors, the remaining variables are those assumed to have no significant effect and can be justified by the nature of the study. Specific deductions are made using the F-ratios.

The coefficients of both access to credit (Cr) and relative composition of forest output (Or) were both positive and significant at 5% in conformity with the *apriori* expectations. This implies that both variables are significantly related to the level of income provided.

The coefficient of access to forest extension service (Fx) has negative sign and it is significant at 5%. This implies that access to forest extension services leads to decrease in level of income provided. Meanwhile this disagrees with the *apriovi* expectation that

access to forest extension service would lead to an increase in the level of income provided to the household heads from the forest activities. This is because it is expected that with the presence of forest extension services, households heads involved in forestry activities will be better equiped with modern skills which will help them to earn more income from forest activities. However, the situation may be understood when one considers the poor attitude cultivated by some forest extension agents toward assisting rural dwellers due to poor motivation from their employers.

Coefficients of market access (Mk), access to modern forest product harvesting/processing technology (Ta), Age (Ae), educational level (Ed), number of years in forest business (Bz) and relative contribution of forest based employment in total household employment (Er) were insignificant at 5%. They were therefore ignored. Since the variables were not significant at 5% level when their coefficient are compared, it implies that no significant relationship exists between them and income level provided by forest products (i.e. they are minor or no determinants to the amounts of income by forest product activities in the rural areas) when considered separately but the F-test confirms that in combination, these factors affect income of rural households significantly.

CONCLUSION

From the study, it has been observed that there are a great number of forest products, which are gathered, processed and marketed in Enugu State. These products make direct and indirect contributions to household economy, through the generation of income from the sale and exchange of gathered and processed forest products such as fuel wood, honey, mushroom, fruits, nuts, leaves, bush meat, and numerous other non-wood forest products. However, from the discussion it could be noted that the contributions of this sector to both household income and national GDP will not improve without efficient and effective provision of improved modern forest harvesting/processing technology. This will reduce the problems of under and over exploitation of forest products, resources.

REFERENCES

Bell, C. (1990). "Interaction between Institutional and Informal credit Agencies in Rural India". *World Bank Economic Review*. 4(3): 297-338.

Cecelski, E. (1987). Energy and rural women's work: crisis, response and policy alternatives. *International labour Review*: 126(1): 41 – 64.

Ezike, J. O. (1998). Delineation of Old and New Enugu State, *Published bulletin*, Land and Survey, Ministry of Works, Enugu.

Falconer, J. and Arnold, J. E. M. (1991). Household food security and forestry: *An analysis of socio-economic issues*. FAO, Italy, pp. 12 - 79

FAO .(1995). Beyond_*Timber: Social, Economic and Cultural Dimensions of non-wood forest products in Asia and the Pacific*, FAO/RAP, Bangkok.

Iloeje, N. P. (1981). *A new geography of Nigeria*, New revised edition, Longman Limited, Ikeja, pp. 58 -106

Nair, C. T. S. (1995). Income and employment from non-wood forest products: What do we know? In FAO (1995), *Beyond Timber: Social, Economic and Cultural dimensions of non-wood forest products in Asia and the Pacific*, FAO/RAP, Bangkok.

NPC. (1992). Population figures, NPC, *Published bulletin*, Enugu.

Obadullahkhan, A. Z. M. (1995). Fruits of the forest; beyond timber In FAO, (1985), *Beyond Timber Social, Economic and Cultural dimensions of non-wood forest products in Asia and the pacific*, FAO/RAP, Bangkok.

Pani, P.K. (1966). Cultivators demand for credit. A cross sectional analysis. *International Economic Review*. 7(2): 176-203.

Richardson, S. D. (1995). Non-wood forest products: A Regional overview In FAO (1995), Beyond Timber; Social, Economic and Cultural dimensions of non-wood forest products in Asia and the pacific, FAO/RAP, Bangkok.

Siamwalla, A. (1990). The Thailand rural credit system: Public subsides, private information and segmented markets". *The World Bank Economic Review*. 4 (3): 271-295.