



Contributions of Non-Timber Forest Products (NTFPs) to household economy of rural dwellers in the tropical forest zone of Ondo State, Nigeria.

OYERINDE O.V.

Department of Forestry and Wood Technology, Federal University of Technology, Akure, Nigeria.
Email: voyerinde@gmail.com

Abstract

Non-timber forest products (NTFPs) are often of particular importance as source of livelihoods for rural dwellers. Even in rural communities where several other livelihood activities exist, dependence on NTFPs is still common. These NTFPs are particularly dominant in the tropical rainforest ecosystem, which is noted for its high biodiversity. This study examined the access of rural dwellers to NTFPs and its impact on household economy in the rainforest zone of Ondo State, Nigeria. Five local government areas (LGAs) were randomly selected within the study area, while four rural communities were randomly selected from each of the LGAs. Primary data were collected through in-depth interviews with key informants, focus group discussions and household interviews. Pre-tested semi-structured questionnaire was administered to ten respondents in each of the sampled communities, with a total of 200 respondents interviewed. The study presents the importance of NTFPs to rural livelihoods in terms of both cash and household subsistence, cash income generation only and household subsistence only. Findings revealed that most households in the study area depend on the incomes from a variety of different income generating activities. This multiple income strategy is evident in the study area. The results showed that NTFPs do not present a significant component of livelihoods strategies accounting for not more than 17% of annual total household income in tropical forest zone of Ondo State, Nigeria. It was revealed that for rural dwellers, collection of NTFPs is a basic necessity rather than an alternative source of income. The results indicated that the incomes derived from NTFPs may not be substantial enough for the communities to participate in conservation efforts in the study area.

Keywords: Rural dwellers, household economy, NTFPs, tropical forest zone, Nigeria

Introduction

Tropical forests provide ample goods and services; these mainly include timber and non-timber forest products (NTFPs). The importance of NTFPs to people from all corners of the world is evident in the enormity and variety of species collected for personal consumption and as a source of income (Lawalet. *al.* 2010). The awareness of the importance of NTFPs as one crucial benefit from forests coupled with a desire to conserve forest while making life better for millions of rural people has made NTFPs the object of many research and development interventions.

Non-timber forest products constitute an important source of livelihoods for millions of people across the world. An indication of the socio-economic importance of NTFPs is the fact that 80 % of the developing world population meets health and nutritional needs by using NTFPs (FAO, 2002). In India, it is estimated that over 50 million people are dependent on NTFPs for their subsistence and cash

income (Prakash,2003). According to Duong (2008), forest-based activities in developing countries, which are mostly in NTFPs area, provide an equivalent of 17 million full-time jobs in the formal sector and another 30 million in the informal sector, as well as 13-35% of all rural non-farm employment. The development of NTFPs will help the tropical forest to be more highly valued, creating greater incentives for their conservation and cultivation of trees on farms (Ndoye and Awono, 2009).

The contributions of NTFPs collected from forests to the household economies of asset poor households in Nigeria go largely unnoticed and are not even accounted for in the GNP. Omitting these values in national accounting and macro-economic policy could undermine sustainable development, and further expose biodiversity to over-exploitation. Despite the known and substantial economic value of a few NTFPs, and high economic value of NTFPs in aggregate, historically forest managers have not included them as important factors in forest

management. Under-evaluation of NTFPs has encouraged deforestation and has caused government to assign low priority to the forestry sector.

In Ondo State, Nigeria, many rural communities exist within and around forest areas. They all use NTFPs and the contributions of NTFPs to their economy have not been captured. There is limited empirical data on the contributions of these products to rural household economy and research gap exist in terms of the variability of use and dependence on NTFPs within the rural communities. Therefore, this paper provides information on the role of NTFPs in rural livelihoods with a view to enhancing their promotion and development without undermining the natural resource base of the study area.

Methodology

Study area

The study was carried out in Ondo State which is situated within the south western zone of Nigeria. The state lies between latitudes 5°45' and 7°52'N and longitudes 4°20' and 6°05'E, and has a

total land area of 13,395 km². The 2006 population census figure for the State is 3.4 million people with male and female accounting 51% and 49%, respectively (National Population Commission, 2008). Within the State, there are three distinct vegetation zones; the mangrove forest/freshwater swamp to the south, the rainforest in the middle and the derived savannah to the north as shown in Figure 1. In terms of climate, Ondo State lies within the humid tropical climate characterized by two distinct seasons (wet and dry). The wet season covers a period of nine months annually (March to November) while the dry season is from December to February. Annual rainfall ranges from 1500mm to 2500mm in the wet season, and could drop to as low as 250 mm in the dry season. The average relative humidity is about 84% daily during the wet season. Average annual temperature is about 27°C. In Ondo State, the people are predominantly farmers, cultivating both cash and food crops such as cocoa, plantain, yam, cassava, maize and cocoyam for family consumption and sale.

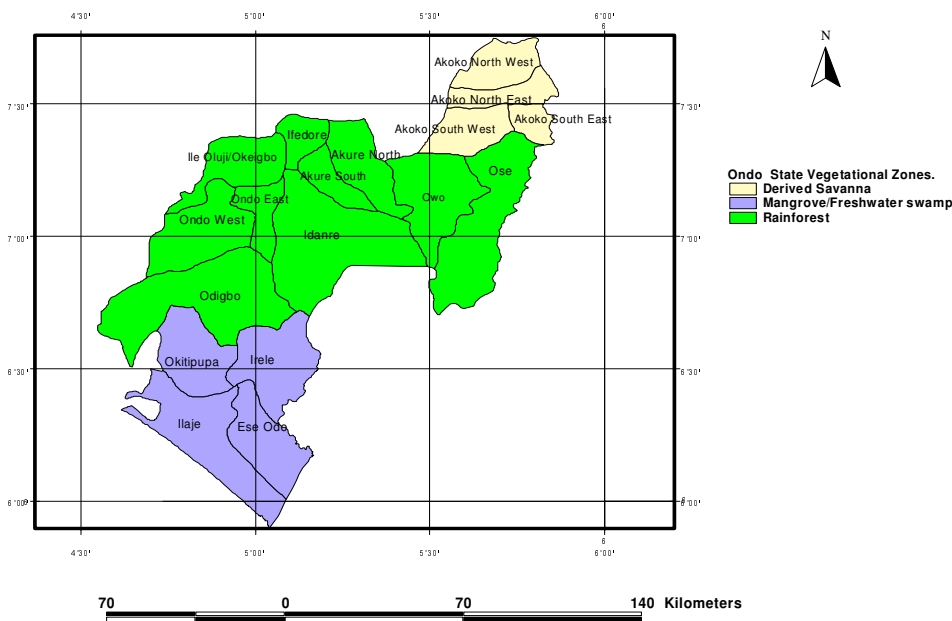


Figure 1: Map of the study area showing the LGAs and the vegetation zones

Method of data collection and analysis

This study covered the rainforest zone of the State and five local government areas were randomly selected out of the ten in the zone. The selection of the rainforest zone was due to the prevalence of NTFPs activities. A list of all communities in each of the selected LGAs was obtained from the records of the National Population Commission. All rural communities, defined as communities with population below 20,000 people were identified. Four communities were randomly selected from the list of the identified rural communities in each of the selected LGAs. Ten house units were randomly selected in each of the selected communities.

Pre-tested semi-structured interview schedules were used to interview the randomly selected households in the study area. A total of 200 households were interviewed and data were also collected through key informant interviews, focus groups discussions and observations. Data collected were on the demographic and socio-economic characteristics of households, and involvement in NTFPs activities (harvesting, processing, consumption and marketing). Such variables include household's head age, level of education, and household size, as well as other relevant variables.

Descriptive statistical analysis was used to summarize and represent the data in form of tables and charts. Student's t-test was also used to compare income from NTFPs and income from other sources. While, correlation analysis was used to test the relationship between levels of dependence on NTFPs, age of household head, household size, etc. All statistical analyses were done using Statistical Package for Social Scientist (SPSS 13.0).

Results and Discussion

Socio-economic characteristics of the respondents

The results of the study revealed that male folk were more across the sampled communities. Eighty-eight (88 %) of the household heads were male while 12% were female. In Nigeria, it is often

not common for a household to be headed by a female. Majority of the household heads (60%) were literates, while 40% had no formal education. Low educational status observed among the rural populace is supported by studies earlier carried out by Adams et al. (2000) and Adhikari, et al. (2004). An earlier study by Stoian (2003), also affirmed that education is one of the important human capitals, which plays important role in determining household status in the society. A high level of illiteracy often leads to over-exploitation of forest resources (Adekunle *et al.*1999), while greed makes the educated to over-exploit resources.

The percentage of respondents in the age class of less than 30 years was 1%, while 61% and 38% were 30-59 years and above 60 years respectively. The fairly large incidence of the working-age adults was similarly reported by Ajibefun *et al.* (2006). This could mean more and constant exploitation of NTFPs to meet subsistence needs. A high percentage of the household heads were involved in crop farming along with livestock husbandry and collection of forest products. Fifty-one percent (51%) and 49% of the household heads were involved in crop farming as their major and secondary livelihoods options respectively as confirmed by Adekunle *et al.*(1999). Majority of the respondents (81%) were married. Household size varied between 2 and 15 persons with an average of 8 persons. This is explained by the practice of polygamy and also by the African family system, which is common in the study area. High household size means more household labour available for forest products collection and other works directed to support the household economy.

The total annual income earned by the respondents in the study area ranged from less than ₦60,000 (US\$400) and more than ₦100,000 (US\$700). Fifteen percent (15%) earned less than ₦60,000 (US\$400) per annum. Majority of the respondents (65%) earned between ₦60,000 (US\$400) and ₦100,000 (US\$700), while 65% earned above ₦100,000 (US\$700) per annum. There was a marked reliance on the natural resource base

for supplying basic needs as well as for income generation as indicated by low average income in the study area. This situation is supported by Shackleton and Shackleton (2000) and Hunter and Twine (2005).

Utilization of NTFPs

Sixty-one percent (61%) of the sampled households collected NTFPs from private farmland, 22% from open access areas, 11% from

community/family land and 6% from forest reserves. The study showed that, 60%, 36%, and 4% of the sampled households used NTFPs for cash and household subsistence, cash income generation and household subsistence respectively. Sixty percent (60%), 36%, and 4% used NTFPs for cash and household subsistence, cash income generation and household subsistence respectively as presented in Figure 2.

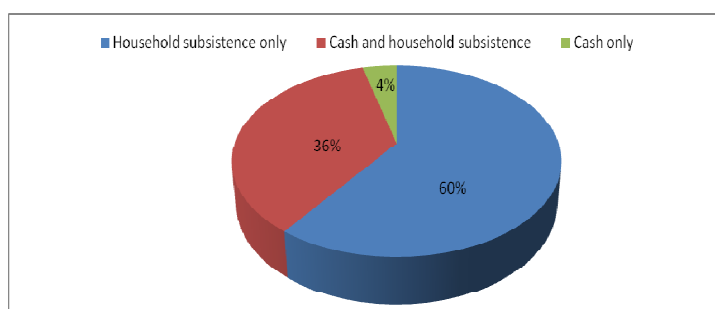


Figure 2: Use and purpose for the collection of NTFPs.

Table 1 shows some NTFPs that are commonly found in the study area and what they are being used for, by the people of the area. These were identified by the respondents as the most commonly collected and most often used species. The most commonly collected species of NTFPs in the study area are vegetables, bush meat, chewing sticks, mushroom, wrapping leaves, construction poles, fruits and nuts. This is in agreement with an earlier report by Awe *et al.* (2009) that apart from farming, bush meat hunting is a common activity in the study area.

It was observed from the study that there are several uses to which rural households put NTFPs. These include the use NTFPs as food, medicine, local construction materials, and crafts. Nearly all (98%) of the respondents affirmed that they collect and use NTFPs as food. The species used as food are in the form of wild fruits (*Chrysophyllum albidum*), vegetables (*Vernonia amygdalina*), and bush meat (*Thryonomys swinderianus*); honey, nuts, snails, edible insects as well as edible roots. This conforms to earlier reports by Andel (2006) and Jimoh and

Haruna (2007) that NTFPs are used as food and food condiments by rural households.

Similarly, more than 95% of the respondents confirmed that they use NTFPs for medicinal purposes to treat various ailments and diseases which include diarrhea, wounds, ulcer, stomach aches and many other infirmities. The part used for these purposes are the roots, leaves, bark and seeds. This is in conformity with the report by Abere and Lameed (2008) that African giant land snails (*Achatina achatina* and *Archachatina maginata*) are used to cure whooping cough, anemia, ulcer, asthma, aphrodisiac and hypertension. They further stressed that the fluid of the snails is used to treat headache, dysentery, eye problems and small pox, while the meat is used to cure bone fracture and infertility in women. The respondents also attested that a single species of NTFPs could have multiple curative values, as observed in snails which have been successfully used to control malformation of bone structure and promotion of easy childbirth, nourishment of lactating women, and circumcision of male children as well as suppression of

convulsion in children. This also agrees with previous reports of Abere and Lameed (2008).

Table 1: Some notable NTFPs in the study area

Scientific Names	Common Names	Purpose/Use(s)	Part(s) used
<i>Cyperus bulbosus</i>	Bush onion	Spice. Medicinal	Leaves/seeds
<i>Annickia chlorantha</i>	Fever bark	Medicinal	Leaves/roots
<i>Antherurus africanus</i>	Porcupine	Meat , medicinal	Whole animal
<i>Archachatina achatina</i>	Giant snail	Meat , medicinal	Whole animal
<i>Artocarpuscommunis-</i>	Bread fruit	Edible fruit	Fruit
<i>Azadirachta indica</i>	Neem tree	Medicinal	Leaves/bark
<i>Bambusa vulgaris</i>	Bamboo	Construction, handicrafts	Boles
<i>Borassus aethiopum</i>	Palm	Construction, handicrafts	Leaves
<i>Canariumschweinfurthii</i>	Bush pear	Edible fruit	Fruit
<i>Cephalophus spp</i>	Duiker	Meat , medicinal	Whole animal
<i>Chrysophyllum albidum</i>	African Apple	Edible fruit	Fruit
<i>Cola acuminata</i>	Cola	Edible fruit	Fruit
<i>Cola nitida</i>	Cola	Edible fruit, cultural	Fruit
<i>Conyza sumatrensis</i>	Fleabane	Medicinal	Leaves
<i>Cricetomys gambianus</i>	Giant rat	Meat , medicinal	Whole animal
<i>Cymbopogon citratus</i>	Lemon grass	Medicinal	Leaves
<i>Dacryodes edulis</i>	Pear	Edible fruit	Fruit
<i>Dendrohyrax sp.</i>	Tree hyrax	Meat , medicinal	Whole animal
<i>Denettia tripetala</i>	Pepper fruit	Edible fruit	Fruit
<i>Diosphyros spp.</i>	Ebony	Carving	Bole
<i>Thaumatococcus danielli</i>	Wrapping leaf	Wrapping of food	Leaves
<i>Ficus capensis</i>	Ficus	Medicinal	Leaves
<i>Garcinia kola</i>	Bitter Kola	Medicinal, cultural	Fruit/leaves
<i>Gossypium hirsutum</i>	Cotton	Medicinal	Fruit/leaves
<i>Irvingia gabonensis</i>	Bush mango	Condiment, pestle	Kernel/stem
<i>Irvingia wombulu</i>	Bush Mango	Edible fruit, condiment	Fruit
<i>Jatropha curcas</i>	Physic Nut	Medicinal	Leaves/exudates
<i>KigeliaAfricana</i>	Sausage tree	Medicinal	Leaves/fruits
<i>Luffa cylindrical</i>	Luffa	Medicinal, sponge	Fruit/leaves
<i>Manis tricuspis</i>	Pangolin	Meat , medicinal	Whole animal
<i>Massularia acuminata;</i>	Randia	Chewing stick	Stem
<i>Monodora myristica</i>	African Nutmeg	Medicinal, condiment	Fruit/leaves
<i>Moringa oleifera</i>	Moringa	Medicinal	Leaves/roots
<i>Terminalia cattapa</i>	Almond	Ornamentals	Whole tree
<i>Termitomyces spp.</i>	Mushroom	Spice	Whole body
<i>Plukenetia conophora</i>	Walnut	Food	Fruits
<i>Pentaclethra macrophylla</i>	Oil bean tree	Edible fruit	Fruit
<i>Piper guineensis</i>	Pepper fruit	Medicinal, spice	Fruit/leaves
<i>Poga oleasa</i>	Poga	Food, Carving	Fruits/Bole
<i>Potamochoerus porcus</i>	Bush pig	Meat , medicinal	Whole animal

Level of dependence on NTFPs

The level of dependence on NTFPs was calculated on the basis of contributions of NTFPs to annual household income and was subsequently categorized into three classes namely: low dependence where NTFPs contributed less than 30% to annual household income, moderate dependence with 30-60% contribution and high dependence with more than 60% contribution. Moderate dependence on NTFPs was observed in the study area. Fifty-three percent (53%) depended on NTFPs moderately, whereas 30% and 17% of the respondents had high and low dependence respectively.

The relationship between the level of dependence on NTFPs and demographic variables as indicated by the correlation coefficient values obtained in this study is presented in Table 2. High positive and significant correlation coefficient values were discovered to exist between almost all the demographic variables and the level of dependence on NTFPs. Highest correlation coefficient value (0.90) which was positive and significant was obtained between age of respondents and level of dependence on NTFPs. Shackleton *et. al.* (2002) noted that although younger community members and households still utilize wild foods, they generally consume these less frequently than the old community members with some younger generations no longer consuming these products at all. They emphasized that, this pattern is not restricted to wild foods but includes medicinal plants, weaving reeds, insects and fuelwood.

Contributions of NTFPs to household income

Figure 3 presents the distribution of respondents' total annual income realized from NTFPs in the study area. The annual income earned from NTFPs ranged from zero to more than ₦30,000 (US\$200). Four percent (4%) claimed to earn nothing from NTFPs activities, while 26%, 61% and 9% earned less than ₦15,000 (US\$100), ₦15,000 (US\$100) - ₦30,000 (US\$200) and above ₦30,000 (US\$200) per annum from NTFPs activities respectively. This income from NTFPs is

somewhat low, but when viewed within the context of the study area where people live on less than a dollar a day, it is very significant. Majority of the rural households in the study area rely on more than one form of economic activity; in fact some rely on more than three. In most households, crop farming was considered the main income source, while only few of the respondents considered NTFPs activities as one of their main income sources. This finding supports previous studies that show NTFPs as supplementary activities that account only for shortfalls in income (Neumann and Hirsh, 2000 and Shillington, 2002) and that most households do not rely solely on NTFPs as a source of income (Browder, 2002).

The percentage contributions of different income sources to total household income in the study area depicts that the percentage contribution of income from NTFPs activities was low compared to percentage contribution of income from other sources. Percentage contribution of income from other sources excluding NTFPs was 83% while the percentage contribution of income from NTFPs activities was 17%. This low percentage attributed to NTFPs fails to capture non-cash contributions of NTFPs to rural household economy. For instance, almost all the households use NTFPs for medicinal purpose. Such contribution of NTFPs to health care has not been computed to facilitate adding it to the estimates. The present results indicate that the incomes derived from NTFPs may not be substantial enough for the communities to participate in conservation efforts in the study area. Ambrose-Oji (2003) also reported that NTFPs do not present a significant component of livelihoods strategies accounting for not more than 6% of annual total income in tropical forest zone of south-west Cameroon. However, these findings are in disparity with results reported by Singh *et al.*, (2010), that the contribution of NTFPs is quite high as it contributes almost 79% on an average to the annual income of the collector's family in Sundarban, India.

The result of students' t-test to compare incomes of respondents in the study area as shown in

Table 3 revealed that at $p < 0.05$, there were significant differences between the mean annual

income from other sources excluding NTFPs and mean annual income from NTFPs activities.

Table 2: Correlation coefficient for demographic variables and level of dependence on NTFPs

	Gender	Age	Education Attainment	Religion	Marital Status	Household Size	Level of Dependence
Gender	1						
Age	0.68 *	1					
Educational Attainment	0.81 *	0.92 *	1				
Religion	0.71 *	0.81 *	0.86 *	1			
Marital Status	0.89 *	0.75 *	0.87 *	0.76 *	1		
Household Size	0.83 *	0.89 *	0.89 *	0.77 *	0.84 *	1	
Level of Dependence	0.49 *	0.90 *	0.78 *	0.69 *	0.59 *	0.71 *	1

*Correlation is significant at the 0.05 level

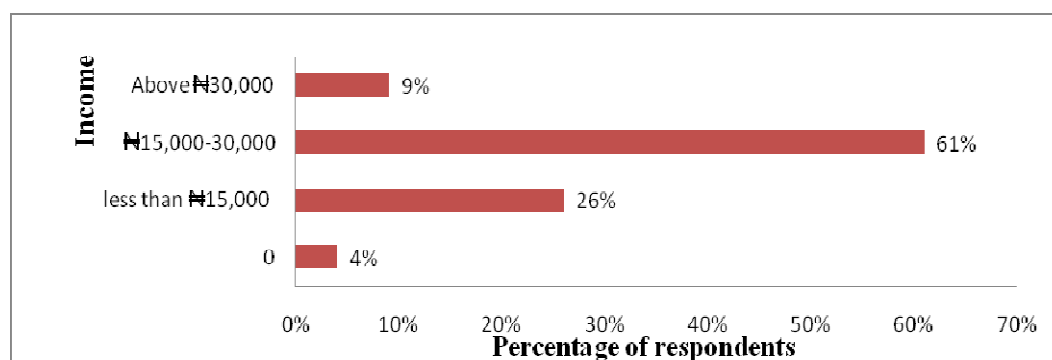


Figure 3: Respondents' Total Annual Income from NTFPs

Table 3: Results of students' t-test to compare incomes of respondents

Mean Annual Income from other sources (excluding NTFPs) (₦)	Mean Annual Income from NTFPs (₦)	P(T<=t) one-tail
93, 774	19, 542.5	4.32E-25 *

* Significant ($p < 0.05$)

Conclusion

The study revealed that the livelihoods of the households in the study area depend on portfolio of activities in which NTFPs is one of the role players. Though, the collection of NTFPs seems not to be a major cash income source to the rural people in the study area, however, the use of these products adds crucial dimension to a diversified livelihood

base of the rural populace. Thus, NTFPs act as a safety net particularly when there are shortfalls in agricultural production to minimize risk and fill the gap of food shortage. Unfortunately, forest coverage and forest resources of the study area are declining, which may affect future prospects of sustainable management of NTFPs and thus livelihoods. In this

regard concerted efforts from all actors are needed to reverse the situation through an appropriate forest management strategy.

Constraints related to poor access to market primarily limit improvement in productivity and production of NTFPs, consequently limiting the improvement of the livelihoods of the rural households. These constraints are mainly related to poor market infrastructure (poor road infrastructure, transport service, low product price). It is recommended that rural development programmes and strategies that aim at improving producers market and access to information be put in place. This might eventually increase the efficiency of marketing and bargaining ability of the rural dwellers for their agricultural produce including fostering NTFPs trade.

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