

NON-TIMBER FOREST PRODUCTS DEPENDENCY AND RURAL HOUSEHOLDS' WELFARE IN EKITI STATE, NIGERIA

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Abstract

The importance of Non-Timber Forest Products extraction in supporting rural livelihoods and food security in many developing countries has continued to receive worldwide acknowledgment. Such products which often serves as a dependable source of food, medicine, shelter, fuels and income to the exploiters has enhanced rural livelihoods in such countries. The study, therefore, assesses the effect of non-timber forest product harvesting and subsequent marketing on the welfare status of rural households in Ekiti State, Nigeria. A total of one hundred and sixty rural households were randomly selected from eight Local Government Areas in the state. Data were collected with the aid of a pre-tested structured questionnaire and analyzed using descriptive statistics, the Foster-Greer-Thorbecke poverty index and Probit regression model. The study revealed that fruits were the most harvested while resin was the least harvested Non-Timber Forest Product in the study area. The result of Foster-Greer-Thorbecke shows that income from non-timber forest products is associated with a decline in number of households in absolute poverty by about 3.3%, severity and depth of poverty by 4.1% and 5.4% respectively. The result of Probit regression model shows that educational level ($P < 0.096$), Household size ($P < 0.007$), Number of household members between 18-59 years ($P < 0.029$), Distance to the nearest forest ($P < 0.007$) and Distance to nearest urban center ($P < 0.072$) all show significant probability relationship with participation in non-timber forest product harvesting.

Keywords: Exploitation, Marketing, Non-timber forest product, Rural households, Welfare status

Introduction

Forest could be described as plant community, predominantly of trees or other woody vegetation, occupying an extensive area of land which in its natural state remains relatively fixed and in self-regulated condition over a long period of time (Adam, 2009). Subsequently, based on the erroneous traditional human-centered perception, the forest has continued to be viewed as the reservoirs of unlimited resources to be exploited, managed and utilized for human purposes. In general, forest products encompasses a broad range of natural resources derived from forests for human goods. Such resources which are usually classified as timber and non-timber products are often harvested for both commercial and subsistence purposes.

These forest-related enterprises do contribute significantly to the development of socio-economic wellbeing as well as maintain good health conditions of human beings. The awareness of the enormous benefits of the forest leads to intense and unrestricted exploitation of forest resources for improved standard of living of sizable proportion of the rural populace. However, Fonta *et al.*, (2010) explained that forest dependence can be linked to socio-economic and cultural benefits and consequences. The potential benefits include; daily sub-

sistence and survival from forest product gathering, income redistribution, and poverty reduction while the potential consequences include the increase in global warming emanating from carbon emissions caused by forest use, displacement and destruction of natural habitats for important ecosystem species. No doubt the increasing demand for forest products such as wood fuel, wild fruits, edible herbs, and grass both for food and medicinal purposes in developing countries has enhanced rural livelihoods and enabled the expansion of domestic markets, particularly in urban areas where such products are needed but scarce (Arnold *et al.*, 2006). This category of forest products is called Non-Timber Forest Products (NTFPs).

Specifically, NTFP refers to all biological materials other than timber extracted for human use from natural forests, farmlands or managed woodland. These products according to Olumide, (2009), Oriola, (2009), Aiyeloja and Ajewole, (2006) range from food or food additives such as nuts, mushrooms, wild fruits, herbs, spices, aromatic plants. Others are plant materials such as fibers, creepers, and flowers; plant derivatives which include raffia, bamboo, rattan, cork and essential oils to the animal (game and bees) and animal products (honey, silk). They are collected from a wide range of eco-

systems such as high forests, farm fallow, and farmland and used for subsistence livelihoods including food and medicine. According to Fuwape (2001), Forest sector is one of the central pivots on which most developing nation's welfare is built especially in Sub-Saharan Africa (SSA). Specifically, Kaimowitz (2003) stated that more than 15 million people in SSA earn their income from forest-related enterprises such as firewood and charcoal sales, small-scale sawmilling, commercial hunting, and handicraft production. Meanwhile, NTFPs have received little attention from both scientists and development planners until recently when NTFPs is manage to increase forest products diversity and consequently economic diversity (Diaw *et al.*, 2002). NTFPs contribute to households' wellbeing via two important ways. First, the market for NTFPs provides opportunities for income generation from the collection and trade in products in rural areas and their sale in urban areas. Secondly, the market for NTFPs offers urban households with a convenient and reliable source of energy for cooking, as well as inexpensive food at relatively stable prices (Richardson 2010; Arnold, *et al.*, 2006).

Agbogidi and Okonta, (2003) noted that a significant proportion of rural population earn their livelihood from the extraction and sales of forest product thereby improving the quality of their life and standard of living. Therefore, this study aimed to value and shed more light on the goods and services that are derived from the forest for the economic benefits of the respondents to understand their effect on household income, consumption and general welfare of respondents in the study area.

The objectives of the study are to:

- i. ascertain the socio-economic characteristics of the respondents
- ii. identify the major NTFPs harvested by the respondents
- iii. evaluate the economic benefits derived by the respondents from NTFPs
- iv. assess the effects of the harvesting of such resources on the respondents' welfare
- v. examine factors influencing participation in NTFP business

Methodology

The Study Area

The study was conducted in Ekiti State, Nigeria, located between longitudes 4° 45' to 5° 45' E and latitude. 7°15' to 8°5' N. The state enjoys a typical tropical climate with a distinct rainy season, from March/April to October/November, and dry season, from November to March, seasons. The temperature range is 21-28°C with high humidity. The state

is mostly agrarian with farmers cultivating both food and cash crops. The agricultural economy in the state is characterized by smallholder farms and fragmented land holdings on which farmers depended heavily on the use of simple farm implements and human labor.

Sampling technique

A multi-stage random sampling survey design was used. First, a total of eight local government areas was selected out of the sixteen LGAs in the state; this was followed by the selection of two villages/communities in each of the LGAs. The last stage involves the selection of 10 respondents from each of the villages/communities. In all, a total of one hundred and sixty respondents were interviewed with the aid of a pre-tested structured questionnaire. Information was collected on the respondents socio-economic characteristics such as age, gender, the major source of income, types of NTFP commonly harvested.

Analytical technique

Descriptive statistics such as frequency counts, percentages, mean, standard deviation, minimum, and maximum values were used to describe and categorize the socio-economic characteristics of the respondents, identify types of NTFP commonly harvested and contributions of such resources to the household income.

Following the works of Fonta *et al.*, (2010), the Foster-Greer-Thorbecke (1984) poverty index was employed to analyze the poverty implications of forest extraction income. The FGT poverty measure according to studies satisfies the relevant welfare properties, and it also satisfies Sen's axioms of transfer and monotonicity (Sen, 1976). That is, the index increases whenever a real transfer is made from a poor person to someone with more income and increases when there is a reduction in a poor person's income, holding other incomes constant.

The FGT poverty index is:

$$P_{\alpha} = \frac{1}{n} \sum_{i=1}^q \left(\frac{z - y_i}{z} \right)^{\alpha} \dots\dots\dots (1)$$

Where $\alpha \geq 0$

Where, $y = (y_1, y_2, \dots, y_n)$ represents the income vector of a population of n individuals with incomes sorted in increasing order of magnitude, z is the poverty line, q is the number of poor individuals, and α is a weighting parameter that can be viewed as a measure of poverty aversion. It usually ranges from 0 to 2 (i.e., $0 < \alpha < 2$). When $\alpha = 0$, the FGT index reduces to the poverty headcount ratio (i.e., the percentage of poor in the population). When $\alpha = 1$, the FGT index measures the average poverty gap ratio (i.e., the average shortfall of income from the poverty line or how far below the poverty line the average poor household's income

falls). However, when, $\alpha = 2$ the FGT index indicates the severity of poverty or the spread of the poor around the level of the average poor. Probit regression model was used to evaluate factors influencing participation in NTFP business in the study area.

The Probit model used in this study is implicitly stated as follows:

$$\text{Prob}(Y_i = 1) = f(\beta_i X_i + \mu_i) \cdot \dots \dots \dots (2)$$

Where Y_i is the dummy variable for household i to participate in NTFP business, X_i is vectors of exogenous variables affecting the household decision to participate, β_i are vectors of parameters to be estimated, μ_i is a zero-mean error term and $f(\cdot)$ is a Probit function.

$Y_1 = 1$ If household participates in NTFP business and 0 otherwise.

Exogenous variable

X_1 = Age of respondents in years

X_2 = Household size

X_3 = Gender of respondents (male=1, female=0)

X_4 = Years of education

X_5 = distance from nearest forest in km

X_6 = Off farm income (Yes=1, otherwise =0)

X_7 = Tenancy status (Indigene= 1, otherwise)

X_8 = Number of household member between 18 - 59

Results and Discussion

Socioeconomic Characteristics of the respondents

The result of socioeconomic characteristics of the respondents is presented in Table 1. The study

showed that the sampled farmers were within the age range of 27 to 67 years and the mean age of 48.63 years. It implies that majority of the sampled farmers were middle aged. Also, an average of about seven household members of the respondents falls within an age range 18 to 59 years all these indicate that majority of the respondents falls within the active industrial age group. The findings also showed that a minimum household size of two was recorded while a maximum size of 13 was recorded with a mean size of about 9 and a standard deviation of 4.44. All the respondents have one form of education or the other, average of 7.05 years was recorded as the year spent in acquiring formal education showing that majority of the respondents can read and write. The recorded minimum distance of the respondents from the nearest forest is 0.5km while the maximum distance of 3km with an average distance of 1.12km and a standard deviation of 0.86. An average distance of 3.25km with a minimum and maximum distance of 1.5km and 7km respectively was recorded between the respondents' residence and the nearest urban center. The mean annual income from NTFPs is ₦49,600 with a minimum and maximum values of ₦28000 and ₦86400 respectively. A mean farm size of 1.08 hectares was cultivated by the respondents indicating that they are mostly small-holders, and this may influence their participation in NTFPs business. The findings also showed that majority (85.65 %) of the sampled respondents were married, 80.57 % were indigene while 19.43% were non- indigene

Table 1: Socio-economic characteristics of respondents

Variable	Min	Max	Mean	Std Deviation
Age (years)	27	67	48.63	9.41
Household Size (Numbers)	02	13	8.84	4.44
Number of Household members between 18-59 yrs (Numbers)	05	11	7.14	1.02
Years spent on formal education (years)	00	11	7.05	1.11
Distance from the nearest forest (km)	0.5	03	1.12	0.86
Distance to the nearest urban center (km)	1.5	07	3.25	1.14
Farm Size (ha)	0.08	2.1	1.08	0.98
Average annual income from NTFPs business (₦)	28,000	86,400	49,600	1100
Marital Status (1=Married, 0 otherwise)	0 (14.35)		1 (85.65)	
Tenancy Status 1= indigene, 0 otherwise)	0 (19.43)		1 (80.57)	

Figures in bracket are percentages, Exchange rate: ₦ (Naira) is Nigerian currency; ₦198 = US\$1 at time of data collection
Number of observations=160

Source: Field Survey, 2015

Major types of NTFPs harvested

Table 2 shows the major types of NTFPs harvested by the respondents. From the Table, 81.88 % respondents collected one type of fruit or the other thereby making fruits the most harvested NTFP in the study area. The vegetable is the next with

75.62% harvesting it as a major NTFP. The resin was the least harvested NTFP in the study area with 4.38% while Honey was next least harvested NTFP with 8.13%. The result, however, shows multiple answers indicating that the respondents do exploit more than one NTFP.

Table 2: Major types of NTFPs harvested

NTFP	Frequency	Percentage
Leaves	93	58.13
Fruits	131	81.88
Seeds	72	45.00
Roots	31	19.38
Tubers	43	35.83
Bark	16	13.33
Vegetables	121	75.62
Mushroom	81	50.63
Snail	56	35.00
Bush meat	21	13.13
Honey	13	8.13
Resin	07	4.38
Fuelwoods	64	40.00

Total > Sample size; Multiple responses recorded

Number of observations=160

Source: Field Survey, 2015.

Non Timber Forest Products Income and Poverty

The results of the FGT poverty index used to evaluate the effects of NTFPs income on the respondents welfare is presented in Table 3. The poverty line was determined by using the Mean Per Capital Household Expenditure (MPCHE) method whereby household that spends below 2/3 of the MPCHE were classified as poor. From the Table when the NTFPs income was neglected 35.7 percent of the respondents were below the poverty line while the poverty depth was recorded (when $\alpha = 1$) is 26.0 percent and the severity of poverty (when $\alpha = 2$) is 25.5 percent. However, the poverty situation becomes entirely different when we considered the NTFPs income, 32.4 percent of the respondents were below the poverty line while the poverty

depth was recorded (when $\alpha = 1$) is 21.9 percent and the severity of poverty (when $\alpha = 2$) is 20.1. This clearly shows that NTFPs income is associated with a decline in some households in poverty by about 3.3%. Also, decreases were related to the severity and depth of poverty (i.e., 4.1% and 5.4%) respectively when the NTFPs income was considered. It implies that while forest income has a limited role in reducing the number of the poor in the state, it is more efficient in alleviating the depth and severity of poverty in the state. This result accords with that of Lopez-Feldman *et al.* (2007) and Mariara and Gachoki (2008), who find that the ameliorating effect of forest extraction activities are greater regarding lessening dire poverty than it is in lifting poverty in Mexico and Kenya respectively.

Table 3: FGT Index with and without NTFPs income

	FGT ($\alpha = 0$)	FGT ($\alpha = 1$)	FGT ($\alpha = 2$)
Total Income without NTFP income	0.357	0.260	0.255
Total Income with NTFP income	0.324	0.219	0.201
% change in FGT	3.3	4.1	5.4

Source: Data Analysis, 2016

Factors Influencing Participation in NTFPs Harvesting

Table 4 shows the results of the Probit regression analysis used to evaluate the factors influencing respondents participation in NTFPs harvesting/business. From the Table, there are positive probability relationships between the decision to participate in NTFPs harvesting and all the dependent variables. However, only five of the varia-

bles show a significant relationship. They are educational level at 10 % level of significance ($P < 0.096$), Household size at 1 percent level of significance ($P < 0.007$), Number of household members between 18-59 years ($P < 0.029$), at 5 percent level of significance. Others are distance to the nearest forest ($P < 0.007$) and Distance to nearest urban center at 10 % level of significance ($P < 0.072$)

Table 4: Factors influencing participation in NTFPs Harvesting

Variables	Coefficients	P value	Standard errors
Intercept	0.775	0.992	
Age (years)	0.015	0.000	0.013
Gender	0.169	0.033	0.137
Education level	0.041 *	0.096	0.017
Household size	0.085**	0.007	0.011
Number of Household members between 18-59 yrs (Numbers)	0.098*	0.129	0.062
Marital status	0.069	0.083	0.017
Farm Size (ha)	0.209	0.007	-0.129
Tenancy status	0.104	0.001	-0.003
Distance to the nearest forest	0.016 **	0.003	-0.001
Distance to nearest urban center	0.131 *	0.009	0.002

Source: Data Analysis, 2016

*, ** and *** refer to statistically significance at 10%, 5% and 1% respectively.

Conclusion

This study examined the effects of non-timber forest product extraction on the rural household welfare status in Ekiti State, Nigeria. The poverty status of the respondents was used as a proxy for their welfare status. Data were analyzed using descriptive statistics, the Foster-Greer-Thorbecke and Probit regression model. The results of the analysis show that fruits were the most harvested while resin was the least harvested non-timber forest product in the study area. Furthermore, the study revealed that income from non-timber forest products extraction is associated with a decline in some households in absolute poverty by about 3.3%, severity and depth of poverty by 4.1% and 5.4% respectively.

The result of Probit regression analysis shows that educational level, household size, some family members between 18-59 years, distance to the nearest forest and distance to nearest urban center all show significant probability relationship with participation in non-timber forest product harvesting. It is therefore concluded that income from non-timber forest product has an important role in mitigating poverty in the study area.

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