**European Journal of Applied Sciences – Vol. 9, No. 6**
**Publication Date:** December 25, 2021
**DOI**:10.14738/aivp.96.11216.
Mawunu, M., Fernando, A. D. A. C., Panzo, A. Z., Mawunu, N. F. E., Narciso, H. A., Lautenschlanger, T., Koto-te-Nyiwa, N., Ndiku, L., & Luyeye, L. (2021). Socio-economic Contributions of the Retail Sale of Mfumbwa (*Gnetum africanum* Welw.) Among Traders in the Uíge city, Angola. European Journal of Applied Sciences, 9(6). 564-575.

# Socio-economic Contributions of the Retail Sale of Mfumbwa (*Gnetum africanum* Welw.) Among Traders in the Uíge city, Angola

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**ABSTRACT**

**The trade of non-wood forest products in the town of Uíge, including the Mfumbwa (*Gnetum africanum* Welw.), is an important activity for the family economy and helps to meet the daily needs of households. The aim of this research was to find out the socio-economic contributions of the retail sale of Mfumbwa among households in the town of Uíge. The socio-economic surveys were based on a semi-structured questionnaire and submitted orally to the informants. The study was based on**

**purposive sampling and took place between March and September of 2021 in the city of Uíge, northern Angola. A total of 56 informants were interviewed, all (100%) women. Mfumbwa retailing is a women's business because the traders interviewed are exclusively (100%) women. The majority (38%) of retailers in Mfumbwa are between 18 and 30 years old. Trade is the main source (97%) of employment and income for the respondents. Mfumbwa retailers in the city of Uíge have an average of 15 years of experience in trading this product. The majority (63%) of retail traders in Mfumbwa have more than 30 years of experience in this activity. The average profit generated by the retail sale of Mfumbwa in the city of Uíge is 85.61 US$ per month/ retailer. The income from the retail sale of Mfumbwa is destined mainly to the strengthening of the household basket (25%), to the schooling of children (21%) and to the health of the household (18%). The retail sale of Mfumbwa in the city of Uíge improves the socio-economic conditions of the trading households, helps to combat unemployment and to supplement the family budget thanks to the income generated by this trade. Finally, to avoid the extinction of this species, it is imperative to develop sustainable conservation strategies.**

**Keywords:** socio-economic contributions, retail sale of mfumbwa (*Gnetum africanum*), Uíge City Angola.

## INTRODUCTION

*Gnetum* is a genus of Gymnosperms [1]. With about 50 species of lianas and trees distributed in tropical regions of the world [2]. Morphologically, there are two species of *Gnetum* in Africa: *G. africanum* and *G. buchholzianum* [3]. Biye et al. [4] identified two new species, bringing the total to four species of *Gnetum* in Africa.

*Gnetum africanum* is an evergreen plant found mainly in tropical rainforests. *Gnetum* is a liana up to 10 m long but sometimes longer [5]. In Africa, it is distributed in the tropical rainforest zone that extends from southern Nigeria through Cameroon, Equatorial Guinea, Central African Republic (CAR), Congo, Gabon and the Democratic Republic of Congo (DRC) to Angola [6].

The species *Gnetum africanum* is one of the slow-growing leafy vegetables highly prized for its edible leaves. The leaves have cultural and socio-economic values and are traded locally and internationally. They are rich in mineral elements, essential amino acids and can be an important source of protein for local populations [7]. 1 kilogram of *Gnetum* leaves contains 216 g of carbohydrates, 60 g of protein, 13 g of lipids, 130 mg of calcium and nearly 6g of iron [8]. Both African *Gnetum* species (*G. africanum* and *G. buchholzianum*) are used as a vegetable, eaten raw or cooked in soups and salads [5], but they also have very useful medicinal properties, such as, diabetes, nausea, constipation, hemorroids. hypertension [5, 9]. *Gnetum* is still collected from wild species. But trial cultivations have begun in Cameroon, Nigeria, and Benin Republic. The main problem is that the plant in its natural habitat seems to prefer shaded forest canopies.

In experiments in Cameroon, propagation by seed was difficult because the seed is show to sprout, with germination taking 1 year or more. Perhaps the seeds need pretreatment, such as passing through the intestines of a bird, fruit bat, squirrel, or other animal, before they germinate. Seeds are normally found only in the tree canopy. Seed collection is thus far from easy, a further reason why *Gnetum africanum* is hardly cultivated. Experimental cultivation using leafy stem cuttings have produced encouraging results [5]. Additionally, African *Gnetum*

species have a long marketing chain [10]. *G. africanum* serves as a source of income generation for the economy of countries and regions through trade; it provides employment to people, provides a stable source of income to stakeholders, and improves the household welfare of participating agents [11]. In general, Eru-business helps many poor households to meet their basic needs [12]. Thus, it is necessary to mention that *G. africanum* trade is very lucrative among the people involved in it, as they earn reasonable incomes from it [11]. Women make a major contribution to the trade in most African countries and are heavily involved in the *G. africanum* trade as petty traders [13]. According to Ingram and Schure [14], the *G. africanum* trade also contributes to the diversification of the income of the actors involved in the *G. africanum* value chains. This very significant trade is estimated at US$13.8 million per year in southwest Cameroon and US$1.2 million per year in Kinshasa (DRC). Finally, in Angola Mawunu et al. [15, 16] showed that Mfumbwa (*G. africanum*) is among the wild food plants traded in Uíge province. In northern Angola, the trade of cultivated plants and wild food products is mainly women's occupation. This trade generates employment and income for urban and rural households. The income from this age-old activity contributes to food security, schooling, household health, etc. [15-19].

However, despite the great interest in this plant among some consumers and traders in Uíge province, very little data is available on its socio-economic contribution [15, 16]. For this reason, this study specifically focuses on the socio-economic contribution of Mfumbwa retailing in Uíge city, northern Angola.

## MATERIAL AND METHODS

### Description of study area and selection of respondents

The municipality of Uíge located in the south of the province of Uíge, covers an area of 2 500 $km^2$ and has a population of 493,529 inhabitants [20]. The capital of the municipality is also the capital of the province of the same name, Uíge. Uíge has a tropical savannah climate with a dry season (Sivu or Mbangala in Kikongo) [18, 19] that runs from May to September and a rainy season that runs from September to January (Masanza in Kikongo), then from February or March to May (Kitombo in Kikongo) with an annual rainfall of 900 to 1500 mm; the average annual temperature in the capital of Uíge is 23°C [18-*22*]. The province of Uíge enjoys excellent edapho-climatic conditions (large arable land and regular rainfall) and also has a dense hydrographic network that irrigates the region [17]. The economy of the province of Uíge is based mainly on subsistence agriculture. Other's source of economy are the livestock, hunting, small-scale trade and traditional fishing [15-17].

Data for this study were collected between March and September 2021. The choice of the study area was made after a pre-survey that confirmed the existence of retail sellers of Mfumbwa in the markets of the city of Uíge. Visits were made to 5 markets in the Uíge city. Respondents were selected based on their availability and their socio-economic activity, retailing Mfumbwa. The method adopted for data collection was the socio-economic survey applied by Monizi et al.[17], Monizi et al. [18], Monizi et al. [19] and Mawunu et al. [15]. It consisted first of all in drafting a questionnaire to better understand the retail trade of Mfumbwa in the study area. Also, data collection was done through direct observation in the markets and through individual interviews with Mfumbwa retail vendors. The exchange rate used is equivalent to 1 US$ = 620.69 AOA [23].

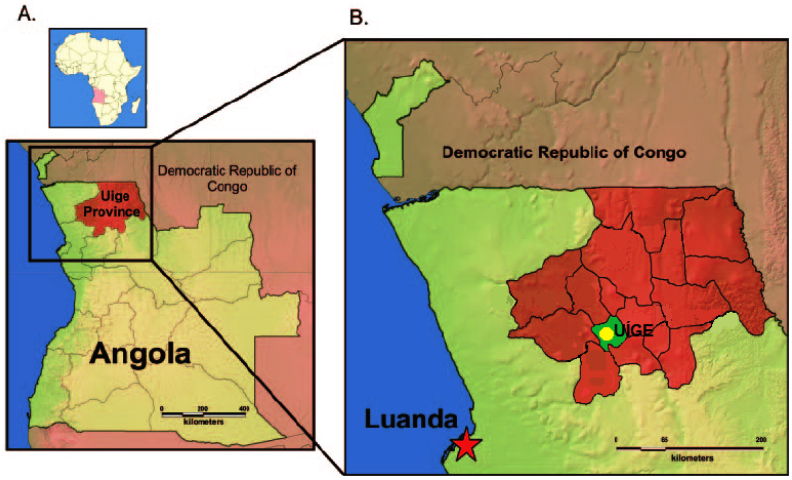



**Fig.1: Location of the study area in the Uíge province, republic of Angola.**

## Biological material

The biological material to be studied consists of Mfumbwa (*Gnetum africanum*) leaves. For its taxonomic identification was used the Flora of West Tropical Africa [24] confirmed by teachers and researchers of the department of agronomy of the Polytechnic Institute of the Kimpa Vita University (Angola) and of the Department of Biology of the faculty of sciences of the University of Kinshasa (RDC).

## Questionnaire

The survey questionnaire was divided into three sections: (1) Vendor data (age, gender, education level, marital status, and main source of income); (2) Biological material (vernacular name, supply source of Mfumbwa or Mfumbua); and (3) Market information (sales patterns, pricing, and customer loyalty; sales locations, sales methods, and units of measurement, income distribution, etc.). In addition, the study was based on purposive sampling. Eligibility criteria were the sale of Mfumbwa leaves and the availability of respondents for socio-economic surveys. The semi-structured questionnaire was administered orally to respondents.
A total of 56 informants participated in this study, all women. The individual interviews were conducted in Portuguese, the language spoken by the respondents.

## Data analysis

The data for this study were entered and analyzed using Statistical Package for Social Sciences (SPSS, Inc., Chicago, USA) version 25.0, the graphs were made with Origin 8 software.

# RESULTS AND DISCUSSION

## Socio-economic profile of respondents

### *Gender and age*

The gender distribution of Mfumbwa retailers in the markets of Uíge town shows that all are women (100%). According to Monizi et al. [18] the gender-specific standards sometimes dictate the roles of women and men and their opportunities in the type of work in both urban and rural areas. Furthermore, Mawunu et al. [15] and Monizi et al. [17, 18] who worked in the same area showed that the sale of edible NWFPs is mostly carried out by women. According to the FAO [25], in southern Africa, women are particularly involved in the collection and sale of NWFPs.

Moreover, these observations are similar to those reported by FAO [26] that the NWFP trade sector in Central Africa is more than 80% dominated by women.

Regarding age, more than half (54%) of the informants are between 31 and 45 years old. On the other hand, 38% of the respondents are between 18 and 30 years old and only 4% are over 45 years old. Age is an important demographic factor in making a decision about operating any type of business. Also, referring to this average age, it shows that the business of Mfumbwa retail sale in this region is exercised by young people who will ensure its continuity for a long time. These results are similar those of Mawunu et al. [18] and Monizi et al. [17, 19] who found in their work an average age of 35, 36 and 38 years, respectively among sellers of edible NWFP, *Raphia* wine and *Dracaena camerooniana* leaves in the same region.

***Marital status and Education level***

Education makes a person more confident, stronger and creates the ability to think and decide quickly. The level of education of the Mfumbwa retailers shows that the vast majority (67%) had attended primary school, while 29% had attended secondary school and 4% had attended adult literacy school. However, no academics are involved in the retail sale of Mfumbwa in this study area. It would appear that academics are more attracted to other occupations such as public service or other types of more lucrative activities. These results are similar to those of Mawunu et al. [15] who showed that 92% of NWFP food vendors are literate; Monizi et al. [18] showed that 95% of the *Raphia* wine value chain actors in Uíge province are literate. In the same vein, Monizi et al. [17], also showed that edible NWFPs made from *Dracaena camerooniana* leaves attract more educated people (76%).

***Main source of employment***

The greatest majority (97%) of retail traders in Mfumbwa depend on trade as their main source of employment and income, while the service accounts for only 3%. Monizi et al. [18] and Mawunu et al. [20] showed that trading is the main source of income and employment for sellers of non-wood forest products for food use in Uíge province.

**Supply areas of Mfumbwa**

Mfumbwa is the local name (Kikongo language) of *Gnetum africanum* in northern Angola [15; 16]. Mfumbwa leaves are highly valued by the local population in the town of Uíge as a leafy vegetable. Therefore, the transport of bundles of Mfumbwa leaves from the rural area to the Uíge town is done entirely (100%) by private vehicle. In addition, the cost of transport varies according to the distance travelled. On average the cost of transport is 2.82 US dollars.

Figure 1 shows the main supply municipalities of Mfumbwa sold at retail in the markets of the Uíge city.

They are many supply areas of Mfumbwa sold in the Uíge town. The municipality of Ambuila is the main source (31%) of Mfumbwa sold in the Uíge city. The other municipalities are Bembe (21%), Makela (16%), Milunga (14%), Quitexe (13%), Songo (3%), Uíge (1.4%) and Mukaba (0.2%).

The agroecological conditions in the Mfumbwa supply areas are thought to be favourable for the growth and development of this species, which is why the plant is present in these

municipalities. In this study area, the municipalities have patches of secondary forest or forest fallow with abundant forest or vegetation cover. Moreover, ethnobotanical studies conducted by Mawunu et al. [16] and Mawunu et al. [27] in the Ambuila and Mukaba municipalities revealed the existence and commercialization of *G. africanum* in these administrative entities. In addition, the quantities of *G. africanum* from the different supply areas are different from one area to another. Regarding the number of Mfumbwa leaves sold in bundles, the results of this study report an average of 1443 leaves/bundle. Monizi et al. [17] reported an average of 130 leaves per bundle of *Dracaena camerooniana* in their study. This difference can be explained by the fact that the leaves of *D. camerooniana* (Asparagaceae) are larger than those of *G. africanum* (Gnetaceae). Therefore, the larger the leaves, the fewer the bundles and vice versa. Furthermore, the two plants are different species, genera and families.

**Market analysis**

The results of this study revealed that there are no standardized units of measurement used in the marketing of Mfumbwa in the markets of Uíge town. Similar results were found by Mawunu et al. [15] in their study on non-timber forest products for food.

All (100%) of the Mfumbwa retailers in Uíge town markets do not display the price on their product. Mawunu et al. [15], showed that there is virtually no labelling or display of prices (99%) on NWFPs foodstuffs on sale in Uíge province. This is a deliberate practice that protects the seller from competition and ensures that he has a good margin to determine the price according to the customer's appearance.

There are many retail sites of Mfumbwa in the Uíge town. Praça Grande (Uíge municipal market) is the main retail site (50%) for Mfumbwa in the Uíge city, while the other markets are: Praça do Bembe (25%), Praça da Feira (13%), Praça do Kandombe (8%) and Praça do Dunga (4%). Outside the markets, Mfumbwa is sold at the roadside and in the homes of retail traders. In addition, Mfumbwa is sold in the markets of Uíge in bundles (**Fig. 2a**) or sliced (**Fig. 2b**). Poor households prefer to buy Mfumbwa sold in heaps of sliced leaves because of its affordability, but also to avoid slicing the Mfumbwa leaves.

In the study area, the selling price of a pile of sliced Mfumbwa leaves varies between US$ 0.31 and US$ 1.53, while the selling price of a bundle of Mfumbwa varies between US$ 0.92 and US$ 3.21, i.e., an average of US$ 2.53/bundle. The cost price (purchase price + additional costs) varies between US$ 0.92 and US$ 2.30.

Furthermore, the average selling price of a bundle of Mfumbwa leaves in Uíge city is US$2.3/kg while the average selling price of sliced Mfumbwa leaves is US$3.6/kg. The selling price of a heap of Mfumbwa leaves varies between 0.31 and US$1.53, while the selling price of a bundle of Mfumbwa varies between 0.92 and 3.21US$. Furthermore, the cost price (purchase price + additional costs) varies between 0.92 and 4.30US$/day.

Taking into account the purchase and selling prices, the average profit generated by the retail sale of Mfumbwa is US$ 85.61 per month/retailer or US$ 1,027.32 per year/retailer. This proves that the retail sale of Mfumbwa in the study area is profitable. In addition, the average monthly profit received by Mfumbwa leaf retailers in the city of Uíge is higher than the Angolan national minimum wage, which is 60 Euros or 70.2 US$ at the current rate. The monthly net

profit margin achieved by Mfumbwa retailers in the city of Uíge, US$ 85.61, is much lower than that in the city of Bangui (capital of Central African Republic, CAR) and Kinshasa (capital of DRC), which are US$ 132 and US$ 221 respectively [14; 28]. There are several reasons for this observation. Among other things, the quantity of Mfumbwa sold by retailers in the capitals of Bangui (CAR) and Kinshasa (DRC) is reportedly much higher than that sold in the town of Uíge. This could be due to the much higher demand in these two capitals, which would be influenced by eating habits, the number of consumer households being ten to one hundred times higher than in the small town of Uíge, capital of the Uíge province. Monizi et al. [17] reported in their study the average price of 1.06US$ per leaf bundle of *Dracaena camerooniana*, a lower price compared to that of *G. africanum* leaf bundle which averages 2.5US$. The population of Uíge prefers to buy *D. camerooniana* leaves to *G. africanum* leaves because they are cheaper or because of organoleptic properties [17].

According to retail vendors in Mfumbwa, Uíge town, sales are good when civil servants receive their salaries because during this period, vendors can earn an average profit of US$3.7. Outside this period, sales are somewhat good; at weekends, retailers in Mfumbwa can earn a profit of US$2.95 per day. With respect to seasonality, the price of a bundle of Mfumbwa leaves varies on average over the year depending on the season, i.e., US$1.92 in the rain season and US$2.46 in the dry season. In addition, respondents reported that when there is an abundance of Mfumbwa on the market, its main seasoning ingredient-peanut butter (Mwamba nguba in Kikongo language) – becomes more expensive on the market and vice versa.




**Fig.2: Sale of Mfumbwa in bundles (Fig. 2a) and sliced leaves sold in heap (Fig. 2b) in the town of Uíge**

It should be noted that households that consume Mfumbwa in Uíge prefer to buy Mfumbwa already chopped into small slices and sold in heaps. They are two reasons for this choice, the first being the behaviour of urban consumers who prefer ready-to-eat food. For this reason, retailers of Mfumbwa in Uíge sell it already chopped into small slices ready to be prepared, thus facilitating the culinary task of their customers. The second is that the purchase of bundles of Mfumbwa leaves by urban consumer households entails additional expenditure, as some households do not have the dexterity to slice Mfumbwa leaves, which means that they have to

pay people who do have skills in this task. Similar observations were made by Manirakiza et al. [28] who studies the Mfumbwa value chain in the DRC.

As for storage, bundles of unsold Mfumbwa leaves are stored in dry places, on the group or on the roof of houses overnight. Or the other hand, the unsold slices are stored in polyethylene bags with holes in them and then put in dry, shady and ventilated places. After several days the unsold leaves can be consumed by the retailers' households or discarded once the deterioration is very pronounced. Experienced retailers of sliced Mfumbwa leaves only cut a quantity that can be sold on the same day at the market. This is to avoid unnecessary waste or loss of their merchandise.

Furthermore, *t*he results of this study show that the majority (63%) of retailers in Mfumbwa in the Uíge city retain their customers by giving them a surplus of the products purchased, this act is commonly called Esquebra in Angolan Portuguese or Ntelo in Kikongo also bonus in French, while others use credit sales (37%) to their loyal customers. Mawunu et al. [15] showed that, with regard to customer loyalty, edible NWFP sellers in Uíge province use several techniques, including selling on credit to loyal customers and giving a discount (reduction in the selling price) and a bonus to the buyer, i.e., a surplus of the product purchased.

The study also shows that the majority (58.5%) of retail traders in Mfumbwa save their money by using tontine, commonly known as quixikila in Angolan Portuguese or Dikilemba in Kikongo, bonus in French. The other means of saving are keeping money at home (41.2%) and banking (0.3%). Our results corroborate those of Mawunu et al. [15], who showed that the vast majority (71%) of edible NWFP sellers in Uíge province keeps the money at home. In addition, 29% practice a kind of tontine locally called Dikelemba, Mbuela or Temo in the Kikongo language. Also, Monizi et al. [17] showed that income from the sale of NWFPs such as *Dracaena camerooniana* leaves is kept in a kind of local tontine called Quixikila in Angolan Portuguese or Dikelemba in Kikongo. Additionally, households in developing countries derive their income from a variety of sources. Figure 3 shows the distribution of income from the retail sale of Mfumbwa in the markets of Uíge town.

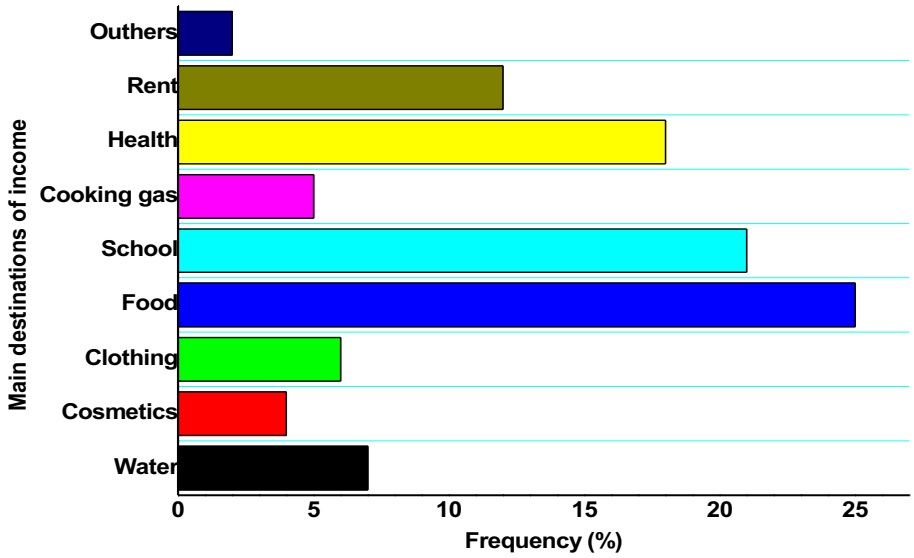



**Fig. 3: Main uses of income by Mfumbwa retailers (%).**

Figure 3 shows that the main destinations of income are: the household basket (25%), school equipment (21%), health care (18%), payment of rent (12%), water (7%), clothing (6%), cooking gas (5%) and cosmetic (4%). Other destinations (2%) are: marriage, telecommunications, electricity, assistance to relatives, church offerings, etc. Mawunu et al. [15], Monizi et al. [17; 18; 19] reported that income generated from the sale of NWFPs contributes to increased food security, purchase of school materials, health care, basic necessities, marriage, purchase of clothes, church offerings, cosmetics, funerals, weddings, etc. Lautenschläger et al. [29], have shown that the collection and sale of certain edible insects is part of the livelihood diversification strategy in northern Angola and provides multiple income opportunities for households. According to Ingram [14], income from the sale of *Gnetum* spp is used for family food, health and education of children.

Figure 4 shows the distribution of Mfumbwa's retail traders according to their business experience.

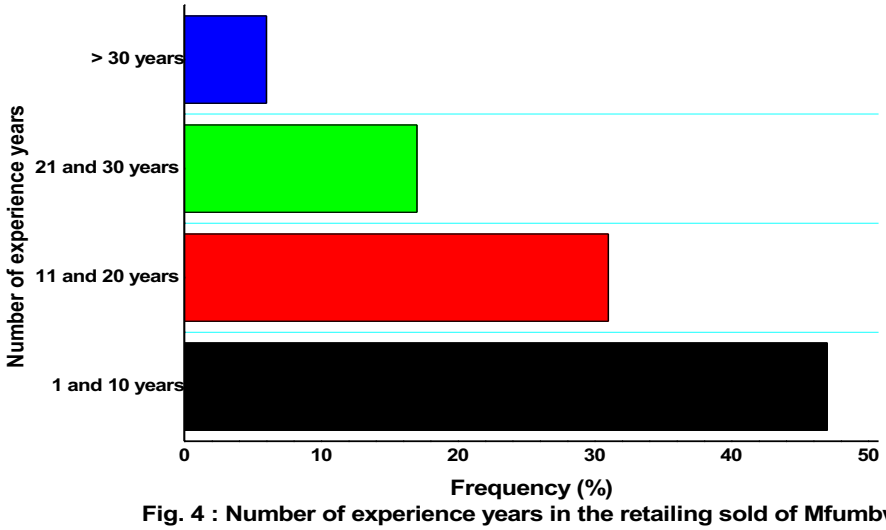



**Fig. 4 : Number of experience years in the retailing sold of Mfumbwa.**

Figure 4 shows that the retail traders in *G. africanum* are quite experienced with an average of 15 years of experience. A breakdown of this figure shows that about 47% had between 1 and 10 years 'experience, 31% had between 11 and 20 years' experience, 17% had between 21- and 30-years' experience and 6% had more than 30 years' experience. The retail sale of Mfumbwa appears to be beneficial, as 53% of the dealers have more than 10 years' experience in this field. Mawunu et al. [15], showed that trading in edible NWFPs appears to be relatively beneficial, as 64% of the vendors have more than 5 years' experience in selling these products. In contrast, those with less than five years' experience represent 36%.

Mfumbwa is traded all year round in the study area. As a result, some traders are exclusively dedicated to the retail sale of this product. Also, the data from this study show that the greatest majority (95%) of Mfumbwa retailers in this town sells only one product on their stall, Mfumbwa. In addition, the rest sell Mfumbwa and peanut butter, the main ingredient in the seasoning of Mfumbwa, known locally as Mwamba nguba in Kikongo.

According to the respondents, the number of *G. africanum* leaves is constantly decreasing for several reasons. Amongst others, slash-and-burn agriculture in this part of the country,

although the main source of food, employment and income for the people of the province, is unfortunately also the main cause of the devastation of the forests, the natura habitats of Mfumbwa. In addition, some Mfumbwa harvesting use unsustainable methods [16, 17]. Mfumbwa is a wild edible vegetable that is highly valued by the population of the Bakongo ethnolinguistic group. Given its commercial value, its exploitation is increasing, reaching the level of overexploitation. Currently, Mfumbwa is classified as a vulnerable plant in Angola [30]. It is imperative that teachers, researchers, donors, and angolan policy markers focus on the experimental cultivation of Mfumbwa in the botanical garden of Kimpa Vita University. Once the cultivation techniques are well mastered, it would be desirable to move immediately to the phase of extension to the loans of local farms in order to respond in a sustainable way to the needs of the harvesting as the consumers of Mfumbwa. Finally, we must also think about developing sustainable harvesting methods, controls, a sustainability label, reforestation of natural habitats, among others.

**Constraints in the marketing of Mfumbwa**

The most common constraints encountered in the marketing of Mfumbwa in the town of Uíge are the lack of transport from the supply area to the town, poor secondary and tertiary roads in the supply area, depletion of the natural habitats of Mfumbwa due to massive deforestation caused by self-sufficiency farming, lack of support programme for the development of appropriate technologies for storage and packaging, etc. Monizi et al. [18] in their study on the cultural and socio-economic role of *Raphia* wine in the province of Uíge (Angola) and Monizi et al. [17] also their study on Ethnobotanical and Socio-economic of *D. camerooniana* Baker in the same Province, obtained similar results to those obtained in this study.

Retailers in Mfumbwa face several difficulties in supplying their goods. The most recurrent ones are due to the poor state of the agricultural roads, the long distances that separate the supply areas from the main selling point, which is the town of Uíge, and the lack of appropriate technologies in the conservation of Mfumbwa.

## CONCLUSION

This study highlighted the socio-economic importance of Mfumbwa (*G. africanum*) retailing in the city of Uíge.

The retail trade in Mfumbwa leaves in Uíge is an economic business carried out exclusively by women. This activity enables trading households to combat unemployment, supplement the family budget and improve socio-economic well-being through the acquisition of goods and services.

That the annual quantities (kg or T) sold and not sold of *Gnetum africanum* leaves in the Uíge city be estimated in order to better know the profit generated. Additionally, the losses due to deterioration due to lack of appropriate conservation technologies and also study be carried out in the big city of Luanda, capital of Angola.

Given the socio-economic importance of the Mfumbwa retail trade for households in the Uíge city, it is therefore desirable to develop strategies for the sustainable harvesting and conservation of this species in its natural habitat through its domestication. Also, to think of continuing to satisfy in a sustainable way the food needs of urban and rural consumers of *G.*

*africanum* and to safeguard the jobs related to its exploitation and commercialization, both for present and future generations.

**ACKNOWLEDGEMENTS**

The authors sincerely thank the reviewers as well as the Mfumbwa retailers for their voluntary participation in this study.

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