INNSPUB

International Journal of Biosciences | IJB |
ISSN: 2220-6655 (Print), 2222-5234 (Online)
http://www.innspub.net
Vol. 21, No. 2, p. 43-50, 2022

RESEARCH PAPER OPEN ACCESS

Evaluation of economic implications of forest products utilization on rural households in south west Nigeria

Peter Otunaruke Emaziye[1*], Nelly Ufuoma Ureigho[2], Oghenekome Emaziye[3] Oghenero Joseph Ovharhe[4]

[1]*Department of Agricultural Economics, Faculty of Agriculture, Delta State University, Abraka, Delta State Nigeria*

[2]*Department of Forestry and Wildlife, Faculty of Agriculture, Delta State University, Abraka, Delta State Nigeria*

[3]*Department of Business Education, Faculty of Education, Delta State University, Abraka, Delta State Nigeria*

[4]*Department of Agricultural Extension, Faculty of Agriculture, Dennis Osadebay University, Delta State Nigeria*

Key words: Forest, products, utilization, rural-households.

http://dx.doi.org/10.12692/ijb/21.2.43-50 Article published on August 10, 2022

Abstract

The main objective focused on the economic implications of forest products utilization on respondents. Sampling technique adopted was multi-stage sampling. Well-structured questionnaires were adopted for data collection and data analysis was done using chi-square test and descriptive statistics. Most respondents were aged and aware about forest product utilization activities in the studied area. Forest were far away five to six kilometer from rural households as results of deforestation. Timber and firewood were the main forest products. The mean annual income, food and medicinal plants for ailment treatment from non-forest products were decreasing tremendously while erosion and land degradation were on the increase. The economic impacts of forest product utilization were severe with adverse economic effects on rural households. The three null tested hypotheses were rejected. The study recommends that forest protection policies and laws should be enacted followed by strict compliance.

* **Corresponding Author:** Peter Otunaruke Emaziye ✉ peteremaziye63@gmail.com

Introduction

Forest naturally plays a key role globally in environmental services and valuable economically in the area of non-timber forest products and timber provision (Mitchel *et al.*, 2007). In Nigeria the industry of forest product is not thriving but barely surviving as a result of numerous challenges faced by the industry (Ekundayo *et al*, 2020).

Non-wood forest products also known as Biological origin goods got from forest play fantastic role in greater number of rural dwellers well-being and daily lives in Africa (FAO, 1999).

Major non-wood forest product (NWFP) were classified into forest foods derived from flora products and faunal products (Okafor, 1979). Forest food important biotic species were composed of wild animals and higher plants made up 42 shrubs, fruits, trees and faunal species (Okafor *et al*, 1944).

Non-forest products serve as a vital income sources that supplement rural dwellers incomes from other livelihood sources in Nigeria (Ojomah *et al.,* 2020). This is crucial in the southern part of Nigeria.

The study tend to address the resultant effects and impacts of forest utilization in Nigeria especially the western area where forest is almost going into extinction as a result of lumbering activities leading to deforestation. Forest play a major role in the provision of non-forest products to rural households for their livelihoods, hence its utilization that could deplete forest must be of serious concern to rural households sustainability.

The objectives of the study were to:
Examine the socioeconomic characteristics of rural households.
Determine types of forest products.
Estimate the resultant effects of forest product utilization.
Analyze the annual mean income from non-forest products periodically.
Ascertain the economic effects of forest product utilization on rural households.
X-ray the economic impacts of forest product utilization on rural households.

The study tends to bridge the literature gap on the resultant effects and impacts of forest products utilization on rural households as empirical literature were lacking. Also to establish relationship between forest utilization and rural households livelihood on non-forest products.

Hypotheses of the study

Null hypothesis one (HO_1): there is no statistically significant relationship between forest product utilization and income of rural households.

Null Hypothesis two (HO_2): there is no statistically significant relationship between forest product utilization and its resultant effects on rural households and

Null hypothesis three (HO_3): there is no statistical significant relationship between forest product utilization and its impacts on rural households.

Material and method

Study Area

The area is made up of six states namely Ondo, Ogun, Osun, Oyo, Lagos and Ekiti states that were mostly Yoruba speaking ethnic nationality. The area is the south western of Nigeria with a population of about 32.5 million people (NPC, 2006). The area was sole chosen due to increase in lumbering activities in recent years. The main occupation is agriculture especially crops, livestock and fisheries farming. The southwest of Nigeria has longitude of E8°40'30" and latitude of N9°4'55".

Sampling

Sampling technique adopted was multi-stage sampling. Firstly, four states were selected randomly from the six states that made up the entire area of study. Secondly five local government area (LGAs) each were selected purposively totaling 20 LGAs. Thirdly, eight rural communities each were selected

purposively to give 160 communities and lastly, four rural households each were selected randomly totaling 320 rural households.

Data Collection and Analysis

A well-structured questionnaires were adopted for data collection and data were analyzed using chi-square test and descriptive statistics such as mode, mean, frequencies and percentages.

Model specification.

$$\dot{X} = \frac{\sum FX}{\sum F} \quad \text{(i)}$$

$$X_i^2 = \frac{(FO_i - FE_i)^2}{FE_i} \quad \text{(ii)}$$

$$X_R^2 = \frac{(FO_R - FE_R)^2}{FE_R} \quad \text{(iii)}$$

$$X_L^2 = \frac{(FO_L - FE_L)^2}{FE_L} \quad \text{(iv)}$$

Where

$\dot{X}$ = Mean

$\sum$ = Summation Sign

F = Frequency

X = Variables

X_i^2 = Chi-square test on mean annual income from non-forest product

X_R^2 = Chi-square test on resultant economic effects of forest product utilization

X_L^2 = Chi-square test on economic impacts of forest utilization

FO_i = Observed frequency of mean annual income from non-forest products

FO_R = Observed frequency of resultant economic effects of forest products utilization

FO_L = Observed frequency of economic impacts of forest products utilization

FE_i = Expected frequency of mean annual income from non-forest products

FE_R = Expected frequency of resultant economic effects of forest products utilization

FE_L = Expected frequency of economic impacts of forest products utilization

Result and discussion

Socioeconomic characteristics of rural households

The mean of age of respondent was 48years that were mostly female households 57.5% with moderate family size of 9 persons. Most respondents were married (59.4%) with primary school educational qualification as shown in Table 1. These assertion were in line with Ebewore and Emaziye (2016) that productive age persons with moderate family size engaged in farming in Isoko North LGA Delta State. Also Emaziye and Ovharhe (2021) postulated that illiterate aged persons who were mostly female engaged in cassava production in Delta State.

Types of forest product

The types of forest products in the study area were mostly timber 63.6% and firewood 36.4%. Most rural households claimed that the forest products mostly found in their forest is timber as the area is known for lumbering activities.

Resultant effects of forest timber product utilization

The main resultant effects of forest timber product utilization were in the area of deforestation 70.0% and a forestation 30.0%. Forest are been cut down for lumbering purposes without replanting of trees as shown in Table 3. These findings collaborated with Okafor *et al*, (1994) that about 90% of our forest in Nigeria especially the rainforest were no longer in existence as results of deforestation.

Income from non-forest products annually

The income derived from non-forest product were categorized into two seasons namely before the year 2000 and presently year 2000 till date.

This categorization was based on when forest were much available. The income level before year 2000 ranges between #54,000 to #65,000 with a mean income of #60,962.50 ($145.18) annually derived from non-forest products as compared to income level of rural households from year 2000 till date

ranging from #42,000 to #53,000 with a mean income of #50,687.50 ($120.71) annually. The mean income of rural households from non-forest products was decreased as a result of excess forest product utilization as shown in Table 4. Rural household income decrease will greatly affect livelihoods survival if forest product utilization not been checked. These assertions collaborated with Belcher and Schreckenberg, (2007) that derived income from non-timber forest products given that the income is usually small in proportion but it contributed to poverty alleviation.

Table 1. Socioeconomic characteristics of rural households.

Parameter	Frequency	Percentage (%)	Mean/Mode
Age(Years)			
29-38	77	24.1	48years
39-48	94	29.4	
49-58	83	25.9	
59-68	66	20.6	
Gender (Person)			
Male	136	42.5	Female
Female	184	57.5	
Family Size (Persons)			
1-4	52	16.3	9 Persons
5-8	75	23.4	
9-12	110	34.4	
13-16	83	25.9	
Marital Status			
Single	71	22.2	Married
Married	190	59.4	
Widow	59	18.4	
Educational level			
No formal education	26	08.1	Primary School
Primary school	142	44.4	
Secondary school	102	31.9	
Tertiary school	50	15.6	
Household Distance to forest (Km)			
1-2	42	13.1	5.3Km
3-4	69	21.6	
5-6	93	29.1	
7-8	116	36.2	

Source: Field data.

Ureigho (2018) stated that non-timber forest products plays vital role as source of income and food security to women rural households.

Economic effects of forest product utilization

The variables in Table 5 revealed that income, snails, chewing sticks, fruit nuts, folders, bush meat, wrapping leaf, firewood, canes for furniture, food additives, snakes especially python, mushrooms, fibres, wild honey and medicinal plants were on the increase as a result of forest product utilization in the area. Most variables served as sources of food and

medicine for ailments treatment that were decreasing tremendously. The variables in Table 6 shown increased in deforestation, erosion and land degradation which of a serious concern to rural households and humanity in general. These collaborated with Ebewore *et al.,* 2015 and Ureigho (2018) that the larger proportion of rural dwellers that derives their livelihoods from non-timber forest products were in serious crisis as a result of deforestation leading to non-availability.

Table 2. Types of Forest Products.

Parameter	*Frequency	Percentage (%)	Mode
Timber	320	63.6	Timber
Firewood	183	36.4	

Source: Field data

*multiple response observed.

Table 3. Resultant Effects of Forest Timber Product Utilization.

Resultant effect	Frequency	Percentage (%)	Mode
Afforestation	96	30.0	Deforestation
Deforestation	224	70.0	

Source: Field data.

Economic impacts of forest product utilization

The level were categorized as severe, moderate and mild in term of economic impacts of forest product utilization on rural households. The study indicated that the economic impacts were severe (39.7%) as shown in Table 7. These is agreement with Emaziye *et al.,* (2012) and Emaziye (2013) that impacts as a result of deforestation leading to climate change events such as flooding and erosion (land degradation) were severe on rural households in Cross River State. Also according to Emaziye (2013) flooding had serious impacts on rural households food security in Delta State.

Chi-square test

Chi-square test postulated for this study were three hypotheses which were tested with the aid of chi-square test model.

Table 4. Income from Non-forest Product Annually.

Amount (#)	Before year 2000	Mean	Presently. (Year 2000 till date)	Mean
30,000 – 41,000	49 (15.3%)		114 (35.6%)	
42,000 – 53,000	57 (17.8%)		84 (26.3%)	#50,687.50
54,000 – 65,000	80 (25.0%)	#60,962.50	67 (20.9%)	
66,000 – 77,000	74 (23.1%)		33 (10.3%)	
78,000 – 89,000	60 (18.8%)		22 (06.9%)	

Source: Field data

Hypotheses Tested

HO_1: there is no statistically significant relationship between forest product utilization and mean income of rural households.

HO_2: there is no statistically significant relationship between forest product utilization and its resultant effects.

HO_3: there is no statistically significant relationship between forest product utilization and its impacts on rural households.

Table 5. Economic Effects of Forest Products Utilization.

Variable	Increasing (%)	Decreasing (%)	Remark
Income	03(0.9%)	317 (99.1%)	Decreasing
Snails	11 (3.4%)	309 (96.6%)	Decreasing
Chewing Stick	84 (26.3%)	236 (73.7%)	Decreasing
Fruit nuts	73 (22.8%)	247 (77.2%)	Decreasing
Folders	43 (13.4%)	277 (86.6%)	Decreasing
Bush meat	97 (30.3%)	223 (69.7%)	Decreasing
Wrapping leaf	104 (32.5%)	216 (67.5%)	Decreasing
Firewood	141 (32.5%)	179 (55.9%)	Decreasing
Canes for Furniture	69 (21.6%)	251 (78.4%)	Decreasing
Food Additives (Spices & herbs)	53 (16.6%)	267 (83.4%)	Decreasing
Snakes (python)	112 (35.0%)	208 (65.0%)	Decreasing
Mushrooms	26 (8.1%)	294 (91.9%)	Decreasing
Fibres	101 (31.6%)	219 (68.4%)	Decreasing
Wild honey	69 (21.6%)	251 (78.4%)	Decreasing
Medicinal plants	58 (18.1%)	262 (81.9%)	Decreasing

Table 6. Economic Effects of Forest Products Utilization.

Variable	Increasing (%)	Decreasing (%)	Remark
Erosion	203 (63.4%)	117 (36.6%)	Increasing
Land degradation	241 (75.3%)	79 (24.7%)	Increasing
Deforestation	224 (70.0%)	96 (30.0%)	Increasing

Chi-Square Decision Rule

If calculated chi-square greater than tabulated reject hypotheses.

If calculated chi-square lesser than tabulated accept hypotheses.

Chi-square test – hypothesis one

The chi-square test on the mean annual income from non-forest product revealed that the calculated chi-square was 472.80 while the Tabulated Chi-square at 0.05 level of significant at 1 degree level of freedom was 3.84 as shown in Table 8.

Applying the Chi-square decision rule, the tabulated value (3.84) hence the null hypothesis that there is no statistically significant relationship between forest product utilization and mean income of rural households is rejected.

Table 7. Economic Impacts of Forest Product Utilization.

Level	Frequency	Percentage (%)	Mode
Severe	127	39.7	Severe
Moderate	103	32.2	
Mild	90	28.1	

Source: Field data.

The implication of the rejection is simply as forest product utilization increases, rural households mean income from non-forest products decreases leading to poverty and low standard of living among rural households.

Chi-square test – hypothesis two

The Chi-square test on the resultant economic effects of forest product utilization has shown that calculated chi-square value (25.60) was greater than tabulated chi-square value (3.84) at 0.05 level of significant at 1 degree level of freedom as shown in Table 9. Since the calculated chi-square was greater than tabulated chi-square the null hypothesis that there is no statistically significant relationship between forest product utilization and its effects on rural households is rejected.

This indicates that forest product utilization have resultant economic effects on rural households.

Table 8. Chi-square test on the mean annual income of Non-forest Product.

Mean Income (#)	FO_i	FE_i	$FO_i - FE_i$	$(FO_i - FE_i)^2$	$\frac{(FO_i-FE_i)^2}{FE_i} = X_i^2$
Before (year 2000)	60,962.50	55,825	5137.50	2639390.60	472.80
Presently (year 2000 till date)	50,687.50	55,825	-5137.50	2639390.60	472.80
Total	111,653		0		

Significant level = 0.05

X_i^2 = Tabulated at 1⁰ level of freedom = 3.84.

Chi-square test – hypothesis three

The Chi-square test on the economic impacts of forest product utilization on rural households that was divided into three levels of impacts namely severe, moderate and mild.

The chi-square calculated value of severe level of impact was 3.86 greater than the tabulated chi-square value 3.84 as shown in Table 10.

This shown that the null hypothesis that there is no statistically significant relationship between forest product utilization and its economic impacts on rural households was severe from the chi-square test.

Table 9. Chi-square test on the resultant effects of forest product utilization on rural households.

Resultant effect	FO_R	FE_R	$FO_R - FE_R$	$(FO_R - FE_R)^2$	$\frac{(FO_R-FE_R)^2}{FE_R} = X_R^2$
Deforestation	224	160	64	4096	25.60
A forestation	96	160	-64	4096	25.60
Total	320		0		

Significant level = 0.05

X_R^2 - Tabulated at 1⁰ level of freedom = 3.84.

Table 10. Chi-square test on the economic impacts of forest products on rural households

Level of Impact	FO_L	FE_L	$FO_L - FE_L$	$(FO_L - FE_L)^2$	$\frac{(FO_L-FE_L)^2}{FE_L} = X_L^2$
Severe	127	160.7	20.3	412.09	3.86
Moderate	103	160.7	-3.7	13.69	0.13
Mild	90	106.7	-16.7	278.89	2.61
Total	320		0		

Significant level = 0.05

X_L^2 = Tabulated at 1⁰ level of freedom = 3.84.

Conclusion and recommendations

Most respondents were aged and aware about forest product utilization activities in the studied area. Respondents were mostly married female with low level of education and moderate family size of 9 persons. Timber and firewood were the main forest product that exist in the area in higher quantities before the year 2000, which were greatly reached as result of deforestation. The mean annual income from non-forest product were on the decrease as forest decreases as result of deforestation. Most non-forest products used as food and medicinal plants for ailments treatment were decreasing tremendously while erosion and land degradation were on the increase. This revealed that the adverse economic effects of forest product utilization were high. The economic impacts of forest product utilization were severe on rural households. The three null tested hypotheses were rejected as chi-square calculated values were greater than chi-square tabulated values.

The study recommends that forest protection policies should be enacted followed by strict compliance.

Reference

Belcher B, Schreckenberg K. 2007 ''Commercialization of Non-timber forest Products''. *A Reality check,* Development Policy Review **25(3),** 355-377.

Ebewore SO, Ovharhe OJ, Emaziye PO. 2015. Acceptability of bush meat as a source of animal protein in Delta State Nigeria. Implication for extension services. Journal of Northeast **22(3),** 67-78.

Ebewore SO, Emaziye PO. 2016. ''Level of use of Organic Manure by Farmers in Isoko North Local Government Area of Delta State Nigeria'' *International* Journal of Agricultural Extension Rural Development Studies **3(1),** 1-11.

Ekundayo OO, Arum C, Owoyemi JM. 2020. ''Forest Product industry and Engineered Wood Products'': The Nigerian Experience'' Journal of Applied Sciences and Environmental Management **25(1),** 1-14.

Emaziye PO, Okoh RN, Ike PC. 2012. A critical analysis of climate change factors and projected values in Delta State Nigeria. Asian Journal of Agriculture and Rural Development **2(1),** 206-212.

Emaziye PO. 2013. Food Security Index and Socioeconomic effects of climate change on Rural Households in Delta State Nigeria. Asian Journal of Agriculture and Rural Development **3(393),** 193-198.

Emaziye PO, Okoh RN, Ike PC. 2013. An Evaluation of Climate Change on Food Security of Rural Households in Cross River State Nigeria. Asian Journal of Agricultural Sciences **5(4),** 56-61.

Emaziye PO, Ovharhe OJ. 2021. Food Crisis and COVID-19 Adaptation Strategies by Cassava Farmers in Delta State Nigeria. Plant Cell Biotechnology and Molecular Biology **22(5&6),** 123-129.

Food and Agriculture Organization of the United Nation FAO. 1999. ''Towards a harmonized definition of non-wood forest products Unasylva **50(198),** 63-64.

Michell L, Lowell W, Bird B. Brocksmith J. 2007. ''The Central Question in Entrepreneurial Cognition Research''. Entrepreneurship Theory and Practice **31(1),** 1-27.

NPC. 2006. National Population Commission (NPC) Nigerian Population Census Report, National Population Commission, Abuja.

Ojomah BC, Ibe AE, Ezenwenyi JU, Chukwu O, Adum NN. 2020. Assessment of income Generation for Non-Timber forest Products in Awka-North Local Government Area of Anambra State, Nigeria Asian Journal of Research in Agriculture and Forestry **5(2),** 16-21.

Okafor FC. 1979. Small farmers and the extension Service in South Eastern Nigeria. Journal of Administration Overseas (UK) **18(4),** 250-255.

Okafor JC, Okolo HC, Ejiofor MAN. 1994. ''Strategies for enhancement of Utilization potential of edible woody forest species of South-Eastern, Nigeria''. The Biodiversity of African Plants Proceedings XIVth AETFAT Congress 22-27 August 1994, Wageningen Netherlands 684-695.

Ureigho UN. 2018. Non-Timber Forest Products as a source of Poverty Alleviation for Women'' Production Agriculture and Technology (PAT) **14(2),** 20-24.