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Deforestation and sustaining plant non timber forest products availability to rural households for poverty alleviation in Delta State, Nigeria

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Abstract

The paper assessed how deforestation affects the sustainable availability of plant Non-Timber Forest Products – NTFPs- to rural households in Delta state, Nigeria. Random and Purposive sampling techniques were used for the study. All together 75 rural households' respondents were sampled. Focus group discussions were used to improve the data collected. Structured questionnaire was the main instrument used for data collection. The questionnaire was validated by experts from the field of study. Data were analyzed using descriptive statistics such as frequency distribution, percentages and means. Findings revealed that deforestation takes place through known methods like population pressure, over-exploitation, logging and non-enforcement of Government policies. The availability of NTFPs was not sustained and little or no conservation measures were carried out by the rural households. Recommendations include among others that forest conservation initiatives by government should allow the participation of rural households in programme formulations and executions and management as regards NTFPs use and sustainability; there should be education and enlightenment of rural households on forest conservation and deforestation. There should also be encouragement of the in-situ and ex-situ cultivation of plant NTFPs and those highly consumed in households which are at the risk of being depleted or going into extinction.

Keywords: *Deforestation; Sustaining Plant NTFPs; Rural Households; Poverty Alleviation*

Introduction

Among the off-farm activities, the rural people especially the poor are dependent on forest for most of their livelihood. Forest includes resources that can produce forest products namely woodland, scrubland, bush fallow and farm bush and trees on farms. They also include ecosystem dominated by trees (Food and Agricultural Organisation –FAO-, 2013). Forest contributes significantly to rural community's household consumption, income and employment. Such contributions include satisfaction of subsistence needs (for instance food, fuel, building materials, substitution for purchased inputs (such as live fencing, animal fodder, and green manure) or opportunities to supplement cash income through sale of raw or processed products and food security use of forest products as hunger insurance to tide over pre-harvest period (Eboh, 1997). It is in acknowledgement of the importance of the forest for livelihood and environmental stability that its conservation was included in the millennium development goals of the United Nations. In Nigeria poverty has led to the dependence of over 90% of the rural population on forest for some livelihoods and economic survival (UN, 2002).

Among the products obtained from forests are those classified as non-timber forest products (NTFPs). Non-timber forest products are products obtained from forest apart from

the commercially exploited timber (FAO, 2013). NTFPs can be of plant origin or animal origin. NTFPs include fuel wood, fruits, nuts, mushrooms, beverages, wine, clean water, medical plants, latex, rubber, gums and resins, cloth, jute, fibers, bast fibers, chewing sticks, tooth cleaners, sponges, decorative beads, oil, bark and lacs, natural varnish, tanning extracts, fodder, honey, bee wax, cocoons and forest games. NTFPs account for thousands of plants and animals species obtained from wild or semi-wild or cultivated areas which are sources of livelihood to human societies. For the purpose of this study only NTFPs from plant sources will be considered. This is to help reduce the scope of the study and paucity of data to be collected and managed within the time frame.

Kalu and Ishikhueme (2007) observed that plant NTFPs are also used as food, medicine and raw material by rural households and cottage industries. Other notable uses are as source of employment opportunities. The most significant of the plants NTFPs use is as fuelwood which most households depend on for cooking. About 60-70% of domestic energy's supply in Nigeria comes from fuel wood (African Institute for Applied Economics - A. I. A.E.-, 2005). If population currently depending on fuel wood for cooking were to switch to kerosene, the annual cost would be on the order of ₦650-980 billion ($4.8-7.3 billion) per year which is equivalent to 9-14 percent of 2006 Gross domestic product (GDP) (A.I.A.E., 2006). Also a study of plant NTFPs (FORMECU, 1996) estimated a total annual income of ₦177,627 billion from plant NTFPs in Nigeria. This estimate stated the study is conservative since only 19 products were used and it also excludes household consumption.

However, sustaining the availability of plant NTFPs in Nigeria have become of great concern to the users, environmentalist and Government who are faced with the management of the products. Availability of NTFPs can be ensured if they are well conserved. NTFPs conservation means the sustainable management of the species for the product it yields in order to ensure availability in the future (Udumo and Etim, 2018). 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 the conservation outside of their natural habitat (domestication) (Laird, 2002). In Nigeria management of forest resources, especially national parks and forest reserves are in the hand of Government and local participation is limited. Bisong, Ogbonna and Kyari (2017) stated that conservation will be successful if the local or indigenous people participate. This is based on the advantages that can be gained by drawing on indigenous knowledge of the forests and forests products, and by building on the sustainable systems of use that local people often seem to have created. There is therefore need for scientific investigation into sustainable availability, improved use and conservation of the resource base of the NTFPs. This is because extensive use without replacement combined with widespread degradation of forest land or deforestation have consequences and can threaten certain species into extinction

Despite the importance of the forests and NTFPs in ameliorating rural poverty, it seems the rate of replacement has not been commensurate with the rate of removal. Ladipo (2010) observed that although a dependable source of income and food supply in rural areas, NTFPs is a diminishing resource. In fact a great percentage of Nigeria's luxurious vegetation has been removed and some species have gone into extinction (UN Environment, 2017). This loss of natural forest is running far ahead of new planting and growth of secondary forest on cleared areas. Trees take 50-100 years to mature and the original balance of species is unlikely to be recaptured by the growth of

urban secondary forest on cleared areas. Many products are no longer available owing to changes in resources exploitation. In addition, the poor, the old and women in rural areas who depend on NTFPs are affected with disproportionate severity (Oriola, 2009) Although Nigeria government established some forests reserves for the conservation and sustenance of forest resources, these forests reserves have for some time been seriously neglected and have received little or no improvement in terms of investments and management (UN, 2002). Thus Nigeria's 2006-2010 total deforestation rate was about 3.5% per year meaning it lost an average of 350,000 – 400,000 ha of forest land per year (Ladipo, 2010). Little has been done in involving rural people in the management of forest resources or even evolving policies to help them to initiate forest management plan for the sustenance of their community forests. Many of the species are over-harvested as harvests are uncontrolled and carried out in highly destructive manner. This study therefore intends to contribute to the quest for sustainable plant NTFPs availability.

The main objective of this study is to assessed how deforestation affects the sustainable availability of NTFPs to rural households in Delta State. Other objectives include, identifying plant NTFPs utilized by the rural household and the extent of availability of these plant NTFPs to the rural households. There is also need to ascertain the deforestation sources that affects the availability of the NTFPs and if the various conservation methods are utilized by the rural household in the study area to sustain the availability of the plant NTFPs.

Materials and Methods

The study was carried out in Delta North Agricultural Zone of Delta State, Nigeria. Delta North Agricultural Zone is made up of 9 local government areas (LGA). The vegetation of the zone is mainly rainforest. From the 9 LGAs, 5 LGAs (Oshimili South, Oshimili North, Aniocha North, Aniocha South and Ndokwa East) were randomly selected for the study. Through purposive sampling technique, one village was selected from each of the selected 5 LGAs based on areas with above average natural forest and used for the study. The villages selected were Oko-anala, (Oshimili South), Ugbolu (Oshimili North), Idumuje-unor (Aniocha North), Nsukwa (Anoicha South) and Uchi (Ndokwa East). From each of the villages selected, 15 households were selected through random sampling. The households were selected from the lists compiled by the village heads. Altogether, 75 households were used for the study. Structured questionnaire was the main instrument used for data collection. The questionnaire was administered each, per household by trained enumerators each, per village. A total number of 75 copies of the questionnaire were administered on the respondents and the same number was collected back giving a 100% return rate. Focus group discussions were also carried out in the 5 different villages selected for the study. This was done to help improve the quality of data gathered from the household administered questionnaire

Data were analysed using descriptive statistics of frequency distribution, percentages and mean. A 4-point Likert scale of Very Available – VA (4), Available – A (3), Diminishing Availability – DA (2) and Not Available – NA (1) was used to analyze the extent of availability of plant NTFPs to rural households.

The mean of the assigned value is therefore 10/4 = 2.5. The decision rule is that any mean that is 2.5 and above is accepted while any mean below 2.5 is rejected.

Result

The following findings were made:

Table 1: Identification of plant NTFPs utilized by rural households in the study area

S/N	COMMON NAME	LOCAL NAME (IGBO)	BOTANICAL NAME	USES	FREQUENCY	%
1	African Apple	Udara	*Chrysophyllum Albidum*	Fruit/Food	70	93.33
2	Alligator Pepper	Ose Oji	*Affromomum spp*	Entertainment/Medicine	65	86.67
3	Bitter Kola	Akuilu	*Garcina Kola*	Entertainment/Medicine	65	86.67
4	Bread Fruit	Ukwa	*Treculia Africana*	Food	72	96
5		Icheku Oyibo	*Tramarindus indics*	Fruit	60	80
6	Bush Mango	Ogbono/Ugiri	*Irvingia gabonensis*	Food	75	100
7	Salad	Okazi	*Gnetum africanum*	Leaf/food	62	82.67
8		Utazi	*Gongronema latifolia*	Spice/food	60	80
9	Hot leaf	Uziza	*Piper guineense*	Spice/food	60	80
10		Uda	*Xylopia aethiopica*	Spice/food	65	86.67
11	Kolanut	Oji	*Cola acuminate/nitida*	Entertainment	75	100
12	Mai-Mai leaves		*Thaumatococus danielli*	Wrapping	65	86.67
13	Locust bean		*Penaclatra macrophylia*	Food	72	96
14		Ora	*Pterocarpus spp*	Leaf/food	56	74.67
15	Pear	Ube Igbo	*Canarium schweinfurth*	Fruit	55	73.33
16		Mbebe Igbo	*Vitex donianu*	Fruit	62	82.67
17	Raffia palm	Ngwo	*Raffia soup*	Wine/building materials	65	86.67
18	Oil palm	Nkwu	*Elaeis guineensis*	Wine/building material	75	100
19	Walnut	Ukpa		Fruit	60	80
20	Chewing stick	Atu	*Massularia acuminate*	Mouth cleaning	75	100
21	Sponges			Washing	55	73.33
22	Mushroom	Elo		Food	62	82.67
23	Native pear	Ube	*Dacyodis edulis*	Fruit/food	72	96
24	Fuel wood			Fuel	75	100

Table 1 shows that all the plant NTFPs used for the study were identified as being utilized by rural households for their livelihood.

Table 2: Extent of availability of plant NTFPs to rural household

S/N	Common Name	Local Name (Igbo)	Botanical Name	Uses	Mean ( )	Remarks $\overline{X}$
1	African Apple	Udara	*Chrysophyllum Albidum*	Fruit/Food	3.03	A
2	Alligator Pepper	Ose Oji	*Affromomum spp*	Entertainment/Medicine	2.32	DA
3	Bitter Kola	Akuilu	*Garcina Kola*	Entertainment/Medicine	2.45	DA
4	Bread Fruit	Ukwa	*Treculia Africana*	Food	3.11	A
5		Icheku Oyibo	*Tramarindus indics*	Fruit	2.15	DA
6	Bush Mango	Ogbono/Ugiri	*Irvingia gabonensis*	Food	3.08	A
7	Salad	Okazi	*Gnetum africanum*	Leaf/food	1.88	NA
8		Utazi	*Gongronema latifolia*	Spice/food	3.03	A
9	Hot leaf	Uziza	*Piper guineense*	Spice/food	2.05	DA
10		Uda	*Xylopia aethiopica*	Spice/food	2.08	DA
11	Kolanut	Oji	*Cola acuminate/nitida*	Entertainment	3.15	A
12	Mai-Mai leaves		*Thaumatococus danielli*	Wrapping	2.05	DA
13	Locust bean		*Penaclatra macrophylia*	Food	2.45	DA
14		Ora	*Pterocarpus spp*	Leaf/food	2.33	DA
15	Pear	Ube Igbo	*Canarium schweinfurth*	Fruit	2.04	DA
16		Mbebe Igbo	*Vitex donianu*	Fruit	1.85	NA
17	Raffia palm	Ngwo	*Raffia soup*	Wine/building materials	1.65	NA
18	Oil palm	Nkwu	*Elaeis guineensis*	Wine/building material	3.05	A
19	Walnut	Ukpa		Fruit	2.05	DA
20	Chewing stick	Atu	*Massularia acuminate*	Mouth cleaning	1.55	NA
21	Sponges			Washing	2.20	DA
22	Mushroom	Elo		Food	2.48	DA
23	Native pear	Ube	*Dacyodis edulis*	Fruit/food	3.03	A
24	Fuel wood			Fuel	3.15	A

NB: A: Available, DA: Diminishing Availability, NA: Not Availaible

Table 2 shows that out of the 24 NTFPs used for the study, 8 of them namely, fuel wood (3.15), Kola nut (3.150, Bread fruit (3.11), bush mango (3.08), Oil palm (3.050, Africa Apple (3.03), *Gongronema latifolia* (3.03) and native pear (3.03) were said to be available, 12 of the NTFPs, namely Alligator pepper (2.32), Bitter kola (2.45), *Tramarindus indics* (2.15), Hot leaf (2.05), *Xylopia aethiopica* (2.08), Mai-Mai leaves (2.05), Locust Bean (2.45), *Ptercarpus spp* (2.33), *Canarium schweinfurth* (2.04), Walnut (2.05), Sponges (2.20) and Mushroom (2.48) were rated as having diminishing availability while 4 namely, *Gnetum africanum* (1.88), *Vitex donianu* (1.85), Raffia Palm (1.65) and Chewing stick (1.55) were rated as not being available.

Table 3: Deforestation sources that affect plant NTFPs availability

S/N	Conservation methods	Frequency	%
1	Population Pressure	72	96.00
2	Over exploitation of NTFPs	70	93.33
3	Expansion of agricultural areas	64	85.33
4	Practice of shifting cultivation	52	69.33
5	Reduction in fallow periods	68	90.67
6	Uncontrolled grazing of livestock	15	20.00
7	Logging	68	90.67
8	Government policies	55	73.33
9	Land tenure system	58	77.33
10	Road construction	35	46.67

Table 3 shows with exception of uncontrolled grazing of livestock (20), all the deforestation sources used in the study affects plant NTFPs availability in the study area.

Table 4: Conservation methods used by the rural households that sustain availability of plant NTFPs.

S/N	Prevention of encroachment	Frequency	%
1	Prevention of Encroachment	15	20.00
2	Controlled harvesting	15	20.00
3	Embargo on cutting of some species	25	33.33
4	Fire tracing	10	13.33
5	Selective weeding	10	13.33
6	Enrichment planting	5	6.67
7	Protective mechanism	25	33.33
8	Discouraging collection of young plants	12	16.00
9	Prohibition of bush burning	30	40.00
10	Ex-situ planting of NTFPs	32	42.67
11	Rehabilitation of threatened species	5	6.67
12	Regulation on collection and harvesting of NTFPs from forests	10	13.33

Table 4 showed that the rural households hardly apply conservation measures that will sustain the availability of NTFPs. All the conservation methods used for the study were rated below average. However conservation measures like ex-situ planting of NTFPs (42.67%) and prohibition on bush burning (40) score relatively high when compared to other variables used for the study. Also there was evidence that embargo on cutting of some species (33.33%) and protective mechanism methods are being practiced in the study area.

Discussion

Respondents rating in Table 1 showed that plant NTFPs were very vital in the livelihood of the rural households in Delta State. The major one being bush mango, Kola nut, Oil palm, Chewing stick, and fuel wood. According to the focus group discussions, these were also planted ex-situ. The NTFPs named, include bread fruit, locust bean, Salad (Ukazi), native pear and walnut. Others like *Gongronema latifolia*, *Piper guineense*, *Xylopia aethiopica* are used mainly as spices and also in medicines. Kalu, et al (2007) also stated that evidence abounds that in spite of the products from agriculture and industries, forest provide the resources for a multitude of products which feature in people's day to day lives.

However, findings also revealed that the availability of the NTFPs to rural households was diminishing. Apart from those NTFPs that were collected from the wild but aware now domesticated and planted in farms, farmstead and homestead, the rest of the NTFPs used for the study were found to be diminishing in availability. The focus group discussions highlighted the need for domestication of the plant NTFPs as this will help to conserve the NTFPs, increase their availability and increase knowledge about them because as the NTFPs, diminishes, knowledge about them also diminishes. The diminishing availability of these NTFPs will create scarcity and increase the demand of the products which in turn will increase the prices of the products and further impoverish the rural households. This finding collaborated with that of Thanam (2005) that loss of biodiversity has been identified as one of the main obstacles to sustainable development since it poses a tangible threat to the health and livelihood of rural communities.

Deforestation as revealed in Table 3 was a major source of the unsustainability of the availability of NTFPs. And the sources of deforestation used in the study affects the availability of NTFPs in the study area. The focus group revealed that when population was high the pressure on the use of NTFPs becomes high (over exploitation) and the demand for forestland for food production becomes high (expansion of agricultural areas). These eventually degrade the forest. Population pressure also had a direct relationship with fallow period. High population density usually exerts pressure on land use and cut the average fallow periods. This in turn affects the NTFPs supply through the source.

Shifting cultivation increases land under cultivation and reduces the forest areas. The forest areas were being reduced without replacement so the plants NTFPs were being depleted. However, it was crucial to recognize according to the focus groups that because of their farming activities they were collectively responsible for the bulk of deforestation but they were not ignorant of the values of the forests. They saw no alternative. This finding agreed with observations made by Eboh (1995) that until the sustainable use of forest resources becomes the most viable choice for the households, the destruction of forest and its resources as a source of physicals access to food will continue.

The rating on logging as a source of deforestation that affects the availability of NTFPs only collaborates previous researches

in the area. For instance, World Bank (2012) reported that the bank has recognized the significant greater role of logging in deforestation and degradation of the forests. The bank in arriving at this conclusion put into consideration, 'the domestic urban and manufacturing demand for wood products and its implications for forest policy noting that most of the domestic needs for wood products have been filled from the forests. Farmers also sell extraction rights to the logging industry and invest this money in agriculture, typically extending the agricultural frontier rather than intensifying existing agriculture. In addition, roads opened for logging stimulate colonization, which in turn brings agriculture and subsequent deforestation to the area.

Government policies as revealed by the findings caused deforestation. The focus group agreed with United Nation Environment (2017) that non-enforcement of government policies bring about high levels of deforestation, low reforestation rates and unsuitable management practices. Only in a few cases were management plans approved by the government actually being implemented. NTFPs have been given very little recognition especially by planners and natural resource managers. Even in most sector policies, wherever they exist, NTFPs get a mention in passing but without objectives, targets and strategies for development.

Findings on conservation methods used by the rural households that sustain availability of plant NTFPs showed that limited conservation activities were carried out in-situ (that is in the natural forest). Although the rural people performed some conservation activities, they were not collectively done and were mainly carried out in areas cleared for farming or during forest clearing. This was usually done by avoiding cutting down of important species and ex-situ planting of NTFPs. The prohibition of bush burning being rated relatively above most of the other conservative measures, showed that the rural households were conscious of conserving the forests.

Conclusion and Recommendations

This study has confirmed the fact that NTFPs were diminishing in availability due to forest depletion. Forest depletion was still taking place through the commonly known methods like population pressure, cultivation practices, over exploitation, logging and non-enforcement of government policies. There was also the revelation that the availability of the NTFPs were not sustained because little or no conservation measures were enforced by relevant authorities or practiced by the rural households. The findings of this study have therefore increased our understanding of status of plant NTFPs conservation and utilization as well as measures that can be used to enhance their conservation and sustainable management. Hence there is urgent need to rebuild and restore the degraded resources. This will in no small measure improve the standard of living of the rural households thereby reducing poverty. Recommendations include among others that forest conservation initiatives by government should allow the participation of rural households in programme formulations and executions and management as regards NTFPs use. There should be education and enlightenment of rural households on forest conservation and consequences of deforestation. There should also be encouragement of the in-situ and ex-situ cultivation of plant NTFPs and those highly consumed in households which are at the risk of being depleted or going into extinction. There should be enforcement of regulations on the collection of NTFPs from the forest.

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