Original Research Article

CONTRIBUTION OF ODOBA FOREST RESERVE TO LIVELIHOODS OF THE RURAL PEOPLE IN OGBADIBO LOCAL GOVERNMENT AREA, BENUE STATE, NIGERIA

Abstract

The study was conducted to assess the contribution of Odoba forest reserve to rural livelihoods of the communities in Ogbadibo Local Government Area of Benue State, Nigeria. Three hundred and seventy-six pre-tested semi-structured questionnaires were administered to 188 households in four communities. Data collected were analyzed using descriptive and inferential statistics. Fifteen different wood and non-wood products were collected by the respondents from the forest reserve with fuel wood products being the product mostly collected from the reserve (65.5%) followed by water supply from the streams in the forest reserve (59%). Others were edible vegetable (56.6%), folder (53.6%), mush room (53.3%), medicinal herbs (52.6%) and timber (50.3%), Bush Meat (46.7%), Chewing stick (43.0%), Pole (40.5%), Honey (37.8%), Snail (27%), Caterpillar (25%), Cricket (20.4%) and Climbers (19%). The result also shows that forest resources contributed very high to the livelihood of the people in the areas of food for household consumption, additional income, medicinal values, water supply and trading of forest products. Furthermore, the study results showed that the most need met by the people from the sale of forest products is feeding of households (19.4%) and investing in farming activities (13.8%). The communities differ significantly (P=0.05) in the contribution of the forest reserve to their livelihoods. The study recommends that State Government, local authorities and aid agencies should provide alternative sources of fuel energy by establishing village owned solar power plants and fuelwood efficient stoves. This will reduce dependence on the forest reserve for energy and also curtail deforestation of the reserve. Modified Taungya system in the reserve to engage households in forest regeneration efforts as well as the sharing of benefits from such efforts should be included in policies of the Government.

KEY WORDS: Odoba forest reserve, forest products, sustainable livelihood, communities, Benue State

UNDER PEER REVIEW

1. INTRODUCTION

Forest resources play a fundamental role in the socio-economic well-being of the local communities; particularly where large rural population depends on natural resources for their livelihoods. Forests are major source of livelihood, providing numerous benefits to human beings. These benefits may be direct (provision of food and timber products) or indirect through their services and contributions to production process (protection of agricultural land), they may also be intangible (cultural values) [1]. Forestry sector which is one of the main pivots on which nations welfare is built, serves as resource base for many forest industries; providing one of the highest revenue and employment generating sectors. [2] reported that world-wide wood fuel industry creates jobs for tens of millions of households in the form of small-scale wood collection, charcoal production, transportation, and retail. In Sub-Saharan Africa charcoal sector alone employs an estimated 7 million people. [3] estimated that the number of people involved informally in the forest sector is around 40 million to 60 million. China is the country that employs most people in the sector, with 3.8 million formal jobs, accounting for 29 per cent of world employment in the sector. Other countries with high formal employment figures in the forestry sector are the United States (0.83 million), Brazil (0.77 million), India (0.71 million), the Russian Federation (0.6 million), Indonesia (0.45 million), Japan (0.38 million), Germany (0.32 million), Italy (0.26 million), Viet Nam (0.25 million) and Poland (0.25 million) [3].

[4] stated that the traditional uses of forests are basically for income generation, environmental protection and socio-cultural values. [5] also maintained that forests play an important role in contributing to carbon sequestration and other global ecological services such as provision of food, fresh water, wood, fiber, genetic resources and medicines, climate regulation, natural hazard regulation, water purification and waste management amongst others. The International Energy Agency (IEA, 2002)[6] asserted that fuelwood is the most important source of energy for developing countries and the only source of energy for most of the world's rural areas.

Unarguably, forest and forest trees are sources of a variety of foods that supplement and complement what is obtained from agriculture. According to [7], majority of rural households in developing countries, and a large proportion of urban households, depends on plant and animal products from the forests to meet part of their nutritional needs. [8] stated that a large proportion of rural population earn their

UNDER PEER REVIEW

livelihood from the extraction and sales of forest products thereby improving the quality of life and standard of living of rural population living near forest lands. Millions of people throughout the world make extensive use of biological products from the wild ([9] and [10]).

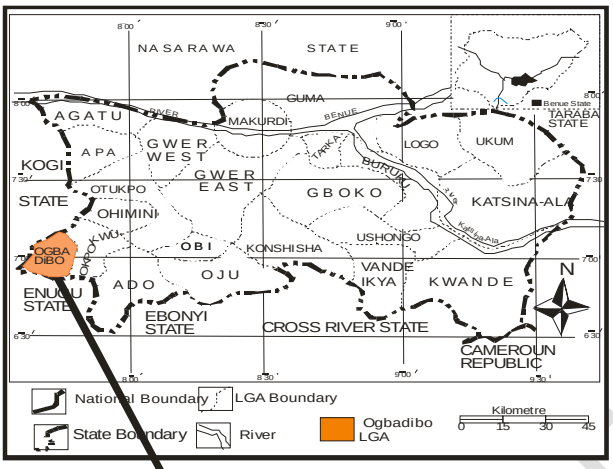
Several studies have been carried out in different localities of the world on the contribution of forest reserves to the livelihood of rural communities. For example, [11] have written on the collection of forest products for livelihood in Nepal. Others such as [12], [13], [14], [15] and [16] reported on foods collected, income generation and environmental benefits of the forest resources. In Africa, [17] reported on the role of Forest Resources of East Mau Ecosystem, Kenya to local livelihoods. Others scholars such as [18], 19], [20], [21] and [22] have also written on the importance, utilization of forest products and services in rural livelihood and security. In Nigeria, [23], [24], [25] have also noted roles of forest resources in sustaining rural livelihoods. Odoba forest reserve was established in 1962 for pole production. The dominant tree species found in the reserve is teak (*Tectona grandis).* Since the establishment of the reserve there is no available literature on its contribution to livelihoods of the rural communities. Thus, the aim of this research was to investigate the contribution of Odoba forest reserve to the livelihoods of the rural people for decision making and policy.

2. METHODOLOGY

2.1 Study Area

The study area was conducted at Odoba forest reserve in Otukpa district of Ogbadibo Local Government Area (LGA). It is located between latitude $7^{o}\ 08^{/}\ 34^{//}$ – $7^{o}\ 10^{/}\ 45^{//}$ N and longitude $7^{o}\ 49^{/}\ 16^{//}$ -$7^{o}\ 51^{/}\ 29^{//}$ E. [26] reported that the reserve has an area of 2.77 km^2 and was established for pole production with Teak (*Tectona grandis*) as the dominant tree species. Other species planted were *Gmelina* spp, *Eucalyptus deglupta, E. torreliana and E. citriodora.* The forest reserve is adjoined by four communities; Ogonukwu, Epaiegbo, Eloga, and Odoba (Figure 1). According to [27], the land uses of Ogbadibo are Agriculture 70% (farm land), commercial (markets 10%), and institutions (Schools and religious buildings 20%). The vegetation is made up of broad leaves type spp and herbaceous graminoids. The reserve is overseen by a

Divisional Forest officer (DFO) who reports to the Director of Forestry in the State Ministry of Water Resources and Environment. The DFO is assisted in the reserve by field workers.



Map of Benue State Showing Ogbadibo LGA

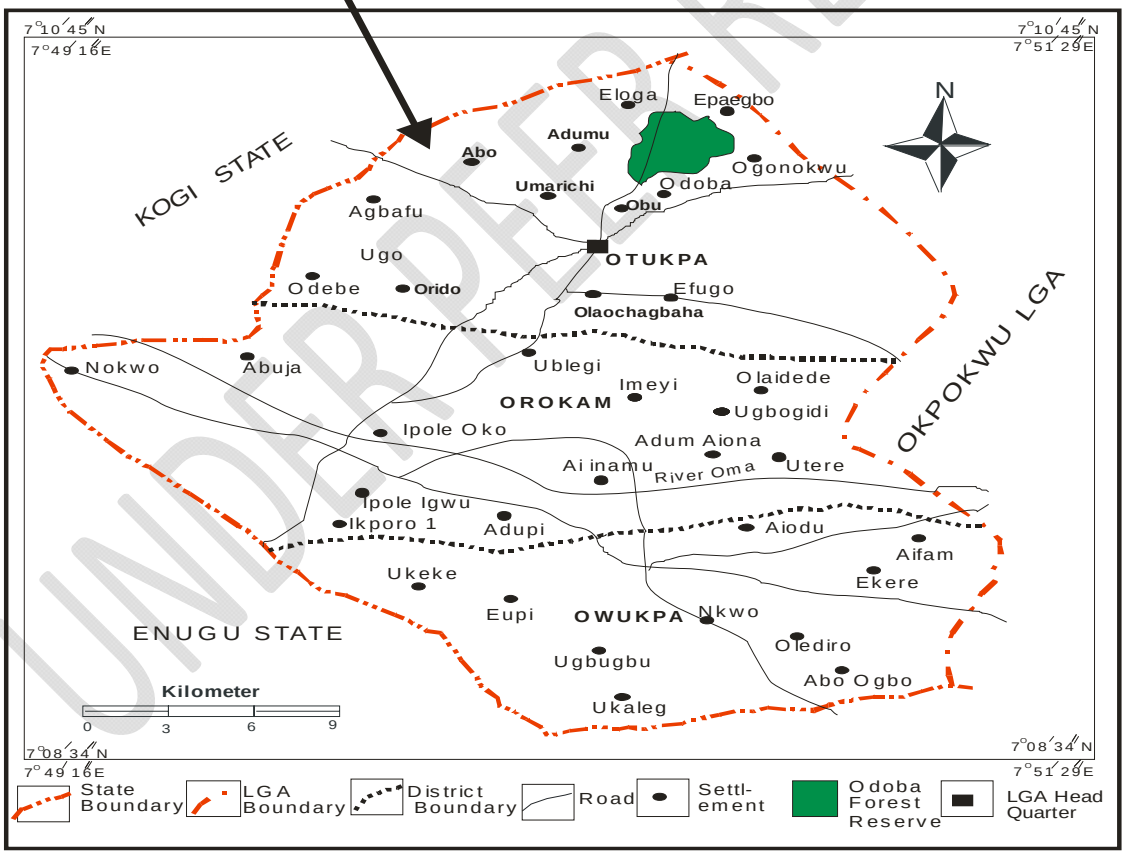


Figure1: Map of Ogbadibo LGA Showing Odoba Forest Reserve

Source: Ministry of Lands and Survey Makurdi

UNDER PEER REVIEW

2.2. Population, Sampling Procedure and Sampling Size

The 2006 population figures of the adjoining communities were projected to 2016 using 2.8% growth rate as expressed by [28].

$$P_t = P_o (1 + r)^t$$

Where:

P_t = Population Projection figure for 2016 for any community

P_o = Existing population as at 2006

1 = Constant

r = Population Growth Rate (2.8%= 0.028)

t = Number of years population was projected (10 Years)

Taro-Yamene (1967) [29] formula at 5% error degree of tolerance was then used for determination of the projected population sample size of 376 respondents (Table 1).

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = Projected population sample size

N = Total size of projected population

1 = Constant

e = Error degree of tolerance 0.05

The sample size of each community was determined using the formula:

$$nh = \frac{n \times Nh}{N}$$

Where

nh = Community Sample size

n = Projected population sample size

Nh = Community Population (Projected)

N = Total size of projected population

The communities were purposely selected due to their proximity to the forest reserve. Systematic random technique was used to select households in of each the communities. The first household in each

community was identified and selected for interview and thereafter every fourth household was selected. Two matured persons in each household were purposively selected for interview as they could provide useful information for the study. This procedure was maintained until the sample size for the community was obtained. Therefore, 376 respondents were sampled in 188 households.

Table 1 Determination of Sample Size for the Study

S/No	Communities	2006 Population Figures	2016 Projected Figures	Community Sample Size	Number of Households Selected
1	Odoba	1734	2285	136	68
2	Ogonukwu	954	1257	75	38
3	Epaeigbo	1409	1857	111	56
4	Eloga	689	908	54	27
Total	-	4786	6307	376	188

Source: National Population Commission, 2006 projected to 2016 using 2.8 % growth rate.
Sample size (n) = 376

2.3. Data Collection

Pre-tested semi-structured questionnaire which sought questions on socio-economic characteristic of respondents in the study area, types of forest products collected from the forest reserve, contribution of the forest reserve to the livelihood of the people and needs met from proceeds of the reserve were administered to the respondents. Administration of the questionnaire was done with aid of research assistants. In the pre-test survey, 188 respondents from the four communities were selected and interviewed for a period of two months. In the final data collection two field assistants were engaged in each of the communities to ease data collection. Due to logistics such as movement to the area and meeting the respondents in their homes, data were collected in the morning and evening twice weekly for a period of eight months.

The questionnaire was designed to cover four thematic areas which included;

1. Socio-economic characteristics of the respondents: The open and closed ended question format was both used in capturing responses from the respondents as regards their socio-economic variables.

2. Types of forest products collected from the reserve: Multi-choice question format was used and the respondents were at allowed to choose as many forest products they collected from the reserve.

3. Contribution of the forest reserve to the livelihood of the people. The Five-point Likert scale format was used to measure the Contribution of the forest reserve to the livelihood of the rural people. The weighting scale used was derived from the following values. Very High Contribution (VHC) = 5, High Contribution (HC) = 4, Moderate Contribution (MC) = 3, Low Contribution (LC) = 2, Very Low contribution (VLC) = 1.

4. Respondents needs met from proceeds of the forest reserve: The Multi-choice question format was used. The needs met were itemized for the respondents to choose from. The respondents were free to choose as many needs they met with the proceeds of the forest resources.

2.4. Data Analysis

Both descriptive and quantitative techniques were employed in the analysis of data obtained. The descriptive techniques used were frequency, percentages, mean and tabular presentation of the results.

Five points Likert weighted scale rating format as used by [30] was adopted to measure the contribution of the forest reserve to the livelihood of the people. The weighting scale was derived from the following values with respect to contribution to reserve Very High Contribution (VHC) = 5, High Contribution (HC) = 4, Moderate Contribution (MC) = 3, Low Contribution (LC) = 2, Very Low Contribution (VLC) = 1

The Mean Score (MS) of the respondents is expressed as $MS = \frac{\sum f}{n}$

Where :

f = Sumation 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 Score (WS) is expressed as : $WS = \frac{\sum_{i=1}^{n} fxi}{}$

The Likert Weighted Mean Score (WMS) is expressed as : $WMS = \frac{\sum_{i=1}^{n} fxi}{N}$

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) is considered 'Low'. Variable with MWS between 2.95 and 3.05, 'Moderate' any variable MWS greater than 3.05 (MWS>3.05), 'High'.

Kruskal-Walis H test was used to test for significant difference between between Contribution of Odoba Forest Reserve to Livelihood and the Communities in the study area. Kruskal-Walis is express as:

$$H = (N - 1) \frac{\sum_{i=1}^{g} n_i (\bar{r}_i - \bar{r})^2}{\sum_{i=1}^{g} \sum_{j=1}^{n_i} (r_{ij} - \bar{r})^2}$$

Where:

H = Kruskal-Walis
n_i= Number of observations in group *i*
r_{ij}= the rank of obsrvations *j* from group *i*
N = Total number of obervations acroos all groups

3. RESULTS

3. 1. Socio economic Characteristic of Respondents in the Study

The result on socio economic characteristic of respondents in the study area are presented in Table 2: Sex of respondents showed that 54% and 46% of the respondents were male and female respectively. Age distribution and marital status showed that 84.2% of the respondents were above 30 years with the mean age of 42 years while 62% of the respondents were married. Educational status showed that 66% had formal education while 34% had non formal education. The result on household size and educational background showed that majority of the respondents 58.9% had household size of 6 members and above with a mean household size of 7 persons. The result on occupation and years of residence showed that 31% of the respondents were farmers while 43% of the respondents had lived in the area above 30 years

with mean years of residence of 21 years. Respondents that generated annual income above N50,000.00 per annum were 21.4% from sales of the forest resources collected while information on years spent on forest resources harvesting showed that 33.9% of the respondents have harvested forest resources from the reserve for over 30 years.

3.2. Types of Forest Products Collected from the Reserve

Types of forest products collected from the reserve are presented in Table 3. The result indicated that fifteen different wood and non-wood products were collected by the respondents from the forest reserve. Fuelwood (65.5%) was the product that was most collected from the reserve and was ranked first. This was followed by water supply (59%) from the streams in the forest reserve, edible vegetable (56.6%), folder (53.6%), Mushrooms ((53.3%), medicinal herbs (52.6%) and timber (50.3%). These products were ranked second, third, fourth, fifth, sixth and seventh respectively. Other resources collected from reserve as reported by the respondents were Bush Meat (46.7%), Chewing stick (43.0%), Pole (40.5%), Honey (37.8%), Snail (27%), Caterpillar (25%), Cricket20.4%) and Climbers (19%). Consequently, the resources were ranked eighth, ninth, tenth, eleventh, twelfth, thirteenth, fourteenth and fifteenth respectively.

3.3. Contribution of the Forest Reserve to the Livelihood of the People

The result on the contribution of forest reserve to the livelihood of the people is shown in Table 4. The result shows that the reserve contributed very high to the livelihood of the people in the areas of food resources (MWS =3.37 > 3.00), income (MWS =3.03 > 3.00), medicine (MWS =3.14 > 3.00) trade (MWS =3.03 > 3.00), water supply (MWS =3.78 > 3.00) and conducive environment (MWS = 3.08 > 3.00). However, the reserve contributed low to the livelihood of the people in the areas of employment (MWS =2.24 < 2.95) and recreation (MWS =2.56 < 2.95).

Table 2: Socio economic Characteristics of Respondents in the Study Area

Characteristics	Category	F(N=304)	%
Sex	Male	165	54.0
	Female	139	46.0
Age (yrs)	20-30	48	15.8
	31-40	90	29.6
	41-50	60	19.7
	51-60	54	17.8
	61-70	32	10.5
	>70	20	6.6
Marital Status	Single	71	23.0
	Married	189	62.0
	Widow/widower	44	14.0
Educational Status	Non Formal	103	34.0
	Primary	80	26.0
	Secondary	69	23.0
	Tertiary	52	17.0
Household size	1-5	125	41.1
	6-10	123	40.5
	11-15	42	13.8
	16-20	11	3.6
	21-25	3	1.0
Major Occupation	Farming	93	31.0
	Civil Servant	69	23.0
	Farming/Civil servant	84	28.0
	Farming/Timber merchant	19	6.0
	Forest resources collection / Trading	37	12.0
Years of Residence	1-10	77	25.0
	11-20	96	32.0
	21-30	46	15.0
	31-40	48	16.0
	>40	37	12.0

N= Number of Respondents

UNDER PEER REVIEW

Characteristics	Category	F(N=304)	%
Annual income			
	41,000-50,000	64	21.1
	51,000-60,000	45	14.8
	61,000-70,000	14	4.6
	>71,000	6	2.0
Years of forest resources harvesting (yrs)	1-10	58	19.1
	11-20	64	21.1
	21-30	79	26.0
	31-40	61	21.1
	41-50	25	8.2
	51-60	14	4.6
	61 Above	3	1.0

N= Number of Respondents

Table 3: Type of Forest `Products Collected from the Reserve

	Frequency of Respondents by Communities						
Resources Collected	**Odoba**	**Eloga**	**Epaiegbo**	**Ogonukwu**	**Total***	**%**	**Ranking**
Fuel wood	59	33	63	44	199	65.5	1
Water supply	53	26	62	37	178	59.0	2
Edible Vegetables	57	18	69	28	172	56.6	3
Folder	60	13	62	28	163	53.6	4
Mush Room	56	19	54	33	162	53.3	5
Medicinal Herbs	23	24	54	34	160	52.6	6
Timber	60	16	47	30	153	50.3	7
Bush Meat	54	23	41	24	142	46.7	8
Chewing stick	36	12	69	13	130	43.0	9
Pole	43	15	44	21	123	40.5	10
Honey	42	17	35	21	115	37.8	11
Snail	24	16	21	21	82	27.0	12
Caterpillar	25	19	19	13	76	25.0	13
Cricket	21	6	25	10	62	20.4	14
Climbers	23	7	20	9	59	19.4	15

*Multiple choice responses

UNDER PEER REVIEW

Table 4. Contribution of the Forest Reserve to the Livelihood of the People

Contribution	VHC	HC	MC	LC	VLC	WS	N	MWS	Decision
Food	56(280)	93(372)	89(267)	41(82)	25(25)	1026	304	3.37	High
Income	75(375)	40(160)	58(174)	82(164)	49(49)	922	304	3.03	High
Medicine	75(375)	46(184)	66(198)	78(156)	41(41)	954	304	3.14	High
Employ-ment	18(90)	29(116)	68(204)	83(166)	106(106)	682	304	2.24	Low
Trade	56(280)	64(256)	72(216)	58(116)	54(54)	922	304	3.03	High
Recreation	69(345)	32(128)	25(75)	55(110)	123(123)	781	304	2.56	Low
Water	124(620)	71(284)	52(156)	31(62)	26(26)	1148	304	3.78	High
Conducive Environment	77(385)	39(156)	67(201)	73(146)	48(48)	936	304	3.08	High

Note: WS= Weighted Score, WMS= Weighted mean Score, VH = Very High, H = High, M = Moderate, L = Low and VL = Very Low. Figures outside brackets are frequency of responses and figures inside brackets are Likert weighted Scores of responses.

3.4. Respondents Needs met from Proceeds of the Forest Reserve

The respondents' needs being met from proceeds from the forest reserve are presented in Table 5. The priority need that was met by the respondents was feeding of households from proceeds obtained from the reserve (19.4%) and was ranked first followed by reinvesting in farming activities (13.8%) which were ranked second. Other needs met by the respondents from proceeds obtained from the reserve are paying children school fees (13.7%), local saving (Bam) (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 nineth respectively.

Table 5: Needs met from Proceeds of the Forest Reserve

Needs Met	(F*)	%	Ranking
Household feeding	223	19.4	1
Reinvesting in farming	159	13.8	2
Paying children fees	158	13.7	3
Local saving (Bam)	141	12.3	4
Building house(s)	128	11.1	5
Raise capital for other business	119	10.3	6
Married wife(s)	80	7.0	7
Pay medical bill	72	6.3	8
Employment	70	6.1	9
	1150	100	-

*Multi-Choice Responses

3.5. Relationship between Contribution of Odoba Forest Resources to Livelihood and the Communities

Kruskal-Wallis test of relationship between contribution of Oboba forest reserve to livelihood of the people and the communities is shown in Table 6. The communities differ significantly (H=5.43, P=0.05) in the contribution of Odoba forest reserve to their livelihood.

Table 6. Kruskal-Wallis Test of the Relationship between Contribution of Odoba Forest Reserve to Livelihood and the Communities

Test variables	H. Values	df	P. value	Decision
Communities Vs Contribution of Odoba forest reserve to rural livelihoods	5.43	3	0.05**	Significant

Significant level = 0.05

4. DICUSSION

Males were more than the females in the collection of resources from the reserve. This result could be attributed to the types of resources collected that had bearing on usage by gender. This finding contradicts the findings by [31] and [21] that women collected forest resources from the reserve more than the men counterpart. Majority of the respondents that collected forest resources from the reserve were above 30 years of age and with the mean age of 45 years. The finding indicates that middle aged persons were responsible for the collection of forest products to meet their family needs. [11] in a similar study found mean age of 41.5 years for collectors of forest resources in Nepal. This finding also

corroborates the assertions by [32]; [23] and [25] that forest resources are collected by middle aged people. Respondents' that had formal education were more than that without formal education agreeing with the study of [31]. However, [21] contradicts this finding as majority of the communities collecting forest resources around the Kruger National Park in South Africa had no formal education.

The respondents with household size greater than 5 persons were more in this study. This finding is in line with the work of [21] and also supports the preponderance of large family size among the poor in the rural areas of Nigeria [33]. Though a very large family size may constitutes a social burden, larger families use their labour input to an advantage in farming and forest product exploitation. [34] and [35] have shown in their study that the intensity of forest products exploitation has a direct relation to household size. Majority of the people resided in the area over 10 years. This finding corroborates the assertion by [22] that the residency of household forest dependency in Chobe enclave, Botswana was over 10 years. The number of persons involved in farming and other livelihood activities predominates in the area. This finding is in line with the findings of [25] that farming and animal rearing were the most important income generating activities of the neighbouring communities in Yankari Game reserve, Nigeria.

[17] in their study on role of forest resources to local livelihoods in East Mau Forest Ecosystem, Kenya found 15 forest resources that were utilized by the people to include: Fuelwood, Timber, Charcoal, Honey, Medicine, Poles, Thatch grass, Fruits, Animal 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 also similar to the findings of [18] in South Africa and the work of [36] in Kipini Division of Tana Delta District, Kenya. The large number of products collected from the forest reserve indicates that the reserve has positive impact on the livelihood of the people in the communitys as they met their economic and household needs. This finding corroborates the assertion by [37] that forest reserve provides wide range of products simultaneously and at different times for rural population for their immediate house hold needs. Fuelwood was the most collected products by the respondents compared to other products agreeing with [38] that fuel wood is the major source of

UNDER PEER REVIEW

energy for cooking and heating among rural households and urban poor in Nigeria. [20] also found fuelwood to be the most resource collected among households in Zambia.

The forest reserve contributed very high in the area of food, income, medicine, trade and water supply. However, the respondents reported low contribution of the reserve in the area of employment and recreation. These finding are consistent with the study [39] in Uganda that wild plants are increasingly becoming a valuable source of livelihoods for many people through household use and trading as medicine, food or craft materials. Plant medicines are generally the first recourse for rural households. When this fails, they either turn to traditional healers or western-type medicines [40]. Generally, a large number of forest plants have medicinal value hence [2] regarded the forest as the richest drugstore. Many resources collected from the forest reserve are sources of cash income for many rural households and this have been confirm by many studies. [41] reported that Non Timber Forest Products (NTFPs) contributed to the average of 61% cash income of households in Nale and Sing districts, Luang Namtha province. [42] also asserted that cash income of households in Nampheng village accounted for 55% of household cash income, which consisted of 40% from bitter bamboo and 15% from other NTFPs.

The most need met with the proceeds from the resources collected from the reserve was feeding of household followed by re-investing in farming activities were ranked first and second respectively. This finding is in line with the work of [43] who estimated that 68% of total forest products harvested by rural households were consumed within the household and the reminder (32%) is sold for cash or exchanged for household goods. Also, in line with the finding of this study [44] asserted that the pattern of users' product needs and expectations are complex, subject to household livelihood patterns and wealth, forest type and product availability. Men and women also have different priorities as they have different household responsibilities. Women may be concerned with fuel wood, fodder and leaf litter collection, while men may be more preoccupied with agricultural implements and construction timber [44].

5. CONCLUSION AND RECOMMENDATION

The study revealed that fifteen different forest products which consist of wood and non-wood products were collected from Odoba forest reserve by people of the surrounding villages. The people depended on

UNDER PEER REVIEW

the forest for different subsistence and income needs. Firewood was the most important forest product collected from the forest for cooking and sale by the local people. Households engaged in forest products collection and use to improve their livelihoods in the form of food for household consumption, additional income, medicinal values, water supply, trading of forest products and contribution of the forest reserve in employment and recreation. Income generated from the sale of forest products played an important role in the livelihoods of the local villages. The proceeds were used in paying children school fees, feeding households, marrying wives, building houses, provided capital for farming investments, paying of medical bills and savings. The people need to be educated on sustainable harvesting/utilization practices to ensure sustainable livelihoods and conservation of environmental resources. It is recommended that the State Government, local authorities and aid agencies should provide alternative sources of fuel energy by establishing village owned solar power plants and firewood efficient stoves. This will reduce dependence on the forest reserve for energy and also curtail deforestation of the reserve. Modified Taungya system in the reserve to engage households in forest regeneration efforts as well as the sharing of benefits from such efforts should be included in policies of the Government.

AUTHORS' CONTRIBUTIONS: The authors contributed equally to the research.

REFERENCES

[1] 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.

[2]. World Bank (2016). Forests Generate Jobs and Incomes. Retrieved from: http://www.worldbank.org/en/topic/forests/brief/forests-generate-jobs-and-incomes

[3]. FAO: State of the world's Forests, Rome, 2014.

[4]. 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.

[5]. 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.

[6]. International Energy Agency (IEA) (2002). Energy and poverty. *In World Energy Outlook 2002.*

UNDER PEER REVIEW

[7]. 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.*

[8]. Agbogidi, O. M. and Okonta, B. C. (2003). Role of women in community forestry and environmental conservation. In: Akindele, S. O. and Popoola, L. (eds.). Community forestry and stakeholder participation in sustainable development. Proceedings of the 29th annual conference of *Forestry Association of Nigeria (FAN)* held in Calabar between 6th-11th October, 2003. Pp. 159-165.

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

[10]. Lawes, M., Eeley, H., Shackleton, C. M. and Geach B. S. (2004). Indigenous Forests and Woodlands in South Africa: Policy, People and Practice. University of KwaZulu-Natal Press: Pietermaritzburg. 863pp.

[11]. Piya, L., Maharjan, K.L., Joshi, N.P. and Dangol, D.R. (2011). Collection and marketing of non-timber forest products by the Chepang community in Chitwan district of Nepal. MPRA Paper No. 35389, 2011. Website: http://mpra.ub.uni-muenchen.de/35389/

[12]. Angelsen, A. and Wunder, S. (2013). *CIFOR Occasional Paper, No 40.* Website: http://www.cifor.cgiar.org.

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

[14]. 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.*

[15]. Sunderland, T., Achdiawan, R., Angelsen, A., Babigumira, A., Ickowitz, A., Paumgarten, F., Reyes-Garci´, 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.*

[16]. 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*

[17]. 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.*

[18]. 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.*

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

[20]. 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.*

UNDER PEER REVIEW

[21]. 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.*

[22]. 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.*

[23]. Olujobi, O. J. (2012). Assesment of nontimber forest products in Ekiti State forest reserves. International Journal of Agriculture, 4 (2), 121-128.

[24]. 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.*

[25]. Usman, Y., Danjuma, M.N. and Abdulkarim, .A.I. (2016). Roles of Forest Resources in Sustaining Rural Livelihoods around Yankari Game Reserve, Nigeria. *Pyrex Journal of Geography and Regional Planning, Vol 2(1) pp. 11-15.*

[26]. Bennett, J.G., Rains, A.B., Gosden, P.N., Howard, W.J. Hutcheon, A.A., Kerr, W.B., Mansfield, J.E, Rackham, I.J. and Wood, A.W. (1979). Land resources of central Nigeria Agricultural development possibilities Volume 4B The Benue Valley. *Land Resources Development Centre Central Nigeria Project Team* (ed. I D Hill).
Retrieved from: Land Resource Study: http://library.wur.nl/isric/fulltext/isricu_i24552_001.pdf.

[27]. Ofomat, G.E.K. (1978). The Nsukka Environment. Fourth Dimension Publishers, Enugu 68pp.

[28]. George, M. V., Smith, S.K., Swanson, D.A. and Tayman, J. (2004). "Population Projections," Chapter 21 in Jacob Siegel and David Swanson (eds.), *The Methods and Materials of Demography.* San Diego: Elsevier Academic Press, 2004.
Website: https://www.bebr.ufl.edu/sites/default/files/Research%20Reports/2004_m_m_projections_.pdf

[29]. Yamane, T. 1967. *Statistics: An Introductory Analysis*, 2nd Ed., New York: Harper and Row.

[30]. Dagba, B.I., Azeez, I.O. and Ancha, P.U. (2017). Assessment of Community Based Forest Management Practices in Benue State, Nigeria. *IOSR Journal of Environmental Science, Toxicology and Food Technology. 11, Issue 9 Ver.1:68-75.*

[31]. Lepetu, 1. and Garekae, H. (2015). Attitudes of Local Communities towards Forest Management Practices in Botswana: The Case Study of Kasane Forest Reserve. *International Journal of Agriculture and Forestry 2015, 5(2): 138-145.*

[32]. Oyun, M. B. (2009): The Role of Non-timber Forest Products on the Livelihoods of Fringe Communities of Idanre Forest Reserve, *Nigeria. Forests and Forest Products Journal,* 2:6-75, 2009.

[33]. Eboh E.C. (1995): Poverty, Population growth and Environmental Degradation: The Vicious Cycle of Human Misery. In: Eboh et al. (eds.): Rural Development in Nigeria: Concepts, Processes and Prospects. Auto-century Publishing Co., Enugu.

[34]. Adhikari B., D., Salvatore, and J.C. Lovett. (2004(. Household characteristics and forest dependency: Evidence from common property forest management in Nepal. *EcologicalEconomics* 48(2):245-257

[35]. Baland J.M.B, Ardhan, P.D., As, S.M., Ookherjee, D. and Rinki S. (2004): The Environmental Impact of Poverty: Evidence from Firewood Collection in Rural Nepal. Paper Presented at the Tenth Biennial Conference of the *International Association for the Study of Common Property (IASCP), Oaxaca Mexico,* 9–13 August, 2004.

UNDER PEER REVIEW

[36]. Olunga, M..A., Kavoi, M.M. and Guthiga, P.M. (2015). Assessment of factors influencing utilization and conservation of forest resources in Kipini Division of Tana Delta District, Kenya. *African Journal of Environmental Economics and Management, Vol. 3 (5): 231-243.*

[37]. Aiyeloja, A. A. and Ajewole, O. I. (2006). Non-timber forest products marketing in Nigeria. A case study of Osun State. *Educational Research and Reviews 1 (2). 52-58.*

[38]. Anderson D. (1997). The Economics of Aforestation. A case study in Africa. The Johns Hopki is University Press, Battimore Maryland, USA.

[39]. Barirega, A., J.G. Agea and P. Van Damme, 2012. Prioritizing wild medicinal and food plants with potential for commercialization and value chain improvement for livelihood enhancement and poverty reduction in Uganda. *Res. J. Environ. Earth Sci.,* 4(6): 668-673.

[40]. Azeke, I.E. (2002). Forestry contribution to Edo State economy. In: *Forest, people and the environment* (Popoola L Ed.) Proceedings of 2nd National workshop organized by *FANCONSULT and Edo State chapter of Forestry Association of Nigeria held in Benin-City, Edo state, 5-6 September, 2002.*

[41]. Kaufmann, S. 1998. Nutrition survey Muang Sing and Nalae, Luang Namtha Province. *GTZ Integrated Food-Security Programme Muang Sing. Luan Namtha, Laos P.D.R*.

[42]. Morris J, Ketphanh S. 2002. Bitter Bamboo and Sweet Living: Impacts of NTFP Conservation Activities on Poverty Alleviation and Sustainable Livelihoods. A Case Study for Lao PDR. Prepared for IUCN's 31-C Project on poverty alleviation, livelihood improvement and ecosystem management. Vientiane, Lao PDR: NAFRI [National Agriculture and Forestry Research Institute] and IUCN [The World Conservation Union]. Available at: http://www.iucn.org/themes/ fcp/publications/files/3ic_cs_lao.Pdf.

[43]. Jumbe, C., S. Bwalya and M. Husselman, 2008. Contribution of dry forests to rural livelihoods and the national economy in Zambia. *Proceeding of 12th Biennial Conference of the International Association for the Study of Commons. Cheltenham, England,* July 14-18, 2008.

[44]. Yadav, N.P., Dev, O.P., Oliver Springate-Baginski, O. and John Soussan, J. *(2003.* Forest Management and Utilization Under Community Forestry. *Journal of Forest and Livelihood 3(1).*

UNDER PEER REVIEW