

**CONSTRAINTS TO NON-TIMBER FOREST PRODUCTS SUPPLY IN AGO-OWU
FOREST RESERVE OF OSUN STATE, NIGERIA**

Abstract

Non-Timber Forest Products (NTFPs) are products or services other than timber that is produced in a forest and of course, are indispensable parts of the livelihood strategy of the forest's adjoining communities. Their economic potentials necessitated the need for research to be carried out on its production and constraints facing its supply in the study area. Therefore, constraints to NTFPs' supply in Ago-Owu forest reserve and its environment were investigated. Three communities (Mokore, Ajegunle and Alabameta) were randomly selected communities of the identified study area (Mokore, Ajegunle, Alabameta, Elewe, Alaguntan and Okodowo) identified communities in the study area. Their populations were sought for and samples were drawn in proportionate to their sizes: Mokore (50), Ajegunle (40) and Alabameta (20). This gave a total number of 110 respondents from which 105 questionnaires were derived for the investigations. A set of questionnaire was used to obtain data on source of NTFPs, commonly sourced NTFPs and constraints facing its supply in the study area. Data were analyzed using descriptive statistics and logit regression at $\alpha_{0.05}$. Majority of the respondents were male (69.1%) and 64.8% of them were within the age of 30-50 years. Also, most of the respondents were married (78.1%) and less than half of them (41%) had no formal education, but were predominantly farmers (72.4%). The major source of NTFPs in the study area was forest reserve (70.5%), while a total of seventeen (17) different NTFPs commonly sourced were documented. Constraints facing the supply of NTFPs included Climate change, Lack of finance for smooth running of the activities involved in the products' supply and price fluctuation with odds-ratio of 9.87, 5.66 and 1.92 respectively. The study established the significance of the Ago-Owu forest reserve to the livelihood of the forest dwellers. However, there is need for the establishment of new plantations to fostering production of the products as well as serving as adaptation strategies against climate change. There is also an urgent need for the State Forestry Service/government to

31 address their areas of concern pointed out in this study for bio-prospecting, economic well-being
32 of forest dwellers and great advantage of boost in revenue propensity of Osun State.

33 **Keyword:** NTFPs, Source, Constraints, Forest dwellers

34

35 **Introduction**

36 Non-Timber Forest Products (NTFPs) are biological products and services derived mainly from
37 forests as well as marginal lands. Over the years, forest and its products have contributed
38 immensely to the economic development of Nigeria (Fonta *et al.* 2010). Forest products can be
39 classified into two: Timber, which constitutes the bulk of forest-based materials used for
40 economic purposes, and Non-timber forest products. During the 1960s and 1970s, forest
41 products earned large amounts of foreign exchange and the sector was ranked highest in
42 employment generation. According to the World Bank (1988) forestry sector earned annual
43 foreign exchange of between 308 million to 412 million naira or about 4.2 percent of GDP,
44 however, the situation turned around between 1970 and 1985, due to the discovery of oil.

45 NTFPs have been studied by researchers from many different academic fields and each field
46 used a slightly different definitions. NTFPs include any product or service other than timber that
47 is produced in a forest (CIFOR, 2004). They include fruits, nuts, vegetables, fish medicinal
48 plants, resins, essences, a range of barks and fibers, bamboo, rattans, honey, insects, animals,
49 fodder, fertilizers, medicinal extracts, construction materials, cosmetic and cultural products,
50 natural dyes, tannin, gums, latex and other exudates, essential oils, spices, edible oils, decorative
51 articles, horns, tusks, bones, pelts, plumes, hides and skins, non-wood ligno-cellulosic products,
52 phytochemicals and aroma chemicals.

53 NTFPs are indispensable part of the livelihood strategy of communities living in and near
54 forests. They constitute an important source of livelihood for millions of people across the globe.
55 The term non-timber forest product preferably called Non-Wood Forest Products in some regions
56 of the world has been used (of recent) to replace minor forest products as it was formerly
57 particularized. The regional expert consultation on NWFPs for Africa held in Arusha Tanzania ,
58 defined NTFPs as all vegetal and fauna products (other than wood) derived from forests,
59 excluding industrial round wood, wood used for energy, horticultural and livestock
60 products(FAO, 1995). Rijsoort (2010) defined NTFPs as all tropical forest products plants and
61 animals or parts thereof other than industrial timber, which are (or can be) harvested for human

62 use at the level of self-support or for commercial purposes. The use of NTFPs is as old as human
63 existence.

64 The role of NTFPs in the daily life and welfare of people all over the world cannot be over-
65 emphasized. Different parts of a plant or animal often provide different products simultaneously
66 and or at different times. About 80% of the population of the developing world depends on
67 NTFPs for their primary health and nutritional needs (FAO, 1995). Rural women were found to
68 be making between ₦115 and ₦500 in fruit gathering and sale of NTFPs. It is therefore
69 paradoxical that in spite of their real and potential value, most NTFPs remain grouped as minor
70 forest products. These products rarely feature in statistics and are hardly studied or researched.
71 Forest management in Nigeria has been largely focused on timber production ever since the
72 beginning of organized forestry. However, in the recent time, there has been increasing
73 recognition of the fact that this approach to forest management is neither conducive to
74 sustainable management of the forests particularly of the tropical moist forest nor is it in the best
75 economic interest of the predominantly rural societies in the tropics (Ikonnikova *et al.*, 2017).
76 Due to the relative scarcity of most of the NTFPs as a result of deforestation and the present
77 awareness of their importance, more value is being added which has made the NTFPs highly
78 marketable.

79 Research at a global scale has identified that rural households draw from a diversity of income
80 sources, adopt a range of livelihood strategies in order to achieve and maintain a sustainable
81 livelihood. These include the use of NTFPs both for household consumption and for sale.

82 In view of the above, this paper revealed the major source and commonly sourced NTFPs viz-a-
83 viz the constraints facing its supply in Ago-Owu forest reserve and its environs, with a view to
84 suggesting mitigations in the study area.

85

86

87 **Methodology**

88 **Area of study**

89 The study was carried out in Ago-Owu forest reserve. It is located between the latitude
90 $7^{\circ}9'37.8144''N - 7^{\circ}14'0.8376''N$ and longitude $4^{\circ}4'22.728E - 4^{\circ}10'6.3264''E$. Ago-Owu
91 forest reserve is in thick forest zone and it consists of 32,116 hectares in the high forest area.

92 There are forest adjoining communities in and around the reserve. These included Mokore,

93 Ajegunle, Alabameta, Elewe, Alaguntan and Okodowo, in which majority of the dwellers are
94 farmers.

95 **Data Collection and Analysis**

96 Three communities (Mokore, Ajegunle and Alabameta) were randomly selected out of the six
97 (Mokore, Ajegunle, Alabameta, Elewe, Alaguntan and Okodowo) identified communities in the
98 study area with the projected populations of 998, 201 and 801 respectively (NPC, 2006).

99 Diaw *et al.* (2002) was adopted for the study. Hence, 10% sampling intensity was used to
100 sample respondents in the communities where the population is less than 500, 5% for population
101 between 500 and 1000 and 2.5% for population over 1000.

102 Therefore, 50 respondents were reached in Mokore, 40 in Ajegunle and 20 in Alabameta.
103 Therefore a total of 110 questionnaires were administered while only 105 were retrieved from
104 the field which represents 95.45% returns. Data collected were subjected to descriptive statistics
105 and Logit regression analysis.

106 **RESULTS AND DISCUSSION**

107 **TABLE 1: Socio-Economic Characteristics of the Respondents in the Study Area**

Socio-economic characteristics	Frequency	Percentage
Gender		
Male	65	61.9
Female	40	38.1
Total	105	100
Age		
20-30 years	21	20
30-41 years	45	42.9
41-50 years	23	21.9
Above 50 years	16	15.2
Total	105	100
Marital status		
Single	12	11.4

Married	82	78.1
Widows	11	10.5
Total	105	100
Educational status		
No formal education	41	39
Secondary education	23	21.9
Primary education	38	36.2
Adult education	3	2.9
Total	105	100
Occupation		
Trading	29	27.6
Farming	76	72.4
Total	105	100

108 *Source:* Federal College of Forestry Field Survey, 2019

109

110 **Socio-Economic Characteristics of the Respondents**

111 Table 1 shows the socio-economic characteristics of the respondents in the study area. It was
 112 revealed that 69.1% of the respondents were male while 38.1% were female. Forest reserve's
 113 environment is notable for diverse economic activities and this may be the reason why the area is
 114 dominated by male. Men strives hard to fend for their families and this may not be unconnected
 115 to the fact that men are mainly household head and the major controller of household resources,
 116 as confirmed by Edey and Mbam (2012). Hence, they tend to engage in diverse economic
 117 activities than female so as to be in financial control of their family.

118 In terms of age distribution, majority of the respondents (42.9%) were within the ages of 30-41
 119 years, followed by respondents within the ages 41-50 years (21.9%) while those within the ages
 120 of 50 years and above recorded the least percentage (15.2%). It could be inferred that most of the
 121 respondents were in their economical active age. This shows that majority of the respondents
 122 were physically and economically active to engage in various production activities, including
 123 collection of NTFPs. As a matter of fact, venturing to any economic activity requires
 124 consideration of one's agility. This is in tandem with the work of Dolisca *et al.* (2006) and

125 Tazeze *et al.* (2012) who reported that age is significantly related to farmer's decisions during
126 adoption strategies.

127 Information on marital status of the respondents revealed that 78.21% of them were married,
128 11.4% were single and 10.5% were widow. Since most of the respondents were married, it is
129 expected that they should have more responsibilities than singles. This in turn has tendency of
130 raising their level of commitment. This agrees with the finding of Akinbile (2007), who reported
131 that marriage confers responsibility.

132 Data on educational status indicated that less than half of the population of the respondents
133 (41%) had no formal education, while the substantial population had at least basic education
134 (38.0% - primary, 23% - secondary and 3% - adult education). Proper education of the people
135 living in forest's adjoining communities is of sinequanon if sustainability of forest resources is to
136 be achieved. This is in line with the report of Kajembe and Luoga (1996) who argued that
137 increase in education tend to increase people's awareness on the importance of natural resources
138 conservation for sustainable production.

139 Finally, data gathered on the occupation of the respondents showed that they are predominantly
140 farmers (72.4%). This implies that farming was the main economic activity in the study area.

141

142 **Table 2: Sources of NTFPs collected by the respondents**

Response	Frequency	Percentage
Reserve	74	70.5
Free areas	31	29.5
Total	105	100

143 **Source:** Federal College of Forestry Field Survey, 2019

144 **Sources of NTFPs**

145 Table 2 shows that majority of the respondents (70.5%) sourced the products from the forest
146 reserve while only 29.5% of them sourced theirs from the free areas. It could therefore be
147 inferred that forest reserve is highly significant to the livelihood of the forest dwellers in the

148 study area and this agrees with the finding of Zugman (1995), who observed that people will use
 149 the forests to provide for their needs; how they use these forests positively or negatively will
 150 depend on economic development.

151

152 **Table 3: Commonly sourced NTFPs in the study area**

Common name	Frequency	Percentage %
Bamboo	7	6.7
Bush-meat	7	6.7
Charcoal	2	1.9
Fruit	8	7.6
Fuel wood	20	19.1
Honey	3	2.9
Locust bean	3	2.9
medicinal plant	8	7.6
Mushroom	5	4.8
Vegetable	5	4.8
wrapping leaf	5	4.8
Bark	7	6.7
Gum	3	2.9
Snail	7	6.7
Insect	4	3.8
Seed	3	2.9
Palm fruit	8	7.6
Total	105	100

153 **Source:** Federal College of Forestry Field Survey, 2019

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155 **Commonly Sourced NTFPs**

156 Table 3 revealed the commonly sourced NTFPs in the study area. The study indicated that a total
 157 of seventeen (17) different NTFPs are commonly sourced from the study area. It was further
 158 observed that fuel wood had the majority percentage which accounted for 19.05%, followed by
 159 fruit (7.6%), medicinal plants (7.6%) and palm fruit (7.6%) while the least was charcoal with

160 1.90%. This agrees with the work of Lynch and Alcorn (1994); Kumar *et al.* (2009) who
161 observed in their studies that many of NTFPs are being used by locals for the improvement of
162 their livelihood status; these include leaves, flowers, fruits, branches, gum/resins, roots etc.

163 **Constraints Facing the Supply of NTFPs**

164 Logit regression model for constraints facing the supply of NTFPs in the study area

165 **The binary model**

166 Table 4 presents binary regression obtained for the constraint facing NTFPs in the study area.

$$167 \text{CFNTFPs} = 0.67 + 2.29\text{CCHA} + 1.73\text{LFIN} - 1.53\text{LDA} - 0.67\text{IPF} - 0.58\text{EFLA} - \\ 168 0.88\text{HCT} - 0.67\text{PRNE} - 0.67\text{ISF} - 0.65\text{PFL} \text{ ---- (Equation 1)}$$

169 N = 105, Final Loss = 34.86, Chi-Square (df, 9) = 19.90, P = 0.0185

170 Odd ratio (Unit Change): Constant (5.53); CCHA (9.87); LFIN (5.66); LDA (0.22); IPF (0.51);
171 EFLA (0.56); HCT (0.42); PRNE (0.51); ISF (0.51); PFL (1.92)

172 Where,

173 CFNTPs =Constraints facing the supply of NTFPs (Dependent variable)

174 While independents variables includes:

175 CCHA =Climatic Change

176 LFIN =Lack of Finance

177 LDA =Low Demand

178 IPF =Inadequate Processing Facilities

179 EFLA =Enforcement of Forest Law

180 HCT =High Cost of Transportation

181 PRNE =Poor Road Network

182 ISF =Inadequate Storage Facilities

183 PFL =Price Fluctuation

184

185 **Table 4: Logit Binary of Constraints Facing the Supply of NTFPs in the Study Area**

186 Dependable Variable (CFNTFPs) = Constraints Facing NTFPS (Yes = 1. No = 0)

Independent Variables	Coefficient	Odds Ratio
Whether presence of (CCHA) is responsible for inadequate supply of NTFPs	2.29	9.87*
Whether presence of (LFIN) is responsible for inadequate supply of NTFPs	1.73	5.66*
Whether presence of (LDA) is responsible for inadequate supply of NTFPs	-1.53	0.22
Whether presence of (IPF) is responsible for inadequate supply of NTFPs	-0.67	0.51
Whether presence of (EFLA) is responsible for inadequate supply of NTFPs	-0.58	0.56
Whether presence of (HCT) is responsible for inadequate supply of NTFPs	-0.88	0.42
Whether presence of (PRNE) is responsible for inadequate supply of NTFPs	-0.67	0.51
Whether presence of (ISF) is responsible for inadequate supply of NTFPs	-0.67	0.51
Whether presence of (PFL) is responsible for inadequate supply of NTFPs	0.65	1.92*
Model χ^2 (df, 9) = 19.90; Final Loss = 34.86; P<0.05		

187 *Significant at p<0.05; ns = Not Significant

188 Model presented above for Ago-Owu Forest Reserve and its environs gave overall significant fit
 189 to the data judging from χ^2 value that was significant at p<0.05. Climate Change (CCHA) had the
 190 highest odd-ratio of 9.87, followed by Lack of Finance (LFIN) with the odd-ratio of 5.66 and
 191 Price Fluctuation (PFL) with the odd-ratio of 1.92 respectively.

192 Therefore, the factors identified to be responsible for inadequate supply of NTFPs in the study
 193 area were climate change (CCHA), Lack of finance (LFIN) for smooth running of the various
 194 activities involved in the products supply and Price fluctuation (PFL). There was sufficient
 195 evidence that the estimated coefficients for the factors were not zero. This implies that the
 196 regression parameters in the model were statistically significant. In other words, the higher the

197 value of odds-ratio the more likelihood these factors responsible for inadequate supply of NTFPs
198 in the study area. Hence, it clearly indicated the variable(s) i.e factors that mostly influence the
199 supply of NTFPs in the study area. The implication was corroborated by Deeks (1996); Bland
200 and Altman (2000) that the logit model provides information on the consequences of one
201 variable on the other. Therefore, existence of these factors poses serious challenges to adequate
202 supply of NTFPs in the study area.

203 **CONCLUSIONS AND RECOMMENDATIONS**

204 The study established the fact that Ago-Owu forest reserve is highly significant to the livelihood
205 of people living in and around the reserve, since most of the NTFPs collected are sourced from
206 there. The study also revealed the huge potentials of the reserve in terms of diverse NTFPs
207 production which are notable for high economic value. Constraints facing the supply of NTFPs
208 in the study area were climate change, lack of finance for the smooth running of the various
209 activities involved in the products' supply and price fluctuation.

210 Therefore, it is suggested that establishment of privately and community-owned plantations
211 stocked with both the exotic and indigenous tree species should be encouraged by the Osun
212 forestry service in the study area so as to enhancing the production of NTFPs to the social,
213 environmental and economic benefit of the community dwellers and even beyond. Since some of
214 the implications of climate change effects are reduction in yield, undefined season, pest and
215 disease outbreak etc., afforestation should be adopted by forest dependent farmers in the study
216 area as an adaptation measure against climate change. It may even be in form of Agro-forestry
217 since it has a particular role to play in mitigation of atmospheric accumulation of greenhouse
218 gases, because it has potential for carbon sequestration, improve soil nutrient uptake, water
219 percolation, aeration, water recharge and soil water balance. For the smooth running of the
220 various activities involved in the products' supply, government of Osun State should try as much
221 as possible to empower the forest dwellers by giving them some financial incentives (Credit
222 facilities) to enhancing the supply of the products. It is understandable that price fluctuation may
223 be seasonal dependent, but nevertheless NTFPs' collectors should always try to fix reasonable
224 prices so as to ease the evacuation and supply of the products to the end users.

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