International Journal of Innovation and Applied Studies
ISSN 2028-9324 Vol. 47 No. 4 Feb. 2026, pp. 392-412

http://www.ijias.issr-journals.org/

Ethnobotanical survey of wild food plants sold in the main markets of Bangui in the Central African Republic

WOROWOUNGA Xavier[1], MADIAPEVO Stéphane Nazaire[2], NDOTAR Michel[3], MANDAGO Jean Bedel[3], and SYMBOLI Olivia[1]

[1]Laboratory of Analysis, Architecture and Reactivity of Natural Substances (LAARSN), Central African Republic

[2]Faculty of Sciences, University of Bangui, BP 908, Central African Republic

[3]Ecole Normale Supérieure, Central African Republic

ABSTRACT: The objective of this study is to understand the diversity of edible wild species sold on the markets of Bangui. To do this, ethnobotanical surveys on the marketing of these resources were carried out from September to December 2023 with 150 sellers installed in six popular markets in Bangui. In total, 86 plant species have been recorded distributed in 69 genera and 41 different families. The analysis of the results showed that the Leguminosae family is the richest (8 species); fruits (68.43%) and leaves (22.12%) are the most sold plant organs; edible fruits (45.16%) remain the most predominant category of uses; these species are mainly trees (55.83%) and are more present in forest ecosystems (52.33%). It also appears that these wild food plants were not only consumed for nutritional needs but also for the traditional treatment of 45 pathologies. These results demonstrate that there is still a high diversity of spontaneous food species in the Central African Republic. Given the dual nutritional and therapeutic interest of these resources, and also in the face of socio-economic issues and the change in food culture in urban areas, the promotion of this precious heritage is necessary and essential. Such an approach would be an opportunity both economically and nutritionally for local populations, particularly women. Also, it would be beneficial to deepen research on the phytochemistry of some spontaneous food plants with medicinal properties in order to achieve the manufacture of improved traditional medicines accessible to all.

KEYWORDS: ethnobotany, wild edible plants, marketing, Central African Republic.

1 INTRODUCTION

Wild plants have since ancient times, played a very important role in human life. they have been used for food, medicines, fiber and other purposes. In Africa in general and in the Central African Republic in particular, wild plants play a vital role in the lives of human beings, occupying a prominent place in the diet and medicine of rural populations [1]. Edible wild plants play a critical role in ensuring food and livelihood security for countless families and communities around the world [2], [3]. All of these biological resources are designated under the generic name of "Non-Wood Forest Products (NTFP) food of plant origin", harvested in the wild in various ecosystems. Many of them are successfully marketed locally, sub-regionally, regionally and even internationally. The different organs of these species (fruits, leaves, bark, stems, roots, tubers) are generally eaten raw. Some are cooked or used as condiments in the preparation of various sauces before being eaten. Wild plants in general contain vitamins, minerals, and iron but also other nutrients essential for health. In addition, they contain organic acid, carbohydrates, proteins and fiber [4], [5], [6], [7]. The most beneficial potential of wild edible plants is their nutritional and therapeutic properties. In the Central African Republic, particularly in Bangui, a diversity of wild plants is consumed and sold in urban markets. The urban population uses these plant genetic resources to diversify their diet and meet their health needs. Some of them, little known, are of great socio-cultural and socio-economic importance. In recent years, we have witnessed a renewed interest in these native species due to their contribution to food security, the household economy and the maintenance of the balance of biological diversity. However, little work has been carried out on their dual nutritional and medical interest even though better knowledge of their diversity, their plant organs used and their socio-cultural considerations is essential for a possible more effective valorization. It is within this framework that this work falls, the overall objective of which is to inventory wild food plants sold and consumed by the population of Bangui. More specifically, it was a question of determining their local taxonomy, their different

uses, the different types of habitat in which they are often harvested and then their characteristics. This article contributes to expanding knowledge on the diversity of wild food plants in the scientific field.

2 METHODOLOGY

2.1 PRESENTATION OF THE STUDY SITE

The study was carried out in the city of Bangui. The study area extends between 4020' and 4025' North latitude and 18030' and 18040'. It covers an area of 80 km^2. The city of Bangui has around 300,000 inhabitants. All ethnic groups are present there but the indigenous ethnic groups are Bantus. Alongside this ethnic diversity are the Muslim community and expatriate foreigners living in this city. The climate is equatorial, characterized by the alternation of two seasons (dry and rainy) distributed equally over six months each. Precipitation is quite abundant with an annual average of 1800 mm. The annual average temperature is 23.8°C. The relief is made up of hills and undulating plains with an altitude of 800 meters. The soil is of the moderately denatured ferralitic type, red sometimes beige. The Bangui city forest is located on a steep slope of Gbazzabangui hill where the altitude is 580 m. The Bangui region is part of the northern zone of the Congolese Guinea forest as a dense humid, semi-evergreen forest with Malvales and Ulmaceae (Celtidaceae).

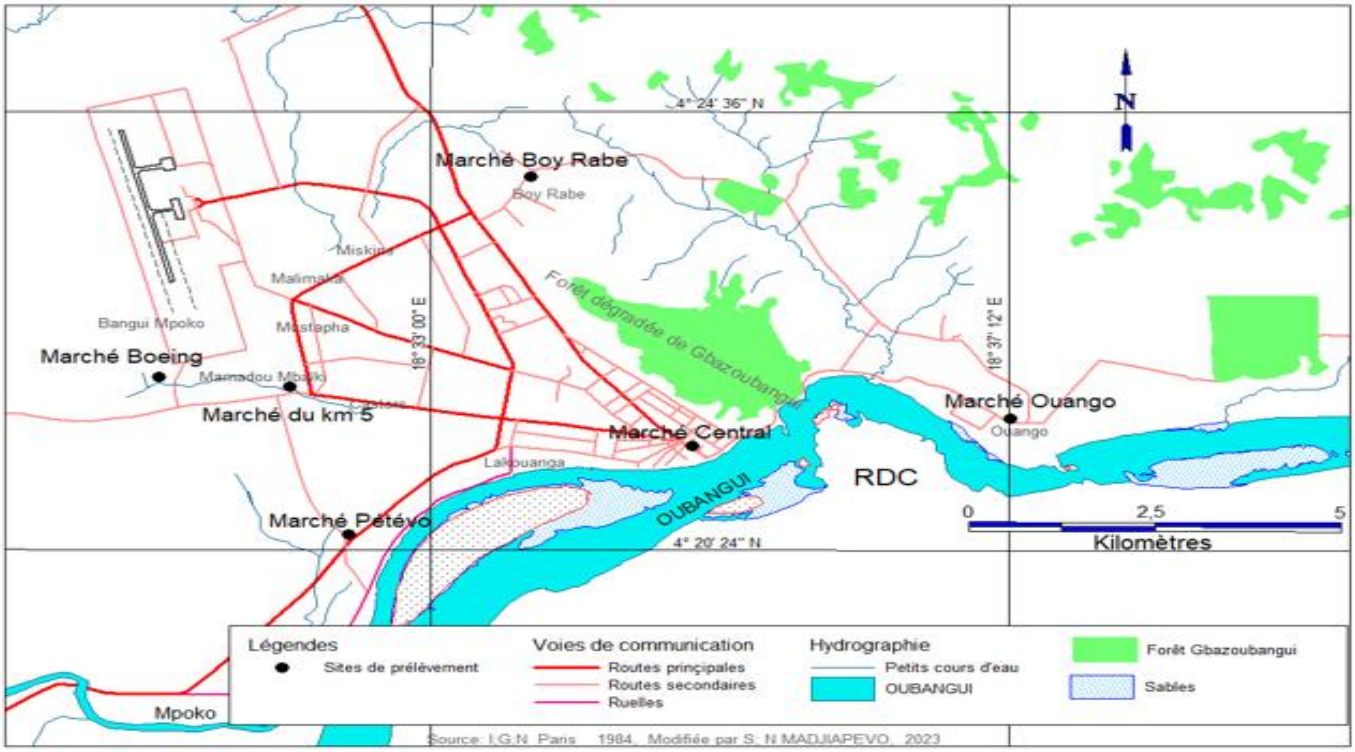

Fig. 1. Location of the main markets surveyed

2.2 TECHNICAL EQUIPMENT

This is a set of classic collection and measurement tools, namely survey sheets for interviews, plastic bags for collecting samples, cameras and for locating geographical positions (GPS), cardboard index cards, old newspapers for making herbaria.

2.3 BIOLOGICAL MATERIAL

It is made up of wild plants used for food sold on the markets of Bangui. In the context of this work, food plants refer to edible plant parts such as "fruits, leaves, stems, bark, roots, tubers", harvested in the wild and sold at home. Raw state or in transformed form. The method used was "the participatory ethnobotanical survey method" using the essential tool dialogue in the local language (sango) [8].

The survey was carried out from September to December 2023 among 150 PSA sellers installed in front of their informal stalls in Bangui markets. This made it possible on the one hand to inventory all the wild plants sold, and on the other hand to collect as much information as possible on their characteristics. The main markets visited are: Km5, Boing, Pétévo, Boy-rabe, Central and Ouango. These markets were selected as locations for investigation based on the economic importance and the abundant sale of wild edible plants. In addition, they are particularly very attractive, which makes them the most popular markets in Bangui where most urban households buy

their supplies. For each plant organ encountered, the vernacular name of the species, the different uses, the harvesting locations, availability, the market on which the organ is sold, the sample and the nature of the product concerned were mentioned. In total, 25 sellers per market were interviewed, i.e. a total of 150 people interviewed for the six markets surveyed.

However, it is important to specify that women were the most solicited during all these surveys because they have knowledge and a special interest in the management of natural resources in terms of food security and marketing. After each field mission, the samples of the organs found were packaged in plastic bags and deposited at the Laboratory of the Ecole Normale Supérieure of the University of Bangui. Photographs of the organs sold were also taken in the markets surveyed in order to assist the botanical identification work. In this same Laboratory, taxonomic identification took place through the spontaneous recognition of species and sometimes by comparison with specimens already described in botanical works [9], [10], [11].

2.4 Analysis Methods

1st Species inventoried

The information collected in the field made it possible to draw up a list of wild species whose organs are edible. These species have been categorized according to botanical families, different types of use, places of harvest, periods of availability. Their characteristics were also taken into consideration in this study, to highlight the nature of sale and the status to which they belong. The presence of these plants according to the markets surveyed was also made in order to highlight common species and identify particularities. All of this data was interpreted and discussed and then avenues for valorizing these plant genetic resources were identified.

2nd Data processing

The data collected in the field were first entered and analyzed using Excel 2010 software. The results were discussed by highlighting the dual interest of PSAs for the population of Bangui in terms of food security and health and then their characteristics.

3 Results

3.1 Profile Of Respondents

This study was carried out among 150 PSA traders located in six popular markets in Bangui. Figure 2 summarizes the data on the profile of the respondents. Figure 2A gives the distribution of respondents by gender. It appears from this figure that women were in the majority (83.33%) compared to 16.67% for men.

Figure 2B gives the distribution of respondents according to age. This figure shows the age groups from 18 to 50 years at most with the predominance among people aged 31 - 50 years (68.67) followed respectively by people aged 18 - 30 years (18.67%) and finally 50 years at most (12.66%). Figure 2C gives the distribution of respondents according to level of education. As we can observe in this figure, the majority of PSA traders have a level of secondary education (50.67%) followed respectively by those with a level of primary education (27.33%), university (14.00 %) and finally those not in school (6%). Figure 2D gives the distribution of respondents according to their experiences in the NTFP sector. Looking at Figure 2D, it appears that respondents with experience of 2 to 10 years represent 43.33% followed respectively by those with experience of 15 to 20 years (20.67%); 11 to 14 years old (16.67%); 21 to 30 years old (12.67%); and finally those with experience of more than 31 years represent 6.66%.

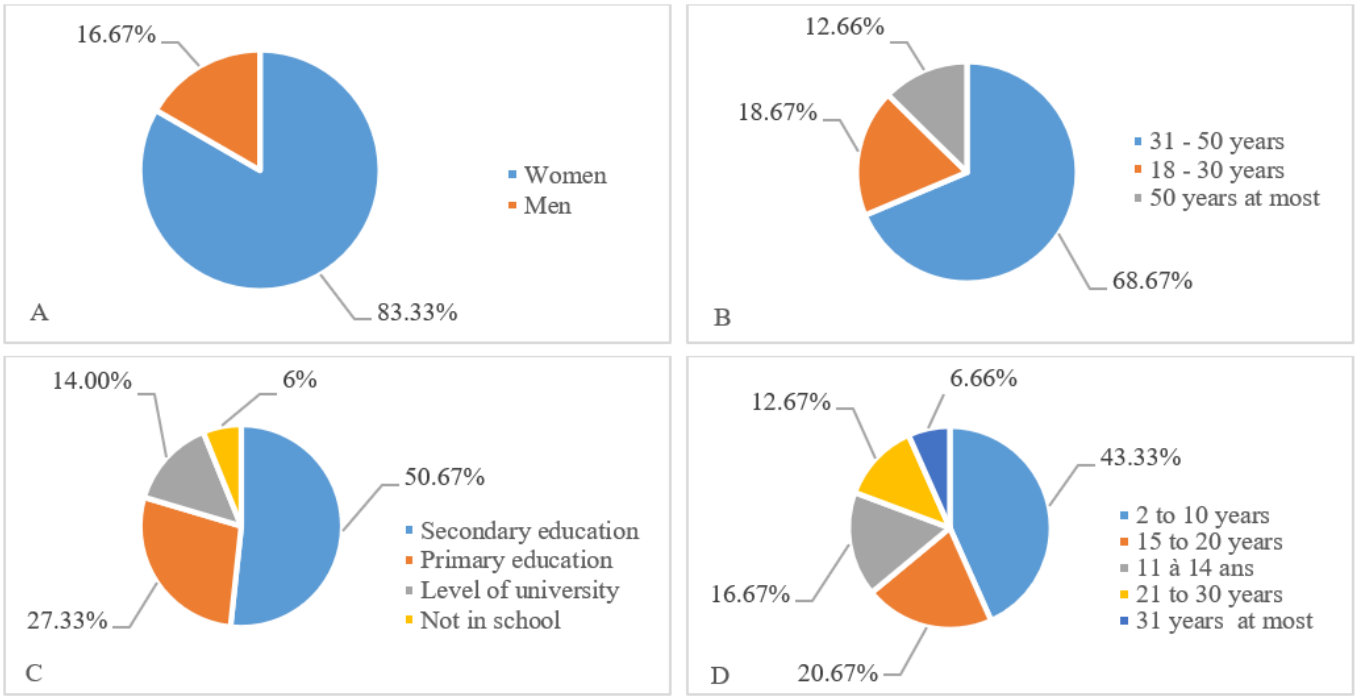

Fig. 2. Distribution of respondents according to: (A) gender, (B) age, (C) level of education), (D) experience in the NTFP sector

3.2 FORIST DIVERSITY

In total, 86 species have been inventoried, distributed in 69 genera and 41 different families. Among these species, 85 have been determined at the specific level, 01 at the generic level. Hence there is an abundance and high diversity of PSA sold in the markets of Bangui. This list is obviously not complete, but nevertheless contributes to increasing knowledge on the diversity of wild food plants in the Central African Republic. The following figure 3 shows the specific diversity of the botanical families identified.

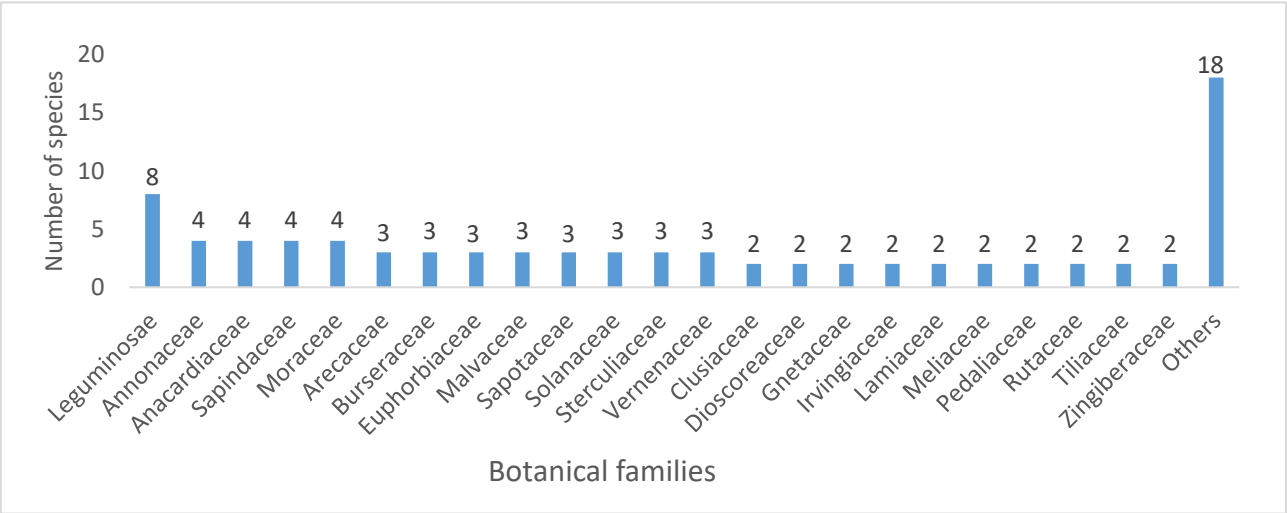

Fig. 3. Specific diversity of the botanical families recorded

It appears from this figure 3 that the Leguminosae family (Fabaceae, Caesalpiniaceae, Mimosaseae) is the richest (8 species) followed by Annonacea, Anacardiaceae, Sapindaceae and Moraceae with 4 species each, then Arecaceae, Burseraceae, Euphorbiaceae, Malvaceae, Sapotaceae, Solanaceae, Verbenaceae and Sterculiaceae with 3 species respectively then Clusiaceae, Dioscoreaceae, Gnetaceae, Irvingiaceae, Lamiaceae, Pedaliaceae, Rutaceae, Tiliaceae, Zingiberaceae with 2 species each. The remaining 18 families are each represented by 1 species. The wild plants recorded constitute only part of the diversity of all plants consumed in the Central African Republic. These specimens are essential from both a nutritional and therapeutic point of view for the urban community of Bangui and present a certain commercial value on the markets surveyed. Table 1 which follows gives the alphabetical list of plants recorded and provides information on the organs sold, the category of uses, the morphological type and the habitat of each species.

Table 1. Botanical diversity and ecology of identified PSAs

Scientific name	Family	Vernacular names	Organs sold and party consumed	categories of use	Habitats	Morphological types
Adansonia digitata L.	Bombacaeae	Guila (Issongo)	Fruits (seeds)	Oil	Savannah	Tree
Aframomum citratum (Pereira ex Oliv. et Hanb.) K. Shum.	Zingiberaceae	Nonga (Zandé) ; Tondo (Nzakara)	Fruits (seeds)	Edible fruit	Savannah	Grass
Aframomum melegueta. (Rosc.K. Schum)	Zingiberaceae	Tondo (Issongo); Kopia (Banda, Gbaya); Tépa (Boffi)	Fruits (seeds)	Edible fruit	Forest, Savannah	Grass
Afrostyrax lepidophyllus Mildbr	Styraceae	Diémbé (Issongo) ;Yémbé (Ngbaka) ;Tendiba (Banda)	Fruits (pulp)	Condiment	Forest	Tree
Allanblackia floribunda Oliv.	Clusiaceae	Moboaba (Issongo) ; Mbounzo (Gbaya)	Fruits (seeds)	Oil	Forest	Tree
Amaranthus spinosus L.	Amaranthaceae	Gboudou (Banda) ; Lungu (Ngbandi)	Leaves	Vegetable	Fallow , field	Grass
Annona senegalensis Pers.	Annonaceae	Bagara (Zandé), Bagara (Banda) ; Bokoto (Nzakara), Sorè (Gbaya)	Fruits (pulp)	Edible fruit	Savannah	Shrub
Anonidium mannii (Oliv.)	Annonaceae	Mobeli-bombi (Ngbaka) ; Bai (Issongo)	Fruits (pulp)	Edible fruit	Forest	Tree
Antidesma venosum Tul.	Euporbiaceae	Zobidà (Gbaya); Dadèhu(Ngbadi)	Fruits (pulp)	Edible fruit	Forest	Tree
Antrocaryon klameanum Pierre	Anacardiaceae.	Manguéngué (Issongo) ; Gongou (gbaya).	Fruits (pulp)	Edible fruit	Forest, fallow	Tree
Antrocaryon micraster A. Chev. & Guillaumin.	Anarcardiaceae	Ngogue (Issongo) ; Mboutou (Gbaya)	Fruits (pulp)	Edible fruit	Forest, fallow	Tree
Balanites aegyptiaca Dawe & Sprague Guin	Balanitaceae	Zama (Banda)	Fruits (pulp)	Edible fruit	Steppe	Tree
Beilschmiedia anacardioides (Engler & Krause) Rob. et Wilcz.	Lauraceae	Nguiriki (Mandjia) ; Nguiriki (Banda) ; Ngala (Gbaya)	Fruits (seed)	Condiment	Forest	Tree
Blighia sapida Koenig	Sapindaceae	Nguéré (Gbaya); Molotoko (Issongo); Gbassi (Banda)	Fruits (arille)	Edible fruit	Forest	Tree
			Fruits (seeds)	Condiment		
Borassus aethiopum Mart.	Arecaceae	Kozo (Banda) ; Kolongo (Ngbandji) ; Kpô (Issongo)	Fruits (pulp)	Edible fruit	Savannah	Tree
Cajanus cajan (L.) Millsp.	Leguminosae		Fruits (seeds)	Vegetable	Fallow, field	Shrub
Caloncoba glauca P. Beau. Gilg	Flacourtiaceae	Dolo (Issongo) ; Begalo (Banda) ; Kuma (Zandé) ; Ukuru (Banda) ; Kulè (Nzakara)	Fruits (pulp)	Edible fruit	Forest	Tree
Canarium schweinfurthii Engl.	Burseraceae	Motoua (Issongo) Gbéni (Banda) ; Gbari (Boffi) ; Obwé (Gbaya) Mbili (Zandé); Beso (Zandé)	Fruits (pulp)	Edible fruit	Forest	Tree
Capsicum frutescens Linn.	Solanaceae .	Doôngo (Nbaka) ; Ndogué wéé (Gbaya) ; Sambia (Ngbandi) ; Rari (Zandé) ; Lambu (Nzakara)	Fruits	Condiment	Forest, fallow, field	Shrub
Carapa procera DC.	Meliaceae	Pesi (Issongo) ; Ngovo (Gbaya)	Fruits (seeds)	Edible fruit	Forest	Tree
Cassia occidentalis L.	Leguminosae	Kenkéliba (Issongo) ; Kabodo (Ali)	Roots	Aphrodisiac	Savannah, field	Grass
Cassia tora L.	Leguminosae	Kotomaféré (Boffi)	Fruits (seeds)	Coffee	Savannah, field	Grass
Ceratotheca sesamoïdes	Pedaliaceae	Mbulu (Gbaya) ; Ndandé (Zandé)	Leaves	Vegetable	Fallow, field	Grass
Chrysophyllum giganteum A. Chev.	Sapotaceae	Moboubou (Issongo) ; Bambou (Ngbaka) ; Mboulou (Boffi)	Fruits (pulp)	Edible fruit	Forest	Tree

Cnestis ferruginea DC.	Connaraceae	Badani (Zandé) ; Kpenguwa (Nzakara)	Fruits (pulp)	Edible fruit	Forest, fallow	Liana
Cola acuminata (P. Beauv.) Schott et Endl.	Sterculiaceae	Kukuruku (Zandé) ; Kukuuku (Nzakara)	Fruits (seed)	Edible fruit	Forest	Shrub
Cola nitida (Vent.) Schott &Endl.	Sterculiaceae	Mologbovo (Issongo) ; Goro (Sango) ; Boma (Ngbandi)	Fruits (seed)	Edible fruit	Forest	Shrub
Cola pachycarpa K. Schum.	Sterculiaceae	Kinini dèdèdè (Ngbaka)	Fruits (arille)	Edible fruit	Forest	Shrub
Corchorus aestuans L.	Tiliaceae	Goussa (Banda) ; Déni (Nbgaka) ; Venè (Ngbandi)	Leaves	Vegetable	Fallow, field	Grass
Corchorus olitorius L.	Tiliaceae	Goussa (Banda) ; Morombida (Zandé) ; Kpulè (Nzakara)	Leaves	Vegetable	Fallow, field	Grass
Costus afer Ker gawl	Costaceae	Ndanga – ndogo (Ngbaka) ; Kpanga (Ngbandi) ; Ngonyo (Nzakara)	Stems (sap)	Condiment	Forest	Grass
Coula edulis (G.Dan.) H.J.Lan.	Olacaceae	Mofoufou (Issongo)	Fruits (arille)	Edible fruit	Forest	Tree
Dacryodes edulis (G. Don.) H. J. Lam.	Burseraceae	Molotoukoulou (Issongo).	Fruits (pulp)	Edible fruit	Forest, fallow	Tree
Dacryodes macrophylla H. J. Lam.	Burseraceae	Toukouou (Issongo)	Fruits (pulp)	Edible fruit	Forest, fallow	Tree
Dialum guineense Wil.	Leguminosae	Magainzokou (Issongo)	Fruits (pulp)	Edible fruit	Forest	Tree
Dioscorea bulbifera L.	Disocoreaceae	Koré (Boffi) ; Ngbakoutou (Boffi) ; Legwui (Nzakara) ; Tunga (Nzakara)	Tubers	Vegetable	Forest	Liana
Dioscorea munitiflora Engl.	Disocoreaceae	Bâ (Ngbaka) ;Golo (Boffi) ; Korè (Gbaya) Nzakabè (Ngbaka)	Tubers	Vegetable	Forest	Liana
Dorstenia brieyi De Wild.	Moraceae	Nguézédé (Issongo)	Leaves	Vegetable	Forest	Shrub
Dorstenia scaphigera Bureau	Moraceae	Gbin (Issongo)	Leaves	Vegetable	Forest	Grass
Elaeis guineensis Jacq.	Arecaceae	Mbia (Nbgaka) ; Mbima (Banda) ; Mbourou (Ngbandi)	Fruits (pulp)	Condiment	Forest, fallow, field	Tree
		Lé mbia (Nbgaka) ; Mbilo (Nzakara)	Fruits (seeds)	Oil		
		Kangoya (Nbgaka)	Sap	Drink		
Fagara heitzii De Wild Cyuin.	Rutaceae	Mbongo (Nbgaka) ; Taki (Ngbandi)	Leaves (poudre)	Condiment	Forest	Tree
Fagara macrophylla (Oliv.) Engl. Var. Cyuin.	Rutaceae	Bandobé (Nbgaka) ; A – ndègè (Nzakara)	Leaves (poudre)	Condiment	Forest	Tree
Ficus sp.	Moraceae	Caracas (Nbgaka) ; A – kpûta (Nzakara) ; Zako (Gbaya)	Fruits (pulp)	Edible fruit	Forest	Tree
Garcinia polyantha Oliv.	Clusiaceae	Gbadani (Issongo) ; Ndâ (Ngbandi)	Fruits (seeds)	Edible fruit	Forest	Tree
Gnetum africanum Welw.	Gnetaceae	Koko (Nbgaka), Poto (Gbaya) ; Koko (Nzakara) ; Koko (Ngbandi)	Leaves	Vegetable	Forest	Liana
Gnetum bucholzianum Welw.	Gnetaceae	Kani (Nbgaka) ; Koko (Banda)	Leaves	Vegetable	Forest	Liana
Gynandropsis ginandra (L.) Briq	Capparaceae	Kini (Gbougou) ; Ngalanda (Zandé) ; Ngalanda (Nzakara) ; Sae yuma (Gbaya)	Leaves	Vegetable	Fallow, field	Grass
Hibiscus acetosella Welw. Exttiern.	Malvaceae	Zima (Issongo) ; Zima (Gbaya)	Leaves	Vegetable	Forest, fallow	Shrub
Hibiscus asper Hood	Malvaceae	Koumba (Gbaya) ; Numba (Zandé)	Leaves	Vegetable	Forest, fallow	Shrub
Hibiscus surattensis L.	Malvaceae	Klakanzi (Nbgaka) ; Ngbè (Ngbandi)	Leaves	Vegetable	Fallow, field	Grass
			Fruits	Juice		

Hilleria latifolia (Lam.) Walter	Phytolacaceae	Soumba (Boffi)	Leaves	Vegetable	Forest	Shrub
Irvingia excelsa Mildbr.,	Irvingiaceae	Pavo (Issongo)	Fruits (almonds)	Condiment	Forest	Tree
Irvingia gabonensis (Aubry – Leconte ex O' Rorke)Baill.	Irvingiaceae	Molomossombo (Issongo)	Fruits (almonds)	Condiment	Forest	Tree
Khaya anthotheca	Meliaceae	Dèkè (Ngbaka)	Barks	Ferment	Forest	Tree
Landolphia owariensis P. Beaux.	Apocynaceae	Done (Issongo) ; Ouvo (Gbaya) ;Wawala (Nzakara) ; Banga (Banda)	Fruits (seeds)	Edible fruit	Forest, Savannah	Liana
Lippia adoensis Hochst.	Verbenaceae	Gouwin (Gbaya) ; Nguridu (Ngbandi) ; Gbakalagba (Nzakara)	Leaves	Tea	Forest	Grass
Monodora myristica (Graertm.) Dunal.	Annonaceae	Nzingo (Nbgaka)	Fruits (seeds)	Condiment	Forest	Tree
Myrianthus arboreus P.Beauv.,	Cecropiaceae	Modiki (Issongo) ; Ouvo (Gbaya) ; Léngata (Ngbaka) ; Ngbénzo (Nzakara) ; Ngbolo (Ngbandi) ; Kogbo (Banda)	Fruits (seeds)	Edible fruit	Forest, fallow	Tree
Nauclea diderrichii De Wild.	Rubiaceae	Kidomeko (Issongo)	Fruits (pulp)	Edible fruit	Forest	Tree
Ocinum basilicum L.	Lamiaceae	Ngbanda (Nbgaka) ; Luumba (Ngbandi)	Leaves	Condiment	Forest, fallow, field	Shrub
Ocinum gratissimum L.	Lamiaceae	Matété (Gbaya); Tété (Ngbandi)	Leaves	Condiment	Forest, fallow, field	Shrub
Pancovia harmisiana Gil.	Sapindaceae	Gbézélago (Issongo) ; Ngongo (Banda)	Fruits (seeds)	Condiment	Forest	Tree
Pancovia laurentii (De Wild.) Gilg ex De Wild.	Sapindaceae	Gbezelago(Issongo);Ngoyo (Gbaya)	Fruits (seeds)	Edible fruit	Forest	Tree
Panda oleosa Pierre	Pandaceae	Ngango (Boffi) ; Payô (Aka)	Fruits (seeds)	Condiment	Forest	Tree
Parkia biglobosa (Jacq.) Benth.	Leguminosae	Dadawoua (Mandjia) ; Abeimbo (Zandé) ; Kombé (Banda)	Fruits (pulp)	Edible fruit	Savannah	Tree
			Fruits (seeds)	Condiment		
Pentaclethra macrophylla Benth.	Leguminosae	Gbagba (Issongo) ; Mbalanga (Ngbaka) ; Makumba (Nzakara)	Fruits (seeds)	Condiment	Forest	Tree
Piper guineense Schumach. &Thonn.	Piperaceae	Ketsou (Lingala) ; Nguéréto (Ngbaka) ; Gadon (Gbaya); Diyo (Banda) ; Siaka (Ngbandi) ; Mevulu (Nzakara) ; Nawada (Zandé)	Fruits	Condiment	Forest	Liana
Pseudospondias microcarpa (A. Rich.) Engl.	Anacardiaceae	Mossaka bouma (Issongo) ; Ngubi (Banda) ; Bobinso (Nzakara)	Fruits (pulp)	Edible fruit	Forest	Tree
Raphia regalis	Arecaceae	Péké (Ngbaka); Bulu (Nzakara) ; Ndègè (Gbaya)	Sap	Drink	Rainforest	Tree
Ricinodendron heudelotii (Baill.) Pierre et Pax.	Euphorbiaceae	Mboboko (Issongo) ; Gopo (Ngbaka)	Fruits (pulp)	Edible fruit	Forest, fallow	Tree
Sesanum radiatum Schum & Thom.	Pedaliaceae	Voko sindji (Ngbandji)	Fruit (seeds)	Condiment	Fallow, field	Grass
Solanum nigrum Muller.	Solanaceæ	Ndoki (Ngbaka) ; Sisa (Ngbaka) ; Sayè (Gbaya)	Leaves	Vegetable	Fallow, field	Grass
Solanum torvum SW	Solanaceae	Taindo (Gbaya)	Leaves	Vegetable	Fallow, field	Shrub
Spondias cytherea Sonner	Anacardiaceae	Kunda (Ngbandji)	Fruits (pulp)	Edible fruit	Forest, fallow	Tree

Synsepalum stipulatum (Radlk) Engl.	Sapotaceae	Mosseteké (Issongo) ; Galangba (Gbaya)	Fruits (pulp)	Edible fruit	Forest	Tree
Talinum triangulare L.	Portulacaceae	Magblet mozewa (Ngbaka) ; Moyégbé (Issongo) ; Singo (Ngbandi)	Leaves	Vegetable	Forest, fallow	Grass
Tamarindus indica L.	Leguminosae	Wassa (Ngbandi) ; A – banza (Zandé) ; Banga (Nzakara)	Fruits (pulp)	Edible fruit	Savannah	Tree
Tetrapleura tetraptera (Schum. & Thonn.) Taub.	Leguminosae	Bassala (Issongo)	Fruits	Condiment	Forest	Tree
Treculia africana Decaisne	Moraceae	Poussa (Issongo) ; A – pûso (Zandé) ; Zilo (Gbaya) ; Kpusa (Ngbandi)	Fruits (seeds)	Edible fruit	Forest	Tree
Uapaca guineensis Müll. Arg.	Euphorbiaceae	Sewgui (Issongo) ; Donzo (Nzakara) ; Donzo (Banda)	Fruits (pulp)	Edible fruit	Forest	Tree
Vitellaria paradoxa C. F. Gaertn.	Sapotaceae	Balawa (sango) ; Dobozon (Gbaya)	Fruits (pulp)	Edible fruit	Savannah	Tree
			Fruits (seeds)	Oil		
Vitex doniana Sweet	Verbenaceae	Léngoungou (Ngbaka) ; Biri (Banda) ; Ngungu (Nzakara) ; Bungu (Ngbandi)	Fruits (pulp)	Edible fruit	Savannah	Shrub
Vitex simplicifolia Oliv.	Verbenaceae	Mbringo (Ngbaka) ; Bungu (Ngbandi)	Fruits (pulp)	Edible fruit	Savannah	Shrub
Xylopia aetiopica (Dunal) A. Rich.	Annonaceae	Mazindi (Sango) ; Nzangué (Issongo) ; Mazindi (Banda) ; Kusua (Nzakara)	Fruits	Edible fruit	Forest	Tree
Zanha golungensis Hiern.	Sapindaceae	Ndokéré (Gbaya) ; Abassa (Zandé)	Fruits (pulp)	Edible fruit	Forest	Tree
Ziziphus mauritiana Engl.	Rhamnaceae	Djabi (Peul) ; Magaria (Haoussa)	Fruits (pulp)	Edible fruit	Steppe	Shrub

3.2.1 DIVERSITIES OF PLANT ORGANS

Eight types of organs that are actually edible and sold have been identified. These are: fruits, leaves, stems, bark, root, sap, tubers and germ. The number of organs of the PSAs sold varies from 1 to 3. The palm (*Elaeis guineensis*) and the palm tree (*Borassus aethiopum*) are the taxa with the most organs sold with three products each. These two species are followed by *Blighia sapîda, Hibiscus surattensis, Parkia biglobosa Tamarindus indica* and *Vitellaria paradoxa* with respectively 2 products each. The other remaining species are represented by one product each. Figure 4 provides information on the diversity of plant organs sold as food in Bangui markets.

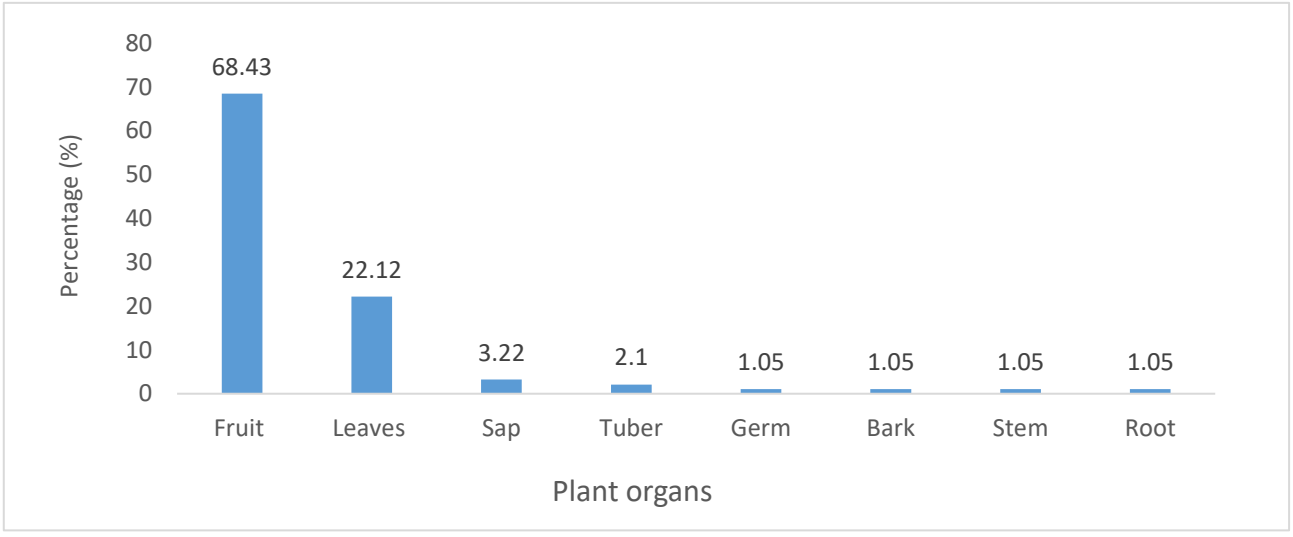

Fig. 4. Plant organs sold in Bangui markets

It appears from this figure that fruits are the most sold (68.43%), followed respectively by leaves (22.12%), then sap (3.22%), then tubers (2.10%). The other organs, namely the germ, the bark, the stem and the root are the least represented with respectively 1.05% each. Overall, the interest in fruits is explained by the fact that these plant organs are consumed in different forms. They are consumed either for their pulp, the seed, the nut, the juice or the whole fruit. As for the leaves, they are almost all used in the preparation of sauce with the exception of *Lippia adoensis* whose leaves are used to prepare tea. All the leaves are therefore cooked before being consumed.

3.2.2 CATEGORY OF USES

Figure 5 gives the categories of use of the inventoried species.

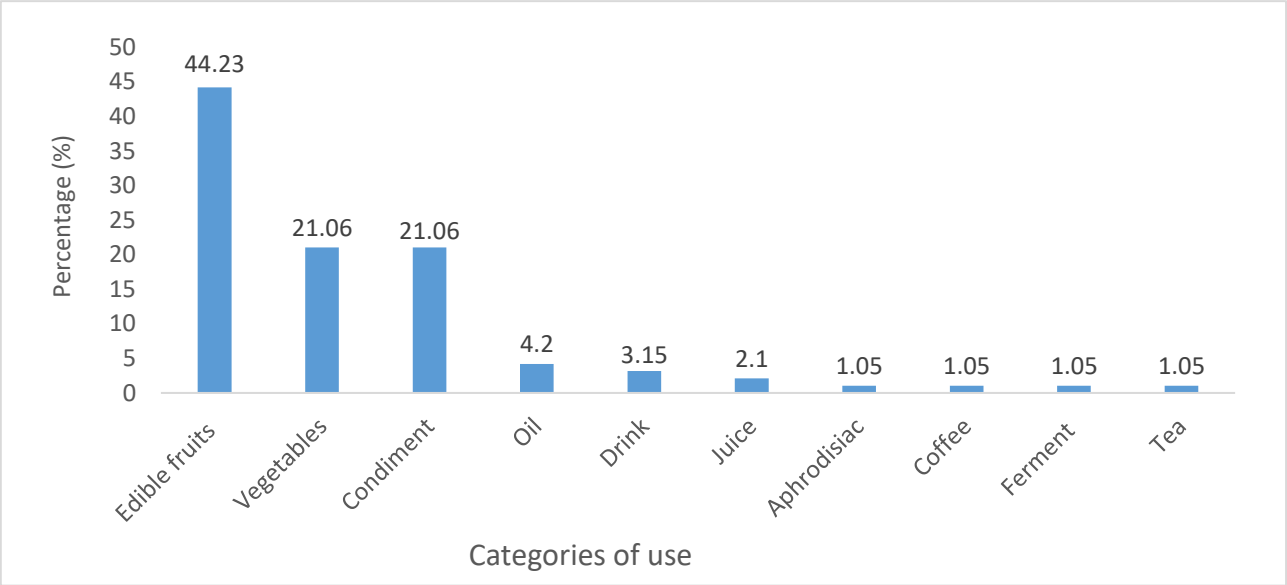

Fig. 5. Types of uses of PSAs identified

As we can observe in this figure, edible fruits (44.23%) are the most predominant, followed by vegetables and condiments with a fair centesimal proportion of 21.06% each, then oil (4.20) and the drink (3.15) then the juice (2.10). The other remaining categories, namely aphrodisiac, coffee, ferment and tea, are the least represented with respectively 1.05% each.

3.2.3 MORPHOLOGICAL TYPES

Figure 6 gives the different morphological types of the inventoried species.

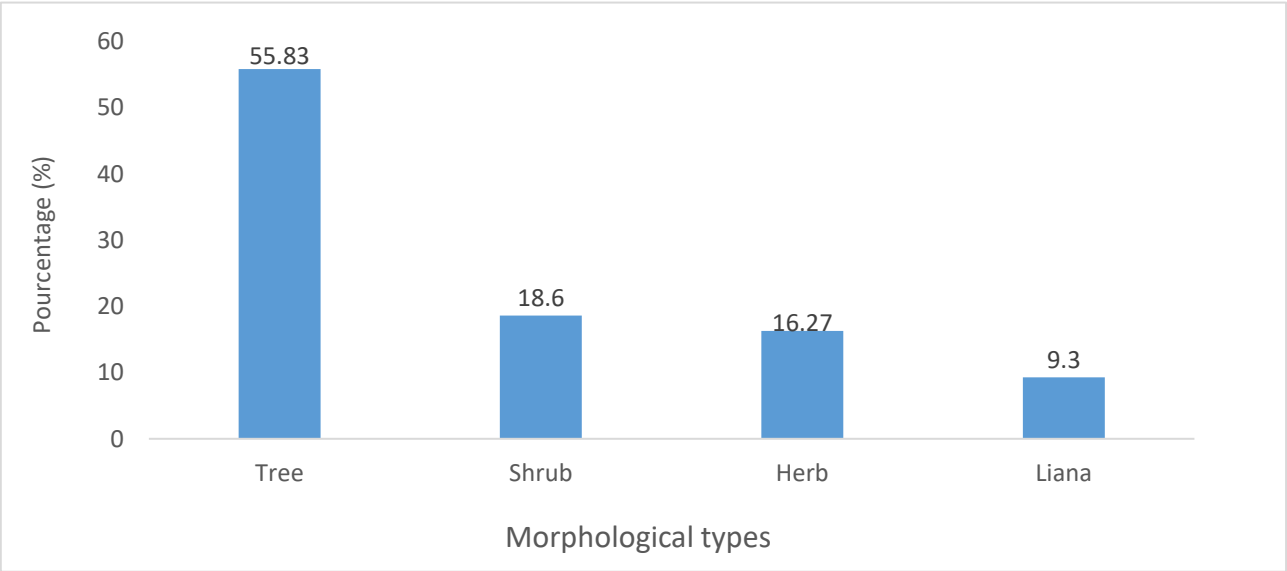

Fig. 6. Spectrum of morphological types of listed species

It appears from Figure 6 that the listed food flora consists of trees (55.83%) followed respectively by shrubs (18.60%), grass (16.27%) and lianas (9.30%). Consequently, trees produce more edible organs for the population of Bangui than other morphological types.

3.2.4 HABITATS

The different ecological environments inhabiting the inventoried species are presented in Figure 7.

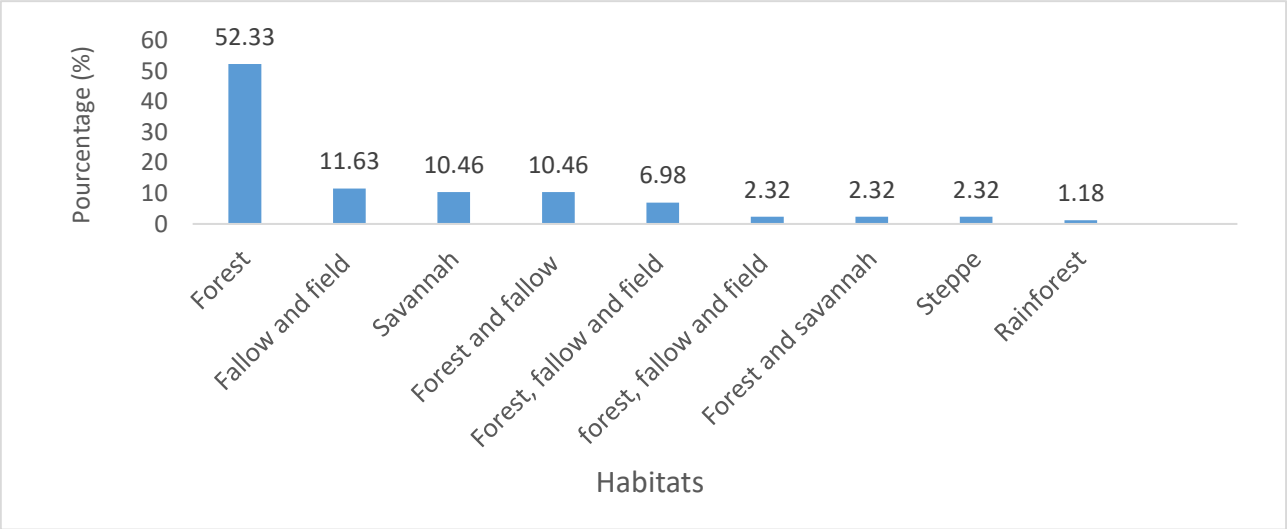

Fig. 7. Habitats of inventoried species

It appears from this figure 7 that nearly 52.33% of the inventoried species come from forest ecosystems. Fallow and field species represent 11.63%. They are followed by savannah species then those of forest and fallow with a balanced percentage of 10.46% each. These are followed by forest, fallow and field species (6.98%). Forest and savannah, savannah and field species and then steppe species are poorly represented with a balanced centesimal proportion of 2.32% each. However, only one species (1.18%) was identified as a specific rainforest species (*Raphia regalis*). Consequently, the forest supplies more PSA to the population of Bangui than other ecological environments. To this end, the forest is therefore of capital importance both from a nutritional and economic point of view for the entire Central African population, and more particularly for that of Bangui.

3.2.5 MEDICAL BENEFIT OF SOME IDENTIFIED PSA

Some inventoried species are not only food, but they are also used in traditional medicine to treat certain diseases. The medicinal value of these species is recorded in Table 2 below.

Table 2. Medicinal value of some identified PSA

N°	Species	Organs used	Diseases
1	*Aframomum melegueta*	Fruits	Piles, toux, angina, cold, malaria
2	*Borassus aethiopum*	Roots	Bronchitis, throut sickness
3	*Capsicum frutescens*	Fruits Leaves	Parasitosis, headache, enema Sprain, cold
4	*Carapa procera*	Fruits (seeds)	Cold
5	*Cassia occidentalis*	Leaves	Parasitosis, yellow fever, icterus, mycosis, hepatitis, abortion, headache, malaria, skin affections
6	*Ceiba pentandra*	Barks	Rachitis, aphrodisiac, cough, malaria, diarrhoea, tooth decay
7	*Corchorus olitorius*	Leaves	Typhoid, high blood pressure
8	*Fagara macrophylla*	Leaves	Biliara hepatilis, tiredness
9	*Gnetum afrcanum*	Leaves	Piles, high blood pressure, rate dilatation, throut sickness, nausea
10	*Gnetum buchozianum*	Leaves	Mycosis, boil, constipation, poison unit
11	*Hibiscus acetosella*	Leaves	Boil
12	*Hibiscus asper*	Fruits	Diabetes
13	*Hibiscus surattensis*	Leaves	Anemia
14	*Irvingia gabomensis*	Fruits (almonds) Barks	Brulurs Diarrhoea
15	*Lippia multiflora*	Leaves	Digestive problems, obésity, high blood pressure
16	*Monodra myristica*	Fruits (seeds)	Stomoch sickness
17	*Myrianthus arboreus*	Leaves	Dermatosis
18	*Ocimum basilicum*	Leaves	Cough, headache, parasitosis, cold, buccal affections
19	*Parkia biglobosa*	Fruits (seeds)	Constipation, yellow problems, rachitisme, icterus
20	*Solanum nigrum*	Leaves	Sick eyes, ictère, diarrhoea, throut sickness
21	*Talinum triangulare*	Leaves	Anémia, frontalier anomalie, furoncle, rachitis, asma, constipation, dermatosis
22	*Tamarindus indica*	Leaves Barks	Yellow fever, diarrhoea Asma, cough, hepatis, diabetes
23	*Tetrapelure tetraptera*	Fruits	Digestive problems, bronchitis
24	*Xylopia aethiopica*	Fruits	Asma

The results of this table 2 above show that 24 species of PSA have medicinal virtues in addition to their nutritional value. They treat 45 common illnesses. These 45 pathologies are treated mainly by the leaf which constitutes the most used plant organ. The interest in leaves finds an explanation in the fact that these organs are the seat par excellence of biosynthesis and even of the storage of secondary metabolisms responsible for the pharmaco-biological properties of the plant [12]. According to Bitsindou [13], the frequency of use of the leaves in traditional medicine is due to the ease of harvesting. The results also show that coughs and sore throats are the illnesses most treated by these 24 plant species. In addition, the PSAs treating more diseases include *Cassia occidentalis* (9 pathologies), *Talinum triangulare* (7 pathologies), *Ocimum basilicum* and *Ceiba pentandra* (6 pathologies each) and finally *Gnetum africanum* (5 pathologies).

3.2.6 ETHNOTAXONOMY

For 21 recorded species, the literal meaning of vernacular names was reported during our surveys. Vernacular names can be descriptions, uses, properties of the plant or a locality. Important information was then derived from the literal meaning of these 21 plants listed.

REFERENCE TO THERAPEUTIC USE

The species *Tetrapleura tetraptera* is locally called "Bassala" in Issongo (the thing that hunts snakes). Their strong-smelling dried fruits are used as repellents in homes and fields to chase away snakes. The leaves of *Ocimum basilicum,* the leaves of which are used in friction on conviction and headache are common, are called "Ngbanda" in Ngbaka. The leaves of *Ocimum gratissimum* provide a fragrant and very popular herbal tea; which earned it the name "Matété" in Gbaya. Likewise, the *Lippia adoensis* species, whose leaves are infused with medicinal plants to make herbal tea, is called "Ngouwin" in Gbaya. As for the species, *Cassia occidentalis* called "Kabodo", it is its

aphrodisiac property which earned it this name. The *Cola nitida* species called "Bouma" which means fatigue because its seeds consumed as an aphrodisiac fight against fatigue.

REFERENCES TO MORPHOLOGICAL CHARACTERS OF PLANTS

References to morphological characters are found for certain vernacular names of the PSA identified. The name takes into account the characteristics of the organ used. The fruit of the species *Annonidium mannii* resembles the fruits of cultivated soursop (*Annona muricata*) whose pulp is eaten raw. In this type of reference, the rapprochement of these two taxa is based on the resemblance (taxon similar to the edible fruits of the soursop tree, with a very sweet flavor). These two species have similar odors. Hence its vernacular name ''Mobeli bombi'' in Ngbaka.

COMBINATION OF REFERENCE TO FOOD USE AND MORPHOLOGICAL CHARACTERS

The name plant can refer to an animal but, from different angles. This is the case of *Myrianthus arboreus* which is called "modiki". The term "mo" refers to the fruits of the plant and "diki" literally means monkey.

REFERENCE TO MORPHOLOGY AND TO ECOLOGICAL CRITERIA

The fruit of *Aframamum melangueta* has the appearance of a bottle designated by the non-local "Tondo". To differentiate this species from other varieties of *Aframamum* with low acidity and light red color, we use the name "Kopia" which literally means sweet fruit of bright red color. Reference to morphology is made in certain cases. The typical example is the species, *Ficus* sp., locally called "Karacas" because of the roughness of its leaves. Likewise, *Ricinodendron heudelotii* is designated by "Mboboko" because its compound and digitate leaves are reminiscent of the fingers of the hand.

The ecology or habitat of the plant is also associated with the name of the plant. This is particularly the case for various wild fruits. The *Vitellaria paradoxa* species is widespread in the savannah. Its name "Balawa" refers to this ecology, that is to say savannah shea. The *Vitex doniana* species is found mainly in the savannah. Its name "Léngoungou" literally refers to this ecology. Likewise, *Afrostyrax lepidophyllus* is a typical forest species whose fruits serve as a food condiment in various sauces. Its local domination "Yémbé" alludes to its forest ecological environment.

OTHER TYPES OF REFERENCES

References to sociocultural concepts were also noted. Matété is the name reserved for *Ocimum basilicum* whose leaves are used to ward off evil spirits that appear at night. Likewise, the name voko sindji (*Sesanum radiatum*) comes from the fact that the use of the seeds keeps away evil spirits at night. The name *Canarium schweifurthii*, ''Motuou'', comes from the fact that the burned resin is often used in traditional ritual practices. There are other names referring to the qualities or properties of the plant, particularly in the case of *Tamarindus indica*, designated by ''Wassa'' in relation to its sweet, tangy taste of the fruits. Likewise, *Antrocaryon micraster* is called ''manguengué'', that is to say a fruit with a tangy and sweet taste. This would explain the use of these two fruits as edible fruits. As for the *Costus afer* species called ''Ndanga– ndgo'', it is the tangy flavor of the sap of its stem which has earned it this non-vernacular. *Adamsonia digitata* is locally called ''Guila'' because of its long lifespan.

Overall, the most used descriptive concept for local species names is the reference to sociocultural concepts. Even though the literal meaning of the vernacular names of the remaining 65 PSAs was not reported during our surveys, nevertheless these PSAs are well known by their vernacular names by the population of Bangui. This observation shows that there would be a significant loss of knowledge relating to the etymology and literal meanings of the vernacular names of most of the PSAs identified. The lack of information on the literal meaning of these vernacular names would probably be linked to ethnic mixing which leads to the loss of traditional cultural values, social diversity, and the adoption of Western lifestyles. Also, this is justified by the fact that the surveys were carried out in the Central African capital, that is to say an urban area.

3.3 CHARACTERISTICS OF WILD FOOD PLANTS SOLD IN THE MARKETS OF BANGUI

A total of 86 different species of PSAs were inventoried in six (6) main markets in Bangui. These plant species belong to 69 genera and 41 botanical families, including only one family from the Gymnosperms Branch, namely the Gnetaceae family with two species (*Gnetum africanum* and *Gnetum bucholzianum*). The remaining 84 species are an integral part of the Angiosperms Phylum with a large dominance of Dicotyledons (80 species) over Monocotyledons (4 species). The availability of these resources was impressive and it depends on the seasons. Their presence was reported almost everywhere in the markets surveyed. The results of the obtained characteristics are summarized in Table 3. They are interpreted essentially according to the status of the species, their nature for sale and their presence in the six markets investigated. It appears from this table 3 that 39 species or 45.88% are common to the six (6) markets surveyed. However, 12 PSA (*Allanblackia floribunda, Annonidium manni, Costus afer, Caloncoba glauca, Irvingia excelsa, Irvingia*

gabonensis, Carapa procera, Khaya anthotheca, Panda oleosa, Zanha golengensis, Synsepalum stipulatum, Treculia africana) are sold specifically at the Pétévo market and one species (*Ziziphus mauritiana*) only at the Km5 market. They are completely absent in the five other markets surveyed. Consequently, their consumption remains limited. Which then justifies their rarity in the Bangui markets.

Table 3. Characteristics of the species recorded in the Bangui markets

Family	Species	Status	Nature of organs sold	Sales markets
Amaranthacea (D)	*Amaranthus spinosus* L.	Wild	Fresh leave	Bi, B, C, K, O, P
Anacardiaceae (D)	*Antrocaryon klainenum* Pierre	Mixed	Fresh fruit	Bi, B, C, K, O, P
	Antrocaryon micraster A. Chev. & Guillaumin.	Mixed	Fresh fruit	Bi, B, C, K, O, P
	Pseudospondias microcarpa (A. Rich.) Engl.	Wild	Fresh fruit	Bi, P
	Spondias cytherea Sonner	Mixed	Fresh fruit	Bi, B, C, K, O, P
Annonaceae (D)	*Annona senegalensis* Pers.	Wild	Fresh fruit	Bi, B, C, K, O, P
	Anonidium manii (Oliv.)	Wild	Fresh fruit	P
	Monodora myristica (Graertm.) Dunal	Wild	Dry seed	K, P
	Xylopia aetiopica (Dunal) A. Rich.	Wild	Dry fruit	Bi, B, C, K, O, P
Apocynaceae (D)	*Landolphia owariensis* P. Beaux.,	Wild	Fresh fruit	Bi, B, C, K, O, P
Arecaceae (M)	*Borassus aethiopum* Mart.	Mixed	Fresh fruit, germ cooked, drink	Bi, B, C, K, O, P
	Elaeis guienensis Jacq.	Mixed	Fresh fruit, oil, drink	Bi, B, C, K, O, P
	Raphia regalis	Wild	Drink	Bi, B, K, O, P
Balanitaceae (D)	*Balanites aegyptiaca* Dawe & Sprague Guin	Wild	Fresh fruit	Bi, B, K
Bombacaeae (D)	*Adansonia digitata* L.	Wild	Oil	Bi, B
Burseraceae (D)	*Canarium schweinfurthii* Engl.	Wild	Fresh fruit	Bi, B, C, K, O, P
	Dacryodes edulis (G. Don.) H. J. Lam.,	Mixed	Fresh fruit	Bi, B, C, K, O, P
	Dacryodes macrophylla	Mixed	Fresh fruit	Bi, B, C, K, O, P
Capparaceae (D)	*Gynandropsis ginandra* (L.) Briq	Mixed	Fresh leave	Bi, B, O
Cecropiaceae (D)	*Myrianthus arboreus* P.Beauv.	Wild	Fresh fruit	Bi, B, C, K, O, P
Clusiaceae (D)	*Allanblackia floribunda* Oliv.	Wild	Oil	P
	Garcinia polyantha Oliv.	Wild	Fresh seed	C, K, O, P
Connaracaee (D)	*Cnestis ferruginea* DC.	Mixed	Fresh fruit	Bi, P
Costaceae (M)	*Costus afer* Ker gawl	Wild	Fresh stem	P
Dioscoreaceae (M)	*Dioscorea bulbifera* L.	Wild	Fresh Tuber	Bi, B, K, O, P
	Dioscorea munitiflora Engl.	Wild	Fresh Tuber	Bi, B, K, O, P
Euporbiaceae (D)	*Antidesma venosum* Tul.	Wild	Fresh fruit	K, P
	Ricinodendron heudelotii (Baill.) Pierre et Pax.	Wild	Fresh fruit	C, K, O, P
	Uapaca guineensis Müll. Arg.	Wild	Fresh fruit	K, P
Flacourtiaceae (D)	*Caloncoba glauca* P. Beau. Gilg	Wild	Fresh fruit	P
Gnetaceae (G)	*Gnetum africanum* Welw.	Wild	Fresh leave	Bi, B, C, K, O, P
	Gnetum bucholzianum Welw.	Wild	Fresh leave	Bi, B, C, K, O, P
Irvingiaceae (D).	*Irvingia excelsa* Mildbr.	Wild	Dry almond	P
	Irvingia gabonensis (Aubry – Leconte ex O' Rorke)Baill.	Wild	Dry almond	P
Lamiaceae (D)	*Ocinum basilicum* L.	Mixed	Fresh leave	Bi, B, C, K, O, P
	Ocinum gratissimum L.	Mixed	Fresh leave	Bi, B, C, K, O, P
Lauraceae (D)	*Beilschmiedia anacardioides* (Engler & Krause) Rob. et Wilcz.	Wild	Fresh seed	Bi, B, C, K, O, P
Leguminosae (D)	*Cajanus cajan* (L.) Millsp.	Mixed	Dry seed	Bi, B, K
	Cassia occidentalis L.	Wild	Fresh root	Bi, B, C, K, O, P
	Cassia tora L.	Wild	Coffee	Bi, B, C, K, O, P
	Dialum guineense Wil.	Wild	Fresh fruit	B, C
	Parkia biglobosa (Jacq.) Benth.	Wild	Fresh fruit, dry seed	Bi, B, C, K, O, P
	Pentaclethra macrophylla Benth.	Wild	Dry seed	B, O

	Tamarindus indica L.	Mixed	Dry fruit, juice	Bi, B, C, K, O, P
	Tetrapleura tetraptera (Schum. & Thonn.) Taub.	Wild	Dry fruit	Bi, B, C, K, O, P
Malvaceae (D)	*Hibiscus acetosella* Welw. Exttiern.	Wild	Fresh leave	Bi, B
	Hibiscus asper Hood	Mixed	Fresh leave	Bi, B
	Hibiscus surattensis L.	Mixed	Fresh leave, Dry fruit, juice	Bi, B, C, K, O, P
Meliaceae (D)	*Carapa procera* DC.	Wild	Fresh fruit	P
	Khaya anthotheca	Wild	Dry bark	P
Moraceae (D)	*Dorstenia brieyi* De Wild.	Wild	Fresh leave	B, C, P
	Dorstenia scaphigera Bureau	Wild	Fresh leave	B, C, P
	Ficus sp.	Wild	Fresh fruit	Bi, B, O
	Treculia africana Decaisne	Wild	Fresh fruit	P
Olacaceae (D)	*Coula edulis* (G.Dan.) H.J.Lan.	Wild	Fresh fruit	K, P
Pandaceae (D)	*Panda oleosa* Pierre	Wild	Dry seed	P
Pedaliaceae (D)	*Ceratotheca sesamoïdes*	Wild	Dry leave	Bi, B, K
	Sesanum radiatum Schum et Thom.	Wild	Dry seed	Bi, B, C, K, O, P
Phytolacaceae (D)	*Hilleria latifolia* (Lam.) Walter	Wild	Fresh leave	Bi, B, C, K, O, P
Piperaceae (D)	*Piper guineense* Schumach. &Thonn.	Wild	Fresh fruit	Bi, B, C, K, O, P
Portulacaceae (D)	*Talinum triangulare* L.	Wild	Fresh leave	Bi, P
Rhamnaceae (D)	*Ziziphus mauritiana* Engl.	Wild	Dry fruit	K
Rubiaceae (D)	*Nauclea diderrichii* De Wild.	Wild	Fresh fruit	Bi, B, C, K, O, P
Rutaceae (D)	*Fagara heitzii* De Wild Cyuin.	Wild	Dry leave (poudre)	K, P
	Fagara macrophylla (Oliv.) Engl. Var. Cyuin.	Wild	Dry leave (poudre)	K, P
Sapindaceae (D)	*Blighia sapida* Koenig	Wild	Fresh fruit, dry seed	K, P
	Pancovia harmisiana Gil.	Wild	Fresh fruit	Bi, P
	Pancovia laurentii (De Wild.) Gilg ex De Wild.	Wild	Fresh fruit	Bi, P
	Zanha golungensis Hiern.	Wild	Fresh fruit	P
Sapotaceae (D)	*Chrysophyllum giganteum* A. Chev.	Wild	Fresh fruit	Bi, B, C, K, O, P
	Synsepalum stipulatum (Radlk) Engl.	Wild	Fresh fruit	P
	Vitellaria paradoxa C. F. Gaertn.	Wild	Fresh fruit, oil	Bi, B, C, K, O, P
Solanaceae (D)	*Capsicum frutescens* Linn.	Mixed	Dry fruit	Bi, B, C, K, O, P
	Solanum nigrum Muller.	Mixed	Fresh leave	Bi, B, P
	Solanum torvum SW	Wild	Fresh leave	Bi, B,
Sterculiaceae (D)	*Cola acuminata* (P. Beauv.) Schott et Endl.	Wild	Fresh leave	Bi, B, C, K, O, P
	Cola nitida (Vent.) Schott &Endl.	Wild	Fresh leave	Bi, B, C, K, O, P
	Cola pachycarpa K. Schum.	Wild	Fresh fruit	Bi, B, C, K, O, P
Styraceae (D)	*Afrostyrax lepidophyllus* Mildbr	Wild	Fresh fruit	C, K, P
Tiliaceae (D)	*Corchorus aestuans* L	Mixed	Fresh leave	Bi, B, C, K, O, P
	Corchorus olitorius L.	Mixed	Fresh leave	Bi, B, C, K, O, P
Verbenaceae (D)	*Lippia adoensis* Hochst.	Wild	Dry leave	B, C, K, O, P
	Vitex doniana Sweet	Wild	Fresh fruit	Bi, B, C, K, O, P
	Vitex simplicifolia Oliv.	Wild	Fresh fruit	Bi, B, C, K, O, P
Zingiberaceae (M)	*Aframomum citratum* (Pereira ex Oliv. et Hanb.) K. Shum.	Wild	Fresh fruit	Bi, B, C, K, O, P
	Aframomun melegueta (Rosc.K. Schum)	Wild	Fresh fruit	Bi, B, K

Sales markets: Bi: Boing; B: Boy–rabe; C: Central; K: Km5 O: Ouango; P: Petevo

3.3.1 SPECIES STATUS

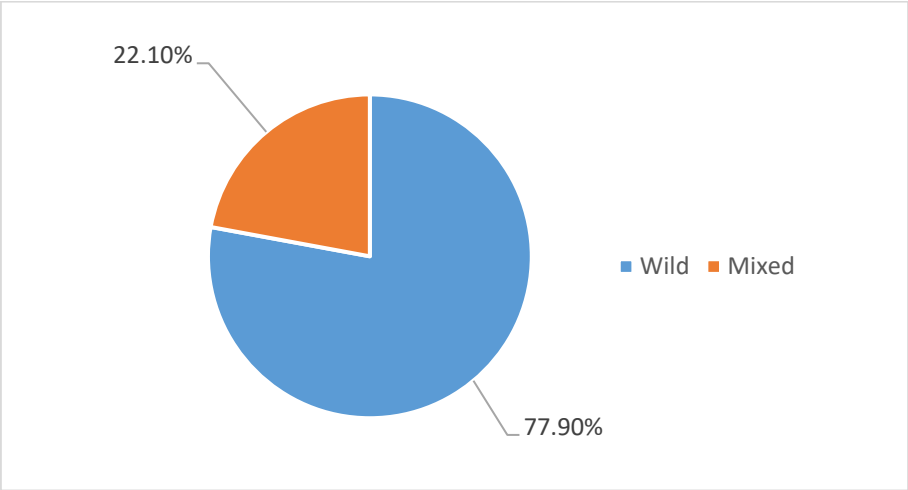

Fig. 8. Status of inventoried species

It appears from this figure 8 that 77.90% of the inventoried species are purely wild compared to 22.10% for mixed species (both wild and cultivated). Consequently, edible plants of purely wild origin still occupy a prominent place in the daily life of households in Bangui. It is important to note that, for cultural reasons, certain households living in Bangui are often attached to traditional foods and favor them more in their daily lives in order to preserve their eating customs.

3.3.2 NATURE OF ORGANS SOLD (FRESH, DRIED AND PROCESSED)

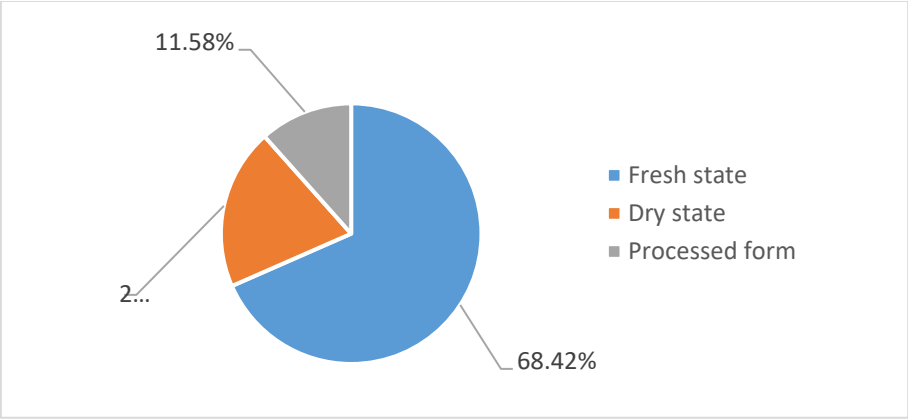

Fig. 9. the state of PSAs sold in the Bangui markets

It appears from this figure 9 that 68.42% of PSAs are sold in the fresh state, 20% in the dry state and 11.58% in processed form. Consequently, these results reveal that more than half of the taxa inventoried are sold fresh. In terms of ecology, it is much preferable to buy and consume plant organs, particularly fruits and leaves, during their production period because it is in their fresh state that they contain the most vitamins.

3.3.3 DISTRIBUTION OF SPECIES ACCORDING TO SALES MARKETS

Fig 10 gives the distribution of PSA species sold by market.

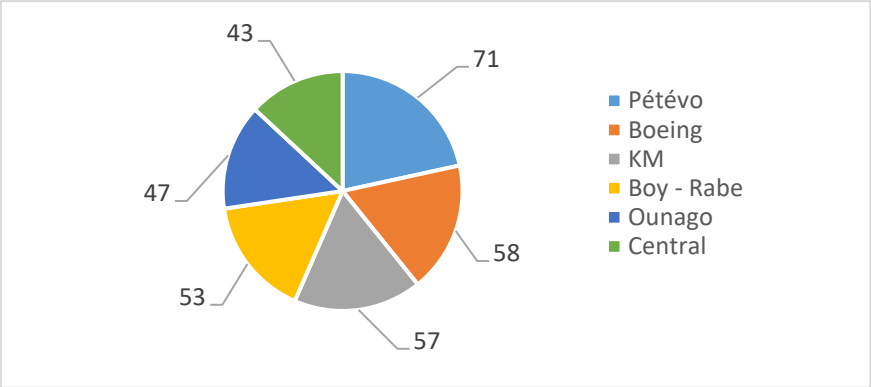

Fig. 10. Distribution of inventoried species by market

This figure reveals an impressive diversity of PSAs species sold in the six main markets of Bangui. 71 different species of PSA were identified in Pétévo followed by Boing with fifty-eight (58), Km 5 with fifty-seven (57), Boy - rabe with fifty-three (53), Ouango with forty-seven (47) and Central with forty-three (43). Consequently, PSAs are sold more in Pétévo than in other markets surveyed. The interest given to the Pétévo market is justified by the fact that it is located at the entrance to the southwest part of the Central African capital where one can find all food NTFPs of plant origin, frequently sold in bulk. In addition, its popularity and dynamism mainly relate to the sale prices of food NTFPs, which are often low and affordable.

3.3.4 SUPPLY AREAS

The sellers surveyed stated that they source their supplies exclusively from the hinterlands because edible native plants are harvested in the wild by harvesting in their respective biotopes. On the one hand, some sellers prefer to buy various products from wholesale traders established in rural markets. Others, on the other hand, make their purchases directly near the harvesting sites or in the villages from the pickers. This latter purchasing strategy is most often done through a system of partnerships between villagers and PSA sellers. Overall, the trade of PSAs in Bangui is permanent, because this city can receive various food products from all provinces throughout the year. There is therefore less risk of out of stock. This is why an abundant diversity and a high number of PSA species were recorded and identified in the six markets surveyed.

4 DISCUSSION

In this study, women were the most solicited during our surveys (83.33%), thus revealing that the marketing of PSAs constitutes a sector largely in the hands of urban women. In addition, women are true holders of culinary knowledge and practices [14]. Various studies in Africa have revealed the same conclusion and agree on the predominance of women in NTFP sales activities [15], [16], [17], [18]. It emerges from this study that the majority of people surveyed were aged between 31 - 50 years (68.67%). Consequently, they represent an active and literate segment of the local population. Which is a valuable asset for the valorization of wild edible plants aimed at rapid social impact on vulnerable households [19]. This study also showed that the majority of people surveyed had secondary school education (50.67%). Therefore, this level of instruction is fair. This result is not at all surprising because it is justified by the fact that the survey was carried out in an urban environment, the Central African capital. This trend in the level of education of the people surveyed is considerable to the extent that sustainable management of natural resources requires a minimum level of education in order to accommodate or contribute to education relating to the management of these [20]. In addition, the level of education has a very remarkable impact in the adoption of innovations and/or in the transfer of knowledge and technologies with a view to increasing productivity in all sectors of activity and in decision-making [21]. It also emerges from this study that respondents with experience in the NTFP sales sector of 2 - 10 years are the most represented (39.33%).

From these results, all the sellers interviewed recognize that the NTFP sector is a profitable activity, which is what justifies the increase in the number of participants in the sector. Ethnically, the sellers are distributed among 16 ethnic groups belonging to different regions of the Central African Republic. This result shows that the trade in NTFPs is a multi-ethnic economic activity. Similar observations were reported by et al [8]. However, the best represented ethnic groups are the Gbaya (27), followed by Mandjia (19), Banda (17), Ngbaka (14), Mbati (11), Ali (10), Yakoma (9) and Gbanou (7). Furthermore, this study made it possible to identify 86 species of PSAs sold in six main markets in Bangui. The abundance and great diversity of these plant species confirm the richness of the Central African flora. Similar results were obtained by

certain authors in ethnobotanical work devoted to wild food plants [22], [23]. However, it is important to note that some previous studies relating to tropical African wild food species have reported some species from our inventory.

The results in Figure 4 indicate that fruits (68.43%) and leaves (22.12%) were the best-selling plant organs. But overall, the organs that are used in the preparation of family meals are the leaves. To this end, they occupy a significant place in the diet of the population of Bangui. However, these results present some similarities with other ethnobotanical studies which have revealed similar observations [24], [23]. The importance given to fruits is due to their high nutritional value and also to the fact that their derived products (oil, paste, powder, etc.) can be preserved better. Species such as *Allanblackia floribunda, Elaeis guinensis, Vittelaria paradoxa, Irvingia gabonensis, Ricinodendron heudelothii, Piper guinenesi, Monodora myristica, Tetrapleura tetraptera, Afrostyrax lepidophylus, Tamarindus indica, Beilschmiedia anacardioides* are sold on the Bangui markets as condiments in dried and fresh forms, in oil or in paste form. According to certain authors [25], [26], there are considerable variations in the abundance of fruits and their consumption. Their high consumption is due to their juicy pulp. For them, it is children who, in general, consume the most. Concerning the leaves, they are the most sought after and the most requested in the preparation of family meals. Most often, they serve as a vegetable base and also as a condiment in the preparation of various sauces. Overall, fruits ripen at different times and leaves are permanent on plants and are the site of photosynthesis. To this end, these two (2) plant organs can cover the nutritional needs of the population of Bangui throughout the year. According to Powell et al [27], foods from wild species contribute to the quality and diversification of the diet as well as seasonal homogeneity. They provide important nutrients and complement the basic diet throughout the year. Fruits and leaves therefore represent a mainly interesting source of food in daily life for the population of Bangui.

Regarding morphological types, Figure 6 shows that trees are more represented than other morphological types. This predominance of trees reflects the state of vegetation in the different regions of the CAR. The trees produce fruits (almonds, seeds), leaves, bark and other key products such as oils, palm kernels and highly sought-after wines. These resources make an important contribution to the diet of households living in the Central African capital. In addition, the perennial nature of tree species also guarantees the availability and use of wild plants. Hence it appears necessary to proceed with the preservation of this heritage and the forest ecosystems which host them. Also, it would be necessary to integrate them into genetic programs and modern agricultural production. Such an approach could enable their sustainable management. Regarding habitat, the results of our surveys (Figure 7) revealed that the forest is better represented than other ecological environments. This predominance of the forest confirms the superiority of forest habitats as providers of PSAs compared to other ecological environments. This is eloquent proof that the Central African forest ecosystems are very rich and still contain a diversity of PSA species. This abundant diversity of PSAs available to the CAR forest constitutes an undeniable asset for its socio-economic development. In addition to their biological importance, the forests of the CAR remain essential for local populations to the extent that they draw numerous resources from them for their subsistence. For these reasons, special attention must be given to them. It is therefore necessary not only to manage them rationally but also to conserve them sustainably for future generations.

Analysis of the results in Table 2 showed that 24 species of PSAs are also used for medicinal uses. Their medical virtues are well known by the population of Bangui. The pharmacological activity of some of them has been scientifically validated. This is particularly the case for *Aframomum melegueta, Ocimum basilicum* and *Ocimm gratissimum* [28], [29]. The results also showed that malaria and hypertension represent the pathologies most frequently treated with four of these 24 PSA, notably *Aframomum melegueta, Ceiba pentandra, Gnetum africanum, Lippia adoensis.* Two PSA (*Tamarindus indica, Hibiscus asper*) are cited in the treatment of diabetes. Considering all these virtues, these 24 species deserve to be the subject of cultivation trials. Also, it would be necessary to initiate their possible domestication. An experimental laboratory analysis on the phytochemistry of these species would also be beneficial in order to identify the secondary metabolists responsible for the biological activities. This could lead to the exploitation of the potential of our ethnomedical knowledge for effective public health. Likewise, such an approach could safeguard PSA for medical use and their endogenous knowledge.

Regarding local names, the vernacular names that we found during our survey correspond respectively to the 86 taxa recorded and identified. For at least 21 inventoried species, we were able to collect the meaning of the vernacular names. These latter reports mainly refer to the morphology, an animal, the ecology or habitat of the species, the use and a property of the plant. For the majority of PSA identified (64 species), the meaning of the etymology of their vernacular names could not be given despite the fact that we mainly interviewed women more. Thus, there would be a loss of knowledge relating to the local names of these PSAs. Rapid changes in social and cultural behavior, reduced contact with nature and the disappearance of natural ecosystems are the causes [30], [31]. This observation justifies both the necessity and the urgency of ethnotaxonomic studies to safeguard what still remains of local knowledge. As revealed by Bokdam and Drooers [32], the disappearance of wild plants under the influence of modernization leads to the loss of knowledge relating to their uses, their vernacular names and their etymologies. This knowledge, which has been slowly accumulated, kept and delivered from generation to generation, risks disappearing permanently. Similar to the preservation of knowledge, the latter could be the support for ethnobotanical and ethnomedical investigations for scientific research.

With regard to the 86 PSA which were the subject of the inventory, 77.90% are of purely wild origin, as shown in Figure 8. Among these, four are the subject of intense overexploitation in their natural habitat for commercial purposes. These are mainly *Beilschmiedia anacardioides, Gnetum africanum, Parkia biglobosa, Xylopia aethiopica*. They are even threatened with depletion in their biotope due to high demand. This is particularly the case for the leaves of *Gnetum* spp., leafy vegetables widely consumed in the CAR and which are harvested in the wild in forest ecosystems. According to Wilkie [33], the overexploitation of NTFPs constitutes a threat, not only to the survival

of forest peoples, but risks ultimately leading to an irreversible impoverishment of species and genetic diversity. Climate change also contributes to the loss of native plants [34]. For these reasons, it would be desirable to take appropriate rational exploitation measures to limit their collection from the wild. Also, it would be appropriate to promote them. Such an approach would be an opportunity both economically and nutritionally for both rural and urban populations, especially women. The results of this same figure (8) also show that 19 are mixed (both wild and cultivated). We can cite, among others, *Capsicum frutescens, Corchorus olitorius, Dacryodes edulis, Hibiscus surattensis, Ocimum gratissimum, Solanum nigrum, Spondia cytherea, Tamarindus indica,* which are cultivated and are the subject of interesting marketing on a local scale. This attitude shows the level of socio-economic importance and interest given to these wild plants and the concern to avoid their extinction in their natural habitat. Overall, the domestication of most of the species studied remains low and constitutes a handicap for the socio-economic development of the NTFP sector. Therefore, efforts must be made to improve knowledge of these resources, their use, their cultivation/domestication and their conservation.

The results in Figure 9 show that 68.42% of PAS, more than half of the taxa inventoried, are sold fresh. This shows that there is a problem with the conservation of these plant resources. It would then be necessary to find more effective means of preserving and processing these products in order to increase the profit linked to their consumption and sale. However, 11.58% of PSAs undergo transformations to be available on the markets. To this end, they can play an essential role in the agro-food industry for the manufacture of juices, jams, mustards, oils, pastes and drinks. Overall, it is well known that PSAs are very perishable products, the lower the selling prices on the markets. To meet the permanent demand in the Central African capital, it would be desirable to encourage their processing in large quantities with a view to facilitating their sale on a permanent and annual basis in the markets of Bangui to meet the nutritional needs of urban populations.

From all these results, we can note that there is a high number of wild edible plants sold and consumed by the Bangui population. Among these, seventeen are an integral part of regional and even international trade, particularly in Belgium and France [8]. These are *Aframomum melegueta, Afrostyrax lepidophyllus, Cajanus cajan, Cola nitida, Corchorus olitorius, Dacryodes edulis, Elaëis guinensis, Gnetum africanum, Irvingia gabonensis, Landolphia owariensis, Lippia adoensis, Monodora myristica, Ocimum gratissimum, Ricinodendron heudelothii, Solanum nigrum, Spondia cytherea, Xylopia aethiopica.* Thus, the 86 plant resources inventoried contribute to the reduction of poverty through food security, the improvement of health, the household economy, the reduction of vulnerability and the maintenance of the balance of ecosystems. Generally speaking, Dibong et al [35] stated that the exploitation of NTFPs is carried out in an anarchic manner and falls within the informal sector. According to Van Zonneveld et al [36], traditional plant diversity is under threat particularly in Africa, and measures must be taken to conserve and use these resources rationally. It would therefore be essential to preserve this precious heritage because they constitute an important genetic base for the CAR.

5 CONCLUSION

This study highlighted the commercialization of at least 86 truly edible plant species. These results demonstrate that there is still a high diversity of wild food species in the Central African flora. The sale of these plant genetic resources would be based essentially on three factors: quality, taste and their availability. Also, they have great sociocultural and nutritional value. Their purchase prices are low and offer the greatest ease of access, although they are highly perishable. These prices vary according to the seasons, the products, the quantity offered for sale, the sellers and also from one market to another and that the sale of these wild species was an activity largely dominated by women, thus contributing to the household economy and consequently the reduction of poverty in urban areas.

The analysis of the results showed that the Leguminosae family is the richest; fruits and leaves are the best-selling plant organs; edible fruits remain the most predominant category of uses; and that there are a high number of edible wild species sold in the markets of Bangui. These species are mainly trees and are more present in forest ecosystems. It also appears that these species are not only consumed for nutritional needs but also and above all for the numerous medicinal virtues. Regarding the local naming of plant species, vernacular names can be descriptions, uses, properties of the plant or a locality. However, the absence of etymology or literal meaning for certain species could be considered as evidence of the loss of cultural identity in Bangui. The results also showed that among these 86 plant species, only 19 are domesticated; more than half are sold fresh; 39 are common to the six markets surveyed, 12 are noted only at the Pétévo market and 1 specifically at the KM5 Market.

This preliminary study on the Central African PSA sector makes it possible to identify a certain number of following recommendations:

- Inventory the PSAs in order to classify them in order of importance.
- Develop, if necessary, the domestication of these resources.
- Further popularize the consumption of PSAs as local foods.
- Improve processing and conservation techniques for these products.
- Improve formal distribution and circulation networks.
- Ensure the sustainable management of these resources and the protection of the environment.
- Monitoring PSA sellers throughout the year would necessarily be important to better appreciate price fluctuations and also collect data with a view to characterizing these species floristically and structurally.
- Finally, the dynamics of vegetation, the control of bush fires, rational harvesting, the protection of seeds, the ecological preservation of forest ecosystems, the savannah and the Central African steppe are measures to consider.

REFERENCES

[1] Madiapevo, S. N., Ndotar, M., Worowounga, X., and Mandago, J. B., 2023. Ethnobotanical survey of indigenous leafy vegetables consumed by the populations of the prefecture of Lobaye in the Central African Republic. International Journal of Innovation and Applied Studies. 40 (1): 179-192.

[2] Ahirwar, J. R., 2015. Some Edible Plants of Bundelkhand Region of India. Research Journal of Recent Sciences, 4: 165-169.

[3] Bhagat, R. B., Chambhare, M., Mate, S., Dudhale, D and Zaware, B. N., 2016. Prospective wild edible fruit plants from part of northern Western Ghats (NWG), Mulshi (MS), India. Journal of Medicinal Plants Studies, 4 (1): 15-19.

[4] Nyero, A., Achaye, I., Anywar, G. U., Malinga, G. M., 2023. Inorganic nutrients and heavy metals in some wild edible plants consumed by rural communities in Northern Uganda: Implications for human health. 9: e18999).

[5] Anywar, G., Kirimuhuzya, C., 2015. Phytochemical and antibacterial activity of crude extracts of the pod of *Aframomum angustifolium* (Sonn.) K.Schum. Eur. J. Biol. Res., 5 (2): 36-41.

[6] Anywar, G.U., Oryem-Origa, H., Kamatenesi-Mugisha, M., 2017. Proximate nutrient composition of some wild edible medicinal plants from Uganda. Afr. J. Food Nutr. Sci., 17 (3): 12215-12226.

[7] Cantwell-Jones, A., Ball, J., Collar, D., Diazgranados, M., Douglas, R., Forest, F., Hawkins, J., Howes, M.J.R., Ulian, T., Vaitla B., Pironon, S., 2022. Global plant diversity as a reservoir of micronutrients for humanity. Global plant diversity as a reservoir of micronutrients for humanity. Nat. Plants, 8 (3): 225-232.

[8] Betti JL, Ngankoué CM, Dibong SD, Singo AE, 2016. Ethnobotanical study of spontaneous food plants sold in the markets of Yaoundé, Cameroon. Int.J.Biol. Chem. Sci. 10 (4): 1678 – 1693.

[9] Souane and Paulin, 1989. Manual of Dendrology of dense forests. Central African Republic. Ministry of Water, Forests, Hunting, Fisheries and Tourism, 683.

[10] Lejoly, J, Llsowski and Ndjele, M., 1988. Catalog of vascular plants of the sub-regions of Kisangani and TSHOPO (UPPER ZAIRE). Monogr. 3rd ed. Trav. Lab. Bot. Syst and phyto-soc-ULB, 135.

[11] Béllé, B. J. (1992). Glossary of Central African dense forest species. Ministries of Water, Forests, Fisheries and Tourism.

[12] Nacoulma - Ouédraogo O., 1996. Plants and traditional medicinal practices in Burkina Faso: case of the Central Plateau. Doctoral Thesis in Natural Sciences, Biochemistry Option, University of Ougadougou (Burkina - Faso), 320.

[13] Bitsindou M. (1986). Survey on traditional phytotherapy in Kindamba and Odzala (Congo) and analysis of convergence of use of medicinal plants in Central Africa. Mémoire Doc (ined.), Free University of Brussels, Belgium, 482.

[14] Nesamvuni C, Steyn NP, Potgieter MJ., 2001. Nutritional value of wild, leafy plants consumed by the Vhavenda. South African Journal of Science 97 (1-2): 97-104.

[15] Balinga, M.P. 2003. Edible caterpillars and larvae in the forest zone of Cameroon. Consultation Report. FAO. Rome.

[16] Agbidye F. S., Ofuya T. I., Akindele S. O., 2009. Marketability and Nutritional Qualities of Some Edible Forest Insects in Benue State, Nigeria. *Pakistan Journal of Nutrition,* 8 (7): 917-922.

[17] Apema R., Mozouloua, D., Madiapevo, S.N., 2010. Preliminary inventory of edible wild fruits sold in Bangui markets. 313 – 319, Royal Botanic Garden: Kew, 313 - 319.

[18] N'Gasse, G. 2004. Contribution of forest insects to food security. Non-timber forest products: Working paper 1. Rome, FAO.

[19] Hlpe., 2018. Nutrition and food systems. Report of the High-Level Panel on Food Security and Nutrition of the Committee on World Food Security. Rome 12: 10.

[20] FAO. 1999. Non-timber forest products and income creation. Rome: FAO, 125.

[21] Tingu, C. & Mathunabo, A., 2019. Analysis of the socioeconomic and food situation of households in the North and South Ubangi provinces in the Democratic Republic of Congo – Rev. Mar. Sci. Agron. Vet. 7: 203–211.

[22] Outtara N.D, Elodie Gaille, Fred W. Stauffer & ADAMA Baka Yoko., 2016. Floristic and ethnobotanical diversity of wild edible plants in the Bondoukou Department (North-East of Ivory Coast) Journal of Applied. Biosciences 98: 9284–9300.

[23] Vanié– Bi Irié G., Béné Kouadio, Zouzou M., 2021. Ethnobotanical study of spontaneous edible plants in the Department of Zuénoula (Center – West of Côte d'Ivoire), 20.

[24] Kouassi Kouamé, A., Beugré Grah, A. M., Kouassi Kouakou, N., N'Dri Yao, D., Amani, G., Gnakri, D., 2018. Biochemical characterization of juices from three wild fruit species consumed in Côte d'Ivoire «Adansonia digitata, Parkia biglobosa and Tamarindus indica». Open Science Journal, 3 (4): 1-11.

[25] Tra Bi, F. H., 1997. Use of plants by humans in the Classified Forests of Haut-Sassandra and Scio, Ivory Coast. Postgraduate doctoral thesis. UFR Biosciences, Cocody-Abidjan University, Ivory Coast, 215.

[26] Ouattara D., 1999. Contribution to the Ethnobotanical study of the Dassioko Classified Forest (Fresco, Ivory Coast). D.E.A dissertation in Tropical Ecology (Option: Plant). University of Cocody – Abidjan, Ivory Coast, 93.

[27] Powell, B., Thilsted, S.H., Ickouit z., Termote, C., Sunderland, T. and Herforth, A., 2015. Improving diets whit wild and cultivated biodiversity from across the landscape, Food security 7: 535 – 54, doi. Org. 10./007/s12571 – 015- 0466 – 5.

[28] Mpiana P.T., Tshibangu D.S.T., Shetonde O.M., Ngbolua K.N., 2007. In vitro antidrepanocyte activity (anti-sickle cell anaemia) of some Congolese plants. Phytomedicine, 14: 192-195.

[29] Bongo N.G., Inkoto L.C., Masengo A.C., Tshiama C., Lengbiye E., Djolu R., Mutwale K., Ngombe K., Mbemba T., Tshilanda D., Mpiana P.T., Ngbolua K.N., 2017. Antisickling, antioxidant and antibacterial activities of Afromomum alboviolaceum (Ridley) K. Schum, Annona senegalensis Pers. and Mondia whitei (Hook. f.) Skeels. American Journal of Laboratory Medicine, 2: 52-59.

[30] Ramirez, C.R., 2007. Ethnobotanya and the loss traditional knowledge in 21st century, Ethnobotany Research and Applications, 5: 245 – 247.

[31] Louv, R. 2006. Last child in the woods: Saving or children from nature – Deficit Disord, Algonquin Books Chapel Hill. NC, in Atato A., Wala K., Batawila K., Woegon A.Y., Akpagan K., 2010. Diversity of spontaneous woody fruit trees in Togo, Vegetable and cereal Science and Biotechnology, Global Science Books, pp. 1– 9.

[32] Bokdam J. & Droogers A.F. (1975). Contribution to the ethnobotanical study of the Wagenia of Kisangani (Zaire), Wageningen, National Agronomic Institute.

[33] Wilkie, D.S. ey Carpenter, J.F., 1999. Bushmeat hunting in the Congo Basin: an assessment of impacts and options for mitigation. Biodiversity and Conservation. 8: 927–955.

[34] Assogbadjo, A.E., R. Glèlè Kakaï, F. Houtoutou Adjalla, A.F. Azihou, G.F. Vohoué, T. Kyndt and J.T.K. Codjia, 2011. Ethnic differences in use value and use pattern of the threatened multipulpose scrambling shrub (Ceasalpinia bonduc L.) in Benin: Jornal of medical plants Research, 5 (9): 1549 –1557.

[35] Dibong SD, Mpondo Mpondo E, Ngoye A, Priso R., 2011. Inventory and biodiversity of species edible wild fruits sold in the markets of Douala, Cameroon. International Journal of Applied Biology and Pharmaceutical Technology, 2 (3): 303-311.

[36] Van Zonneveld M., Kindt, R., Solberg, S., N'Daniko, S., & Dawson, I.K., 2020. Diversity and conservation of traditional African vegetables. Priorities for action. Diversity and Distribution (https://doi.org/10.111/ddi.13188).

ANNEX 1. ILLUSTRATION OF SOME PLANT ORGANS OF PSAS SOLD IN THE MARKETS OF BANGUI

Leaves of *Talinnum triangulare*

Leaves of *Gnetum africanum*

Leaves of *Ocimum gratissimum*

Fruits of *Myrianthus arboreus*

Fruits of *Xylopia aethiopica*

Fruits of *Borassus aethiopum*

Ricinodendron heudelothii almonds

Irvingia gabonensis almonds

Tamarindus indica pulp

Cola nitida seeds

Parkia biglobosa mustard

Monodora myristica seeds