

Original Research Article

Economic Analyses of Non-Timber Forest Products Utilized by Communities around Kwabaktina Forest Reserve

ABSTRACT

This study was carried out among communities surrounding the 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 utilized 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 (commonwealth forest association and Forest association of Nigeria) who are concerned with trees planting and sustainable forest management; and individual should participate in funding of trees planting campaign in marginal land. Also, the people of the communities should be encouraged to embark on economic trees planting for the provision of raw materials for carving/crafting; these can help to reduce rural-urban population drift and the prevailing unemployment especially among youths.

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].

34 Rural communities rely heavily on NTFPs as a means of generating income, sources of food
35 and medicine thereby reducing poverty level of the people. Hence, NTFPs play a vital role in
36 Nigeria [4]. Rural households spend income realised from NTFPs to buy food to maintain
37 their families hence dependence upon several combined and seasonal activities of NTFPs as
38 the only one/ sure way to ensure household food security [5, 2].

39 The type of resources and utilization patterns, vary by ecological zone and socio-cultural
40 area. Food, fodder, firewood and herbs medicine are important non-timber values of forests
41 collected all year round in different locations by rural dwellers [6].Millions of people in many
42 developing countries do not have enough food to meet their daily requirements; furthermore,
43 people are deficient in one or more micronutrients [7]. Rural communities in most cases
44 depend on wild resources including wild edible plants to meet their food needs in periods of
45 food crisis [8]. There is no documented information (research) on NTFPs utilization in the
46 study area. The aim of this study is to provide basic information and guide to further research
47 on the importance of NTFPs and their utilization in the study area.

48 **METHODOLOGY**

49 **The Study Area**

50 The study was carried out on NTFPs (such as bush meat, Condiments/spices, borassu
51 products (fruits & hypocotyls), crafting/carving products, honey, herbs medicine, insects,
52 among others) in Kwabaktina forest reserve communities in Hong Local Government of
53 Adamawa State, Nigeria. The reserve lies between Latitudes 10°24' 2" N and Longitude 12°
54 56' 58" E. The study area had population of about 681,353 with 2012 projected population
55 estimate of 823,094 based on 3.2% population growth rate [9].

56 The area has distinct seasons, namely- dry and wet seasons.The annual rainfall range between
57 800mm to 1000mm. Maximum temperature is about 40 °C and minimum temperature is
58 about 20.54 °C; Humidity is about 96% with a pressure of about 949.74 hPa with about 535 m
59 height above sea level. The Vegetation of the area is characterized of Sudan Savannah
60 towards extreme North and Northern Guinea Savannah for the remaining part of the area.

61 **Data Collection**

62 Data were collected through purposive and random samplings. The communities around the
63 reserve were purposively selected; these communities include: Muzigiba, Arndu, Manza'a
64 and Hong. In each community, respondents were randomly sampled and administered a copy
65 of questionnaire each to 60 respondents; making a total number of 240 copies of

66 questionnaire used for this finding. Views of the illiterate members in the communities were
67 solicited through group discussions and personal interview; field observations were adopted
68 for the field study.

69 Data Analysis

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

73 The spearman correlation is expressed as:

$$74 \quad r = 1 - \frac{6 \sum d^2}{n^2 - n}$$

76

77 Equation [1]

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

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

82

$$83 \quad \chi^2 = \sum \frac{(O - E)^2}{E} \quad \text{Equation [2]}$$

84 **Where χ^2 = Chi-square, O= observed frequency and E= Expected frequency**

85 RESULTS

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

91 The majority (59%) of the respondents were married, followed by 28% who were single, 24%
92 divorcee/separate while 6% were widows/widowers in the study area. Most of the respondents
93 (66%) were from a household size category of less than 10 house members, followed by
94 household size category of 10-20 which had 24% of the respondents while 10% were from
95 household size category of 21 and above.

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

99 The primary occupation for most of the respondents (37%) was farming, followed by students
 100 who had 28%, Civil servants were 13%, traders 15% while other occupation (such as fishing,
 101 crafting and labourers etc.) had 7%.

102 The result on respondents income showed 44% of the respondents earned less than ₦10,000
 103 per month, followed by 34% of the respondents earned between ₦10,000to 20,000, 15%
 104 earned above ₦20,000 to 30,000 while only few (7%) of the respondents earned above
 105 ₦30,000 per month.

106 **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
Major Occupation	Total	240	100.0
	Farming	88	36.7
	Civil Service	32	13.3
	Trading	36	15.0
	Student	68	28.3
	Others	16	6.7
Income Category	Total	240	100.0
	<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

107 **Source:** Field survey, 2018

108 The most utilized NTFPs by the respondents in the study area are presented on Table 2; most
109 of the respondents had multiple response on the utilization of NTFPs. Majority of the
110 respondents (20%) mostly preferred to utilized *Borassu* products (fruits, hypocotyls, stem and
111 leaves) and crafting/carving products, followed by condiments/spices (16%), others (tannins,
112 resins, oil, vegetative leaves) which had 15%, Bush meat 6%, edible insects (10%) and
113 traditional herbs/medicine was utilized by 8% while honey was the least utilized NTFP by
114 5% in the study area.

115 **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
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116 **Source:** Field survey, 2018

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

124 **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}

125 **5=** very high; **4=** High; **3=** moderate, **2=** low; **1=** very low;*= significant, ns= not significant

126 The result on *Mann-whitney* test on gender difference on NTFPs utilization in the study area
 127 showed gender difference was significant ($p=0.001$) in utilization of NTFPs. Gender play
 128 vital role in NTFPs utilization in the study area. The result on *Kruskal-wallis* test on
 129 difference between communities and extend of NTFPs utilization in the study area. This
 130 finding revealed that communities and extend of NTFPs utilization had no significant
 131 ($p=0.72$) differences with H-value (1.33). Also, this finding showed that, there was no
 132 significant difference ($p=0.76$) with H. value (1.17) between communities and NTFPs
 133 contribution to the livelihood of the people in the study area.

134 The relationships between socio-economic attributes and NTFPs utilization in the study area
 135 show on Table 4. The result from Spearman correlation test on the relationship between age
 136 versus NTFPs utilization was significant ($p=0.00$) with negative correlation value of -0.26.
 137 Household size versus NTFPs Utilization was significant with $p=0.04$ and a positive correlation
 138 value of 0.11, Education level versus NTFPs Utilization was highly significant $p=0.000$ with a
 139 positive correlation value of 0.20 while Income versus NTFPs Utilization had no significant
 140 $p=0.92$ with a positive correlation value of 0.01.

141 **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

142 *= significant ($p<0.05$); ns=Not sig

143 **Source:** Field survey, 2018

144 **DISCUSSION**

145 This result may not be connected to the fact that the male folk are mainly household head and
 146 the major controller of household resources. This may be attributed to the fact that females in
 147 the study area didn't exhibit shyness, and had more access to NTFPs than the males. The
 148 result on sex status of the people in the study area is not in accord with Edeh and Mbam [10],
 149 Famuyide [11], reported that males were mostly engaged in the utilization of NTFPs in
 150 Ebonyi and Oyo states, respectively. The age bracket of the people was an indication that the
 151 respondents were within the active workforce with the potential ability to utilize NTFPs
 152 positively.

153 This result implies that both religions utilize NTFPs either as food, medicine and raw
 154 materials in the study area, with more Christians involved in NTFPs utilization. This agreed
 155 with Dau and Elisha [2], which reported that most Christians (42.7%) were involved in
 156 NTFPs collection and utilization in Bauchi south senatorial district, Bauchi state. There is an
 157 indication of low level of educational attainment among the respondents since majority
 158 attained secondary school level. This finding implies that majority of the respondents were
 159 within the income category of $< \text{₦}10,000$ to 20,000.

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

167 The fruits of *Borassus* trees are relevant during the famine season or dry season when they
168 had sold all their stored food stuff. The list of NTFPs implies that there were available NTFPs
169 in the study area. This result agreed with Siawet *al.* [12], who reported that 54% of the
170 respondents in Abrimasu Forest Reserve of Mampong Forest District (Ghana) used the young
171 sprouting *Borassu* hypocotyls.

172 Other preferred NTFPs utilized by the respondents in the study area include: honey,
173 condiments and crafting/carving. This finding is in line with the report of Agbogidi [5], who
174 reported that NTFPs range from being utilized as food or food additives, medicines, and
175 crafts among others. Also, Shiva and Verma, [13] reported that NTFPs can be classified in
176 many different ways; according to ends use (medicine, food, drinks, etc) by the part used
177 (roots, leaves, barks, etc). One could deduce from these results that NTFPs provide some
178 daily needs to the inhabitants. This agrees with the findings of Arnold [14], who reported that
179 rural dwellers in developing countries depend on NTFPS for various levels of use

180 The result on *Likert scale* rating implied that the respondents in the study area utilized NTFPs
181 on a very high extent especially *Borassu* products, condiments, bush mean, honey and
182 crafting/carving products. This may be as a result of the high economic values attached to
183 these products which served as sources of income to the communities around the forest
184 reserve in the study area. This result implies that even though NTFPs were sourced from the
185 forest reserve by the people of the communities, yet the people placed high value to these
186 products by utilizing the products to a very high extent. However, they used the products for
187 other daily needs which can be quantify in monetary value i.e they generate income
188 indirectly. Some of the most pressing needs that can be met by utilizing forest products
189 include: Dealing with medical emergencies as they arise [15, 16] or meeting medicinal needs
190 [17]; The payment of school fees [18]; Using profits for participating in family ceremonies

191 [19]; Funding investments in consumptive activities (such as new clothes, school uniforms,
192 gifts, pots, and pans) [18, 20] among others.

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

200 This implies that income had nothing to do with the respondents' level of utilization of
201 NTFPs in the study area. If there is an increased or decreased on the respondents' income, it
202 has no any effect on the level at which the people utilize NTFPs available to them from the
203 forest reserve.. This finding is in close variance with *Ogundelet al* [21], who reported that
204 education status, household size, monthly income, age and sex were significant in
205 determining the variation in the level of forest utilization in Akwalbom State, Nigeria.

206 Gender difference had an implication on the utilization of NTFPs in the study area. These
207 findings showed female were mostly the ones that utilized NTFPs in the study area than male.
208 Therefore, gender plays important role in NTFPs utilization based on this finding. Females
209 were mostly engaged in the utilization of NTFPs as obtained from this study. This result
210 disagreed with *Edeh and Mbam* [10], which discovered from the field that males use NTFPs
211 more as they move in their daily activities.

212 This finding showed that communities do not differ significantly in the extent in which they
213 utilized NTFPs in the study area. This may be attributed to the relative scarcity of most of the
214 NTFPs as a result of deforestation and the present awareness of their importance, more value
215 is being added which had made the NTFPs highly marketable [21]. Thus, communities do not
216 differ significantly in NTFPs contribution to their livelihood as obtained from this study. This
217 agrees with *Dau and Elisha* [2], which reported that NTFPs play an important role in the
218 livelihood of people and forest-dwelling communities in Bauchi south senatorial district.

219

220

221 **CONCLUSION**

222 This study assessed the utilization of Non Timber Forest Products (NTFPs) in Kwabaktina
223 forest reserve in Adamawa state, Nigeria. NTFPs were mostly utilized by female and young
224 and agile youth who were within the low income class of ₦1,000 to 20,000. Borassu
225 products, condiments, honey, crafting/carving materials, traditional herbs, bush meat, edible
226 insects among others were the most preferred NTFPs utilized on a high extent in the area.
227 Age, educational status and household size had significant effect in the extent of utilizing
228 NTFPs in the study area. Gender had significant implication on the utilization of NTFPs.
229 NTFPs play an important role in the livelihood of people in different communities, to ensure
230 speedy growth and yielding (development) of NTFPs in the study area; it is recommended
231 that NGOs (commonwealth forest association and Forest association of Nigeria who aims are
232 trees planting and sustainable forest management) and individual should participate in
233 funding of trees planting campaign in marginal land. Also, State and local governments and
234 also the rural chiefs should encouraged the communities to embark on afforestation and
235 reforestation of economic tree species to ensure availability of NTFPs in the area which can
236 help to reduce rural-urban population drift and the prevailing unemployment by providing
237 raw materials for crafting and carving.

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