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SIGNIFICANCE OF WOOD AND NON-WOOD FOREST PRODUCTS IN CROSS RIVER STATE, NIGERIA

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ABSTRACT

This study was carried out to examine the significance of wood and non- wood forest products in Cross River State, Nigeria. Structured questionnaires were used to generate primary data which were analyzed using simple descriptive and inferential statistics tools. The results showed that majority of respondents were males (68.16%) with 80.27% of the respondents belonging to age brackets of 31 to 60 years. Only 31.39% obtained a maximum of school certificate and above. Majority (79.82%) of the respondents were married and 63.12% derived their livelihood directly from the forest either by farming or gathering or through hunting. Also 62.13% of the respondents had their annual income ranging between N10000 and N70000. There was significant socio - economic values of wood and non-wood forest products in the study area. Notably among the socio-economic values from the forest include source of raw materials (94%), source of energy (91.2%), source of food and nutrition (87.7%), income generation (82.5%), medicinal uses (80%) and employment generation (75%) which recorded high percentage of response. Forest and its resources are considered a warehouse for goods and services by the rural and urban dwellers in Cross River State. However, the status of the forest and its resources is no longer view as renewable by the rural poor because of numerous factors which include indiscriminate exploitation, plantation establishment and infrastructural development. In fact, many of the forest resources are imported from neighboring countries because of high rates of deforestation in the study area. In order to minimize the high dependency on the forest, every household should be encouraged to establish a small wood - lots or orchard in their home gardens.

Key-words: Wood, non-wood, forest, socio-economic significance, people's livelihood

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INTRODUCTION

There is a high correlation between rural people and forest resources in Cross River State. Rural people strongly depend on a wide range of forest resources for food, construction materials, medicine and energy. Moreover, the contribution of forests to human welfare is measured not only by wood and non- wood forest products (NWFPs) they provide but also by the services they offer. According to Food and Agricultural Organization (FAO, 2001) an estimated range of 1.4 to 1.6 billion rural people worldwide made use of non-wood forest products. People living in and around forest environment practicing hunting, gathering of NWFPs, and shifting cultivation draw heavily on forest products not only for subsistence but also for supplementary income. Forest the world over are vital resources to ameliorate the climate, alleviate poverty and provide food security. Wood and NWFPs in the form of industrial raw materials, food and nutrition, fodders, wild games, medicine, soil and erosion control play a significant role in the livelihood of the people of Cross River State. Over two -third of the people in Africa depend on NWFPs for both subsistence and cash income derived from a wide range of

wood and NWFPs (Arnold 2001). However, millions of rural and urban dwellers the world over patronized a wide diversity of forest products to satisfy a wide range of livelihood requirements from direct household needs to cash income, cultural needs and as a fall back in times of emergency or as a means to income diversification (Shackleton,2011). The challenge of climate change and environmental degradation arising from over exploitation of forest resources has negatively impacted the life of communities both human and plants, leading to ecological imbalance and forest resources depletion (Amuya, 2011). There is an increasing awareness that the forest not only provides multiples benefits to mankind but also help in conserving the environments and has created a global concern over the forest production and preservation. However, despite the numerous contributions of NWFPs, they are increasingly under threat of rapid increase in population and greedy attitude of man (Amuya, 2011). Moreover, Madu (2008) attributed forest clearance to rapid growth in population, quest for livelihood, technological growth and development, economic down turn and mass migration. Forest degradation is akin to deforestation which broadly speaking refers to the gradual or rapid process of complete removal of trees leading to partial or permanent eradication of tree cover in a locality. When forest cover is lost at an alarming rate, it negatively impacted on the livelihood of the people through potential loss of food, medicines, vegetables, and raw materials thereby under pinning the rural economy. Fuwapet et al. (2006) noted that there was reduction in land area under tropical rainforest by 11,254km^2 between 1976 and 1995 in Nigeria. FAO (2001) noted that NWFPs consists of goods of biological origin other than wood derived from forests, other wooded land and trees outside forests. Forest contributes in several ways to rural livelihoods but the growing importance of forest resources exploitation poses a significant threat to this livelihood's structure and to the sustainability of biodiversity (Ousseynou, et al. 2010). Wood refers to all ligneous plants including trees and woody species. The term non-wood forest products consist of all biological materials other than timber which are exploited from the forest for human use (Ahenkan et al. 2010). Currently, the increase demand for forest products and the technology adopted for its extraction are without corresponding advancement in forest sustainability. Management practice have caused serious deforestation and degradation of forest resources in various parts of the world (FAO,2005). Forest resources are a key component of natural resource base of any community, region or country and they play a fundamental role in the socio-economic well-being of the people of those communities (Inoni,2009).

MATERIALS AND METHODS

Study Area: Cross River State is located within the tropical rainforest belt of Nigeria. It lies between latitude 4 ^{o} 28' and 6^o 55' North of equator and between longitude 7^o 50' and 9^0 28' East of Greenwich meridian. It has a total land mass of about 23000km^2. Arising from its location, the state enjoys a tropical climate with the Obudu plateau at an altitude of 1595.79 metres above sea level enjoying temperate climate. The State recorded heavy rainfall during the wet season (April to September). At least five distinct ecological zones are represented in the State. It ranges from mangroves swamp forest towards the coast, tropical rainforest further inland and savannah woodlands in the northern parts of the State. The montane types of the vegetation are experienced along the highlands of the Obudu plateau. The favorable climate of tropical, humid, dry and wet seasons give rise to rich agricultural lands. Hence, the major socio-economic activities in the State include agriculture (perennial and annual crop cultivation), timber exploitation, hunting, extraction of non-wood forest products and trading.

Study Design and Type

A research design is a plan showing how problems under investigation are solved. A descriptive cross sectional survey design was adopted in this study. Descriptive research enables the researcher to collect data by means of observation, description and recording, analyzing and reporting the conditions operating at that

moment from a population (Cooper &Schindler, 2006). The cross - sectional research design is also suitable in finding out the prevalence of a problem or situation in the study by selecting a cross section of the population. The design is helpful in obtaining an overall of the time of carrying out the study according to Ranjit (2011). This means that cross sectional research enables the researcher to collect data and compare many different variables at the same time without manipulating the study environment. In this study researcher employed both quantitative and qualitative methods of data collection. This was couple with purposive sampling technique to select the respondents.

Study Population

According to Ngechu (2004), a population is a well - defined or set of people, services, elements and events, group of or households that are being investigated. The study population should have some observable characteristics to which the researcher intends to generalize the results of the study. This study was carried out in six communities within three local government areas (LGA) of Cross River State, Nigeria. The selected communities were subjected to reconnaissance survey in order to obtain the sampled households within each of the selected communities for questionnaire administration (Table 1)

Sample Size Estimation

THE formula developed by (Ranjit,2011) for calculating sample size was used to select 223 respondents for the study: $n= N/(1+N(x)^2)$ ------ Eq. (1)

Where: n=sample size, N= Total number of the households, X=Tolerable error/margin of error, in this case, it was 0.05. Proportional allocation method was used to allocate sample size to each selected community. Thus: $n_h=N_h/N*n$ ----------Eq. (2)

Where: n_h = sample size of each selected community, N = Total number of the households, n=Total sample size, N_h = Number of households in each selected community.

Table 1: Location of study area and sample size

LGA	Selected Community	Number of households	Sample size (n)
Akpabuyo	Ikot Asuquo Edem	67	30
-do-	Akwa Ikot Effanga	102	45
Akamkpa	Oban	120	53
-do-	Awi	87	39
Biase	Iwuru	72	32
-do-	Iko Esai	55	24
Total		503	223

Data collection

Self - administered questionnaires and interviews were used to collect data from the respondents. The formal interview method of data collection offers a greater chance to explore the topics in-depth and allowed for interaction such that any misunderstanding of the question and answers provided could easily be corrected.

Data Processing and Analysis

The data collected were coded, edited, analyzed and rephrased to eliminate errors and ensure consistency. Both quantitative and qualitative data analysis methods were used in the study. Descriptive and inferential statistical analyses were employed using the SPSS version 21.0.

RESULTS

Table 2 (i-vi) revealed that majority (68.16%) of the respondents were male household while only 31.84% were female household. Both male and female households in the study area constitute bread winner in their respective families. 80.27 % of the respondents in the study area belonged to the age bracket of 31-60 years followed by those in age group 21-30 years which represent 13% of the total respondents (Table 2 ii). As regards the educational level, Table 2 (iii)

revealed that only 39.46% of the respondents had primary education while 29.15% had no formal education. Others had either post primary (17.94%) or post-secondary education (13.45%). For their marital status about 20.18% were single among the respondents while 79.82% were married (Table2 iv). Majority (57.84%) of the respondents were either farmers or gatherers. Traders (13.45%) and government staff (13.01%) while hunters were 6.28% of the respondents (Table 2 (v). Many of the respondents were low level earners with 53.81% of the respondents having N10000 to N30000 annual income, just as 35.43% had between N30001 and N70000 annual income. Only 10.76% of the respondents had their annual income above N70000 (Table 2 (vi).

Table 2: Demographic characteristics of respondents (N = 223)

Gender	Akpabuyo IkotAsuquo Edem	Akpabuyo AkwaIkot Effanga	Akamkpa Oban	Akamkpa Awi	Biase Iwuru	Biase IKo Esai	Total (%)
Male	20(8.97)	31(13.9)	36(16.14)	27(12.11)	22(9.87)	16(7.17)	152(68.16)
Female	10(4.48)	14(6.28)	17(7.62)	12(5.38)	10(4.48)	8(3.59)	71(31.84)
Total	**30(13.45)**	**45(20.18)**	**53(23.77)**	**39(17.49)**	**32(14.35)**	**24(10.76)**	**223(100.0)**
(ii) Age (years)							
Up to 20	1(0.45)	1(0.45)	2(0.90)	1(0.45)	1(0.45)	1 (0.45)	7(3.14)
21-30	4(1.79)	6(2.69)	7(3.14)	5(2.24)	4(1.79)	3(1.34)	29(13.0)
31-40	8(3.59)	11(4.93)	13(5.83)	10(4.48)	8(3.59)	6(2.69)	56(25.11)
41-50	9(4.04)	14(6.28)	16(7.17)	12(5.38)	10(4.48)	7(3.14)	67(30.05)
51-60	8(3.59)	11(4.93)	13(5.83)	10(4.48)	8(3.59)	6(2.69)	56(25.11)
60+	1(0.45)	2(0.90)	2(0.90)	1(0.45)	1(0.45)	1(0.45)	8(3.59)
Total	**30(13.45)**	**45(20.18)**	**53(23.77)**	**39(17.49)**	**32(14.35)**	**24(10.76)**	**223(100.0)**
(Iii) Educational status							
No Formal	9(4.04)	13(5.83)	15(6.73)	12(5.38)	9(4.04)	7(3.14)	65(29.15)
Primary	12(5.28)	18(8.07)	21(9.42)	15(6.73)	13(5.83)	9(4.04)	88(39.46)
Post prim	5(2.24)	8(3.59)	10(4.48)	7(3.14)	6(2.69)	4(1.79)	40(17.94)
Post Sec	4(1.79)	6(2.69)	7(3.14)	5(2.24)	4(1.79)	4(1.79)	30(13.45)
Total	**30(13.45)**	**45(20.18)**	**53(23.77)**	**39(17.49)**	**32(14.35)**	**24(10.76)**	**223(100.0)**
(iv) Marital status							
Single	6(2.69)	9(4.04)	11(4.93)	8(3.59)	6(2.69)	5(2.24)	45(20.18)
Married	24(10.76)	36(16.14)	42(18.83)	31(13.90)	26(11.66)	19(5.82)	178(79.82)
Total	**30(13.45)**	**45(20.18)**	**53(23.77)**	**39(17.49)**	**32(14.35)**	**24(10.76)**	**223(100.0)**
(v) Major occupation							
Farming	10(4.48)	14(6.28)	18(8.07)	13(5.83)	11(4.93)	8(3.59)	74(33.18)
Trading	4(1.79)	7(3.14)	7(3.14)	5(2.24)	4(1.79)	3(1.35)	30(13.45)
Govt Staff	4(1.79)	6(2.69)	7(3.14)	5(2.24)	4(1.79)	3(1.35)	29(13.01)
Gathering	7(3.14)	11(4.93)	13(5.83)	10(4.48)	8(3.59)	6(2.69)	55(24.66)
Artisan	3(1.35)	4(1.79)	5(2.24)	4(1.79)	3(1.35)	2(0.90)	21(9.42)
Hunting	2(0.90)	3(1.35)	3(1.35)	2(0.90)	2(0.90)	2(0.90)	14(6.28)
Total	**30(13.45)**	**45(20.18)**	**53(23.77)**	**39(17.49)**	**32(14.52)**	**24(10.76)**	**223(100.0)**
(vi) Annual Income (N)							
Up to 10000	8(3.59)	11(4.93)	13(5.83)	10(4.48)	8(3.59)	6(2.69)	56(25.11)
10001-30000	9(4.04)	13(5.83)	15(6.73)	11(4.93)	9(4.04)	7(3.14)	64(28.70)
30001-50000	6(2.69)	9(4.04)	11(4.93)	8(3.59)	7(3.14)	5(2.24)	46(20.63)
50001-70000	4(1.79)	7(3.14)	8(3.59)	6(2.69)	5(2.24)	3(1.35)	33(14.8)
70001+	3(1.35)	5(2.24)	6(2.69)	4(1.79)	3(1.35)	3(1.35)	24(10.76)
Total	**30(13.45)**	**45(20.18)**	**53(23.76)**	**39(17.49)**	**32(14.52)**	**24(10.76)**	**223(100.0)**

Socio-Economic Values of Wood and Non-Wood Forest Products

It was observed from Table 3 that there are several socio-economic values of wood and NWFPs in the study area. Source of raw materials

(94.17%), source of energy (91.03%), source of food and nutrition (87.44%), income generation (82.51%), medicinal uses (78.03%) and employment generation (74.89%) production of household and agricultural tools (51.12%) recorded high percentage of response while others such as source of trophy and souvenirs, source of ecotourism and recreation, site for cultural and religious celebration, erosion and flood control, agroforestry and facilitating fishing recorded the least response of 34.08%, 38.12%, 37.67%, 27.8%, 43.5% and 12.56% respectively.

Table 4 shows seasonal variation collection per month and the relative quantity from each identified products over the study area. According to muzayen (2010) the majority of the NWFPs are available seasonally especially honey, bush mango, star apple, fruit,

Table 3: Identified socio-economic values of wood and non-wood forest products

S/N	Socio-economic values of wood &NWFPs	Total response	Percent
I	Source of food and nutrition	195	87.44
Ii	Source of industrial raw materials	210	94.17
Iii	Medicinal uses	174	78.03
Iv	Source of ecotourism & recreation	85	38.12
V	Source of energy	203	91.03
Vi	Income generation	184	82.51
Vii	Source of craft raw materials	153	68.61
Viii	Source of trophy and souvenirs	76	34.08
Ix	Site for cultural and religious celebration	84	37.67
X	Employment generation	167	74.89
Xi	Erosion and flood control	62	27.8
Xii	Production of household & agric. tools	114	51.12
Xiii	Agroforestry	97	43.5
Xiv	Source craft raw materials	65	29.15
Xv	Facilitating fishing	28	12.56

Table 4: Seasonal Variation of Wood and Non-wood forest products collection in Cross River State

Variation	Jan	Feb	March	April	May	June	July	Aug.	Sept	Oct.	Nov	Dec.	Total
Fuel wood	10	12	14	12	8	6	4	4	6	6	8	12	100
Honey	20	20	20	20	20	0	0	0	0	0	0	0	100
Bush meat	10	10	10	14	10	10	5	5	10	10	5	5	100
Bush mango	10	10	12	5	10	10	10	9	6	6	3	5	100
Salad	10	5	10	8	8	8	10	10	10	6	6	10	100
Cane rope	9	9	10	6	7	8	8	8	8	8	8	8	100
Leaves	5	5	5	10	10	10	5	8	10	10	10	10	100
Bark	10	13	13	10	20	0	0	0	0	20	5	5	100
Medicine	8	8	8	8	8	8	8	8	8	8	8	8	100
Snail	0	0	6	12	12	12	12	12	12	8	0	0	100
Star apple	10	15	15	15	0	0	0	0	0	15	15	10	100
Bitter cola	0	5	12	10	12	10	9	9	5	5	10	10	100
Liana	10	14	14	10	8	7	8	0	0	6	10	10	100
Cray wood	10	14	14	10	8	8	7	7	6	0	5	0	100
Thematococus	0	0	10	10	10	10	10	10	6	6	5	0	100
Hot leave	10	10	10	9	0	0	10	10	10	10	10	5	100
Hotleave seed	0	0	4	6	10	6	10	10	10	12	12	12	100
Fruits	15	15	15	15	10	0	0	0	0	0	15	15	100
Bulb	0	0	0	0	18	18	18	18	6	6	6	6	100
Flower	12	12	12	6	0	0	0	10	12	12	12	12	100
Xypopia sp	10	10	10	10	10	10	0	0	0	0	20	20	100
Tetrapleura	0	0	0	0	10	5	10	15	15	15	15	15	100
Mushroom	7	7	6	0	0	0	0	0	20	20	20	20	100
root	10	10	10	10	4	10	6	6	4	5	6	6	199
Reptiles	0	5	5	5	10	10	10	0	0	15	15	15	100
utensils	8	10	10	6	6	8	10	8	8	6	0	0	100
Garcinia sp	8	8	8	10	5	5	8	5	10	8	10	8	100

DISCUSSION

The findings agree with Madu (2006) that 69% of the respondents were male household head while 31% of the respondents were female household head. The result also shows that so many youths were not involved in forest activities. This is because forestry business requires time and students may not be able to leave their studies for a long time. As regards the respondent's educational level, the study reveals that most of them involved in forestry business were educated. This could enhance easy understanding of sound forest management innovation if introduced to them. A lot of people considered the forest as a warehouse for goods and services. The forest dwellers depend on the forest and its resources for their daily sustenance. They make use of a wide range of forest products to fulfil several livelihood requirements ranging from an immediate household need, cultural and traditional needs to daily cash income. The socio-economic values of wood and non-wood forest products include:

NWFPs such as fruits, nuts, condiments, vegetables, honey, berries, snails, mushroom and bushmeat play a vital economic role in the livelihood of forest and urban dwellers in the state. Some food obtained from the forest products have peculiar characteristics of being seasonably available, especially during harvesting period. There is no means of preserving them, so a lot them are wasted and cheap sales (Udofia et al.,2013).

About 94% of the respondents identified the provision of raw materials as the major socio-economic significance of wood and non-wood forest products in the study area. There are forest base industries that depend on wood raw materials from forest. Raw materials such as honey and other extracts from the fruits and leaves are used by pharmaceuticals and traditional healers (Udofia, et al., 2013).

Majority (80%) of the respondents depend non-wood forest products as a means of herbal health care remedies and natural products. Barks, leaves, seeds and roots of plants such Moringa oleifera, Allium ascalonicum, Piper guineensis and Occimum gratisoimum (Etukudo, 2000). The preference of non-wood forest products ranges from traditional belief to its being readily available and low cost. Today, no nation of the world whether developed or developing can afford to ignore the importance of wild games and recreation. Wild games and recreation are akin to tourism. More than ever before, nations of the world have become increasingly more aware of the immense benefits derivable from tourism. However, tourism can cause severe environmental problems ranging from the possible destruction of social fabrics of adjacent communities, thereby destroying the very resource that led to the industry itself (Marguba, 2006).

Fuel wood is patronized by the majority (91.03%) of the respondents in the study area both of rural and urban household in the study area. Wood fuel consumption has been all time high due to the unreliable and indiscriminate increases in the price of petroleum products in Nigeria. This situation calls for means of supplementing the demand of wood for fuel (Aina, 2006). With high cost of kerosene and gas, fuel wood is a major heat energy source in the study area where it is used for cooking and heating. About 82.51% of the respondents claimed that their relationship with forest is income generation. Wood and non-wood forest products constitute the bedrock of the most reliable and consistent sources of income to rural dwellers in study area. The rural dwellers derive income from woody species which provide timber, fruits, leaves, nuts, building materials, craft materials, medicinal plants bushmeat and fuelwood trading (FAO, 2010).

Many forest products are used to make crafts which are as souvenirs in rural and urban markets. Craft raw materials are reported by 68.67% of the respondents and is reliable sources of income to rural and urban crafts men in the study area. The major constraint is lack of sustainability in exploiting craft raw materials such as rattan, ebony and canes (Inoni, 2009).

Forests constitute a renewable source of valuable trophy and souvenirs that are currently increasingly demand and that have little prospect of being replaced by economically and environmentally acceptable substitutes. This is

largely patronized by tourists and 34% of the respondents claimed that the trophy and souvenirs are by products obtained from ivory and python skin.

Respondents revealed that forest reserve protect the soil from erosion, flooding and decline of the water table. Forest reserve also provide indirect values to ecosystem service that indirectly contribute to the improvement of economic productivity and improvement in the quality of life in general. Income and employment are the necessary social requirement needed by mankind for food security and a better standard of living. The result revealed that 74.89% of the respondents are involved in different types of employment in the study area. A lot of household utensils and agricultural tools such as cane chairs and tables, baskets, mortar and pistles, sleeping mats, mattocks, tool handles like hoes and axe handles as well as other farm implements. Agroforestry is a combination of agricultural crops and forest trees simultaneously on the piece of land. 43.5% of the respondents revealed that agri-silviculture is of major significance and immense benefits of the interaction with forest reserve (Agbeloha, 2008). About 12.56% confirmed that forest excessive evapotranspiration and maintain streams flow by shading water courses and preventing silting of the rivers. Therefore, a lot of fishes exist in the water holes, ponds, lakes and rivers in all the study area.

Result shows seasonable gathering and the relative quantity collected from each of the study areas. This is in line with report submitted by Muzayen (2010) that majority of the cave rope, medicinal plants, fuel wood and bush mango were collected throughout the year.

CONCLUSION

This study was carried in Cross River State Nigeria with the aim of assessing the socio-economic benefits of the wood and non-wood forest products in the state. The result of the study revealed that forest and its resources are of significant importance to the rural and urban dwellers in the state. It continues to make an important contribution to the livelihood of the forest dwellers in Cross River State, Nigeria. The rural people continue to depend increasingly on the forest and its resources for their sustenance. The status of forest resources in the study areas is no longer considered as renewable resources or inexhaustible by the rural poor as result of numerous factors including anthropogenic activities, agricultural plantation establishment and infrastructural development. In fact, most of these forest resources are being imported from neighboring countries because high rate of deforestation in this study area.

It is therefore recommended that every household must endeavor to establish home garden, small wood lots or orchard to reduce and minimize people high dependency on the forest and its resources

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