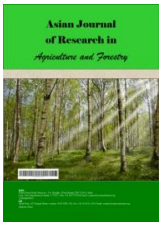

Asian Journal of Research in Agriculture and Forestry

7(3): 27-37, 2021; Article no.AJRAF.70305
ISSN: 2581-7418

Contribution of Non-Timber Forest Products Bitter Kola, Njangsang and Palm Wine to the Income of Marketers in the Mifi Division of the West Region of Cameroon

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJRAF/2021/v7i330130
Editor(s):
(1) Prof. Nebi Bilir, Isparta University of Applied Sciences, Turkey.
Reviewers:
(1) Mariasole Calbi, Freie Universität Berlin, Germany.
(2) Kleomenis Kallogeropoulos, Harokopio University of Athens, Greece.
Complete Peer review History: https://www.sdiarticle4.com/review-history/70305

Original Research Article

Received 02 May 2021
Accepted 06 July 2021
Published 14 July 2021

ABSTRACT

The objective of the study is to contribute to the promotion of NTFPs (Bitter kola, Njangsang and palm wine) by assessing their contribution to the income of marketers in the Mifi division. The study was carried out in the Mifi division in the West Region of Cameroon between January and May 2020. Respondents were drawn from a cross-section of marketers. Data was collected through the administration of semi-structure questionnaires and interview guide as well as direct observations. 81 persons involved in the economic sector in five main markets were identified during the reconnaissance survey, of which 65 were interviewed accounting for 80.24%. Data analysis was carried out using descriptive statistics for processing quantitative data and to generate tables and graphs. Results revealed that every stratum of the community participates in the trade, but the main actors were of the middle age group (45 to 55 years old). Economic analysis revealed that measurement unites for NTFPs in various markets are not standardized and there is a high variation in price between period of abundance and period of scarcity. Wholesalers were able to make an annual benefit of 2 338 900 FCFA, 1 077 400 FCFA and 178 600 FCFA per person from palm wine, bitter kola and Njansang respectively. This benefit was related to the origin of products,

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thus, the proximity of the supply area of palm wine permitted the concerned persons to meet higher benefit. The benefit observed is this study still includes transportation cost, so in reality, the final benefit is a variable value due to the constant variation (usually little variation) of transportation cost depending on the means of transport. Nevertheless, NTFPs are of real contribution to the income of the Mifi division population, but the supply areas are out of the Mifi division and this implicates some constraints such as high transportation cost, seasonality of products and high variation of sale prices. There is a real need of domestication of species to promote their sustainable management in the actual context of climate change.

Keywords: Non-timber forest products; economic contribution; marketers; Mifi division.

1. INTRODUCTION

Africa has the highest percentage of people anywhere in the world that live on less than a dollar a day [1]. In forest areas of Central Africa, forests products called Non-Timber Forest Products (NTFPs), play an important role in providing between 29–39% of food, medicine and income needs to about 80% of the local populations [2,3]. They are equally used as trophies, for making ethno-musical instruments, jewelry, for decoration, magico-religious issues and offer multipurpose services [4-8]. NTFPs are goods of biological origin other than timber, derived from forests and agroforestry areas [9,2]. They include roots, seeds, nuts, barks, resins, feathers, bush meat, fungi, fruits, fibers and leaves [10,11]. More recently, there has been a growing interest in the economic potential of NTFPs. This is because of the role they can play in reducing poverty levels and promoting sustainable development [12]. [13] proposed a typology of people-forest relationships that does justice to the varied dependencies on forest resources. They distinguish between: - Populations living within forests for whom forests provide the main source or starting point of livelihood; - Farming communities that rely on the forest as a supplementary source of livelihood.

Forest areas communities in Cameroon fall under the first type, were many studies on the contribution of NTFPs to the livelihood including [14-21] have been carried out.

Contrary to those of the forest areas, communities of the West Region of Cameroon fall under the second type. They constitute the densest population in the country with an average density of 125 hab./km²; the national average being at the same date only 16 hab./km² [22] and agriculture is their main source of income. NTFPs play an indispensable role in this Region as they are used in the main traditional meals and in some spiritual ceremonies [23]. Hence, just few and unpublished studies in this Region exist. Except the later author who worked on the non-monetary benefit of some NTFPs to communities of the Mifi Division. Thus, there is a poor assessment of NTFPs in this part of the country. When visiting various markets in the Mifi division, it is easily noted that many NTFPs are part of the cash income of people and that the most present species are *Garcinia kola*, *Ricinodendron heudelotii* and *Raphia farinifera*. These NTFPs play an indispensable role in this Region as they are used in the main traditional meals and in some spiritual ceremonies. The nuts of *Ricinodendron heudelotii* locally called “Njangsang” are used in the meal called “Condreh”, present in all feasts and funerals. The nuts of *Garcinia kola*, locally called “Bitter kola” and the sap from *Raphia farinifera*, locally called “Palm wine” are frequently used together and are present in all weddings, funerals and traditions ceremonies. Bitter kola and Njangsang are imported from other regions of the country, mostly the “Wouri”, “Lékié”, “Hauh-Nyong”. Palm is the only product harvested in the Mifi division. The questions are what is their economic contribution to communities of the Mifi division? And what strata of the community are implicated? The objectives of this study were therefore to characterize the marketers implicated by age groups, to determine the measurement unites, the prices of products on supply areas markets and the selling prices in periods of abundance and scarcity in Mifi markets; the quantity of products sold per marketers per season according to the supply area and the contribution of these three species to the income of marketers in the Mifi division.

2. MATERIALS AND METHODS

2.1 Study Area

Mifi Division is the administrative head quarter of the West Region of Cameroon with its chief town

being “Bafoussam”. It covers an area of 40 200 ha (402 km2) and it is geographically located between latitude 5° 28’ N and longitude 10° 25’ E (Fig. 1). It is made up of three sub-divisions namely: Bafoussam I, Bafoussam II (Baleng) and Bafoussam III (Bamougoum). The climate is the Sudano-guinean type characterized by two seasons; one rainy season form mid-March to mid-November and one dry season from mid-November to mid-March. The average rainfall is 1871 mm/year and the annual average temperature is 20°C. The soils fall into two main categories: ferrallitic averagely desaturated soils and poorly evolved (low proportion of lithosols and alluvial soils) [24]. The vegetation is dominated by shrub savannah characterized by the presence of *Albizia gummifera* and *Carapa grandiflora*.

2.2 Data Collection Technique

The approach used was essentially participatory. A total of 81 respondents were identified during the reconnaissance survey with delegates of various markets. Data was collected through the administration of semi-structure questionnaires and interview guide as well as direct observations with 65 wholesalers that accounted for 80.24% of the respondents, in five main markets (Market A, Market B, Market C, Casablanca market and Socada market) of the Mifi Division. The questions asked to marketers included: What are the main products you sale? What quantity do you buy par season? What is the buying price? What are your measurement unites? What is the price of unite during period of scarcity? And in period of abundance? What can be your benefit per day? Per week? Per season? What can be your expense per day? Per week? Per season? What constraints to your sale activity?

Marketers were characterized according to their age. Four age bracket groups were defined such as 20 to 45 representing the young age group; 45 to 55 representing the middle age group; 55 to 70 and 70 and above, representing the young elderly and the elderly respectively.

2.3 Data Analysis

Data analysis was carried out using Excel 2016 for processing quantitative data and to generate tables and graphs.

Calculation of the value added on the economy of each marketer

To determine this value, the average quantity of each NTFP obtained per marketer was multiplied by the average selling price as indicated by the following formula [25].

VA = Pm * Qtym

VA: Value added in FCFA per marketer per season;

Pm: Average selling price in FCFA;

Qtym: Average quantity obtained per season per marketer.

The standard deviation was calculated as indicated by the following formula [26].

$$\sigma = \sqrt{V} \text{ with } V=\sum_{i=1}^{n} \frac{(xi-\mu)^2}{n}$$

σ = Standard deviation
V = Variance
$\sum$: Sum of…
xi: Each value x
μ = Mean of xi values
n = Total number of xi values

Calculation of the annual average benefit

To determine this value, average annual expenditure for the purchase of each NTFP was substracted from the value added.

3. RESULTS AND DISCUSSION

3.1 Characterization of Marketers

Globally for the three species, women (58,4%) were more implicated in wholesaling than men (41,6%). For *Garcinia kola* (Bitter kola) (Fig. 2), 28% of respondents were in the 35 to 45 years age bracket, 48% in the 45 to 55 years age bracket, 20% in the 55 to 65 years age bracket and 4% of respondents were above 65 years old. For *Ricinodendron heudelotii* (Njangsang), 5% of respondents were in the 20 to 40 years age bracket, 30 % in the 40 to 55 years age bracket, 55% in the 55 to 70 years age bracket and 10% of respondents were above 70 years old. And for *Raphia farinifera* (Palm wine), 20% of respondents were in the 15 to 45 years age bracket, 60 % in the 45 to 60 years age bracket, 10% in the 60 to 70 years age bracket and 10% of respondents were above 70 years old.

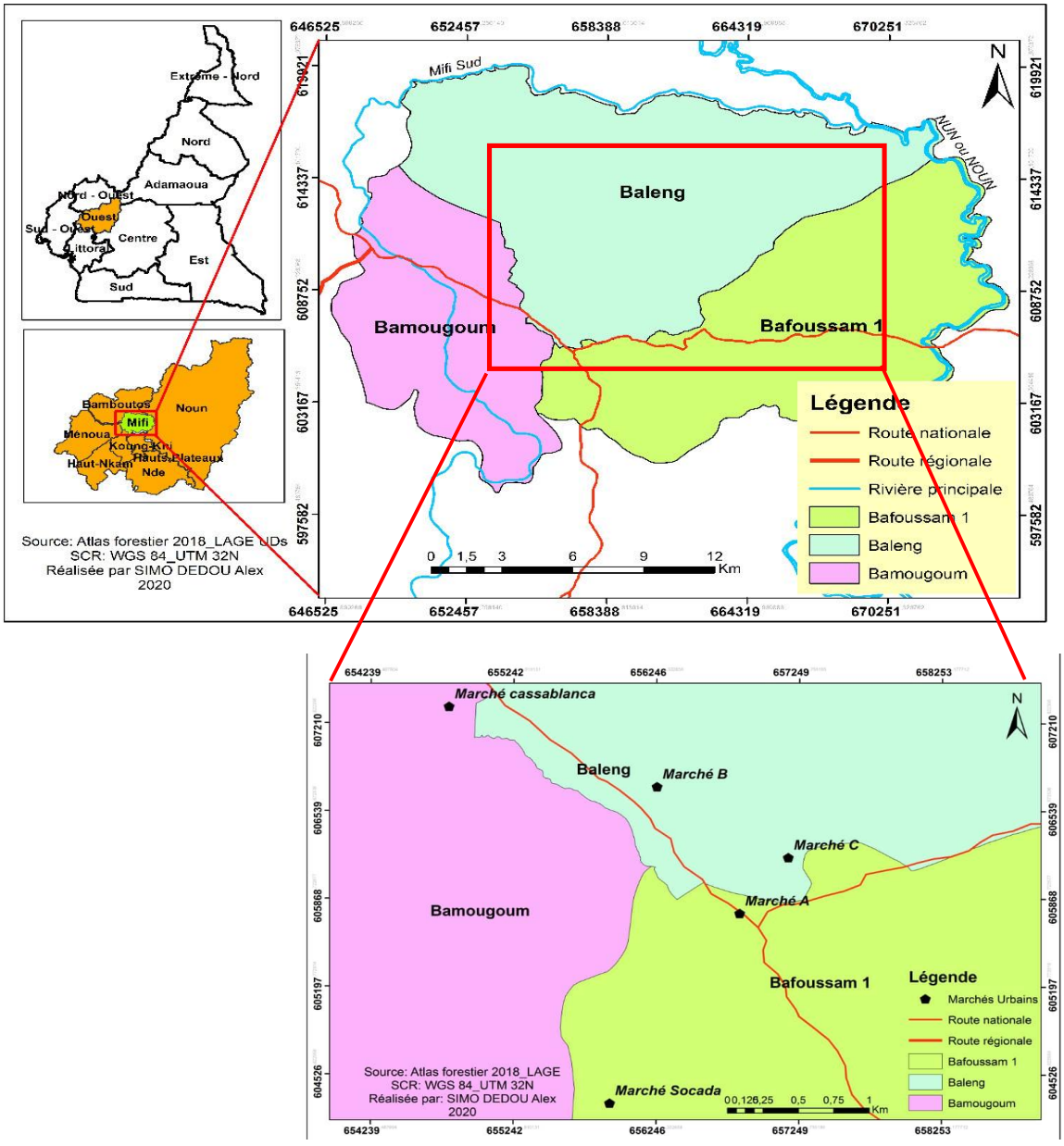

Fig. 1. Localization map of the study area

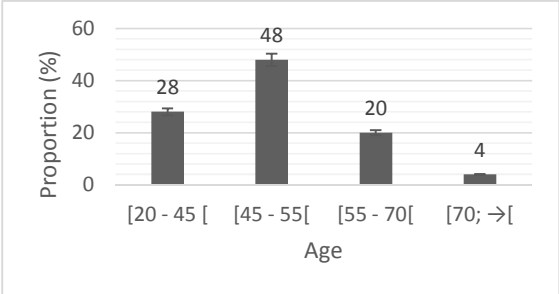

Fig. 2. Ages of wholesalers of Biter kola

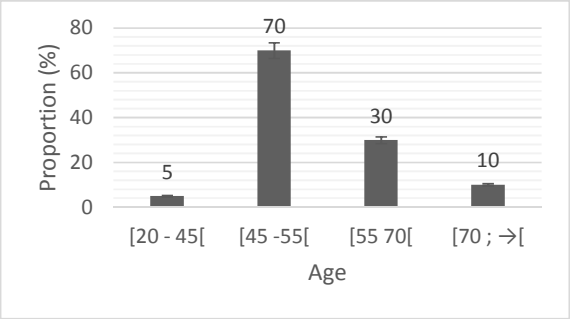

Fig. 3. Ages of wholesalers of Njangsang

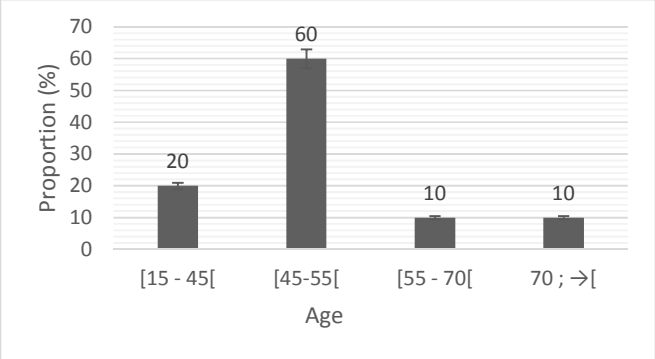

Fig. 4. Ages of wholesalers of Palm wine

Figs. 2, 3, 4 show that the most implicated people in the trade of these three NTFPs are in the 45 to 55 year age bracket.

3.2 Measurement Unites of NTFP$_S$

The measurement unites for NTFPs in various markets are not standardized. Marketers use buckets which are usually in liters and bags for the Biter kola and Njangsang and cans of many capacities for the palm wine. The study has tried to convert the local measurement unites into standard measurement unites which is the kilogram for Biter kola and Njangsang.

3.3 Buying price on the supply areas markets and selling price on MIFI markets

3.3.1 Buying prices on the supply areas markets

The buying price of bitter kola and Njangsang (Table 2) and palm wine (Table 3) in each supply area is taken as the average between the variable prices during the year.

Table 2 show that the buying prices for bitter kola and Njangsang are variable from a supply area to the other, but the average buying price of Njangsang in higher in general than the one of bitter kola.

3.3.2 Selling prices on Mifi markets

The selling price of products is taken as the average between the price in times of abundance and in times of scarcity (Table 4) on markets.

3.4 Quantity sold per wholesaler per year

The average quantity (Table 5 for biter kola and Njangsang; Table 6 for the Palm wine) was found between the times of abundance and of scarcity, according to the area of supply.

Table 5 show that the highest quantity of Bitter kola is from the Wouri, follow by the Haut-Nyong. Menoua produces the lowest quantity. The highest quantity of Njangsang come from the Haut-Nyong, follow by the Lékié. Wouri produces the lowest quantity.

Table 6 shows that Bafoussam III supplies more palm wine than Bafoussam II and Bafoussam I.

Table 1. Measurement device for biter kola and Njangsang

Volume in litter	Weight in Kilogram (kg)	
	Biter kola	Njangsang
1 plastic bucket 2 L	2,3	1,55
1 bucket 5 L	5,74	3,54
1 bucket 15 L	28,75	10,62
1 bucket 30 L	57,5	21,24
1 jut bag 100 L	100,2	88,21

Table 2. Average buying price of bitter kola and Njangsang according to the supply area

Supply area	Average price per kg on supply markets in (FCFA)	
	Bitter kola	Njangsang
Wouri	3277	4341.21
Haut-Nyong	3521.36	3861.37
Menoua	3560.79	-
Lékié	-	4357.36
General average	3453.05	4186.64

Table 3. Average buying price of palm wine according to the supply area

Supply area		Average price per L on supply markets in (FCFA)
Mifi	Bafoussam I	45
	Bafoussam II	52.97
	Bafoussam III	54.96

Table 4. Selling price of products

Products	Abundance	Scarcity	Average price per kg or L (FCFA)
Biter kola	2000	6360	4180
Njangsang	2500	7000	4750
Palm wine	150/L	200/L	175/L

Table 5. Average quantity of Biter kola and Njangsang per year per wholesaler according to the supply area

Supply area	Average quantity (kg) per year per wholesaler according to the supply area	
	Biter kola	Njangsang
Lékié	-	309.6
Wouri	1724.21	288.5
Haut-Nyong	1483.94	332.4
Menoua	1127.36	-

Table 6. Average quantity of Palm wine per year per wholesaler according to the supply area

Supply area		Average quantity (L) per year per wholesaler of Palm wine according to the supply area
Mifi	Bafoussam I	2016
	Bafoussam II	1638.4
	Bafoussam III	1996.8

3.5 Contribution of $NTFP_S$ to the Income of Wholesalers

The income of wholesalers varies depending on the origin of supply of NTFPs. Tables 7, 8, 9 give the values added and the annual average benefit related to the origins of supply. The value added is the total value of the sale during a period of one year. The benefit was obtained by the subtraction of the expenses from the value added.

3.5.1 The contribution of bitter kola (*Garcinia kola* nuts)

Table 7 shows a total value added of 6,040,800 FCFA per wholesaler per year for Biter kola with an annual benefit of 1 077 400 FCFA and a standard deviation of 605 400 FCFA.

Table 7 shows that Bitter kola from the Wouri has the highest value-added compare to the one from Haut-Nyong and Menoua. The expenses and the benefit follow the same logic.

3.5.2 The contribution of Njangsang (*Ricinodendron heudelotii* nuts)

Table 8 shows a total value added of 1 473 600 FCFA per wholesaler per year for Njangsang with an annual benefit of 1 786 000 FCFA and a standard deviation of 693 200 FCFA.

Table 8 shows that Njangsang from the Haut-Nyong has the highest value-added compare to the one from Lékié and Wouri. But the expenses related to Lékié is higher than of Haut-Nyong and Wouri. Nevertheless, wholesalers make more benefit from Njangsang from Haut-Nyong than of the two other origins.

3.5.3 The contribution of palm wine (*Raphia farinifera* sap)

Table 9 shows a total value added of 3 296 500 FCFA per wholesale per year for palm wine with an annual benefit of 2 338 900 FCFA and a standard deviation of 547 100 FCFA.

Table 10 summarizes the general average revenue of the three products. Bitter kola has the highest value added (6 040 800 FCFA), follow by palm wine (3 296 500 FCFA). Njangsang has the lowest value added (1 473 600FCFA). But wholesalers make more benefit from palm wine (2 338 900 FCFA) than bitter kola (1 077 400 FCFA), and less with Njangsang (178 600 FCFA). The standard deviations of the later are higher than the others (for VA, AAE and AAB).

Table 7. Value added and the average annual benefit from the sale of Biter kola

Supply area	VA	AAE	AAB
Wouri	7207.2 ± 3310.5	5650.4 ± 2708.2	1556.8 ± 796.8
Haut-Nyong	6202.9 ± 3114.8	5225.5 ± 2385.3	977.3 ± 788.1
Menoua	4712.4 ± 1880.8	4014.3 ± 1651.3	698 ± 231.3
General average	6040.8 ± 2768.7	4963.4 ± 2248.3	1077.4 ± 605.4

VA= Value Added; AAE= Annual Average Expenses; AAB= Annual Average Benefit

Table 8. Revenue and the average annual benefits from the sale of Njangsang

Supply area	VA	AAE	AAB
Haut-Nyong	1579.2 ± 5531.2	1283.52 ± 4663.5	2956.8 ± 878.7
Lékié	1471.0 ± 5084.8	1349.04 ± 4663.4	1219.6 ± 526.9
Wouri	1370.6 ± 4690.8	1252.44 ± 4294.4	1181.6 ± 674.1
General average	1473.6 ± 5102.3	12950 ± 4540.4	1786 ± 693.2

VA= Value Added; AAE= Annual Average Expenses; AAB= Annual Average Benefit

Table 9. Revenue and the average annual benefits from the sale of palm wine

Supply area	VA	AAE	AAB
Bafoussam I	3528 ± 712.7	907.2 ± 142.5	2620.8 ± 570.2
Bafoussam II	2867.2 ± 1008.7	868 ± 268.9	1999.2 ± 739.7
Bafoussam III	3494.4 ± 585.8	1097.6 ± 271.5	2396.8 ± 331.4
General average	3296.5 ± 769.1	957.6 ± 227.7	2338.9 ± 547.1

VA= Value Added; AAE= Annual Average Expenses; AAB= Annual Average Benefit

Table 10. Summary of the contribution of the three NTFPs to the income of communities

Products	VA	AAE	AAB
Garcinia kola	6040.8 ± 2768.7	4963.4 ± 2248.3	1077.4 ± 605.4
Raphia farinifera	3296.5 ± 769.1	9576 ± 227.7	2338.9 ± 547.1
Ricinodendron heudelotii	1473.6 ± 5102.3	1295.0 ± 4540.4	1786 ± 693.2

VA= Value Added; AAE= Annual Average Expenses; AAB= Annual Average Benefit

4. DISCUSSION

The findings of this research showed that NTFPs are of great economic importance to communities in the Mifi Division as it is across the Central African sub-region, where this importance has been widely documented as mentioned by [27,28]. Every stratum of the community including women, men, youths and the elderly participates in the trade. Globally for the three products, women (58,4%) are more implicated in wholesaling than men (41,6%). According to [29], women rely more frequently than men on forest products activities for the generation of income. A higher proportion of respondents falls within the middle age group of 45 to 55 years age bracket for the three products. This is because they include married women without capital as mentioned by [30], and most of the people of this age group are parent with all the responsibilities that it implicates such as the payment of school cost. It is in accordance with [31], who mentioned that the cash earned by the sale of marula beer in South-Africa is important for paying school costs and that one of the traders interviewed mentioned that she had already paid her elder child's high school fees from her earnings, and would continue to sell beer until she had paid her younger child's primary school fees, and then stop. As mentioned by the later, some respondents do the trading activity of NTFPs just for a determined period and stop. The income earned is then used either for another trading activity of for direct use as it is the case with respondent of the younger age group. [31] equally mentioned that another young seller was doing so to pay her own school fees and that other uses of the proceeds from beer selling included reinvestment into alternative income generating opportunities such as sewing and shoe mending, and/or the purchase of goods for resale. The presence of respondents above 56 years old made up of the elderly is because the trade of NTFPs is an occupation after retirement as indicated by the later author that in Benin, shea nuts (*Vitellaria paradoxa* C.F. Gaertner) are particularly important for those with few other incomes generating options, including the elderly (often widows and those without the physical strength necessary to engage in other activities).

Marketers obtained the highest quantity of bitter kola from the Wouri compare to Haut-Nyong and Menoua. The first two areas are forest areas but Wouri is nearer to the Mifi division compare to the Haut-Nyong. Menoua is globally a savanna grassland area, thus poor in this product. The high quantity of Njangsang from the Haut-Nyong and Lékié compare to Wouri is logic, since it is a typical forest product and Wouri is less a forest area compare to Lékié and Haut-Nyong.

The income varies depending on the origin of supply of the NTFPs. The value added, and the annual average benefits are then related. The selling prices of products vary considerably, depending on the season and the source of products. The variation of prices is due to the distance between Mifi and the supply areas, the cost of transport and the local prices of products at the local markets of the supply areas. In fact, NTFPs sold in the Mifi division face the problem of conservation, infrastructure and high transport cost. According to [32], the perishable nature of many products, combined with the poor infrastructure and high transport costs in remote tropical rain forest areas also hinder the successful marketing of NTFPs. The benefit observed is this study still includes transportation cost, so in reality, the final benefit is a variable value due to the constant variation (usually little variation) of transportation cost depending on the means of transport.

Form the summary of table 10, bitter kola has the highest value added and the highest expenses that influenced on the benefit, which is 1/2 lower than the one from the sale of palm wine which had a lower value added and lower expenses. Wholesalers make more benefit from palm wine than from bitter kola, and less with Njangsang because palm wine is directly harvested in Mifi's villages; marketers are then exempted of high transportation cost and this palm wine is available all year round since *Raphia farinifera* is abundant in the Mifi division and the West region in general, where it is even cultivated. Plus, palm

wine is very appreciated by men as wine, it also has a cultural great importance (Present in all weeding ceremonies, in the welcoming of newly born babies, in traditional ceremonies and during funerals) and the cash from it sale is used for the payment of school fees, books, uniforms of students. [31] found that income from the sale of Marula beer in South Africa was crucial following the Christmas season as there was a high demand for cash for school fees, books, and uniforms, at a time when cash reserves were particularly low. The high standard deviations observed is due to the high variation of sale prices related to the variable cost of transport, the differences between expenses of marketers and the variable local prices of NTFPs in various supply areas as mentioned before, and the seasonality of products. The standard deviations (for VA, AAE and AAB) of Njangsang are higher than the others because on the seasonality of this product that causes it scarcity on markets. It is in accordance with [33], who mentioned that the reliance on NTFPs in general, and forest-based incomes in particular, varies depending on the season and accompanying household needs and that some activities are seasonal because the crop or material can only be gathered at certain times of the year and/or is directed by the seasonality of other activities (e.g., agricultural production), or because of seasonally induced cash needs (e.g., school fees).

5. CONCLUSION

The study confirmed that NTFPs contribute significantly in sustaining the livelihood of marketers in the Mifi division of the West Region of Cameroon. They are of real contribution to the income of all strata of the society, but the value added of certain of them still depends on the supply area which are out of the Mifi division and this implicates some constraints such as high transportation cost, seasonality of products and high variation of sale prices. The benefit observed in this study still includes transportation cost, so in reality, the final benefit is a variable value due to the constant variation (usually little variation) of transportation cost depending on the means of transport. The measurement unites in various markets are still not standardized and can be disadvantageous for consumers. Palm wine which is the only product harvested in the Mifi division in this study had the highest benefit but faces the problem of overexploitation. For the others, there is a real need of domestication in order to promote sustainable management of NTFPs in the actual context of climate change.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the authors.

ACKNOWLEDGEMENTS

The authors are thankful to the delegates of the five main markets in the Mifi division. We are grateful to the wholesalers for participating in the survey and providing valuable information.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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