

# Smallholders' Perceptions and Socio-Economic Importance of *Megaphrynium macrostachyum* (Benth.) Leaves in the Central and Littoral Regions of Cameroon

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**Abstract:** This study, which aims to determine the perceptions of the actors and the socio-economic uses of *Megaphrynium macrostachyum* leaves, was conducted in the Central and Littoral regions of Cameroon, in fourteen markets distributed in four cities among which Douala, Edea, Boumnyebel and Yaounde. Data collection carried out from April to June 2021 from 102 merchants involving men and women was done through an ethnobotanical survey with individual and semi-structured interviews and direct observations in the field. Regarding the knowledge of the smallholders on the socio-economic uses, the result revealed that *Megaphrynium macrostachyum* leaves are mainly used in food (UA = 99%) and medicinal (UM = 61.85%) sectors and its trade was proved to be a profitable activity according to 99% of respondents. An average gain of 211.1 FCFA per package of 57 leaves was reported, the purchase and sale prices being 147 FCFA and 246 FCFA respectively. The major difficulties encountered by the sector are the transport (48.23%) and the rotting of the leaves (27.06%). The actors involved in the sector are mostly single (48%) and married (34%), their education level being mainly secondary (47%) and primary (46%). Young women are the main providers (84.15%) and the Bassa community is the main source of supply for the product (55.31%). *Megaphrynium macrostachyum* appears then to be both of social and economic interest, because it is used as a medicinal plant and also as a traditional vegetable sold and consumed by several households. In order to improve the well-being of the populations who benefit from it, this species must be taken into account in programs for the conservation and sustainable development of NTFPs in Cameroon.

**Keywords:** Perceptions, Smallholders, Socio-Economic Importance, *Megaphrynium macrostachyum*, Cameroon

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## 1. Introduction

In Africa, natural resources are of socio-economic interest to local populations. They enable local people to meet their basic needs thereby contributing to the reduction of poverty and food security [18]. In many countries, ethnobotanical studies have been conducted on plant resources by researchers [12, 11, 9, 13, 4]. Among these, non-timber forest products (NTFPs) are of great importance [24, 14]. They are products of biological origin, other than wood derived from forests, other wooded

lands and trees outside forests [10]. NTFPs are a source of packaging or binding materials [14], food consumed as a staple or main dish, a side dish, spices or flavoring, aphrodisiac, or "appetizers" [24]. These include various plant organs like buds, leaves, stems, barks, roots, bulbs, rhizomes and underground tubers, fruits and seeds [18].

When we talk about the forest in the countries of the Congo Basin, we think first of timber and to some extent of fuelwood and hunting. Other non-timber forest products (NTFPs), also known as "hidden crops", are neglected and their contribution to the economy (gross domestic product) is

often very poorly assessed due to a lack of reliable statistical data, as is the case for *Megaphrynium macrostachyum*. This observed misjudgment is itself linked to the lack of knowledge of these products both in terms of quality and quantity [3, 7]. Yet, "hidden crops" have always been and continue to be an important component of the culture of African populations. They are not only part of the "traditional" ways of life of these people, but also remain essential and indispensable to the quality of life of many households, both in rural and urban areas. Hidden crops contribute to poverty alleviation, food balance, and population security in both urban and rural areas [1, 30].

*Megaphrynium macrostachyum* is counted among the priority NTFPs in terms of trade and consumption in the Democratic Republic of Congo [31], Cameroon [17, 15] and Central African Republic (CAR). In addition, the species under study is among the most consumed traditional vegetables during the lean season in the DRC [8, 16]. However, this species lacks market value in Cameroon despite its multiple uses. This lack of market value is caused by the absence of socio-economic studies on its value chain. According to [20] in the DRC, a household earns an average of 13,650 CDF, or 15 USD per week compared to 3,512 CDF, or 4 USD for other

income, a figure crossing 20 USD and thus a 63% contribution to their income. For traders, an investment of 47,100 CDF, or 52 USD, gives a weekly profit of 51,500 CDF, or 111% of profit, while in southern Cameroon it is only 5 to 10% because of the lack of attention paid to this sector at the national level.

Indeed, *Megaphrynium macrostachyum* is a highly coveted species used for various purposes in Cameroon. This could lead not only to its overexploitation, which could result to its extinction in the coming decades, but also to an imbalance within the ecosystems, the major consequences of which will be the loss of biodiversity and especially the poverty of the populations who benefit from it on a daily basis. It is thus with the objective of determining the perceptions of the actors and the socio-economic importance of *Megaphrynium* that the present work was carried out.

## 2. Material and Method

### 2.1. Study Location

The present study was conducted in four areas of Cameroon, namely: Yaounde, Boumnyebel, Edéa and Douala. The characteristics of the study locations are given in Table 1.

**Table 1.** Characteristics of study locations (<https://fr.m.wikipedia.org>).

Location	Geographical coordinates	Surface area	Climate	Agro-ecological zones	Population
Yaounde	3°52' North latitude and 11°31' East longitude	304 km <sup>2</sup>	Equatorial Guinean	Bimodal rainfall forest (zone 5)	4.1 million
Douala	4°03' North latitude and 9°42' East longitude	410 km <sup>2</sup>	Equatorial	Monomodal rainfall forest (zone 4)	5.7 million
Edéa	3°48'0" North latitude and 10°7'60" East longitude and at 22 m altitude	180 km <sup>2</sup>	Tropical	Monomodal rainfall forest (zone 4)	226 thousand
Boumnyebel	3°52'58" North latitude and 10°50'58" East longitude	92 Km <sup>2</sup>	Equatorial	Bimodal rainfall forest (zone 5)	30 thousand

### 2.2. Method

#### 2.2.1. Target Population

The targeted populations for this study were those involved in *Megaphrynium macrostachyum* trade. The traders were identified and surveyed in the markets of the above mentioned study locations. In total, one hundred and two (102) individuals, including 53 women and 49 men distributed in 14 markets were interviewed; 54 in the Central

Region and 48 in the Littoral Region (Table 2).

#### 2.2.2. Survey

Data were collected from traders in the different zones using participatory research evaluation tools and techniques [2, 27]. Individual and group interviews were conducted with the aim of identifying popular knowledge on the use of *Megaphrynium macrostachyum* leaves.

**Table 2.** Number of sellers surveyed per location.

Locations	Market names	Number of persons surveyed
Centre Region	Mvog-Atangana-Mballa	12
	Mokolo	14
Yaounde	Essos	6
	Ekounou	3
	Mfoundi	3
	Nkoa-Mbang	2
	Parking	12
Boumnyebel	Petit marché	2
Littoral Region	Synatex Ndokoti	14
	Gare Newbell	11
Douala	Marché des Chèvres	6
	Marché des palmiers	5

Locations	Market names	Number of persons surveyed
Edéa	Grand marché	10
	Petit marché	2
TOTAL		102

### 2.2.3. Data Analysis

The data collected were analyzed using descriptive statistics (average, percentage, etc.) with "Statistical Package for Social Sciences" library of the SPSS software, and results were consolidated in the form of tables and figures. The validation of the information was done based on the percentages of the responses. The Frequency of Citations (FC) for each category of use was calculated from the formula:

$$FC = (\text{Number of citations of use} / \text{Total number of respondent}) \times 100$$

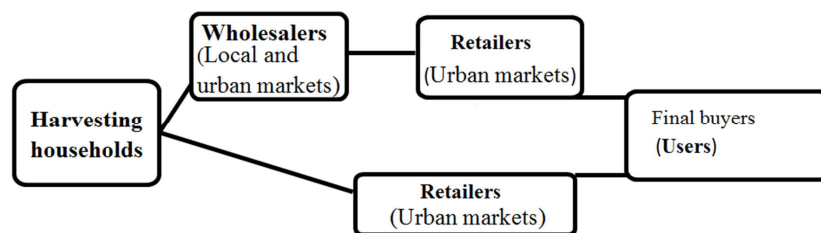


Figure 1. Exploitation chain of *Megaphrynium* leaves.

### 3.1.2. Socio-Demographic Characteristics of Respondents

The profile of the respondents (traders) showed that 51.96% of women and 48.04% of men are involved in the *Megaphrynium* leaves value chain. The ages of the majority of actors involved in the sector ranged between 25 and 30 years (59.59%), followed by 30 years old and above (33.33%) and finally 20 to 25 years old (9.09%). As for marital status, 48% of respondents were single, 34% married, 14% widowed and 1% divorced. The level of education was secondary (47%), primary (46%) and higher (5%). These traders are mainly retailers (58.60%), wholesalers (37.40%) and both wholesalers and retailers (4%), their main activities being trading (68.04%) and gathering (31.96%) (Table 3).

Table 3. Socio-demographic characteristics of respondents.

Variables	Terms	Proportion (%)
Gender	Male	48,04
	Female	51,96
Marital Status	Married	34
	Widowed	14
	Divorced	1
	20 – 25 years	9,09
Age	25 – 30 years	59,59
	30 years +	33,33
	Retailer	58,60
Type of trader	Wholesaler	37,40
	Retailer and Wholesaler	4
	Did not go to school	2
	Secondary	47
Education level	Primary	46
	Higher	5
Main activity	Trade	68,96
	Gathering	31,04

## 3. Results and Discussions

### 3.1. Results

#### 3.1.1. Exploitation Chain of *Megaphrynium* Leaves

The smallholders of *Megaphrynium macrostachyum* leaves are grouped in three links: harvesting households, which are mostly women (62%) and men (38%), resale buyers who are wholesalers or retailers and final buyers (users) (Figure 1).

#### 3.1.3. Socio-Economic Uses of *Megaphrynium* Leaves

*Megaphrynium* leaves are sold in packets with a number of leaves ranging from 10 to 70 and with an average of 57 leaves per packet. This packet is purchased at a price between 100 and 500 F CFA, with an average of 147 F CFA. The resale price ranged from 150 to 1000 F CFA with an average of 246 F CFA. The profit generated per package sold ranged from 50 to 500 CFA francs with an average of 211.1 CFA francs (Table 4). The break-even point for this activity is 99% according to the respondents.

Table 4. Average purchase, sale prices and gain of *Megaphrynium* leaves.

Price (F CFA)	Purchase	Resale	gain
Minimal	100	100	50
Average	147	246	211,1
Maximal	500	1000	500

### 3.2. Discussions

The percentage of actors in the surveyed sample reveals that 51.86% are women, compared to 48.04% men. Furthermore, according to the information provided by these respondents, young women are the main suppliers of leaves in the markets (84.15%). This adheres to the assertion of another study [29], which showed that young women are much more involved in NTFP harvesting in Cameroon. Likewise, the work of [26] reveals that NTFPs are much more exploited by women and youth in Cameroon.

The majority of these smallholders are single (48%), and this status, which gives them certain availability and freedom of movement, justifies their involvement in the

activity. The education level of the latter is essentially secondary (47%) and primary (46%). These results are not consistent with those of [25], who showed that in the DRC, it is rather the divorced and illiterate who are mostly involved in the exploitation of *Megaphrynium* leaves. The fact that these smallholders have been to school could be an asset for future studies or research in this area.

Among resellers, retailers are in the majority (58.60%) and wholesalers are the minority (37.40%). This dominance of retailers could be justified by the fact that they maximize their resale in order to make an acceptable profit instead of selling wholesale at the same price as some harvesters. The city of Yaounde, where there are many more resellers than harvesters, appears to be the most expensive in terms of the sale of *Megaphrynium* leaves and generates the highest incomes. Betti *et al.* [6] obtained the same result, which showed that price variation of spontaneous food plants depends on seller and product quality. Mutambwe [22] explained that NTFP prices are highly dependent on the supply and demand ratio which in turn is influenced by the seasonality of the products, quality, size, transportation cost and the locality where the product is sold. This cost could also be related to the fact that Yaounde is the political capital of Cameroon, and therefore the place where many ethnic groups converge.

Bassa (51.31%), Beti (24.46%), Bulu (24.46%) and Ewondo (8.51%) were identified as the main ethnic groups providing *Megaphrynium* leaves. This result shows that *Megaphrynium* harvesting is a multi-ethnic activity. This result is in line with that of Betti *et al.* [6] who reported that NTFP selling is a multi-ethnic economic activity. Furthermore, this could also be explained by the fact that these ethnic groups are predominantly represented in the study area.

*Megaphrynium* leaves are used and traded both locally and in urban areas. Similar results were found by Betti *et al.* [6] who noted that *Megaphrynium* is among the food plants sold in the city of Yaounde. Tata and Awono [29] showed that *Megaphrynium* is the tenth NTFP among the 16 priority NTFPs in the Centre Region. Similar results were obtained in Douala markets [28] and in the DRC in Kisangani markets [23].

The use of 61.85% *Megaphrynium* leaves in medicine was also reported by Maloueki *et al.*, [19] who showed that the total aqueous extracts of *Megaphrynium* are used in medical therapy with regard to its antioxidant activity *in vitro*. Similarly, Meva *et al.* [21] showed that extracts of *Megaphrynium* fresh leaves are used for the synthesis of nanoparticles against *E. coli*.

The income generated from the *Megaphrynium* leaves trade supports several households through savings (69.47%), ration (62.10%), health (34.73%), school fees (34.73%), house rent (26.31) and bills (9.47). This result is similar to those of Awono *et al.* [3] who showed that in urban areas, NTFP retailing, especially fruits and leaves sustain entire families.

## 4. Conclusion

This study provides an overview of the *Megaphrynium*

*macrostachyum* leaf sector in selected markets in Yaounde, Douala, Edéa and Boumnyebel, with a focus on the links in the value chain, uses and prices. It highlights the nature and different types of operators, sources of supply, uses, prices and also the difficulties encountered in the sector. *M. macrostachyum* plays an important role for the rural populations whose livelihood depends on gathering and those settled in towns.

The development of this species and its sustainable management requires in-depth studies on various themes that will allow for a better understanding of this NTFP and the resources related to it. The perspectives of this work could be turned towards local actors in order to carry out a study on the constraints and the techniques of exploitation of this species. These perspectives constitute essential elements to speculate on the sustainability of this resource and to recommend sustainable management strategies.

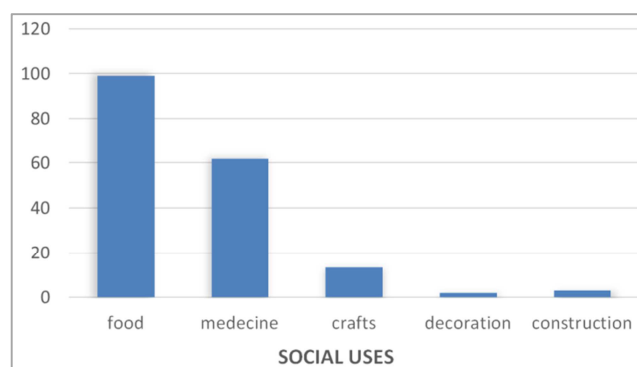


Figure 2. Social uses of *Megaphrynium* leaves.

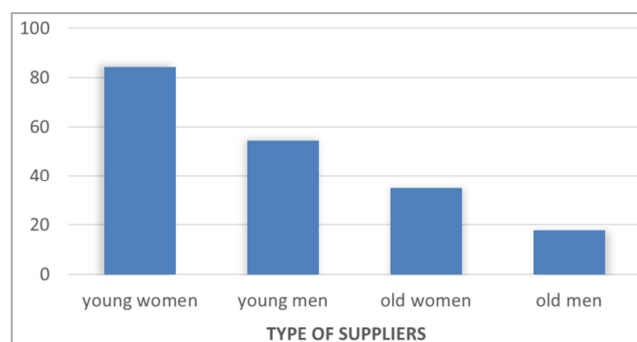


Figure 3. Categories of *Megaphrynium* leaf suppliers.

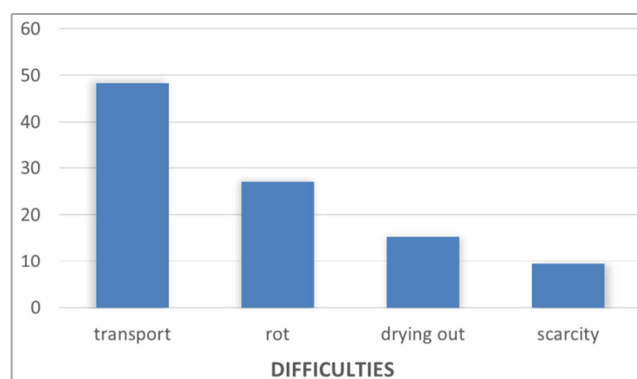


Figure 4. Difficulties in *Megaphrynium* leaves sector.

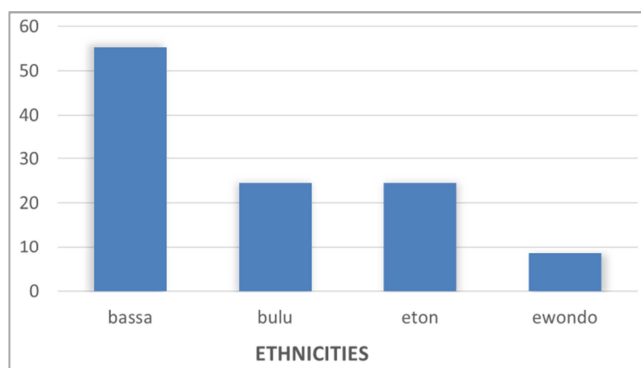


Figure 5. Ethnic groups of *Megaphrynium* leaf suppliers.

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