Contribution of Non-Wood Forest Products (NWFP) to Livelihood Generation Products in Eriti Community Forest Wetlands, Ogun State, Nigeria

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Abstract

An ethno-botanical study of non-wood forest products (NWFP) extraction in Eriti Community Forest Wetlands was carried out with the aim of providing an additional baseline data for policy makers on need for the conservation and proper management of wetlands in forest areas. Respondents (400) drawn from 8 fringe villages of the Eriti Forest Wetlands provided the data for the study. The methods adopted include group discussions, participant observations and interpersonal interviews using pretested and structured questionnaire. The result analyses were descriptive using percentages, mean, mode and frequency distribution tools. The results showed that the respondents were highly dependent on the extraction of NWFP for livelihood generation especially at the subsistence level. The NWFP include medicinal products, edible leaves and fruits, wrapping leaves, mushrooms, wild-animal products, snails, palm wine and chewing sticks. The extraction of the identified products were gender bias as majority of the respondents were males (75%) and married (97%) indicating that the extraction of the products can be integrated into the family lines. The negative impacts of NWFP extraction on the wetland ecosystem was observed because of the destructive means of harvesting. The paper suggests appropriate management policies for the protection of the wetland ecosystems for environmental sustainability.

Key words: Non-wood forest products, Wetlands, Ecosystem, Conservation

Introduction

Wetlands are considered to be the most biologically diverse of all ecosystems whose formation has been dominated by water, and whose processes and characteristics are largely controlled by water. Wetland is a place that is wet enough for a long time to develop specially adapted vegetation and organisms. Wetlands are amongst the Earth's most productive ecosystems. They have been described both as "the kidneys of the landscape", because of the functions they perform in the hydrological and chemical cycles, and as "biological supermarkets" because of the extensive food webs and rich biodiversity they support.

There are more than 50 definitions of wetland. The Ramsar definition is the broadest and the most widely used. As stated in the Ramsar Convention (Article 1.1), wetlands are

> *"areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters" (Ramsar, 1971).*

That is, a wetland is seasonally or permanently covered by shallow water. The water table is close to or at the surface. Wetlands are therefore unique areas, representing a combination of terrestrial and aquatic characteristics, and are further categorized by type as marsh, swamp, fen and bog. In the wetlands, water is the primary factor controlling the environment and the associated plants and animals' lives. Delineation of water is mainly dependent on plants, which are typically adapted to saturated soils (Dugan, 1992).

In line with the above definition, Nigeria is endowed with diversity of wetland ecosystems (lakes, swamps, flood plain, natural or artificial ponds, high mountain lakes and micro dams) as a result of formation of diverse landscape. The landscapes are subjected to tectonic movements, a continuous process of erosion and human activities. Some of the recommended types or examples of wetlands are Swamp, Freshwater swamp forest, Slough, Marsh, Flooded grass and savannas, Salt marsh, constructed wetland, Bog, riparian and Peat swamp forest. The economic benefits of wetland have been cited in literature. This could be as a result of its richness in biodiversity of plant and animals. In spite of the benefits associated with forest wetlands, especially Timber and Non-Wood Forest Products for livelihood, timber products are given more attention to the detriments of NWFP, hence, the relevance of this study.

Forestry is a productive sector with significant effects on meeting national socio-economic and environmental functions as well as the improvement of rural livelihoods. The important roles play by NWFP in the livelihood of rural and urban households cannot be overemphasized as majority of rural households in developing countries, and a large proportion of urban households depend on the products to meet some part of their nutritional, health, house construction, or other needs. A large number of households also generate some of their income from trades in forest products e.g. sales of Irvingia seeds in Ibadan (Uke, 2010). Non-wood forest products (NWFP) in particular have been widely advocated by conservation and development organizations as potential alternative livelihood strategies, particularly in the wetland area communities because of their multi-benefits.

The importance of NWFP at the national level lies in the huge number of people involved in gathering, hunting, processing, trading and other aspects of their production and use. As noted earlier, most of the rural people use some forest products, and many obtain part of their income from forest-product activities. Inadequate information and data about the rural and urban people dependent on NWFP from wetlands is bane to any meaningful development of these resources. This study therefore provides an additional baseline data on the significant support provided by wetlands in adding value to the NWFP for rural dwellers in the forest wetland areas. Baseline information is necessary for policy makers to understand the need for the conservation and proper management of wetlands in forest areas.

Study Area

The Eriti forest wetlands is in Obafemi - Owode Local Government Area of Ogun State and is located in the humid tropical rainforest zone on latitude 6°50'N and 7°50'N and longitudes 3.18°'E and 3.32°'E some 20 kilometers on the southern corner of Abeokuta, Ogun State capital. The wetland shares western boundary with Ewekoro and Ifo Local Government Areas, and covers an estimated area of 156Km^2. The population of Eriti Forest Wetlands Community is over 6,000 in numbers. The two major ecosystems are Eriti Forest and banks of Ogun River. The wetland possesses rich alluvial soil useful in farming as a result of seasonal inundation and overflow of the river during raining season.

The fringe communities are well dispersed in settlements and villages. Eriti village appears to be the largest among the villages in the intervention area with a population of about 2,000 people and it is within a walking distance on foot paths to the forest. The least populated village (Saare) is about 100 people. The other fringe villages in and around the intervention area include: Isiba, Ogunpa, Ajegunle, Oluwo Oke, Itori and Arowa. Being an agrarian community, the villagers have utilized the forest wetlands to their best advantage, over the years. Particularly in farming and other means of livelihoods such as fishing, fuel wood production, grazing of animals, hunting, logging and soil excavation for building and other constructions among others.

Methodology

Sampling techniques and sample size

A multistage random sampling approach was adopted to select a total of 400 respondents from the 8 randomly selected fringe villages in Eriti community forest wetlands areas. Combinations of random and purposive sampling methods were used to identify the respondents for data collection. In each of the selected villages, 50 respondents were randomly selected for the purpose of uniformity. The snow ball non-probabilistic techniques' following Mcall and Simmons (1969) and Adekunle (2005) was adopted. The villages selected include; Eriti, Isiba, Ogunpa, Arowa, Ajegunle, Itori, Oluwo Oke, and Saare.

Data Collection

The major data collection method was a structured pretested questionnaire. Four hundred questionnaires were administrated, complimented with participant observations and group discussions. The questionnaires were administered in the homes of respondents and sometimes in open places especially in the evening and on Sundays when the respondents were less busy.

Data Analysis

Data obtained from interviews were encoded in the Microsoft Excel Program and processed using SPSS. The variables analyzed included age, gender, occupation, education and religion. The data on species prioritization were analyzed following Adeola (1995) and Frenzel et al

(1996). Descriptive statistical tools such as percentages, and frequencies were used. Results of analysis are presented in Tables.

Results and Discussion

Table 1: Summary of socio-economic characteristics of the respondents

	Frequency	**Percentage (%)**	**Mode**
Age Class			
20 – 30	92	23	
31 – 40	114	28.5	31-40
41 –50	106	27.5	
51 – 60	50	12.5	
61^{+}	48	23	
Total	**400**	**100**	
Gender			
Male	298	75	Male
Female	102	25	
Total	400	100	
Marital Status			
Married	386	97	Married
Single	14	3	
Total	**400**	**100**	
Occupation			
Farming	392	98	Farming
Hunting	5	1.25	
Civil service	-	-	
Trading	2	0.5	
Artisan	-	-	
others (Food Vendor)	1	0.25	
Total	**400**	**100**	
Educational Status			
Primary School	64	41	
Secondary school	44	11	
Tertiary school	8	2	
No Formal Education	184	46	No formal Education
Total	**400**	**100**	
Religion			
Christianity	262	65.5	Christianity
Islam	132	33	
Traditional	6	1.5	
Total	**400**	**100**	

Age distribution of the dwellers

The dwellers age group ranged from 20 to 60 years and above. Those in the age group of 31 –40 years are in the majority accounting for about 29%. The majority age group is followed by those in the age group of 31 – 50 representing about 27%. The absence of the youths under the age of 20 years could be because they are either in the cities attending school or learning one trade or the other.

Gender and marital status

The male respondents are in the majority representing about 75% of the total sample while the female respondents were 25%. Majority of the dwellers (97%) are married while the remaining are single (3%) (Table1). Those classified as singles include the divorcees, widows and widowers. Monogamy was prominent among the dwellers with an average of six people in each household. As majority of the dwellers are married, there is the likelihood of the integration of economic activities especially forest resources exploitation into the family line.

Occupational distribution and land use pattern

Farming is the major occupation and the major land use type with 99% of the respondents involved. Vegetable farming *Cochorus olitorus* (Ewedu) is the most prominent. Farmland sizes range from 0.04ha to 1.0ha. Other arable farm crops include cassava, rice, maize, yams and garden eggs, most of which are for domestic consumption. The arable crops are usually planted as inter crops. Ewedu farming was observed as the major cash earning enterprise. The main perennial cash crops include cocoa, kolanut and palm trees. Hired labour and seasonal fishing business also featured to generate income. In larger settlements such as Eriti, there are non-farming occupations such as petty trading in the home stead's, sales of wares like cigarettes, toiletries, bread, biscuits, alcohols and mineral water, food canteen and illicit gin joints.

Hunting is mainly done on part time bases by most hunters at least twice in a week. The strategy employed is usually an individualistic approach. Many of the respondents have specific areas for hunting while others search for animals all around especially those hunting for snails. The strategies and technologies adopted include setting of wire and gin traps especially where the animals are crop pests and the use of dane guns. Local breeds of poultry birds are commonly kept in small quantity under the extensive management strategy (free range system).

Educational status

According to Table 1, about 54% of respondents had formal education from primary, secondary or tertiary institution while 46% of the respondents had no formal education but are socially enlightened. Although only primary schools were common in the villages, other formal education could have been acquired from neighbouring towns and cities like Oba, Owode, Abeokuta and Lagos.

Religious practices

Religious practices are common, especially the Christian and Muslim religions. About 66% were Christian and the Muslim was 33% of the total (Table 1). This trend could be because

Christianity and Islam are the two prominent religions in Ogun State. More so, Abeokuta happens to be the cradle of Christianity in Nigeria.

Land use practices

The major type of land use is farming involving arable crops like leaf vegetables, pepper, garden egg and tomato. Other arable crops include maize, cassava and rice. Fishing and hunting also feature to generate income. Nomadic cattle rearing are also observed because of the presence of grasslands in the area.

Dependence of forest for livelihood

The rural economy is highly dependent on forest resources to general income and to provide food and medicines. The assertion is reflected in this study among the dwellers. Table 2 below shows a sample of some of the forest products and the level of dependency on the products.

Table 2: Non-wood Forest Products: Dependency and Impacts

Forest Products	Level of dependency	Impact on the forest
Medicinal products	High	Negative
Geological materials, stones, gravels	High	Negative
Edible leaves (cultivated and wild)	High	Negative
Wild animals products	Low	Negative
Edible fruits (wild and cultivated)	Low	Negative
Wrapping leaves	High	Negative
Mushrooms	Low	Negative
Snail	Low	Negative
Aquatic fish	High	Negative
Religious activities	Low	Negative

It can be observed from the table that the dwellers depend highly on products such as medicinal products, stones/gravel, edible leaves, wrapping leaves and aquatic fish. The high dependence on stones/gravel, edible leaves, wrapping leaves and aquatic fish could be because the products are major source of income for the rural dwellers in the community forest wetlands. The proximity to Lagos and Abeokuta provides easy market for the products. Also the dwellers are highly dependent on traditional systems of medicine using forest plants because of lack of proximity to orthodox systems of medicine and personnel (Adekunle, 2005).

The extraction of all the products had negative effects on the forest wetland ecosystem. For instance removal of sands/gravels, fish from the wetlands and the unsustainable systems of harvesting of medicinal products, edible leaves and wrapping leaves always predispose the forest wetlands to different levels of threat. In most cases the system of harvesting is destructive and unsustainable.

Prioritization of NWFP by the communities

Based on the answers of the respondents, the different NWFP exploited in the area are listed for prioritization. The basis for selecting the NWFP for prioritization was the frequency of mention. Percent mention has been described as the strongest criteria for selection and ranking of multipurpose species (Adeola 1995). The author asserted that percent mention gives an insight into the acceptability of multipurpose species from which NWFP are sourced by farmers.

To meet an objective basis for ranking, the NWFP were subjected to systematized criteria rating test based on identified criteria. The criteria include species availability, ease of processing, growth characteristics, harvesting and market potentials. Subsequently, a summary of the NWFP exploited in the study area in order of priority is derived (Table 3). The source tree species from which the NWFP are extracted are also shown in Table 4.

Table 3: List of NWFP in order of priority

Items	**Frequency of Mention**	**Ranks**
Edible leaves	400	1
Wrapping leaves	400	2
Edible fruits	400	3
Medicinal products	398	4
Geological materials	300	5
Palm wine	240	6
Mushroom	200	7
Honey	140	8

Table 4: List of edible leaves

Local Name	**Scientist Name**	**Status of Domestication**	**Level of Dependency**
Edible leaves			
Ebolo	*Chrysocephun*	Wild	Low
Eforoko	*Telfararia accidentals*	Domesticated	Low
Ewuro	*Vernonia amygdalina*	Wild and domesticated	High
Gbure	*Talinum triangulae*	Wild	High
Ewedu	*Cochorus olitorus*	Domesticated	High
Tete	*Amaranthus spp*	Domesticated	High
Soko	*Celosia argentinea*	Domesticated	High
Wrapping leaves			
Eweran	*Thanmatococus darielli*	Wild	High
Teak	*Tectona grandis*	Wild	High
Edible fruits			
Agbalumo	*Chrysophyum albidum*	Wild	Low
Iyeye	*Spondias mombin*	Wild	Low
Oro/Apon	*Anitiaris toxitaria*	Wild	Low
Mango	*Mangifere indica*	Domesticated	Low
Ghara	*Psidium guajava*	Domesticated	Low

Attitudes of the Community Dwellers toward Participating for Management

It should be noted that all respondents showed interest in more than one mode of participation of wetlands. A high level of willingness to participate in management of the forest wetlands was

expressed by the dwellers (Table 5). Even some were ready to take part and be involved in all the suggested options of participation. This observation should be harnessed for the sustainable management of the forest wetlands.

Table 5: Participation in management of forest wetland areas by the dwellers

Mode of participation	**Frequency**	**Percentage**
Forest management communities	364	20
Community Development Association	384	21
Monetary contributions	378	20
Planting of trees	382	21
Protection activities	344	18
Total	**1862**	**100**

Conclusion

It can be concluded that beyond timber, Eriti forest wetlands offer other products which are of economic benefits. Hence, wetlands could no longer be referred to as wastelands. The contribution of NWFP extraction in Eriti forest wetlands to the respondent has been recognized. The respondent depended highly on the wild sources for the NWFP, the negative impact of the community on the ecosystem and the integrity of the forest wetlands cannot be over stressed. As farming is the predominant occupation, a large portion of lands will have to be cleared for cultivation every year. A large farming population could mean a high level of forest resources exploitation. Small holder farmers are described as shifting cultivators and also hunter gatherers. Shifting cultivation without adequate years of fallow could result in the loss of forest biodiversity. In the same vein the collection and harvesting of medicinal products are not sustainable and always result in waste as more than needed are always collected with the erroneous believe that nature would replenish itself. As observed in this study, water pollution constitutes a menace to the integrity of the wetlands to support fish. The use of fires for hunting was common especially during the dry season. Also religious activities without control have a negative impact.

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