

Assessment of Forest Products and Services Utilization as Sustainable Livelihood Options Among Households in Okpukwu Local Government Area, Benue State, Nigeria

Ancha, P.U.^{1*}, Ikyagba, E.T.¹, Egwunatum, A.E.², Origbo, B.I.¹ and Sunday, L.M.¹

¹Department of Social and Environmental Forestry, University of Agriculture, Makurdi
Nigeria

²Department of Forestry and Wildlife, Nnamdi Azikiwe University Awka, Anambra
State, Nigeria

*Corresponding author: anchapaul@gmail.com

Abstract

This study examined the impact of extraction and utilization of forest resources as sustainable livelihood option for households in Okpukwu LGA in Benue State. Data was collected from 144 respondents with the aid of semi-structured from six (72) households in 12 communities from the six (6) randomly selected council wards in the LGA. Descriptive statistics as percentages and mean, 5 point Likert scale rating and Spearman correlation analysis were employed to analyze socio-economic characteristics, forest resources exploitation and utilization as well as relationship between socioeconomic variables of the people and level of forest utilization. The results showed that there were significant differences between variable responses in the six wards in family sizes, distance to the forest, educational status, occupation, age, sex and estimated income from

collected forest resources. Majority of the respondents that collected forest resources from the reserve were between 31-40 years of age, with reserve contribution to the livelihood of the people rated low in food (MWS=2.01<2.95), income(MWS =2.31 < 2.95), and low in the area of Trade (MWS =2.84 < 2.95). However, the mean weight score of contribution of forest resources to livelihood was in the order recreation (4.33) > employment (4.33) > medicine (3.34); type and abundance of forest products was chewing stick (2.59) > animal fodder (2.57) > fuelwood (2.45) while the utilization level was fuelwood (4.47) > folder (4.50) > Mushroom (4.44) > Timber (4.33). The study revealed that 2/3 of the 18 identified forest products in Okpodu LGA were highly utilized (MWS > 3.05) for proceeds from the reserve (19.4%) and re investing in farming activities (13.8%). The study recommended the pursuit and enlistment of these forest communities into the global carbon credit scheme for sustainable management of identified forest products and services, especially the fuelwood with high potential of causing degradation and deforestation.

Key words: Forest products, services, utilization, sustainable livelihood, households.

INTRODUCTION

Forest resources are critical key component of the natural resource base of communities, regions or countries in the socio-economic well-being, as large rural populace often rely on natural resources for livelihoods. This is because forests provide numerous benefits that range from utilitarian value in provision of food and timber products to ecological and edaphic services that sequester carbon and maintain watershed against groundwater degradation respectively for sustained intangible values (Popoola, 2002; Agbogidi and Eshegbeyi, 2008; Egwunatum et al, 2018) as well as recreational and intrinsic values that have overtime been restrained to rural communities. Food and Agricultural Organisation (FAO) stated that the forest sector contributes about \$468 billion to national income, representing 1% of global GDP in 2006 (Jaunky and Lundmark, 2016). Forests have

contributed significantly to the economy of Edo State through 217 wood mills established across state with over 10000 workers generated revenue of over N250 million between 1991 and 2002 (Ehiagbanare, 2007). Consequently, the forestry subsector is pivotal for national economic development as veritable resource base for teeming industries, providing one of the highest revenue and employment generating sector (Abu and Adebisi, 2002).

Significantly, the contributions from this sector have been linked over time with the rural economy that overtly accounts for more than 80% of forest produce and products. Forest products constitute a major source of livelihood in rural areas with over 45% of the country's population lives in rural areas (World Bank, 2002). The majority of these people depend on the environment and natural resources for their livelihoods. A greater populace of these rural dwellers earn more of their livelihoods from the gathering, processing and sales of the multipurpose forest tree species resource of the forest (Koziell and Saunders, 2001; Laweset *al.*, 2004). This is irrespective of the type of forest as they apparently supply variegated products that eventually become sustainable livelihood options readily meeting the needs of rural poor. The forest wood and non-wood products include traditional medicines, honey and beeswax, tubers, wild animals, fodders and fibres, wild fruits, mushrooms, and wild vegetables. The forest wood produce component as fuelwood and charcoal accounts for 56% of global wood production with approximately 90% produced in developing countries being the major source of energy for most of the world's rural areas (WCFSD 1998; IEA, 2002; Egwunatum and Udoba, 2017). Furthermore, the forest represent a potential source for variety of nutritional supplement, especially spices, condiments and 'white meat' for a good proportion of households in both urban and rural conurbations.

Despite the numerous benefits accruable from forest, the increasing rate of deforestation and forest degradation constitutes serious concern on the likely capacity of existing forest in communities to still meet the needs of her immediate and the secondary urban

households to produce substantial economic leverage. The report of Idumah and Awe (2017) of poor timber export earnings of \$400.2 million behind Cameroun and Gabon with \$745.9 million and \$474.7 million respectively from 2011-2015, in comparison with the earlier growth of 4.1%, 8.0% and 28.8% between 1950 – 60, 1960– 70 and 1970 – 80 respectively in the forestry sector shows the significant challenge in the potential of forest resources to sustain economic growth in Nigeria. Although the intensive exploitation of the forest resources has been advanced among several factors as probable cause of declining forest (Ogunwusi, 2012), yet it is very critical to actually ascertain the variability and veracity of this decline with respect to individual climes of rural forest holdings.

This, therefore underpinned the need for this study in Okpokwu Local Government Area with a gazette of Forest reserve and many natural community forests that could play a great role as sustainable livelihood option in improving rural communities' standards of living for the present and future generation in Benue State. Hence, this research was conducted to provide information on the Utilization of forest products and services for livelihoods among households in Okpokwu Local Government Area, Benue State.

2.0. MATERIALS AND METHODS

2.1. Description of Study Area

Okpokwu local government area is a local government area in Benue state Nigeria. It is located between latitude 6°30'N to 8°30'N and longitude 7°30'E to 10°0'E. It has an area of 731 km² with a population of approximately 176,647 (NPC, 2006). Figure shows the map of Okpokwu local government area.

Okpokwu local government areas economy is agricultural as most of the indigenes are farmers. The staple crops are yams and taro, known locally as cocoa yams while other crops of importance include maize, manioc, peppers, peanuts, tomatoes, squash, and sweet potatoes.

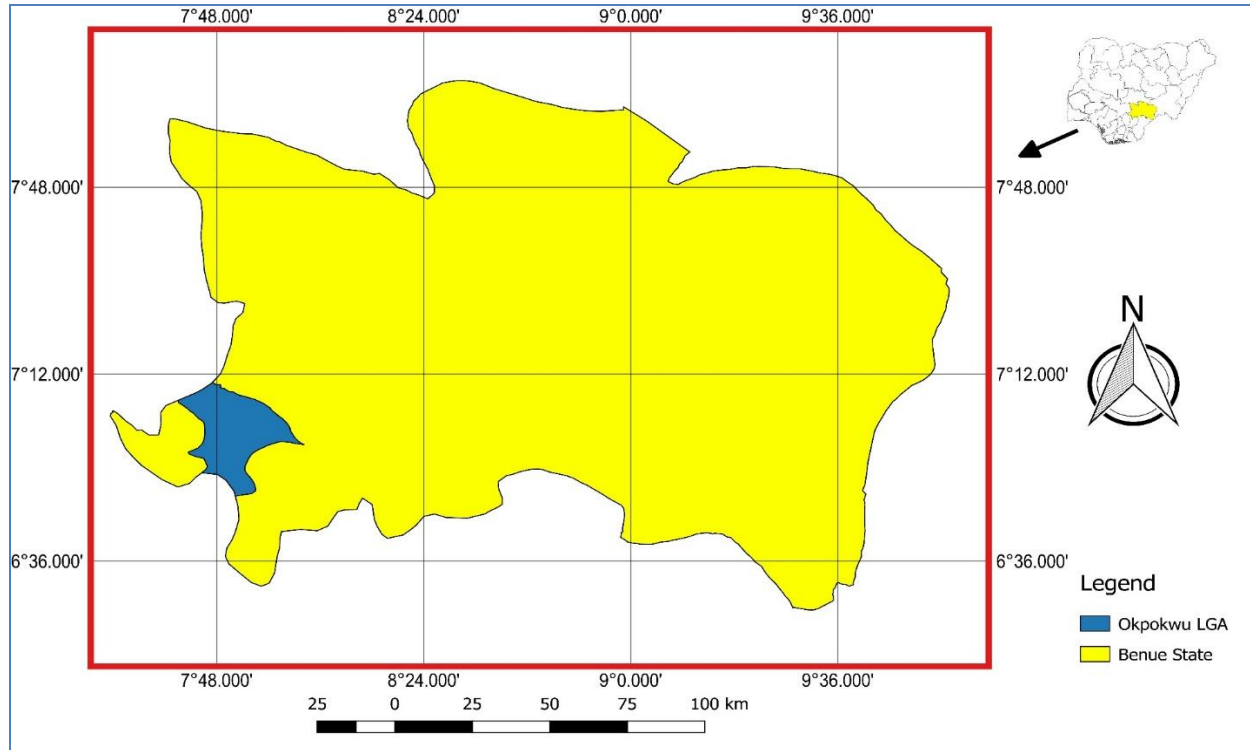


Fig. 1. Map of Okpokwu Local Government Area

2.2. Sampling Procedure and Data Collection

Six council wards of Okpokwu LGA were randomly selected from the 12 council wards from which 2 communities were selected from each of the selected wards. Then 6 households were randomly sampled from each community and 2 matured members of each the households were selected, to give a total of 144 people. The six council wards were Okpafie, Effoyo, Olayenga, Eke, Olo, Ugbokolo. Primary data for the study were collected with copies of a semi-structured questionnaire as well as structured five-point Likert scale rating format as employed by Dagba (2017), with closed and open-ended questions.

2.3. Data Analyses

Descriptive statistics such as frequency mean and percentage was used to analyze the socio economic characteristics of the people in the study area. The spearman rank correlation analysis was used to test for significant relationship between socioeconomic variables of the people and level of forest utilization in the study area. The Spearman Rank correlation is expressed as:

$$r_s = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$$

Where:

r_s = Spearman Rank Correlation Coefficient

d = The difference between the two ranks of each observation

n = Number of observations

6 = Constant of the formula

Positive correlated variables indicate that the variables move in the same direction, meaning that increase in one variable leads to increase in the other variable. Negatively correlated variables indicate that the two variables move in the opposite direction, meaning that increase in one variable leads to decrease in the other variable.

A five point Likert scale rating format as used by Dagba (2017) was employed to measure the contribution of forest products and services to livelihood and level of utilization of forest resources

The weighting scale was derived from the following values with respect to level of utilization of forest resources; Very High (VH) = 5, High (H) = 4, Moderate (M) = 3, Low (L) = 2, Very Low (LV) = 1.

The Likert Rating Mean Score (MS) was expressed as: $MS = \frac{\sum f}{n}$

Where:

f = Summation of the five point rating scale and

n = Number of points

Therefore, for a five point Likert scale, MS is expressed as: $MS = \frac{1 + 2 + 3 + 4 + 5}{5}$

$$MS = 3.0$$

The Likert Weighted Mean Score (WMS) of contribution of forest products and services to livelihood and level of utilization of forest resources was expressed as:

$$WMS = \frac{\sum_{i=1}^n f_i x_i}{n}$$

Where:

f = frequency of respondent

x = Likert scale point

N= Total Number of respondents

Using the interval scale of 0.05, the Upper Limit (UL) cut-off is $MS+0.05$ ($3.0+0.05 = 3.05$). The Lower Limit (LL) cut-off is $MS - 0.05$ ($3.0-0.05 = 2.95$). Based on these two extreme limits any variable with WMS below 2.95 ($WMS < 2.95$) was considered 'Low'. Variable with MWS between 2.95 and 3.05, 'Moderate' any variable MWS greater than 3.05 ($MWS > 3.05$), 'High'.

A three point Likert scale rating format was used to assess the level of abundance of forest products and services in area.

3.0. RESULTS

3.1. Socio-economic Characteristics of Respondents

The results of the socio-economic characteristics of respondents (Table 1) show that 57.6% of the respondents interviewed were males while 42.4% were females. With respect to the interviewed households, age of the respondents ranged from <20 to >50, with the highest age ranging between 31-40 years (28.5%) with a mean age of 43 years. The highest family size ranged was between 5-10 (53.5%) with mean family size of 6 persons. The result also revealed the major occupation of the respondents, 29.2% of the respondents are farmers, 22.2% while 20.1% are traders, 18.1% are civil servants and 10.% are timber dealers.

Household estimated income per annum was also determined. The majority of the household had estimated income that ranged between N1,000 - 250,000 (77.6%), N251-500,00 (10.1%), N501,000 - N750,000 (5.6%), 751,000 - N1,000,000 (3.5%) and >N1,000,000 (2.8%). The estimated mean annual income of the people was N233,125.00K

Distance from home to forest was also estimated, more than half respondents (54.2%) reside at <5 Km away from the forest while 40.3% reside between 5-10 Km, 3.5% between 11-20Km, 1.4% between 21-30Km and 0.7% resided between 31-40Km from the forest. The mean distance from home to the forest was 5.3Km.

Table 1: Socio-economic Characteristics of the Respondents

Characteristics	Category	F (n=144)	%
Sex	Male	83	57.6
	Female	61	42.4
Marital Status	Single	26	18.1
	Married	89	61.8
	Divorced	12	8.3
	Widow(er)	17	11.8
Age category	<20	3	2.1
	21-30	24	16.7
	31-40	41	28.5
	41-50	40	27.8
	>50	36	25.0
Major occupation	Civil servant	26	18.1
	Farming	42	29.2
	Trading	29	20.1
	Timber dealer	15	10.4
	Others	32	22.2
Educational status	Primary	32	22.2
	Secondary	53	38.8
	Tertiary	36	25.0
	Non formal	18	12.5
	Others	5	3.5
Estimated annual income	1,000 - 250,000	112	77.6
	251,000- 500,000	15	10.1
	501,000 -750,000	8	5.6
	751,000 – 1,000,000	5	3.5
	>1,000,000	4	2.8
Family size	<5	42	29.2
	5-10	77	53.5
	11-15	11	7.6
Distance from home to forest	<5	78	54.2
	5-10	58	40.3
	11-20	5	3.5
	21-30	2	1.4
	31-40	1	0.7

3.2. Contributions of Forest Products and Services

The contribution of forest products and services to the livelihood of the people is shown in Table 2. The reserve contributed very high to the livelihood of the people in medicine resources (MWS =3.34>3.0), employment (MWS =3.58 > 3.0), recreation (MWS =4.33 >3.0) water (MWS =4.09>3.0) and conducive environment (MWS=4.14>3.0).

However, the contribution of forest reserve was low with respect to the livelihood of the people in food (MWS=2.01<2.95), income (MWS =2.31 < 2.95), and low in the area of Trade (MWS =2.84 < 2.95).

Table 2: Types and Abundance of Forest Products and Services in Opkokwu Local

Government Area

Forest products	Very abundant	Moderately abundant	Less abundant	N	Weighted score	Weighted mean score	Decision
Fuel wood	83(249)	43(86)	18(18)	144	353	2.45	Very abundant
Edible vegetable	72(216)	48(96)	24(24)	144	336	2.33	Very abundant
Folder	10(30)	63(126)	71(71)	144	227	1.57	Less abundant
Mush room	95(285)	26(52)	23(23)	144	360	2.5	Very abundant
Medicinal herbs	112(336)	13(26)	19(19)	144	381	2.64	Very abundant
Timber	45(135)	90(180)	9(9)	144	324	2.25	Very abundant
Bush meat	55(165)	77(154)	10(10)	144	329	2.28	Very abundant
Chewing stick	102(306)	26(52)	16(16)	144	374	2.59	Very abundant
Pole	52(156)	80(160)	12(12)	144	328	2.27	Very abundant
Honey	63(189)	58(116)	23(23)	144	328	2.27	Very abundant
Snail	36(108)	65(130)	43(43)	144	281	1.95	Moderately abundant
caterpillar	83(249)	42(84)	19(19)	144	352	2.44	Very abundant
cricket	61(183)	62(124)	21(21)	144	328	2.27	Very abundant
climbers	44(132)	83(166)	17(17)	144	315	2.18	Very abundant
Charcoal	43(129)	72(144)	29(29)	144	302	2.09	Moderately abundant
Wild fruits	19(57)	100(200)	25(25)	144	282	1.95	Moderately abundant
Animal fodder	101(303)	25(50)	18(18)	144	371	2.57	Very abundant
Water supply	56(168)	64(128)	24(24)	144	320	2.22	Very abundant
Provision of shade	9(27)	19(38)	4(4)	32	69	0.47	Less abundant

Note:

VA= Very Abundant, MA= Moderately Abundant and LA= Less Abundant N= Frequency, WS = Weighted score, MWS = Mean weighted score. Figure outside the bracket are the frequency of the students while figures in the bracket are product of Likert scale value and frequency of students. (N)=195. For 3 point Likert Scale rating; Mean Score (MS) =2.0, Upper Limit (UL) =2.05 and Lower Limit (LL) =1.95

3.3. Impact of Forest Reserve Proceeds

The needs of respondent met with proceeds from the forest reserve are presented in Table 3. The priority need met by the respondents was feeding of households from proceeds obtained from the reserve (19.4%) and was ranked first while reinvesting in farming activities (13.8%) was ranked second. Other needs met by the respondents from proceeds obtained from the reserve were paying children school fees (13.7%), local saving (12.3%), building houses (11.1%), raising capital for other businesses (10.3%), marrying more wives (7.0%), paying medical bills (6.3%) and employment (6.1%). These needs were ranked third, fourth, fifth, sixth, seventh, eighth and ninth respectively.

Table 3. Contribution of Forest Products and Services to Livelihood in Okpokwu

Local Government Area, Benue state

Forest product	Very high	High	Moderate	Low	Very low	N	WS	WMS	Decision
Food	12(60)	46(184)	63(189)	18(36)	5(5)	144	290	2.01	VL
Income	70(360)	54(216)	18(54)	2(4)	0(0)	144	334	2.31	VL
Medicine	7(35)	58(232)	59(177)	18(36)	2(2)	144	482	3.34	VH
Employment	19(95)	69(276)	37(111)	15(30)	4(4)	144	516	3.58	VH
Trade	6(30)	34(136)	52(156)	36(72)	16(16)	144	410	2.84	L
Recreation	65(325)	64(256)	12(36)	3(6)	0(0)	144	623	4.33	VH
Water	39(195)	82(328)	20(60)	3(6)	0(0)	144	589	4.09	VH
Conducive environment	59(295)	54(216)	24(72)	7(14)	0(0)	144	597	4.14	VH

Note:

VH= Very High, H=High, M= Moderate, L= Low, VL= Very Low

N= Frequency, WS = Weighted score, MWS = Mean weighted score.

Figure outside the bracket are the frequency of the students while figures in the bracket are product of Likert scale value and frequency of students. (N)=195, Mean Score (MS) =3.0, Upper Limit (UL) =3.05 and Lower Limit (LL) =2.95

3.4. Forest Resources Utilization Levels

The fuelwood recorded highest utilization level (MWS =4.47) while the least was shown by edible vegetable (MWS= 2.29). The utilization level of folder, mushroom, timber and pole were very high with mean weighted scores of 4.50, 4.44 and 4.33 respectively.

However, the chewing stick was least utilized (MWS= 2.71) while the edible vegetables, water supply, snail and wild fruits were rated very low in utilization.

Table 4. Current level of utilization of forest resources in Okpokwu Local

Government Area, Benue State

Forest products	Very High	High	Moderate	Low	Very Low	N	Weighted Scores	Weighted Mean Scores	Decision
Fuel wood	81(405)	51(204)	12(36)	0(0)	0(0)	144	645	4.47	VH
Water supply	40(200)	66(264)	34(102)	4(8)	0(0)	144	574	3.99	VH
Edible vegetable	3(15)	14(56)	31(93)	70(140)	26(26)	144	330	2.29	VL
folder	90(450)	41(164)	10(30)	2(4)	1(1)	144	649	4.50	VH
Mush rooms	83(415)	43(172)	17(51)	1(2)	0(0)	144	640	4.44	VH
Medicinal herbs	22(110)	42(168)	57(171)	22(44)	1(1)	144	494	3.43	VH
Timber	63(315)	66(264)	15(45)	0(0)	0(0)	144	624	4.33	VH
Bush meat	29(145)	52(208)	42(126)	18(36)	3(3)	144	518	3.59	VH
Chewing stick	4(20)	23(92)	51(153)	60(120)	6(6)	144	391	2.71	L
Pole	37(185)	79(316)	21(63)	7(14)	0(0)	144	578	4.01	VH
Honey	24(120)	40(160)	17(51)	52(104)	11(11)	144	446	3.09	VH
Snail	5(25)	17(68)	13(39)	58(116)	51(51)	144	299	2.07	VL
Caterpillar	22(110)	41(164)	52(156)	14(28)	15(15)	144	473	3.28	Very high
Cricket	32(160)	76(304)	26(78)	6(12)	4(4)	144	558	3.87	VH
Climbers	34(170)	32(128)	48(144)	28(56)	2(2)	144	500	3.47	VH
Charcoal	8(40)	59(236)	48(144)	26(52)	3(3)	144	475	3.29	VH
Wild fruits	5(25)	37(148)	45(135)	48(96)	8(8)	144	412	2.86	VH
Animal fodder	3(15)	13(52)	9(27)	5(10)	0(0)	30	104	3.46	VH

Note:

VH= Very High, H=High, M= Moderate, L= Low, VL= Very Low

N= Frequency, WS = Weighted score, MWS = Mean weighted score.

Figure outside the bracket are the frequency of the students while figures in the bracket are product of Likert scale value and frequency of students. (N)=195, Mean Score (MS) =3.0, Upper Limit (UL) =3.05 and Lower Limit (LL) =2.95

3.5. Relationship between Socioeconomic Characteristics of the People and Level of Utilization of Forest Resources

Table 5 shows the results of Spearman Rank correlation analysis between the socioeconomic variables of the respondents and level of utilization of forest resources in the study area. There was a non significant positive relationship ($r_s = 0.02, P > 0.05$) between the age of the respondents and level of utilization of forest resources. Also, there was a non significant positive relationship ($r_s = 0.06, P > 0.05$) between the family of the respondents and level of utilization of forest resources. However, there was a non significant negative relationship between the level of utilization of forest resources and educational level of the respondents ($r_s = -0.01, P > 0.05$), annual income of the respondents ($r_s = -0.05, P > 0.05$) and distance from home to forest reserve ($r_s = -0.07, P > 0.05$).

Table 5. Relationship between Socioeconomic Characteristics of the People and Level of Utilization of Forest Resources

Spearman Rank Test Variable	r_s	P. Value
Age Vs Level of Utilization	0.02	0.83
Educational level Vs Level of Utilization	-0.01	0.92
Annual Income Vs Level of Utilization	-0.05	0.54
Family Size Vs Level of Utilization	0.06	0.49
Distance from home to forest Vs Level of Utilization	-0.07	0.43

4.0. DISCUSSION

Males were more than the females in the collection of resources from the forest reserve. This result could be attributed to the types of resources collected that had bearing on usage by gender. Hence, this result contradicts Ofoegbu *et al.*, (2017) that reported women as more collectors of forest resources from the reserves than the men counterpart. Majority of the respondents that collected forest resources from the reserve were between 31-40 years of age. This findings may not be unrelated with the youthfulness and agility of middle age persons in the collection of forest products coupled with the drive to provide for the needs of family. Piyaet *al.*, (2011) in a similar study in Nepal observed the mean age of 41.5 years for collectors of forest resources. This finding also corroborates the assertions by Oyun and Olujobi (2012) and Usman *et al.*, (2016) that forest resources are collected by middle aged people.

The respondents with formal education were more than those with non-formal education in the collection of forest produce. This finding is in line with the study of (Lepetul and Garekae, 2015) but contrasted the finding of Ofoegbu *et al.* (2017) that majority of the communities collecting forest resources around the Kruger National Park in South Africa had non-formal education. This contrasting result in Benue State Nigeria could be as a result of the current unemployment trend in Nigeria that leaves formal educated individuals with no option than to compete with the non-formally educated sector for available jobs.

The respondents with household size between 5-10 persons were more in the collection of forest produce. This supports the preponderance of large family size among the poor in the rural areas of Nigeria (Eboh, 1995). Although such large family size may constitutes a social burden, its advantage on reduced labour input favorably facilitates forest product extraction and exploitation (Adhikari *et al.*, 2004; Balandet *al.*, 2004).

Furthermore, the number of persons involved in combining farming with other livelihood activities was predominate in the study area. This is in line with the findings

of Usman (2016) in that farming and animal rearing are the most important activities in the neighboring communities around Yankari Game reserve in Nigeria. This study revealed that people in the study area highly utilized traditional firewood, water, vegetables, fodder, mushrooms, medicinal herbs, timber, bush meat, electric pole, honey, caterpillar, cricket, climbers, charcoal and animal fodder. Langat *et al.* (2016) found 15 forest resources that were utilized by people to include firewood, timber, charcoal, honey, medicine, poles, thatch grass, fruits, fodder, agricultural tools, forest soils, building stones, mushrooms, fibres, and meat. These forest resources were similar to the ones obtained in this study.

The forest resources obtained in this study were similar to the findings of earlier work (Shackleton and Shackleton, 2014; Lunga *et al.*, 2015) and showed that large number of products collected from the forest reserve implied the sustainability of reserve vis-à-vis its positive impact on the livelihood of the people in the communities as veritable source of household economic empowerment (Aiyelaja and Ajewole, 2006). Significantly among these produce, fuelwood was the most collected products by the respondents compared to other products occurring on account of being the major source of energy for cooking and heating among rural households and the urban-poor in Nigeria and other developing nations (Adderson, 1987; Kalinda and Bwalya, 2014).

Even though the forest reserve contributed very high in food, income, medicine, trade and water supply, it could not support employment and recreation as it was low in contribution. These finding is consistent with the study Barirega *et al.*, (2012) that wild plants are increasingly valuable source of livelihoods for many people through household use and trading as medicine, food or craft materials than recreation.

The study revealed that honey is collected from forest trees, traditional beehives, and underground fissures with the respondents involved in beekeeping and honey collection from natural forests, particularly as study area is surrounded by natural forests particularly woodland which favours beekeeping. It was also observed that trees which

are used to hang beehives are not cut down making beekeeping to be an income generating activity while at the same time conserving forests. This is in agreement with Kessy *et al.* (2007) that reported the woodlands as potential forest types for the main source of wide range of non-wood forest products including honey and beeswax.

The respondents revealed that traditional medicine was employed occurring various diseases in the households, including headache, wounds, stomachache, malaria, diarrhea and anemia as alternative medicines and therapy (Chihongo, 1992; URT, 2002). In addition, some of the respondents reported that traditional medicines are sold in the market to earn income as approximately 80% of rural people depend on herbal traditional medicines from the indigenous forests for primary health care.

Most of the respondents collected poles for tool handles are for immediate home consumption while others are sold in order to earn cash income. Poles and tool handles are mostly used for construction of houses, fences, bed making, hoes and axe handles. These findings are in line with Monela *et al.* (2000) that trees are felled for the production of wooden products such as dug-out canoes, handles, ladles and ornaments. Furthermore, Turpie (2000) reported that poles of a variety of thicknesses are cut from both forests and mangroves, mainly for use in construction. This implies that, poles play a part in improving livelihoods of rural people.

The number of respondents in the sampled communities that obtain charcoal from forests revealed that charcoal makers are the ones who use charcoal for cooking in their households probably because those that do not make charcoal do not see the necessity of buying it while firewood is freely available. It was also reported that most of the produced charcoal is sold in order to earn income and very little is used for home consumption for the particular household of the charcoal maker. Makonda and Gillah (2007) corroborated this finding that reported up to 70% of cash income of most of the communities was earned from charcoal production.

5.0. CONCLUSION AND RECOMMENDATION

The study revealed that 18 different forest products were utilized from Odoaba forest reserve by the surrounding communities that relied on the forest products for different subsistence and commercial purposes. Fuelwood was the most important forest produce collected by households to improve their livelihood incomes generated from the sale of these forest products economically. Although there was low contribution of the forest reserve in the to employment and recreation, the use and sales of traditional medicine for curing various diseases headache, wounds, stomachache, malaria, diarrhea and anemia highly augmented earned income.

However, there is the need to educate collectors on sustainable harvesting /utilization practices to ensure sustainable livelihoods and continued impact on environment. This will go a long way curtailing unsustainable harvesting practices of forest resources and biodiversity conservation.

It is recommended that the State Government should provide alternative sustainable sources of energy by establishing community owned fuel woodlots, fuel-wood efficient stove by keying into International programmes on carbon credit scheme. These will reduce dependence on the forest reserve for source of energy, curtail deforestation and conserve the potential for supply of non-timber forest resources especially intrinsic and ethical values.

References

- Abu, J. E. and Adebisi, L. A. (2002). A review of traditional forest uses. In: Popoola, (ed). Proceedings of a national workshop organized by FANCONSULT and Edo State Chapter of FAN held in Benin City, Edo State between 5th and 6th of September, 2002. Pp.42-50.
- Adeniyi, A.S. (2015). Contribution of some ornamental plants to the socioeconomic development of urban household in Akure metropolis. *African Journal of Agricultural Research*. Vol. 10(4), pp. 264-268.

Agbogidi, O. M. and Eshegbeyi, O. F. (2008). Forestry development for a safe environment. In: Onykwelu, J.C., Adekunle, V.A.J. and Oke, D. O.(eds). Research for development in forestry, forest products and natural resources management. Proceedings of the 1st national conference of the forests and forest products society of Nigerian (FFPN) held at the Federal University of Technology, Akure, Ondo State between 16th-18th April, 2008. Pp. 95-98.

Angelsen, A. and Wunder, S. (2013). CIFOR Occasional Paper, No 40. Website: <http://www.cifor.cgiar.org>.

Angelsen, A., Jagger, P., Babigumira, R., Belcher, B., Hogarth, N.J., Bauch, S., BoRner, J., Smith- Hall, C. and Wunder. S. (2014). Environmental Income and Rural Livelihoods: A Global-Comparative Analysis. *World Development Vol. 64:S12–S28*.

Anorld, M. and Persson, R. (2003). Reassessing theFuel wood situation in developing countries. *International Forestry Review*. 5(4): 381 – 382pp.

Belcher, B. Achdiawan, R. and Dewi, S. (2015). Forest-Based Livelihoods Strategies Conditioned by Market Remoteness and Forest Proximity in Jharkhand, India. *World Development Vol. 66, pp. 269–279, 2015*

Bryon N., and Arnold J.E.M (1997). What futures for the people of the Tropical Forests? *Centre for International Forestry Research (CIFOR), Indonesia (Cifor) Working Paper No. 19*.

Clarke, J. W. Cavendish, and C. Coote (1996) Rural Household Management and Miombo Woodlands: Use, Value, and Management, pp. 101-36 in B. Campbell (ed.) *The Miombo in Transition: Woodlands and Welfare in Africa*, Bogor, CIFOR.

Garekae, H., Thakadu, O.T. and Lepetu, J. (2017). Socio-economic factors influencing household forest dependency in Chobe enclave, Botswana. *Ecological Processes (2017) 6:40, 1-10*.

http://www.efi.fi/attachment/f5d80ba3c1b89242106f2f97ae8e3894/241e80d8e1b2b0919426d5a82060db7e/Proc_47.pdf.

In: Oksanen, T, Pajari, B., Tuomasjukka, T. (eds.). Forests in poverty reduction strategies: capturing the potential. Joensuu, Finland, European Forest Institute. EFI Proceedings No. 47. 45-64. Available online [URL]:

Kaimowitz, D. (2003). Not by bread alone. Forests and rural livelihoods in Sub-Saharan Africa.

Kalinda, T. and Bwalya, S. (2014). Utilization of Forest Products and Services for Livelihoods among Households in Zambia. *Research Journal of Environmental and Earth Sciences* 6(2): 102-111, 2014.

Kantai, P. (2002). Hot and dirty. *EcoForum* 25 (4):16-22.

Kessy, J. F. (1998). Conservation and utilization of natural resources in EastUsambara Forest Reserves. *Conventional views and local perspectives*. Tropical resource management papers No. 18, Wageningen Agricultural University, The Netherlands. 168pp.

Kessy, J. F.; Mombo, F. M.; Muhammed, J. and Mariki, S. (2007). The status, potentials and limitations of marketing some non-wood forest products in themiombo woodlands of Tabora, Tanzania. *Journal of the Korean Association of African Studies* 25:283-306.

Kihwele, D. and Bradbear, N. (1989). Beekeeping. *Tropical Forestry Action Plan Tanzania*. Sector Review Mission Report No. 15, Dar es Salaam. Ministry of Lands, Natural Resources and Tourism. 15pp.

Koziell, I. and Saunders, J. (2001). living off biodiversity: Exploring livelihoods and biodiversity in natural resources management. IIED: London.U.K.36pp.

Langat, D.T., Maranga, E.K., Aboud, A.A and Cheboiwo, J.K. (2016). Role of Forest Resources to Local Livelihoods: The Case of East Mau Forest Ecosystem, Kenya. *International Journal of Forestry Research* Volume 2016:1-10.

Mariki, S. W. F. and Shechambo, J. S. (2003). *The contribution of environmental goods and services to Tanzania's economy: with reference to poverty reduction*. Policy Brief No. 5. Nairobi: The World Conservation Union, Eastern Africa Regional Office. 67pp.

- Maxwell S. A. and Frankenberger, T.R. (1992). *Household food security concepts, indicators and measurements*. A technical review. IFAD – UNICEF, Rome, Italy. 274pp.
- Nyborg, I. and Haug, R. (1994). Food security indicators for development activities by Norwegian NGO in Mali, Ethiopia and Eritrea. *A paper of the SSE- Program (Sudano-Sahel Belt of Africa)*. NORAGRIC. September, 1994. 27pp.
- Ofoegbu, C., Chirwa, P.W., Joseph Francis, J. and Babalola, F.D. (2017): Socio-economic factors influencing household dependence on forests and its implication for forest-based climate change interventions, *Southern Forests, Journal of Forest Science*, 2017:1-8.
- Oksanen, T and Mersmann, C. (2003). Forests in Poverty reduction strategies: An assessment of PRSP processes in Sub-Saharan Africa. In *Forests in Poverty Reduction Strategies: Capturing the Potential*. EFI Proceedings No. 47 (121-158). European Forest Institute, Finland.
- Pimental, D.; McNair, M.; Buck, L. and Kamil, J. (1997). The value of forests to world food security. *Human Ecology* 25: 91–120.
- Popoola, L. (2002). Prevalence of, and conservation strategies for non-timber forest products in the Sudano-Sahelian zone of Nigeria. *Nigerian Journal of Ecology*. 4 (1):24-33.
- Rees, J. (1985). *Natural Resources Allocation, Economics and Policy*. Mathuen, London and New York. pp. 25-55.
- Roper J., Roberts R.W. (1999). Deforestation: Tropical Forests in Decline. *Forestry Issues No.1999- 200* International Energy Agency (IEA) (2002). Energy and Poverty. In *World Energy Outlook 2002*.
- Shackleton, C. and Shackleton, S.(2014). The importance of non-timber forest products in rural livelihood security and as safety nets: A review of evidence from South Africa. *South African Journal of Science* **100**, 2004:658-664.

Slater, R. and Twyman, C. (2003). Hidden livelihoods? Natural resource-dependent livelihoods and urban development policy. [<http://www.odi.org.uk>] website visited on 27/06/2006.

Sunderland, T., Achdiawan, R., Angelsen, A., Babigumira, A., Ickowitz, A., Paumgarten, F., Reyes-García, A. V and Shively, G. (2014). Challenging Perceptions about Men, Women, and Forest Product Use: A Global Comparative Study. *World Development Vol. 64: S56–S66*.

United Republic of Tanzania (URT) (2000). *Poverty Reduction Strategy Paper (PRSP)*. United Republic of Tanzania. Government Printer, Dar es Salaam, Tanzania. 63pp.

Vadivelu, G. (2004). Common pool resources in India: New evidence on the PPR-CRP hypothesis. Paper prepared for the tenth *Biennial conference of the International Association for the study of common property*. Oaxaca, Mexico 9th -13th August 2004. 11pp.

Walelign, S.Z. (2013). Forests beyond income: The contribution of forest and environmental resources to poverty incidence, depth and severity. *International Journal of Agri Science Vol. 3(7): 533- 542*.

World Bank (1986). *Poverty and hunger issue and options for food security in developing countries*. A World Bank policy study. Washington, D.C. International Bank for Reconstruction and Development (IBRD). 91pp.

World Bank (2002). Operational policies. [<http://wbln0018.worldbank.org>] website visited on 13/04/ 2007.

Wunder, S., Angelsen, A. And Belcher, B. (2014) Forests, Livelihoods, and Conservation: Broadening the Empirical Base. *World Development 64:S1–S11*.