



Non-Timber Forest Products: Constraints and Prospects in Rainforest Communities in Nguti Sub-division, South West Region, Cameroon

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Abstract:

This study assessed the constraints and prospects of production and marketing of non-timber forest products (NTFPs) by farmers. This study aimed to identify the main constraints and prospects of production and marketing of major NTFPs within the Nguti Sub-Division. Three villages were randomly selected in the Subdivision. Thirty (30) respondents were sampled in Ediengoh, Ofrikpabi and thirty-two (32) from Ekenge making a total number of 92 respondents. Descriptive statistics was also used to calculate frequencies, percentages and chi-square was used to test for the level of association between variables at $p=0.05$. Forty six percent (46.7%) were men while 53.3% were women. Forty two percent (42.4%) had farming experience for 6-10 years. The main NTFP that was produced and marketed was *Irvingia wombulu* at (31.5%) and the least was *Gnetum africana* which stood at (3.3%). The major marketing problems challenging the farmers of the NTFPs was significant ($X^2_{cal}=86.95$, $X^2_{tab}=7.815$) with lack of storage facilities at the top followed by inadequate market information and low purchasing power of buyers. The major constraint of production noticed was duration taken for vegetative growth ($X^2_{cal}=82,26$, $X^2_{tab}=7.815$), followed by inadequate access to credits and inadequate extension support/ advisory services. There is therefore urgent need for producers to embark on simple processing and packaging technologies to reduce wastage and value add to the products. This study recommends domestication of fast-growing species and government to improve rural road networks for produces taken to markets.

Keywords: NTFPs, production, constraint, market, Rainforest communities, Nguti Sub-division

INTRODUCTION

Globally, more than one-fourth of the world's population rely on the forest for food and livelihood, 60% of whom are indigenous and tribal communities (FAO, 2015). These include products from plants and trees (e.g., medicinal plants, herbs, resins, fruits, nuts, etc.), as well as animals (e.g., honey, bush meat, fish). As one of the major sources of livelihood for tribal communities in many of the developing countries, NTFPs act as community safety nets where agriculture is unable to provide a sustainable income. Further, NTFPs are also used for cultural and recreational purposes, and offer various opportunities, including cultural maintenance and revival, forest biodiversity support, and rural economic development (Cocksedge, 2006).

Despite the increasing knowledge, the NTFPs sector is still strongly underutilised. The main constraints of the NTFP sector are "scarcity of raw material (in terms of both quantity and

seasonal availability), low market transparency, inadequate business and marketing skills, small market size and high production and transport costs" (Maso et al., 2011). Further challenges include market inefficiencies for products that are produced in low quantities, especially when both the quantity and quality of the products can vary due to changes in the weather and other production conditions.

Although NTFPs are an important source of subsistence and cash income, there is growing concern regarding the fact that overharvesting fuelled by an increasing population and market demand is accelerating stock depletion (Arnold & Perez, 2001; Belcher et al., 2005). Domestication is also crucial for improving genetic quality in order to realize higher yields, extended periods of production, and the development of tolerance to variable temperature and soil conditions (Leaky & Izac, 1996).

In Cameroon, as in most developing countries with forest cover, Non-Timber Forest Products ensure the maintenance of food security for many rural households (Guedje et al., 1998). Rural communities get most of the craft material, food, medicine and spirituality (Abanda, 2013). It is in this perspective that this study seeks to assess the constraints and prospects in the production and marketing of Non-Timber Forest Products in the Nguti Sub-division, South West Region of Cameroon.

MATERIALS AND METHODS

Description of Study Site

Nguti Sub-division is found in KupeMuanenguba Division of the South West Region of Cameroon. It is 94 km from the town of Kumba and has an altitude of about 400 m above sea level, with a surface area of 1500 km² (Nguti Council, 2016). The subdivision shares common boundaries to the North with Tinto Sub division, to the South with Konye Sub division, to the South-East with Bangem and Melong, to the East with Santchou, Dschang and Fontem and to the West with Eyumojock and Toko (Figure 1). Topographically, the land is generally flat and raised 400 m above sea level with gentle and steep hills dotted within the thick humid forest in the municipality. It is host to two forest reserves including BayangMbo and the Nguti Council Forest with timber resources, wildlife and medicinal plants. Its coordinates are 5°15'0N and 9° 30'0E, Nguti Municipality is within the equatorial rain forest with a climate which is characterized by two distinct seasons; the rainy and the dry seasons. The dry season runs from October to March and is characterized by elevated temperatures (30°C-32°C). The rainy season begins from March to September or October. Peak periods are during the months of July and August. There are 54 villages and nine clans which are geographically separated by the MbayangMbo Wildlife Sanctuary (Nguti Council, 2016).

According to the monographic Study Nguti Council, August (2009), the main economic activities of communities in Nguti are farming (70%), hunting (20%), fishing (5%) and the collection of non-timber forest products (5%). The main local markets are ElumbaMbo, Mbetta, Nguti and Manyemen, where farming produce (cocoa, coffee, palm oil, vegetables) and other food items (bush meat, salt, fresh fish) are sold. This illustrates how reliant local communities are on forest land and resources. When access to these is compromised, so are the communities' livelihoods and wellbeing.

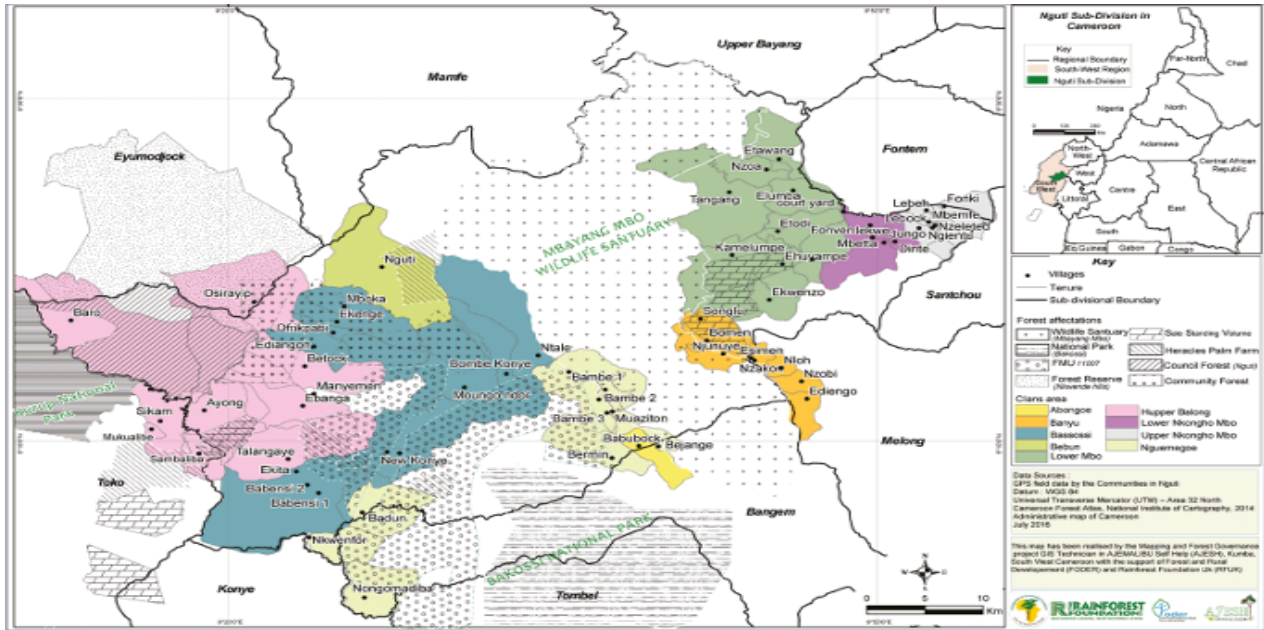


Figure 1: Map of the study sites, source: Nguti council, 2010

Population of the Study

This study was conducted in three villages in the Nguti subdivision. These villages include Ediengoh, Ofrikpabi and Ekenge. The Ediengoh has a total population of 103, Ofrikpabi 100 and Ekenge 401, giving a population size of 604 inhabitants (Nguti-Council, September 2016). The total population of the study was 120, consideration was taken for household which were not involved in the production and marketing of NTFPs as well as households which have not been involved in the activities for more than five years. The sample size was 92 respondents, 30, 30, and 32 respondents were involved in the production, gathering and marketing of NTFPs were selected randomly from each village (Ediengoh, Ofrikpabi and Ekenge) respectively. The sample size of the study was determined with the aid of the Krejcie and Morgan table, where 92 is a representative sample of the studied population.

Data Collection

The field work was carried out from January to May 2022 and questionnaires were administered to both male and female respondents involved in the production and marketing of NTFPs in Nguti Sub-division. Basically, primary and secondary methods of data collection were used;

Primary Data Collection:

Primary data was collected by using well-structured questionnaires with open and closed ended questions made up of three sections. Section A comprise of the socio-economic characteristics of the respondents for example gender, age of respondents in years and level of education, section B the NTFPs that are produced and marketed such as do you produce NTFPs?, which are the NTFPs produced? , section C dwell on the opportunities of production and marketing of NTFPs for example increase growth of the community, increase in income and section D consist of the constraints and prospects involved in the production and marketing of NTFPs for example lack of knowledge to identify and harvest certain NTFPs, lower purchasing powers of the market agents, NTFPs should be domesticated and storage facilities created and field observation. Discussions with key informants were also used to collect information.

Secondary Data:

The secondary data were collected from scientific publications, the university library, electronic documents (internet) and documents from establishments from Nguti council and Divisional Delegation of Agriculture and Rural Development.

DATA ANALYSIS

The quantitative data obtained from the household survey was coded and analysed using IBM Statistical Package for Social Science (SPSS) version 16.0. Descriptive statistics was also used to calculate frequencies, percentages and chi-square was used to test for the level of association at $p=95\%$ and significance.

RESULTS

Socio-Demographic Characteristics of Farmers in Nguti Sub-Division

The result on socio-demographic characteristics of respondents in the study area is shown in Table 1 below. The NTFPs producers and marketers sex ratio showed that 46.7% were men while 53.3% were women.

43.5% of the respondents who were involved in production and marketing of NTFPs were below the age range of 18-40 years and 16.5% were above the age range of 60 years while 40.2% of the respondents were between 41-60 years.

Table 1 on educational level showed that 33.7% of the respondents attained primary school; 41.3% attained secondary education, while 14.1% did not attain any formal education but only 10.9% attained university education.

Results on household size on table 1 indicated that 45.7% of the respondents have a household size of 1-5, 38.0% has a household size of 6-10 and 16.3% have 11-15 persons.

Furthermore, on table 1 the results showed that 59.8% of the respondents' source for labour comes from family labour, 26.1% comes from hired labour and 14.1% comes from njangi.

Also, it was noticed in table 1 that majority (42.4%) of the respondents involved in production and marketing of NTFPs had farming experience for 6-10 years 31.5% 11-15 years, 21.7% had experience for more than 16 years and 4.3% of the respondents had farming experience for less than 5 years.

Regarding the monthly income from the sales of NTFPs, as shown on table 1, 29.3% of the respondents earn < 20.000frs, 43.5% earn 20.000-50.000frs, 23.9% earn 60.000-100.000frs and 3.3% earn >100.000frs.

Also, based on farm sizes as observed on table 1, 29.3% had 1-5ha, 27.2% had 6-10ha, 35.9% had 11-15ha and 7.6% had more than 16 ha. Furthermore, regarding the primary occupation of the respondents as reported in table 1, 95.7% were farmers, 2.2% were civil servants and 2.2% were business men.

Table 1: Socio-demographic characteristics of farmers

Variables	Frequency	Percentage
Male	43	46,7
Female	49	53,3
Total	92	100,0
Age group		
18-40	40	43,5
41-60	37	40,2
>60	15	16,3
Total	92	100,0
Level of education		
No formal education	13	14,1
Primary education	38	33,7
Secondary education	31	41,3
University education	10	10,9
Total	92	100,0
Household size		
1-5	42	45,7
6-10	35	38,0
11-15	15	16,3
Total	92	100,0
Source of labour		
Family labour	55	59,8
Hired labour	24	26,1
Njangi	13	14,1
Total	92	100,0
Farming experience		
<5 years	4	4,3
6-10 years	39	42,4
11-15 years	29	31,5
>16 years	20	21,7
Total	92	100,0
Farm size		
1-5 ha	27	29,3
6-10 ha	25	27,2
11-15 ha	33	35,9
>16 ha	7	7,6
Total	92	100,0
Monthly income		
<20.000frs	27	29,3
20.000-50.000frs	40	43,5
60.000-100.000frs	22	23,9
>100.000frs	3	3,3

Total	92	100,0
Primary occupation		
Farming	88	95,7
Civil servant	2	2,2
Business	2	2,2
Total	92	100,0

The Major NTFPs Produced and Marketed in Nguti Sub-Division

Based on table 2 below, 21.7% of the respondents are involved in the production and marketing of rainy season bush mango, the highest NTFP that was produced and marketed was in the dry season bush mango at 31.5%, 19.6% of njangsa, 12.0% of the respondents produced and marketed bitter cola, 7.6% produce country onion, whereas the least NTFP that were being produced and marketed in the area of study were eru which stood at 3.3% followed by bush pepper at 4.3% (Table 2).

As shown on table 2 the parts used for *Recinodendron heudelotii*, *Garcinla kola*, *Afrostryrax lepidophyllus* are seeds, for *Irvingia gabonensis*, *Irvingia wombulu* are kernels, and *Piper guineeses* the leaves and seeds.

Table 2: Major NTFPs collected and marketed in Nguti Subdivision

s/n	Scientific name	Common name	Part used	% Produced	% Marketed
1	<i>Irvingiagabonensis</i>	Rainy season bush mango	Kernel	21.7	21.7
2	<i>Irvingia. wombulu</i>	Dry season bush mango	Kernel	31.5	31.5
3	<i>Recinodendron heudelotii</i>	Njangsa	Seed	19.6	19.6
4	<i>Garcinla kola</i>	Bitter cola	Seed	12.0	12.0
5	<i>Afrostryrax lepidophyllus</i>	Country onion	Seed, bark	7.6	7.6
6	<i>Gnetum africanum</i>	Eru	Leaves	3.3	3.3
7	<i>Piper guineeses</i>	Bush pepper	Leaves, seed	4.3	4.3

Opportunities of Production and Marketing of NTFPs in the Nguti Subdivision

As shown in table 3 below, 59.8% strongly agreed that the production and marketing of NTFPs has led to an increase in income, 35.9% agreed it has led to an increase in income, 3.3% disagreed that the production and marketing of NTFPs has not led to an increased in their income and 1.1% strongly disagreed ($X^{2cal}=87.30$, $x^{2tab}=7.815$).

With respect to seasonal employment as an opportunity for the production and marketing of NTFPs, 54.3% strongly agreed that NTFP business has led to seasonal employment, 35.9% agreed the production and marketing of NTFPs has led to seasonal employment, 7.6% strongly disagreed and 2.2% disagreed ($X^{2cal}=66.34$, $x^{2tab}=7.815$).

Based on the table 3 below, 55.4% of the respondents strongly agreed the production and marketing of NTFPs is a great opportunity because the can be stored and sold later, 42.4% agreed and 2.2% strongly disagreed which showed a significant difference ($X^{2cal}=42,54$, $x^{2tab}=5.991$).

In addition to the opportunities mentioned above, 62.0% respondents strongly agreed that the production and marketing of NTFPs is an opportunity because these products are not easily

perishable, 34.8% agreed they are not easily perishable whereas 3.3% disagreed ($X^{2cal}=47,63$, $x^{2tab}=5.991$).

Also, as seen on the table below, 67.4% of the respondents strongly agreed that there is a high demand for NTFPs, 30.4% agreed that there is a demand for NTFPs and 2.2% strongly disagreed that there no increase in the demand for these products ($X^{2cal}=47,63$, $x^{2tab}=5.991$).

Table 3: Opportunities of production and marketing of NTFPs

Variables			X^{2cal}	$X^{2tab}=value$
increase in income	Frequency	Percent	87.30	7.815 ***
Strongly agreed	55	59.8		
Agreed	33	35.9		
Strongly disagreed	1	1.1		
Disagreed	3	3.3		
Total	92	100.0		
Seasonal employment			66.34	7.815 ***
Strongly agreed	50	54.3		
Agreed	33	35.9		
Strongly disagreed	7	7.6		
Disagreed	2	2.2		
Total	92	100.0		
Can be stored and sold later			42,54	5.991 ***
Strongly agreed	51	55.4		
Agreed	39	42.4		
Strongly disagreed	2	2.2		
Total	92	100.0		
Not perishable			47,63	5.991 ***
Strongly agreed	57	62.0		
Agreed	32	34.8		
Strongly disagreed	3	3.3		
Total	92	100.0		
High demand			59,04	5.991***
Strongly agreed	62	67.4		
Agreed	28	30.4		
Strongly disagreed	2	2.2		
Total	92	100.0		

(* at $p < 0.05$, ** significant at $p < 0.01$: *** significant < 0.001 , ns not significant)

Constraints and Prospects of Production and Marketing of NTFPs

Constraints of production and marketing of NTFPs:

Constraints of production of NTFPs:

As seen on table 4 below, 48.9% strongly agreed that unsustainable harvesting of NTFPs has greatly affected the production of these products, 42.4% agreed it has led to a decrease in production, 8.7% strongly disagreed that unsustainable harvesting of NTFPs has not affected production ($X^{2cal}=25,71$, $x^{2tab}=5.991$) showed a significant difference (Table 4).

With respect to lack of access to credits, 43.8% strongly agreed that it affected production, 48.3% agreed it affected production, 5.6% strongly disagreed that lack of access to credit has not affected production of NTFPs and 2.2% disagreed ($X^{2cal}=63,76$, $x^{2tab}=7.815$). Again, based on table 4 below, 48.9% of the respondents strongly agreed that continues deforestation has affected production of NTFPs , 39.1% agreed it had a negative effects on production and 6.5% strongly disagreed that continuous deforestation has not affected production and 5.4% disagreed ($X^{2cal}=55,04$, $x^{2tab}=7.815$). As noticed on the table 4 below, 50.0% respondents strongly agreed that poor rate of seed germination affects production of NTFPs , 41.3% agreed similar whereas, 8.7% strongly disagreed that poor seed germination did not affects production ($X^{2cal}=26,17$, $x^{2tab}=5.991$). Next, 56.6% of the respondents strongly agreed that NTFPs take longer periods to grow before it start producing fruits which therefore affects production, 39.1% agreed similar 2.2% strongly disagreed and 2.2% disagreed it does not affect production ($X^{2cal}=82,26$, $x^{2tab}=7.815$). Furthermore, 50.0% strongly agreed in adequate extension support/advisory services has greatly affected the production of NTFPs in the community, 30.0 agreed, 6.5% strongly disagreed that inadequate extension services has not affected production and 5.4% disagreed ($X^{2cal}=55,91$, $x^{2tab}=7.815$).

Table 4: Shows constraints in NTFPs production

Variables			X²cal	x² tab
Unsustainable harvesting of ntfps	Frequency	Percent	25,71	5.99***
Strongly agreed	45	48.9		
Agreed	39	42.4		
Strongly disagreed	8	8.7		
Total	92	100.0		
Lack access to credits	Frequency	Percent	63,76	7.815 **
Strongly agreed	39	43.8		
Agreed	43	48.3		
Strongly disagreed	5	5.6		
Disagreed	2	2.2		
Total	89	100.0		
Continues deforestation	Frequency	Percent	55,04	7.815***
Strongly agreed	45	48.9		
Agreed	36	39.1		
Strongly disagreed	6	6.5		
Disagreed	5	5.4		
Total	92	100.0		
Poor rate of seed germination	Frequency	Percent	26,17	5.991**
Strongly agreed	46	50.0		
Agreed	38	41.3		
Strongly disagreed	8	8.7		
Total	92	100.0		
High numbers of years for vegetative growth	Frequency	Percent	82,26	7.815 ***
Strongly agreed	52	56.5		
Disagreed	36	39.1		
Strongly disagreed	2	2.2		

Disagreed	2	2.2		
Total	92	100.0		
Inadequate extension support/advisory services				
	Frequency	Percent	55,91	7.815 ***
Strongly agreed	46	50.0		
Agreed	35	38.0		
Strongly disagreed	6	6.5		
Disagreed	5	5.4		
Total	92	100.0		

(* at $p < 0.05$, ** significant at $p < 0.01$: *** significant < 0.001 , ns not significant)

Constraints of NTFPs Marketing:

The table 5 showed that, 52.2% strongly agreed that poor roads network limited the penetration of buyers into the community which has therefore affected the commercialization of these products, 41.3% agreed that poor roads has affected NTFPs marketing, 6.5% disagreed that poor roads has not affected marketing ($X^{2cal}=31,39$, $x^{2tab}=5.991$). In addition, as showed on table 5 lower purchasing power of buyers, reported a 57.6% strongly agreed that it affects marketing of NTFPs, 48.3% agreed as well, while 5.6% strongly disagreed that lower purchasing power of buyers has not affected the marketing of NTFPs and 2.2% disagreed ($X^{2cal}=74,08$, $x^{2tab}=7.815$). Also, table 5 showed that 41.3% of the respondents strongly agreed that inadequate number of buyers has affected marketing of NTFPs, 45.7% agreed and 9.8% strongly disagreed that inadequate number of buyers has not affected marketing and 3.3% disagreed ($X^{2cal}=51,39$, $x^{2tab}=7.815$). Next, 54.3% of the respondents strongly agreed they lacked market information of NTFPs, 40.2% agreed similar 3.3% strongly disagreed and 2.2% disagreed lack of market information did not affect marketing of NTFPs ($X^2=76,78$, $x^{2tab}=7.815$). Moreover, 35.1% strongly agreed that lack of storage facilities has greatly affected the marketing of NTFPs in the community, 62.0 agreed, 5.4% strongly disagreed that lack of storage facilities did not affected marketing and 1.1% disagreed ($X^{2cal}=86,95$, $x^{2tab}=7.815$).

Table 5: Shows constraints of NTFPs marketing

Variables			X^2cal	X^2table value
Poor roads limiting the entry of buyers	Frequency	Percent	31,39	5.991 ***
Strongly agreed	48	52.2		
Agreed	38	41.3		
Disagreed	6	6.5		
Total	92	100.0		
Lower purchasing powers				
	Frequency	Percent	74,08	7.815 ***
Strongly agreed	53	57.6		
Agreed	31	33.7		
Strongly disagreed	7	7.6		
Disagreed	1	1.1		
Total	92	100.0		
Lack of buyers				
	Frequency	Percent	51,39	7.815 ***
Strongly agreed	38	41.3		
Agreed	42	45.7		
Strongly disagreed	9	9.8		

Disagreed	3	3.3		
Total	92	100.0		
Lack of market information				
	Frequency	Percent		
Strongly agreed	50	54.3	76,78	7.815 ***
Agreed	37	40.2		
Strongly disagreed	3	3.3		
Disagreed	2	2.2		
Total	92	100.0		
Lack of storage facilities				
	Frequency	Percent		
Strongly agreed	29	31.5	86,95	7.815 ***
Agreed	57	62.0		
Strongly disagreed	5	5.4		
Disagreed	1	1.1		
Total	92	100.0		

(** at p<0.05, ** significant at p<0.01: *** significant < 0.001, ns not significant)

Prospects of NTFPs Production and Marketing of NTFPs:

Prospects of Production:

The results on table 6 are showed below. It was noticed that 58.7% of the respondents strongly agreed that farm to market roads should be improve upon whereas 41.3% agreed ($X^{2cal}=2,78$, $x^{2tab}=3.841$). Also, 55.4% strongly agreed that there should be forest regulations that will protect direct entry of producers into the forest 41.3% agreed, 1.1% strongly disagreed and 2.2% disagreed ($X^{2cal}=84,08$, $x^{2tab}=7.815$). From table 4.6, 75.0% strongly agreed that improving the production of NTFPs, they should be domesticated, 23.9% agreed and 1.1% strongly disagreed ($X^{2cal}=2,78$, $x^{2tab}=3.841$).

Table 6: Shows prospects of production of NTFPs

Variables			X^{2cal}	x^{2tab}
Improve farm to market roads	Frequency	Percent	2,78	3.841 (ns)
Strongly agreed	54	58.7		
Agreed	38	41.3		
Total	92	100.0		
There should be forest regulations	Frequency	Percent	84,08	7.815 ***
Strongly agreed	51	55.4		
Agreed	38	41.3		
Strongly disagreed	1	1.1		
Disagreed	2	2.2		
Total	92	100.0		
Domestication of NTFPs	Frequency	Percent	79,06	5.991 ***
Strongly agreed	69	75.0		
Agreed	22	23.9		
Strongly disagreed	1	1.1		
Total	92	100.0		

(* at p<0.05, ** significant at p<0.01: *** significant < 0.001, ns not significant)

Prospects of Marketing:

As seen on the table 7 below, 64.1% respondents strongly agreed that storage facilities should be created in order to improve marketing of NTFPs, 35.9% agreed ($X^{2cal}= 7,34$, $x^{2tab}=3.841$). Also, 55.4% respondents strongly agreed that market information should be properly disseminated in order to improve marketing of NTFPs, 44.6 % agreed ($X^{2cal}= 1.08$, $x^{2tab}=3.841$). Base on the table below, 52.2% strongly agreed farmers should organize themselves and form cooperatives, 45.7% agreed while 2.2% strongly disagreed ($X^{2cal}=40,78$, $x^{2tab}=5.991$). Furthermore, 56.5% strongly agreed that farmers should be train on how to transform their products in order to reduce post-harvest losses and 43.5% agreed ($X^{2cal}= 1.56$, $x^{2tab}=3.841$).

Table 7: Shows prospects of marketing of NTFPs

variables			X ² cal	X ² tab value
Creation of storage facilities	Frequency	Percent	7,34	3.841 ***
Strongly agreed	59	64.1		
Agreed	33	35.9		
Total	92	100.0		
Proper dissemination of market information	Frequency	Percent	1.08	3.841 ***
Strongly agreed	51	55.4		
Agreed	41	44.6		
Total	92	100.0		
creation of cooperatives	Frequency	Percent	40,78	5,991 ***
Strongly agreed	48	52.2		
Agreed	42	45.7		
Strongly disagreed	2	2.2		
Total	92	100.0		
Train farmers on product transformation	Frequency	Percent	1,56	3.841 (ns)
Strongly agreed	52	56.5		
Agreed	40	43.5		
Total	92	100.0		

(* at $p < 0.05$, ** significant at $p < 0.01$: *** significant < 0.001 , ns not significant)

DISCUSSION**Socio-Demographic Characteristics of Farmers**

Sex ratio was noticed as an important socio-demographic parameter (Table 1). The results showed that the percentage of female respondents were higher 53.3% than the male which stood at 46.7%. NTFPs production, gathering and marketing has been noticed to be of a more feminine than a masculine activity which required minimal amount of energy. This finding is in conformity with works of Sunderland et al., (2004) who mentioned women are more involved in NTFPS activities than men.

Most of the respondents had attained a level on the educational ladder. About 41% of the respondents had secondary education, 33.7% had primary education, 10.9% had tertiary education and only 14.1% had no formal education. This showed that most of the respondents were educated. The high level of literacy though at lower level could help them to seek information of the price of NTFPs in the market and gathered knowledge on storage and

preservation of their products. BUCREP (2005) also agreed that the basic knowledge of the farmers could help in seeking informations. Pagiola (1999) ; Newton et al., (2016) also reported that a basic level of education by the respondents will enable the farmers to know the level of exploitation and extraction NTFPs, thus limit over exploitation and extinction of some of these species.

The majority of the respondents were below 40 years (43.5%), indication of a youthful and productive population. At this age there are expose to lots of knowledge and experience, this potential can develop solid agricultural projects that will improve the production and marketing of NTFPs (Joel et al., 2016).

With respect to household size, majority of the farmers had small household sizes of 1-5 (45.7%), this was closely followed by 6-10 (38.0%) household size (Table 4.1). This is an indication that during peak periods labour maybe solicited. With low household sizes farmers may form ngangi groups to assist one another. However, large families are also more likely to face lower per capita land availability and high dependency ratios for food requirements (Adesina et al. 2000; Mujawamariya and Karimov 2014). They may thus rely on forest resources around the communities because of the available family labour that can be utilized for NTFPs production and marketing.

Most of the labour the respondents used on their farms was family labour with the percentage of (59.8%). The family labour utilised by most of the household helped to reduce their labour cost. In most rural settings most farmers make maximum use of household labour. This is in line with works of Alfred and Fagbenro (2007) who mentioned that a high family labour could reduce household expenses on farming activities.

Farmers in Nguti Sub-division have some experiences in production and marketing of NTFPs. The relatively high experience shown by farmers in this area could be an indication that farming is an ensuring occupation that farmers could rely. This is in agreement with the findings of Adeoti (2004) who reports that continuous practice of an occupation for long period of time could lead to more experience and production.

Table 4.1 showed that (35.9 %) of the farmers had 11-15 ha and (7.7%) had more than 16 ha. Farm size plays an important role in crop production as it influences the quantity and availability of food in the household at any point in time. Households with limited farmland may not be able to produce adequate food for their families, hence, rely heavily on forest resources around them as their safety net, to complement food shortage. Wunder et al., (2003) confirmed that communities around forest resources will depend on forest for their livelihoods.

The main occupation of the respondents was farming with 95.5%, and others such business and civil servants recorded 4.3%. Most farmers' households depend on NTFPs collection as compared with those into business and civil servant. Jimoh and Azeez (2002); Daneji and Suleiman (2011) supported the fact that household who are engaged in other sectors of the economy such as trading and formal employment are less likely to be dependent on NTFPs collection to supplement their earnings.

Major Non-Timber Forest Product (NTFPs) Produce and Marketed

The major NTFPs produced and marketed in this area of study were rainy season bush mango,

dry season bush mango, njangsa, bitter cola, country onion, eru and bush pepper. This is as a result of the high market demand of these products within and beyond the national territory. As such it improves on livelihoods inhabitants. The highest NTFP that was produced and marketed was the dry season bush mango (*Irvingia wombulu*) at 31.5%. This is due to the fact that this *Irvingia wombulu* is available off season of NTFPS collection, thus most farmer exploited lack season and sold to buyers from neighboring towns from Nigeria and Cameroon at a higher price. Eru (3.3%) was the least that was produced and marketed because this NTFP was produced mainly for home consumption. This is in line with Nkefor et al., (1998) who noticed low percentage propagation for the domestication of eru. It is important to note that the harvesting techniques employed by most of the inhabitants are by pulling the plant destroyed right down to the roots.

Opportunities of Production and Marketing of Non-Timber Forest Products

In respect to the opportunities of production and marketing of NTFPs, majority of the respondents indicated that through the sales of these products they' have been able to raise more income from NTFPs. NTFPs also provide an extra income when agricultural produce failed. This finding is in accordance with works of Angelson and Wunder, (2003); Neuman and Hrisch, (2000), who reintegrated that NTFPs are considered a safety net to fill in the gaps when there is an agricultural shortfall.

Seasonal employment was another opportunity from the sale of NTFPs were (54.3 %) strongly agreed that the production and marketing of NTFPs has led to seasonal employment. During this period persons are being hired to collect and transform some of these products, thus, earning an extra income. This is in conformity with Schreckenberget al., (2006) and FAO, (2010), who reported that most rural households makes impressive income during peak season of NTFPs production. Another finding noticed is that, (55.4%) strongly agreed that one of the greatest opportunities for NTFPs production and marketing was the fact that the products could be stored and sold later during off season which fetches more income for the household. During the rainy season, the NTFPs are saturated in the market and are sold at giveaway prices. This finding is in line with Belcher and Schreckenberget al., (2007) who reported that unpredictability could also be caused by demand punctuations as a result of changing trends.

High demand was indicated as an opportunity from the sale of NTFPs (67.0 %). The fact that most farmers in the rural areas and urban center rely solely on NTFPs, these products are bought for consumption while others are being exported and use for pharmaceutical industry. This is in accordance with Guedje et al., (1998) who said non-Timber Forest products ensure the maintenance of food security for many rural households. These products are used as medicines, feed for animals, food and income to meet basic necessities (Ingram et al., 2016).

Constraints of Production and Marketing of NTFPs

From the results, majority of the respondents strongly agreed that unsustainable harvesting of NTFPs affected production. These results showed that commercialization of NTFPs has both positive and negative effects for livelihoods and conservation (Marshall et al., 2006); and striking the balance between these two is crucial for sustainability (Arnold and Perez, 2001). Some of the positive role noticed for commercialization includes: alternative income generated from sales of NTFPs, revenues from exported products and increase in supply of NTFPs for consumption in the market. On the other hand, we noticed negative effects of commercialization which includes: stock degradation, over exploitation and the fact that most of the products could be depleted and farmers could cover long distances in search and collect the NTFPs. Marshall et al. (2006)

observed similar overharvesting trends influenced by increased commercialization in Mexico and Bolivia. Sunderland et al., 2004 also observed similar trends in the Takamanda rainforest of Cameroon.

Continuous deforestation was reported as a constraint for the production of NTFPs. With the increase in population growth, there's bound to be a lot of pressure on the forest for food, construction of houses and establishment of plantation to better their livelihoods. This is in line with Arnold and Perez, (2001); Belcher et al., (2005) who reported that although NTFPs are an important source of subsistence and cash income, there is growing concern regarding the fact of overharvesting. This is fuelled by an increasing population and market demand for these products.

Also, the long duration observed for vegetative growth is a constraint for NTFPs production. Most of the species take longer period to fruits. Therefore, the need for domestication of some of these NTFPS is paramount to reduce pressure on natural production. This is in accordance with Leaky and Izac, (1996) and Nkefor et al., (1998) who mentioned that domestication is also crucial for improving genetic quality in order to realize higher yields, extended periods of production, and the development of tolerance to variable temperature and soil conditions. Therefore, domestication of NTFP species to enrich and sustain stock is essential for sustainable commercialization and marketing (Vantomme et al., 2002).

Furthermore, inadequate extension service was also observed as a constraint as (50.0%) strongly agreed that it affects production of NTFPs. The consequence of overexploitation of the forest resources are also due to the lack of extension agents and poor follow-up of laws of forest governance. This observation in agreement with Pandit, (2001); Pandit and Thapa, (2004) whose mentioned that this situation is severe in community forest managed by the councils where access is open. This is also in conformity with Moobi and Oladele (2012) whose results showed that about 75% of the farmers indicated the need for communication strategies that facilitate effective flow of information between government agencies and farming communities. This may be the results of inappropriate ratio of government agencies to farmers. In this situation, the government extension agents may not be able to visit all farmers within a week, hence productivity level declines.

Inadequate number of buyers was also a constraint (45.7%) agreed that it has affected the marketing of NTFPs. This is because of the socio-political crisis and poor farm to market roads that limits marketing of NTFPs. This is in accordance with Anold et al, (2001) who said that the socio-political crises have greatly affected the marketing of goods in rural areas for fear of unknown.

Another aspect is the inadequate number of storage facilities which was noticed as a main constraint of marketing of NTFPs as (62.0%) agreed. Cong et al., (2006) stated that due to the inadequate number of storage facilities, farmers tend to use traditional techniques which are not efficient resulting to high losses and reduction in the quality of produce for small-scale farmers.

Inadequate of transportation, resulting from bad road network in the subdivision, (52.2%) strongly agreed that poor roads prevent buyers from coming into the villages and also limited transportation of produce to better markets. However, it might have retarded quick distribution of produce after harvesting especially perishable goods. Thus, less income that could be made from sales of low quantity and poor-quality products. This is in conformity with Adeleke et al.,

(2010) who stated that road systems are the most serious infrastructural constraints faced by the agricultural and forestry sectors. This observation was also reported by Marshall et al., (2006) who found out that although most of the villages accessible by road during dry seasons but the conditions are very different in the rainy season.

Inadequate access to credit turned out to be a major barrier to NTFP producers in the subdivision as (48.3%) agreed. The inadequate access to credit may probably be due to the fact that most of the farmers are not into cooperatives and small common imitative groups (CIGs) which they could get micro loans for their activities. Most of the farmers lack information about available sources of funds or credits to exploit. According to Ozowa (1995) he mentioned that awareness of existing loan facilities could be linked to the high illiteracy rate amongst most rural farmers. Adeleke et al., (2010) stated that the main reason for commercial banks not to lend money to agricultural enterprises is as a result of low reliability of the NTFPS sector.

Furthermore, majority (54.3%) of the farmers did not have access to marketing information. Farmers had very little knowledge about the existing and potential markets for NTFPs. This result is in accordance with Dorward and Kydd (2005), who reported that businesses in rural areas are attributed by weak information on potential market players, prices and innovations. Saxena (2008), further stated that producers are often in agricultural practices, but highly limited in effective and efficient marketing strategies.

Prospects of Production and Marketing of Non-Timber Forest Products

With respect to domestication of NTFPs (75.0%) strongly agreed that these products should be domesticated in order to improve production. This is in accordance with Leaky et al., (2005); Belcher et al., (2005) who demonstrated that domestication is an alternative strategy to reduce pressure on the wild products and at the same time generating income as well as it could play a vital role in conservation.

To reduce the market constraints, the farmers in Nguti Sub-division have suggested better and frequent transport facilities for better communication, more financial support to encourage cooperative based NTFP cultivation activities, and enhanced access to market as essential initiatives. This finding is in conformity with Shiba, (2010) who reported that sufficient government or NGO interventions to eliminate constraints could play a positive role in assisting the villagers to generate more income. For example, micro-credit or small-scale loans from government departments, NGOs, or banks could be arranged to develop NTFP-based enterprises designed to generate income. Moreover, enhancing the villagers' access to market information relevant to NTFPs could be achieved through forest extension agents (currently no such personnel exist) appointed by the forest department. However, (55.5%) strongly agreed that forest regulations should be enacted in order to reduce pressure on the forest as people will not have the liberty of entering the forest at will to collect NTFPs. This is in line with (Belcher, 2007) who reiterated that merely taking these initiatives without considering the policy issues, and taking related steps such as creating and effectively implementing people-oriented NTFP management plans and defining land and property rights, may only accelerate the current unsustainable extraction practices. Moreover, when organizational interventions are undertaken, they should include plans for managing specific NTFPs.

Base on the findings, (55.2%) of NTFPs producers and marketers strongly agreed that there should be proper dissemination of market information. More market knowledge tends to increase

villagers' income from NTFPs, as observed in Mexico and Bolivia (Marshall et al., 2006). Thus, enhancing the villagers' market knowledge could be an effective avenue for NTFP-based interventions. The villagers' market knowledge is greatly influenced by different socioeconomic factors relating to households and markets (Marshall et al., 2006). The results of the analysis on the production and marketing prospects also include creation of storage facilities and the fact that farmers should be trained on product transformation in order to minimize spoilage and add value to some products before commercialization. Only a small percentage of what is harvested from the forest is eventually utilized, meanwhile, a larger percentage is wasted during storage and processing. This is in accordance with Babalola, (2009) and Shrestha et al., (2020), who mentioned that lack of modern technology for processing and storage is one of the major problems associated with the production and marketing of NTFPs. Most of the raw NTFPs got rotten during storage because they were not appropriately processed. This leads to wastage of the resources and time spent in collection.

CONCLUSION

Results from the study in Nguti Sub-division on prospects of production and marketing of NTFPs revealed that NTFPs play an important role in the livelihood of rural and forest dwelling communities. Respondents from the study areas depend on those NTFPs for their nutrition and health care. It also provided food and generated income to most household who depend on NTFPs production and marketing for their livelihoods. During scares period due to over exploitation, poor seasonal production and settlement encroachment, usually resulted to devastating consequence with most of the farmers left hungry. Domestication techniques should be encouraged on farms and gardens. Fast growing species should be encouraged on farms and garden to overcome scarcity periods. Information on production, exploitation and marketing information should get to the farmers in due time.

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