Original Research Article

Economic Analyses of Non-Timber Forest Products Utilization among Communities around Kwabaktina Forest Reserve, Adamawa State, Nigeria

ABSTRACT

This study was carried out among communities surrounding Kwabaktina forest reserve in Adamawa state, Nigeria with the aim of assessing the utilization of Non Timber Forest Products (NTFPs) in the study area. Data were collected through Stratified and purposive sampling designs using structured questionnaire. Data were analyzed using descriptive and inferential statistics to identify NTFPs utilize in the study area. The result showed age, educational status and household size had significant effect on the extent of NTFPs utilization in the study area. Income had no significant in determining the level of the utilization of NTFPs; while gender had significant implication on the utilization of NTFPs. This may be attributed to the relative scarcity of most of the NTFPs as a result of deforestation and the present awareness of their (NTFPs) importance to the communities. NTFPs play an important role in the livelihood of people in the communities. These products occupy a significant place in the livelihood of the people, to ensure speedy growth and yielding (development) of NTFPs in the study area; it is recommended that NGOs and individual should participate in funding of trees planting campaign in marginal land. Also, the people of the communities should also be encourage to embark on planting of economic trees to support some cottage industries located in the area which can help to reduce rural-urban population drift and the prevailing unemployment by providing raw materials for crafting and carving.

Keywords: Deforestation, NTFPs, Utilization, forest reserve, communities

INTRODUCTION

Non-Timber Forest Products (NTFPs) include a vast number of edible and non- edible products are gathered from the forest –by- forest edge or a team of urban people for subsistence or for local and external trade [1]. NTFPs are very important resources from the forests [2]. People are depending upon natural resources to meet a large number of their basic necessities of life. Considering the variability and diverse nature of the NTFPs, a lot of households are able to meet their immediate needs by collecting NTFPs from the forest while other earn income to meet other needs through marketing of NTFPs harvested [3].

Rural communities rely heavily on NTFPs as a means of generating income, sources of food and medicine thereby reducing poverty level of the people. Hence, NTFPs play a vital role in

Nigeria [4]. Rural households spend income realised from NTFPs to buy food to maintain their families hence dependence upon several combined and seasonal activities of NTFPs as the only one/ sure way to ensure household food security [5, 2].

The type of resources and utilization patterns, vary by ecological zone and socio-cultural area. Food, fodder, firewood and herbs medicine are important non-timber values of forests collected all year round in different locations by rural dwellers [6]. Millions of people in many developing countries do not have enough food to meet their daily requirements; furthermore, people are deficient in one or more micronutrients [7]. Rural communities in most cases depend on wild resources including wild edible plants to meet their food needs in periods of food crisis [8]. Only little qualitative and quantitative information on NTFPs utilization have been documented in the area. The aim of this study is to provide basic information and guide to further research on the importance of NTFPs and their utilization in the study area.

METHODOLOGY

The Study Area

The study was carried out in Kwabaktina forest reserve communities in Hong Local Government of Adamawa State, Nigeria. The reserve lies between Latitudes 10º 24′ 2″ N and Longitude 12º 56′ 58″ E. The study area had population of about 681,353 with 2012 projected population estimate of 823,094 based on 3.2% population growth rate [9].

The area has distinct seasons, namely- dry and wet seasons. The annual rainfall range between 800mm to 1000mm. Maximum temperatures is about 40 ºC and minimum temperature is about 20.54 ºC; Humidity is about 96% with a pressure of about 949.74 hPa with about 535 m height above sea level [10]. The Vegetation of the area is characterized of Sudan Savannah towards extreme North and Northern Guinea Savannah for the remaining part of the area.

Data Collection

Data were collected through purposive and random sampling designs. The communities around the reserve were purposively selected; the communities include: Muzigiba, Arndu, Manza'a and Hong. Respondents were randomly sampled from each community, and 60 copies of structured questionnaire were as administered to every respondent in each community; given a total number of 240 copies of questionnaire used for this finding. Group discussion, personal interview and with field observation were adopted for the field study.

Data Analysis

Descriptive statistics (frequency and percentages) were used to identify NTFPs utilize in the study area. Spearman correlation analysis was also used to test the relationship between socio-economic variables and extent of utilization of NTFPs in the study area.

The spearman correlation is expressed as:

$$r = 1 - \frac{6 \sum d^2}{n^2 - n}$$

Equation [1]

Where: r = Spearman rank correlation; d= difference between the two ranks of each observation; n= number of observation; 1 and 6= constant; Σ=summation sign

Chi-square inferential statistic was used to test the role of gender in the utilization of NTFPs in the study area. The chi-square formula was given as:

$$x^2 = \sum \frac{(0 - E)^2}{E}$$

Equation [2]

Where x^2= Chi-square, O= observed frequency and E= Expected frequency

The Binary Logistic Regression Analysis will be used to determine factors that significantly influence utilization of NTFPs in Adamawa State. The Binary Logistic Regression Analysis is expressed as:

Logit [P (NTFPs Ū)] =a + b_1x_1 + b_2x_2 + b_3x_3 + ... b_6x_6 +e equation [3]

Where: TFPs T=NTFPs utilization=Y=Dependent variable; Y=NTFPs Utilized; a= constant; b_1 - b_6= independent variable; Logit [P (NTFPs Ū)] =b_1 - b_6=b_1 = sex; b_1= Age; b_3= Education; b_4= Income; b_5= Household size ; b_6 = Residence years.

RESULTS

Table 1 show the socio-economic attributes of the respondents in the study area. Based on this finding, the majority 59% of the respondents were female while 41% were male. Most (38%) of the respondents were youths between the ages of 26 to 35 years, followed by 18 to 25 years which had 26%, 17% of the respondents were less than 18 years of age, 12% were between 36 to 45 years while 7% were between the ages of 46 and above.

Majority (59%) of the respondents were married, followed by 28% who were single, 24% divorcee/separate while 6% were widows/widowers in the study area. Most of the

respondents (66%) were from a household size category of less than 10 house members, followed by was household size category of 10-20 which had 24% of the respondents while 10% were from household size category of 21 and above.

Most of the respondents 43% attained secondary school level, followed by 28% who had primary school education level; non-formal education was 20% while 10% of the respondents had attained tertiary education.

The primary occupation of the respondents was assess, most of the respondents (37%) were Farmers, followed by students which had 28%, Civil servants 13%, traders 15% while other occupation (such as fishing, crafting and labourers etc.) had 7%.

The result on respondents income showed 44% of the respondents earned less than ₦10,00 per month, followed by 34% of the respondents earned between ₦10,000 to 20,000, 15% earned above ₦20,000 to 30,000 while only few (7%) of the respondents earned above ₦30,000 per month.

Table 1: Socio-economic Attributes of Respondents in the Study Area

Characteristics	Category	Frequency	Percentage (%)
Sex	Male	98	40.8
	Female	142	59.2
	Total	**240**	**100.0**
Age	<18 years	41	17.1
	18-25 years	63	26.3
	26-35 years	92	38.3
	36-45 years	28	11.7
	46years & above	16	6.7
	Total	**240**	**100.0**
Marital Status	Married	142	59.2
	Single	68	28.3
	Divorced/separate	24	10.0
	Widow/widower	6	2.5
	Total	**240**	**100.0**
Household Size Category	<10	159	66.3
	10-20	58	24.2
	21 and above	23	9.6
	Total	**240**	**100.0**

Education Status	Non-formal Education	48	20.0
	Primary Education	66	27.5
	Secondary Education	103	42.9
	Tertiary	23	9.6
	Total	**240**	**100.0**
Major Occupation	Farming	88	36.7
	Civil Service	32	13.3
	Trading	36	15.0
	Student	68	28.3
	Others	16	6.7
	Total	**240**	**100.0**
Income Category	<10,000	105	43.8
	₦10,00-20,000	82	34.2
	₦20,001-30,000	36	15.0
	₦30,001-40,000	11	4.6
	₦40,001 and above	6	2.5
	Total	**240**	**100.0**

Source: Field survey, 2018

The most utilized NTFPs by the respondents in the study area are presented on Table 2; most of the respondents had multiple response on the utilization of NTFPs. Majority of the respondents (20%) mostly preferred to utilized *Borassu* products (fruits, hypocotyls, stem and leaves) and crafting/carving products, followed by condiments/spices (16%), others (tannins, resins, oil, vegetative leaves) which had 15%, Bush meat 6%, edible insects (10%) and traditional herbs/medicine was utilized by 8% while honey was the least utilized NTFPs by 5% in the study area.

Table 2: The Most Utilized NTFPs by the Respondents in the Study Area

NTFPs	Frequency	Percentage
Borassu products (fruits & hypocotyls)	89	20.3
Herbs medicine	36	8.2
Honey	21	4.8
Crafting/carving products	88	20.1
Bush Meat	28	6.4

Insects	42	9.6
Condiments/spices	68	15.5
Others	66	15.1
Total	438	100.0

Source: Field survey, 2018

Table 3 shows the extents in which the respondents utilize NTFPs in the study area. Based on this finding, the result showed NTFPs that were available to the people in the study area were highly utilized for different purposes. Borassu products, honey, crafting/carving products and condiments/spices were significantly utilized n the study area; followed by bush meat while edible insects and other products (such as tannins, resins, oil, etc) were not significantly utilized. Though, few respondents utilized edible insects, tannins, resins and oil at very low extent as revealed from this study.

Table 3: Extent of Utilization of NTFPs in the Study Area

NTFPs	Very High	High	Moderate	Low	Very Low	WS	WMS	Grand mean
Borassu products (fruits & hypocotyls)	364	342	143	40	12	901	3.8	4*
Herbs medicine	188	298	171	60	15	732	3.1	3*
Honey	325	264	128	74	25	816	3.4	4*
Crafting/carving products	344	242	98	86	40	810	3.4	4*
Bush Meat	382	234	111	70	17	814	3.4	3*
Insects	98	106	122	65	65	456	1.9	2^{ns}
Condiments/spices	420	284	160	80	22	966	4.0	4*
Others	185	141	92	42	5	465	1.9	2^{ns}

5= very high; **4**= High; **3**= moderate**, 2**= low; **1**= very low**;***= significant, ns= not significant

The result on *Mann-whitney* test on gender difference on NTFPs utilization in the study area showed gender difference was significant (p=0.001) in utilization of NTFPs. Gender play vital role in NTFPs utilization in the study area. The result on *Krustkal-wallis* test on difference between communities and extend of NTFPs utilization in the study area. This finding revealed that communities and extend of NTFPs utilization had no significant (p=0.72) differences with H-value (1.33). Also, this finding showed that, there was no

significant difference (p=0.76) with H. value (1.17) between communities and NTFPs contribution to the livelihood of the people in the study area.

The relationships between socio-economic attributes and NTFPs utilization in the study area show on Table 4. The result from spearman correlation test on the relationship between age verse NTFPs utilization was significant (p=0.00) with negative correlation value of -0.26. Household size verse NTFPs Utilization was significant with p=0.04 and a positive correlation value of 0.11, Education level vs. NTFPs Utilization was highly significant p=0.000 with a positive correlation value of 0.20 while Income vs. NTFPs Utilization had no significant p=0.92 with a positive correlation value of 0.01.

Table 4: Relationship between Socio-economic Variables and Utilization of NTFPs

Test Variables	rs. Value	P.Value	Decision
Age vs. NTFPs Utilization	-0.26	0.00	*
Household size vs. NTFPs Utilization	0.11	0.04	*
Education level vs. NTFPs Utilization	0.20	0.00	*
Income vs. NTFPs Utilization	0.01	0.92	ns

*= significant (p<0.05); ns=Not sig
Source: Field survey, 2018

DISCUSSION

This result may not be connected to the fact that the male folk are mainly household head and the major controller of household resources. This may be attributed to the fact that females in the study area didn't exhibit shyness, and had more access to NTFPs than the males. The result on sex status of the people in the study area is not in accord with Edeh and Mbam [11], Famuyide [12], reported that males were mostly engaged in the utilization of NTFPs in Ebonyi and Oyo states, respectively. The age bracket of the people was an indication that the respondents were within the active workforce with the potential ability to utilize NTFPs positively.

This result implies that both religions utilises NTFPs either as food, medicine and raw materials in the study area, with more Christians involved in NTFPs utilization. This agreed with Dau and Elisha [2], which reported that most Christians (42.7%) were involved in NTFPs collection and utilization in Bauchi south senatorial district, Bauchi state. There is an indication of low level of educational attainment among the respondents since majority

attained secondary school level. This finding implies that majority of the respondents were within the income category of <₦10,000 to 20,000.

Based on this finding, the most preferred NTFPs utilized by the people in the study area were *Borassu* products which consist of Hypocotyls (which is popularly known in Yoruba, Igbo and Hausa languages as Agbon-eye, Ubiri and Giginya), fruits and stem. The result implied that the people consumed more of these young shoots than any other parts in the study area. This may be attributed to the fact that it is this part that is mostly sold. They consume it, either in the form of food which complements the diets of the people; the white albumen in the three woody kernels of the seeds was consumed mostly by children.

The fruits of *Borassus* trees are relevant during the famine season or dry season when they had sold all their stored food stuff. The list of NTFPs implies that there were available NTFPs in the study area. This result agreed with Siaw *et al*. [13], who reported that 54% of the respondents in Abrimasu Forest Reserve of Mampong Forest District (Ghana) used the young sprouting *Borassus* hypocotyls.

Other preferred NTFPs utilized by the respondents in the study area include: honey, condiments and crafting/carving. This finding is in line with the report of Agbogidi [5], who reported that NTFPs range from being utilized as food or food additives, medicines, and crafts among others. Also, Shiva and Verma, [14] reported that NTFPs can be classified in many different ways; according to ends use (medicine, food, drinks, etc) by the part used (roots, leaves, barks, etc). One could deduce from these results that NTFPs provide some daily needs to the inhabitants. This agrees with the findings of Arnold [15], who reported that rural dwellers in developing countries depend on NTFPS for various levels of use

The result on *Likert scale* rating implied that the respondents in the study area utilized NTFPs on a very high extent especially *Borassu* products, condiments, bush mean, honey and crafting/carving products. This may be as a result of the high economic values attached to these products which served as sources of income to the communities around the forest reserve in the study area. This result implies that even though NTFPs were sourced from the forest reserve by the people of the communities, yet the people placed high value to these products by utilizing the products to a very high extent. However, they used the products for other daily needs which can be quantify in monetary value i.e they generate income indirectly. Some of the most pressing needs that can be met by utilizing forest products include: Dealing

with medical emergencies as they arise [16, 17] or meeting medicinal needs [18]; The payment of school fees [19]; Using profits for participating in family ceremonies [20]; Funding investments in consumptive activities (such as new clothes, school uniforms, gifts, pots, and pans) [19, 21] among others.

The result on spearman correlation test on the relationship between socio-economic characteristics and NTFPs utilization was to ascertained whether there was any significant relationship between the selected socioeconomic variables of the respondents and the utilization of NTFPs, it was found that age, education status and household size significantly determine whether the utilization of NTFPs is more effective and efficient to the communities around *Kwabaktina* forest reserve but income had no any significant relationship with NTFPs utilization.

This implies that income had nothing to do with the respondents' level of utilization of NTFPs in the study area. If there is an increased or decreased on the respondents' income, it has no any effect on the level at which the people utilize NTFPs available to them from the forest reserve.. This finding is in close variance with Ogundele *et a*l [22], who reported that education status, household size, monthly income, age and sex were significant in determining the variation in the level of forest utilization in Akwa Ibom State, Nigeria.

Gender difference had an implication on the utilization of NTFPs in the study area. These findings showed female were mostly the ones that utilized NTFPs in the study area than male. Therefore, gender plays important role in NTFPs utilization based on this finding. Females were mostly engaged in the utilization of NTFPs as obtained from this study. This result disagreed with Edeh and Mbam [11], which discovered from the field that males use NTFPs more as they move in their daily activities.

This finding showed that communities do not differ significantly in the extent in which they utilized NTFPs in the study area. This may be attributed to the relative scarcity of most of the NTFPs as a result of deforestation and the present awareness of their importance, more value is being added which had made the NTFPs highly marketable [22]. Thus, communities do not differ significantly in NTFPs contribution to their livelihood as obtained from this study. This agrees with Dau and Elisha [2], which reported that NTFPs play an important role in the livelihood of people and forest-dwelling communities in Bauchi south senatorial district.

CONCLUSION

This study assessed the utilization of Non Timber Forest Products (NTFPs) in Kwabaktina forest reserve in Adamawa state, Nigeria. NTFPs were mostly utilized by female and young and agile youth who were within the low income class of ₦1,000 to 20,000. Borassu products, condiments, honey, crafting/carving materials, traditional herbs, bush meat, edible insects among others were the most preferred NTFPs utilized on a high extent in the area. Age, educational status and household size had significant effect in the extent of utilizing NTFPs in the study area. Gender had significant implication on the utilization of NTFPs. NTFPs play an important role in the livelihood of people in different communities, to ensure speedy growth and yielding (development) of NTFPs in the study area; it is recommended that NGOs and individual should participate in funding of trees planting campaign in marginal land. Also, the people of the communities should also be encourage to embark on planting of economic trees to ensure availability of NTFPs in the area which can help to reduce rural-urban population drift and the prevailing unemployment by providing raw materials for crafting and carving.

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