



ANALYSIS OF CONSERVATION OF FOREST AND TREE PRODUCTS PRIMARY RESOURCE BASE BY RURAL HOUSEHOLDS: IMPLICATION FOR POVERTY REDUCTION IN DELTA STATE

By

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ABSTRACT

The paper analysed conservation of Forest and Tree Products (FTP) primary resource base by rural households and its implication for poverty reduction in Delta State. Multistage sampling techniques was used to select 360 respondents used for the study. Data was collected with the aid of structured questionnaire and analysed with descriptive statistics and regression analysis. Findings revealed that only 27.8% planted trees in the last 12 months only 33.3% planted trees in the last 2 years. Rural households indicated that they planted trees mainly in home gardens or farmstead. The main reason for planting trees was for consumption (55.4%), to secure the land and for commercialisation of the FTPs. Measures used to conserve and sustain FTPs resource base that have reasonable ratings include spirit- linked prohibitions (53.8%), protective mechanisms (41.2%), National laws concerning conservation (38.8%) and weeding around FTPs resource base (37.6). Regression analysis showed that the coefficients and t-values (values in parenthesis) of educational qualification of household head 0.537 (2.858); access to technology 2.596 (2.694) access to credit 5.514 (4.811); total household size 2.166 (3.776); amount of FTP resources owned 2.83 (4.34) were all positively signed and significant at 5% level of confidence. Recommendations include use of serious campaign by various stakeholders on conservation and management of the primary resource base of the FTPs, adoption of participatory approach to conservation and management of FTPs resource base and checking illegal farming within the protected area by the rural communities.

Keywords: Conservation, Forest and Tree Products, Resource-base, Rural-households, Poverty-reduction

INTRODUCTION

Forest and Tree Products (FTP) are life support system for rural households 'livelihood. For many rural households, the forest is their habitat and satisfies practically all their needs. Dependence on wild foods by rural communities is too common and often linked to poverty. The poor see the forest as their last resort and hope of survival. According to Food and Agricultural Organisation – FAO – (2014), Forest and tree products are derived from the

primary base which may be natural forest, planted forests and trees outside forest. Trees outside forest include isolated trees in landscape, windbreaks, shelter belts, trees along roads and rivers, trees in agricultural systems and trees in urban environment (FAO, 2013). According to Ahmed (2000), FTPs are products from forest and all other parts or produce of trees and plants including climbers, grasses and creepers. They also include produce from animals when found or brought



from a forest, peat surface soil and minerals. In this study, FTPs will be defined as products obtained from natural forest, planted forest (including plantations and orchards) and trees outside forest. FTPs are made up of wood and non-wood products. The wood products are mainly timber, poles and fuelwood (firewood and charcoal). The non-wood forest products (NWFPs) consist of goods of biological origin (FAO, 2014). NWFPs are fruits, nuts, mushrooms, beverage, wine, clean water, medicinal plants, latex, rubber, gums, and resins, cloth, jute fibers, baste fibers, chewing sticks, tooth cleaners, sponges, decorative bead, oil, barks, bark and lac, natural varnish, tanning extracts, fodder, honey, bee wax, milk cocoons and forest games. For the purpose of this study, the economic and environmental services provided by forest and trees, for example carbon sequestration, soil fertility and soil protection, watershed protection, windbreak uses or general aesthetic and spiritual values are not included. For the rural households, FTPs diversify their diet, provide minerals and nutrients, medicine, fuel and cash income. They also provide production inputs critical support for agricultural production, fodder for livestock, durables and also as asset formation which can be liquidated in hard times (Mukul, Rashid, Uddin and Khan, 2015).

On the other hand, for the availability of these FTPs to be sustained, conservation of their primary base is necessary. This study will adopt the definition given by Chou (2018) that forest conservation is activities of forest maintenance, forest protection and reforestation. Forest maintenance is activities that will lead to sustainable extraction behaviour of the rural households. Forest protection includes regulatory, economic and suasion instruments that guide the sustainable extraction of the FTPs. While reforestation, includes activities of replanting or replacing the removed FTPs. According to Etowa *et al* (2015) conservation can be in-situ or ex-situ. In-situ involves conservation of ecosystems or species in their natural surroundings while ex-situ conservation

involves conservation outside of their natural habitat (domestication).

Problem Statement

The benefits derived by the rural households from FTPs are not in doubt; however, the sustainability of the primary base of these FTPs needs to be considered. This is because the rate of removal is not commensurate with the rate of replacement. The spate of deforestation in Nigeria is not abating. Recent data from United Nation Environment Programme –UNEP- (2017) showed that forest now occupy 923,767 km² or about 10million ha. This is about 10% of Nigeria forest land area which is well below FAO recommended national minimum of 25%. Diminishing forest means alteration of ecosystem and depletion of forest resources including diminishing availability of FTPs to rural households. There is therefore need for more forest conservation studies in Nigeria. This will help create awareness and action on forest. This study will focus on the aspect of measures being taken by rural households to conserve the primary base of the FTPs.

Study Objectives

The main objective is to analyse the conservation of Forest and Tree Products primary base by rural households. The specific objectives were to:

- * ascertain the extent of planting of trees by the rural households;
- * determine reasons for planting trees by the rural households;
- * identify measures used by the rural households to conserve and sustain FTPs primry base; and
- * analyse household socio-economic and institutional factors affecting the conservation of FTPs primary base. The study area is Delta State.

METHODOLOGY

The Study Area

The study area was Delta State. It is estimated



that 70 percent of the State population is rural of which 75 percent is engaged in one form of farming or the other (Ministry of Agriculture and Natural Resources, -MANR- 2018) Apart from agriculture majority of the rural population are engaged in off-farm, non-agricultural activities which include diverse forms of artisanship, business, employment in both public and private sectors, forestry and other forms of wage labour (MANR, 2018). The State has relatively moderate forest resources in existence (Delta State Ministry of Environment, 2020). The vegetation of the State ranges from mangrove swamps along the coast to rainforest in the central and northern areas of the state. The State's wide coastal belt is interlaced with numerous rivers, creeks and creeklets while the interland has many perennial rivers and streams which form part of the Niger Delta. The total land area of the State is estimated at 17,698 square kilometres with 1,770 square kilometres of fresh water swamp, 5,840 square kilometers of mangrove swamp and 10,088 square kilometers of rainforest. The annual average rainfall is 241.52 millimeters, temperature is 28.64°C while humidity is 81.14%.

Sample and Sampling Techniques

The State is divided into 3 Agricultural zones with 25 Local Government Areas (LGA). The 3 Agricultural Zones include Delta North (9 LGAs), Delta Central (8 LGAs) and Delta South (8 LGAs). Multistage sampling technique was used for the study. The first stage was the selection from the 3 Agricultural zones in Delta State, 2 local government areas each giving a total of 6 LGAs used for the study. The LGAs were purposively chosen because they were identified from Delta State Ministry of Environment to have forest resources. The Agricultural zones and the LGAs selected include Delta North – Oshimili South and Ndokwa East; Delta Central – Ethiope West and Okpe, and Delta South – Patani and Isoko South. The next stage was the selection of villages. From each of the LGAs selected, 4

rural villages were selected through random sampling from the list of villages compiled by the Delta State Ministry of Lands and Survey, Asaba. These villages and their LGAs were Oshimili South – Obiokpu, Oko-Anala, Oko-Ogbele and Akpako. Ndokwa East – Utchi, Abala, Oshimili and Asaba-Ase. Ethiope West – Ovade, Otefe, Jesse and Oghareki. Okpe – Jakpa, Aragba, Ometan and Jeddo. Patani – Bulou-Angiama, Koloware, Odorubu and Toru-Angiama, Isoko South – Irri, Uro, Uzere and Ada. These selection gave a total of 24 villages used for the study. Households formed the final sampling stage. Selection of households was done through simple random sampling. With the assistance of the village heads, the list of the total number of households in each village was compiled. Fifteen (15) households were randomly selected from each of the 24 villages giving a total of three hundred and sixty households used for the study.

Data Collection

Data were gathered by the use of structured questionnaire, oral interviews and group discussions. The structured questionnaire was administered on 360 rural household respondents. 20 household respondents were unable to complete the questionnaire correctly making such questionnaire to be incomplete and invalid. Such questionnaire was discarded and was not used for computations. The remaining 340 household respondents' questionnaire was successfully completed and was used for the analyses of data.

Data Analysis

Data was analysed with descriptive statistics and multiple regression analysis.

Multiple Regression Analysis

$$Y_1 = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9) + U$$

Where:

Y_1 = Conservation of FTPs primary resource base

The independent variables include:



X_1 = Educational qualification of household head (Number of years spent in formal education)
 X_2 = Access to technology (1 = modern, 0 = otherwise)
 X_3 = Access to credit (N)
 X_4 = Access to extension services (1 = access, 0 = otherwise)
 X_5 = Total household size
 X_6 = Number of household members engaged in FTP employment
 X_7 = Hours spent on FTP employment
 X_8 = Gender of household head

X_9 = Amount of FTP resources owned (N)

Various functional forms such as linear, semi-log and double-log were fitted to the data to obtain model estimates. The model with the best fit, in terms of F-value, R^2 and individual coefficients was the linear form and was selected for detail interpretation.

RESULTS AND DISCUSSIONS

Planting of trees by rural households

Table 1 Tree planting by rural households

		Frequency	Percentage (%)
Did you plant trees in the last 12 months?	Yes	93	27.8
	No	241	72.2
	Total	334	100.0
If no, have you planted trees in the last two years?	Yes	89	31.3
	No	195	68.7
	Total	284	100.0

The rural household respondents were asked if they have been planting trees in different locations. Table 1 showed that 72.2% of the rural household respondents did not plant trees in the last 12 months. Only 27.8% planted trees. On the other hand, 68.7% did not plant tree in the last two years while 31.3% planted trees during the period under review. These findings

showed that rural households hardly plant trees in FTPs primary resource base. The implication is that diminishing forests will be catering for increasing population. Chukwu, *et al* (2010) also found a similar trend when they discovered that community folks were not involved in management and implementation of a programmes in forest reserves.

Location Where Rural Households Planted Trees.

Table 2 Location where rural households planted trees

Location	Frequency	Percentage (%)
Trees in home gardens/homestead	101	69.2
Trees in outer crop fields (arable farm)	13	8.9
Trees in farm boundaries	1	0.7
Trees in fallow fields	2	1.4
Plantations	28	19.2
Trees in privately owned woodland/forest	1	0.7
Total	146	100.0



Table 2 revealed that 69.2% of the rural household respondents that planted trees did so in home gardens/homestead; 19.2% planted in plantations; 8.9% in arable farms; 1.4% in fallow fields and 0.7% in farm boundaries and privately owned woodland/forest respectively.

On conservation and sustainability of primary sources of FTPs results showed that majority of the rural households do not plant trees in the different locations where they collected FTPs. Few rural households that planted trees did so in home gardens/homestead and plantations.

Reasons for Planting Trees

Table 3 Reasons for Rural Households Planting Trees

Reasons	Frequency	Percentage (%)
To get tree products for consumption	82	55.4
To secure the land	30	20.3
Increase commercialization of tree products	30	20.3
Reduce low incidence of tree planting	4	2.7
Conserve the soil	2	1.4
Total	148	100.0

There is need to find out if the trees planted were for conservation and sustainability of FTPs by the rural households. Table 3 showed that 55.4% of the rural household respondents who planted trees indicated that the trees were planted to get tree products for consumption. 20.3% said the trees were planted to secure the land and to increase commercialization of tree products respectively. 2.7% said that the reason was to reduce low incidence of tree planting

while 1.4% said that they planted trees to conserve the soil. The implications is that trees were planted not necessarily because of conservation of FTPs primary base but mainly for consumption and commercial purposes considering where the households planted the trees. Etowa *et al* (2015) find that rural households depend mainly on forest resources for their livelihood.



Measures Used to Conserve and Sustain FTPs Resource Base

Table 4. Measures used to conserve and sustain FTPs resource base

Variables	Yes	
	Frequency	%
Conservation strategies	87	25.6
Use of local rules guiding conservation of FTPs	183	53.8
Spirit – linked prohibitions	132	38.8
National laws concerning conservation	21	6.2
Involvement of locals in development of forest conservation strategies	34	10.0
Promotion of participatory approach to forest conservation	22	6.5
Training and organization of lectures for FTPs users on conservation	61	17.9
Controlled harvesting of FTPs users of conservation	128	37.6
Weeding around FTPs resource base	140	41.2
Use of protective mechanisms	96	28.2
Enrichment planting	45	13.2
Enforcement of sanctions of erring individuals of the community on FTPs		

Table 4 showed that rural household respondents generally do not use all the measures listed for the study for the conservation and sustainability of primary base of FTPs except for the use of spirit-linked prohibitions which had a rating of 53.8%. However, closer observation revealed that some conservation measures had reasonable ratings as measures adopted. Such measures include use of protective mechanisms (41.2%); obeying national laws concerning conservation (38.8%); weeding around the FTPs (37.6%); enrichment planting (28.2%); use of local rules guiding conservation of FTPs (25.6%); and controlled harvesting (17.9%). On the other hand, involvement of locals in development of forest conservation strategies (6.2%), training and organization of lectures for FTPs users on FTPs conservation (6.5%); promotion of participatory approach to forest conservation

(10%) and enforcement of sanctions to erring members of the community on FTPs (13.2%), were hardly used. Conservation and sustainability of FTPS are important measures that will benefit the rural households both in the short-run and on the long-run.

Socio-economic and institutional factors affecting commercialization of FTPS

To ascertain the socio-economic and institutional factors affecting conservation of FTPs primary resource base a multiple regression analysis was carried out. The four functional forms – linear, double log, semi-log and exponential were used. The linear functional form was chosen since it provided higher number of variables with significant levels and also based on its records of having best R^2 , F-ratios and also best coefficients when signs and significant were considered.



Table5 Regression estimates of socio-economic and institutional factors affecting conservation of FTPs primary resource base

S/N	Explanatory Variables	Coefficients	Std Error	t-ratio
1.	Education al qualification of household head	0.537	0.188	(2.858)*
2.	Access to technology	2.596	0.964	(2.694)*
3.	Access to credit	5.514	1.146	(4.811)*
4.	Extension services received on FTPs	0.359	0.898	0.400
5.	Total household size	2.166	0.574	(3.776)*
6.	Total number of household members engaged in FTP employment	0.030	0.123	-0.243
7.	Hours spent on FTP employment	-0.242	0.039	(6.152)*
8.	Amount of FTP resources owned	2.83	0.000	(4.347)*

Constant term	=	27.455	3.065
R ²	=	0.968	
Adjusted R ²	=	0.964	
F-Value	=	242.817	

* = Significant at 5% probability level

() Number in parenthesis is t-value

From the linear regression analysis result in Table 5, the R² value of 0.968 shows that 96.8% of the variations in dependent variable (conservation of FTPs resource base) was accounted for by variations in the independent variables put together. The adjusted R² also supported the claim with a value of 0.964 or 96.4%. This implies that the independent variables explained the behaviour of the dependent variables at 96% level of confidence. The calculated F-ratio of 242.817 which was greater than any critical F-ratio value implies that there was significant impact between the dependent variables and the independent variables.

The coefficients and t-values (values in parenthesis) of educational qualification of household head 0.537 (2.858); access to technology 2.596 (2.694) access to credit 5.514

(4.811); total household size 2.166 (3.776); amount of FTP resources owned 2.83 (4.34) were all positively signed and significant at 5% level of confidence. These variables conform with *apriori* expectations. That is, they were significant and positively affect conservation of the FTPs resource base.

Analysis showed that education as a human capital development makes an individual to be more informed which attracts better options and diversify methods of conservation of FTPs resource base. Access to technology was also significant and positive. Technology aids planting and maintenance at both in-situ and ex-situ conservation. Technology is also important in communications and information dissemination which are important in conservation.

Access to credit was positive and significant.



Credit improves production, also influences the quantity that is eventually planted and replenished. Credit will be used for planting and replanting of FTPs are been depleted in quantities from the natural resources base Credit can also be used to procure technology. Household size was also significant and positive. Household size influences conservation since the more the number in the household the higher the chances of more members engaging in conservation of FTPs resource base. Amount of FTP resources owned was positive and significant at 0.05. Generally, the amount of resources owned influences conservation. Resource ownership will help to control harvesting and maintenance of the FTPs resource base. Resource owners can also use their land to raise plantation of economic trees or leave them as forest for collection of FTPs. However, the coefficient of hours spent on FTP employment was negatively signed with a value of -0.242 (6.152) but significant. The number of hours spent on FTP employment negatively affect conservation of FTPs resource base since members of the rural households may concentrate more on collections than conservation.

From the explanatory variables analyzed thus far, the t-values were all significant and the probability of rejecting any of them was less than 1% confidence level. The standard errors for these explanatory variables were also very low.

On the other hand, coefficients and t-values of both extension services received on FTPs 0.359 and total number of household members engaged in FTP employment 0.030 were insignificant at 0.05 level of confidence. They were therefore ignored. Since both variables were not significant, it implies that they do not have effect on conservation of FTPs resource base.

CONCLUSION

On conservation and sustainability of primary sources of FTPs results showed that majority of the rural households do not plant trees in the

different locations where they collected FTPs. Further, results indicated that few rural households that planted trees did so in home gardens/homestead and plantations. Their reasons for planting the trees were mainly to get tree products for consumption and increased commercialization of FTPs. The results on other measures adopted by rural households to conserve and sustain primary sources of FTPs also showed that generally rural households do not participate actively in the conservation of forest. Apart from the use of spirit-linked prohibitions, other measures such as use of local rules guiding conservation of FTPs, controlled harvesting, enrichment planting, weeding around the FTPs, sanctioning erring individuals of the community on FTPs, promotion of participatory approach to FTPs conservation and involvement of locals in development of forest conservation strategies among others were not actively used as FTPs conservation measures. very felled trees must be replaced

Recommendations

- * There should be a serious campaign by various stakeholders on conservation and management of the primary resource base of the FTPs in rural areas. This will create more awareness for the reasons why FTPs resource base should be maintained.
- * Government and policy makers should adopt participatory approach to conservation of FTPs resource base where rural dwellers should be carried along from policy formulation right through implementation.
- * Education as observed in one of the findings is an important tool conservation of the FTPs primary base. There is need to educate the rural households on conservation and management of the FTPs resource base.
- * Every felled tree must be replaced both in-situ and ex-situ
- * Hunting should be checked
- * Illegal farming within the protected area by the rural communities should be checked.



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