

# Sacred Forests in the Western Highlands-Cameroon : Ethnobotany Role and Indigenous Conservation of Biodiversity

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## ABSTRACT

Deforestation in tropic and sub-tropical regions can be attributed to the change in land use system from forests to agriculture and industrialization. The social and scientific role of Ethnobotany are becoming more consistently defined. Its importance as a tool for complementing management and conservation strategies of biodiversity is now well recognized. In this work, ethnobotanic exploration was undertaken in the Western Highlands of Cameroon in 2017, specifically sacred forest of "Mbing Mekoup", "Bamendjinda" and "Bamendjo" counties. It assesses the importance of ethnobotany role of species conservation in these forests. A total of 62 species belonging to 31 families and 57 genera were identified using 20m x 20m quadrat method. Among the identified species, 34% represents those with a socio-cultural importance, with numerous non-timber forest products being collected for multiple uses (*Piper umbellatum* used during the twin's ritual ceremony, *Bridelia speciosa*, *Prunus africana* and *Albizia gummifera* being used for therapeutic purposes). Survey via interviews with indigenous from these counties revealed that these sacred forests have been protected by oral tradition for centuries. They also considered it as prioritized places reserved for traditional healers. In spite of this indigenous conservation effort, rapid increase of population, poverty and lack of arable farm land have ushered the way to degradation of these relic forests though very important in maintaining biological balances.

**Keywords :** Cameroon conservation, diversity, endogenous ethnobotany, Sacred Forest, tradition western.

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## I. INTRODUCTION

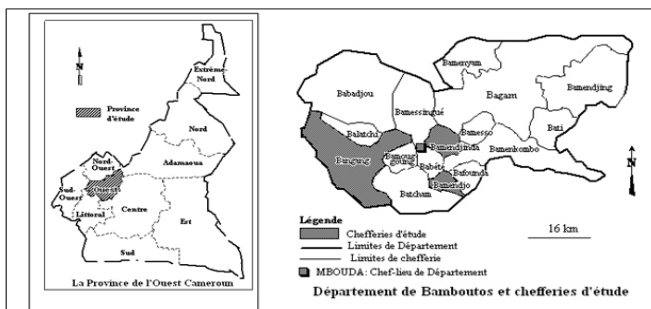
Extinction is a threat to world's natural resources in general and particularly forests which constitute the basis of biodiversity longevity [3]. Forests play an important role in traditional folk medicine and ritual ceremonies in most Africa communities. Traditional medicine occupies an important place in African culture where accessibility to modern medicine is hindered probably by high cost of drugs or treatment. Numerous of rural populations have resolved this by sourcing to medicinal plants and traditional healers. Plants are also used as sources for food, energy and building materials. In Africa and other parts of the world, there are plant-related cultural practices. Most communities in Benin and Togo believed support or success in their specific businesses can be attained by performing rituals at the base of specific tree trunks species [7]. In the same light, thanksgiving is equally in case of good benefits [6]. In formerly Western Cameroon, the settlement occupied by the Bamilekés was chosen after a tree of the genus *Ficus* sp. planting it on the piece of land where houses will be built. Where ever this plant grows normally is believed to be void of spiritual enemies [12]. These trees and forests have been kept according to their character says "sacred". These are important in the maintenance of the natural species and environmental protection. Indeed, Tahoux [14] reported

that Zaïpobly sacred forest in Ivory Coast hosts a large number of species endemic of to Southwest Ivory Coast. African traditional practices have for a long time played a pivotal role in ecosystem conservation [8], [13], [5]. The sacred forests for example, protected at all times, are considered as the only witnesses of the forest element in the zones where agricultural exploitation is growing [5]. Nevertheless, they are today subjected to intense human pressure which can pave way to complete disappearance. In Cameroon, several studies have been done in the sacred forests in the Western. So, the sacred forests strategies of protection have been studied [2], [10], [15], [11] made a census of all the sacred forest of Cameroun included their surface. The floristic composition and structure of Mbing Mekoup sacred forests have been done [16]. This work is focus on the socio-cultural role and indigenous way of conservating "Mbing Mekoup", "Bamendjinda" and "Bamendjo" sacred forests in West Cameroon through flora assessment of ethnobotanical scope and shows their importance in the conservation of biodiversity.

## II. MATERIALS AND METHODS

### Study Zone

The study sites are located in the Western Highlands of Cameroon on a surface area of 13.890 km<sup>2</sup> at an altitude of 2000 masl [9]. The sacred forests are found in the department of Bambouto. Batcham district harbors Mbing Mekoup forest (5 ° 37'N, 10 ° 06'E, Alt: 2183 m) while Bamendjinda (5 ° 97'N, 10 ° 18 E, Alt 1327 m) and Bamendjo forests (5 ° 34'N, 10 ° 18'E, Alt: 1376 m) are situated at Mbouda district (Figure 1). Mbing Mekoup is an independent sacred forest away from the chief residence established on slope and valleys with rocky levelling in some places and relief marked by interfluves to steep slopes, plateaus and plains. It has an area of 27.7 ha. Bamendjinda forest with an area of 4.2 ha is marked by a flat slope partly surrounded Eucalyptus. Bamendjo sacred forest is located on a gentle slope with a relatively closed canopy measuring a surface area of about 1.8 ha with a cool and humid climate. This is a mountain climate "Camerounien" characterized by a short dry season of 4 months (mid-November to mid-March) and a long rainy season of 8 months (mid-March to mid-November) characterized by low and constant temperatures due to the high altitude.



**Figure 1: Location of study area in the Western Highlands of Cameroon. Left: Complete political map of Cameroon with study area highlighted in gray and right: complete and detail view of study area.**

### Sampling method

The quadrat method (Hall and Swaine 1981) was used for inventory and identification of individuals. Quadrats of 25 x 25 m were established and randomly distributed in each plant formation. Within each plot, all species including medicinal herbs and food as well as those used for other purposes were considered. The specimens were collected and some identified directly in the field. Unrecognized species were taken to the National Herbarium of Cameroon for identification. In order to assess the use of these forests, indigents were interviewed and ethnobotanical role of these forests in biodiversity conservation evaluated. Interviewees were adults greater or equal to 30 years old (men and women), youth between 16 and 29 of age (girls and boys) living in the vicinity of each study site. Information obtained was of an individual nature.

## III. RESULTS AND DISCUSSION

### Floristic Aspects

Analysis of the sacred forests flora reveals relatively significant high abundance of species such as: *Cassine aethiopica*, *Bridelia speciosa*, *Xymalos monospora*, *Nuxia congesta*, *Clausena anisata*, *Maesa lanceolata* in Mbing Mekoup *Trilepisium madagascariense*, *Cola cordifolia* and *Celtis zinkeri* were significantly high at Bamenjinda while Bamendjo recorded abundance of *Trilepisium madagascariense*, *Celtis zinkerii*, *Markhamia lutea* and *Alangium chinense*.

### Uses of Forest Plants by Local Communities

The interviews results revealed that these plants are coveted by people for several needs. For ritual purpose, leaves of *Piper umbellatum* are attached at the fore head of twins during the ceremony where they are being taken to a public square. This ceremony is literally referred to as "going out of twins". According to local people believe, twins have some supernatural power which during this ceremony *Piper umbellatum* plant leaves purify and fortify the powers. It will equally give them honor and possibly would protect them from evil spirits who could compromise the power that the twins hold. Moreover, these leaves are used as packaging material of dust taken from grave of the dead during ancestral worship ceremony. Formerly, *Piper umbellatum* leaves were tied on slaves to differentiate native of the village and free people. These populations also use *Dracaena deisteliana* to testify to the "gods" the recognition of a ritual rite that has been announced but has not been performed; thus, the person who are supposed to performed the rite should cut a young stem of *Dracaena deisteliana* species and put on the road where he hardly borrows meaning to "god" that he is aware of the rite. The villagers use *Dracaena deisteliana* plant to establish peace by settling conflict among. Often *Dracaena deistelina* and *Ficus thonningii* are planted in close range where navels and first haircut of new born babies are buried. So, doing it is believed it will serve as a center of attraction and would allow these children to always return to their native village regardless of where they go. The

conception that some children have two “souls” and are tied to abnormal behavior is common in these villages. To circumvent this, the local population use leaves of *Dracaena deisteliana* to perform ritual in order to unite the two “souls”.

For communication purpose, a branch *Ficus thonningii* placed at the entrance of a concession signifies the presence of the village chief. When the leaf is pinched by a twig broom and given to a peasant, he understands that the chief needs him to report immediately at palace. To designate their heir, the elderly persons in their lifetime often send him who will be the next of kin with *Ficus thonningii* leaf to the father’s best friend. When this friend receives, he understands that the bearer of the sheet will be successor since the heir are not supposed to know the secret. In case of change of decision, the same child will be assign to repeat this process. The same plant is recognized and use as a peace setter. In case of a dispute between a woman and the chief a *Ficus thonningii* branch with leaves is placed in front of the house where the lady resists. The woman concerned leaves the area and return only when the problem has been settled. Plants such as; *Markhamia lutea* and *Vernonia amygdalina* have some superstitious believe linked to them. They are considered and used for invoking and establishing prohibition of evil spirits. In situations where a woman wants to be definitely repudiated as a chief’s wife from the chiefdom, a stem of *Markhamia lutea* is planted in front of her house for to leave as soon as possible. Moreover, during rainy period it is forbidden to shelter under *Ensete gillettii* plant or to use the leaves as an alternatively as an umbrella in order to avoid thunderbolt; for it is believed to be a major source of thunderbolt. It is also used to wrap up the mortal remains of the disciple of chief before burial. This would cover the "negative side"-unwanted behavior of deceased, by so doing its being prevented from spreading after his death. *Canarium schweinfurthii* is considered as traditional incense which when burn it repels evil spirits. The leaves of *Musa paradisiaca* and *Musa sapientum* are used when a couple is in need of a baby of a specific gender. In circumstances that a boy child is needed, the poured salt at the basis of *Musa paradisiaca* and let a young non-pubescent boy cut off the shoot. The shoot is being given to the women to place on their marriage bed. By performing this rite, the young boy automatically transmits its gender to women. Contrary, in case a girl is need same practice will be done by a young non-pubescent girl base of *Musa sapientum*.

For food purpose: *Aframomum* sp., *Persea americana*, *Pseudospondia microcarpa* fruits are greatly exploited for consumption. *Canarium schweinfurthii* is widely exploited for the commercialization of its fruit as a food source. This generate income form many families. *Elaeis guineensis* is highly coveted for its fruit that serves as a rich source of fats and oils, food ingredient and its sap that gives white wine as a very useful stuff during traditional ceremonies.

For medicinal purpose, there are also reputed medicinal species that are exploited for the treatment of various diseases.

**Table1:** Summary of some plants whose therapeutic uses have been reported in these forests

Scientific name and family	Diseases	Used parts and Preparatory fashion
<i>Myria arborea</i> (Myristicaceae)	Cough, abdominal pain	The bark is eaten fresh or infused in water and taken orally
<i>Cassine aethiopica</i> (Celastraceae)	Intestinal worms	The fruit or bark associated with raw peanuts is eaten
<i>Prunus africana</i> (Rosaceae)	Malaria, painful menstruation, abdominal pain	decoction of the bark is taken orally, the crushed leaves in water also have the same medicinal properties
<i>Embelia schimperi</i> (Myristicaceae)	Intestinal worms	The leaves are cleaned and eaten
<i>Bridelia speciosa</i> (Euphorbiaceae)	Gonorrhoea, malaria	A bark decoction is associated with leaves and taken orally
<i>Albizia gummifera</i> (Mimosaceae)	Impotence	The bark associated with that of <i>Croton macrostachyus</i> is boiled in white wine
<i>Zehneria scabra</i> (Monimiaceae)	gastric pain, glair	The plant is used for purging by mucus and triturated in water before being taken orally for gastric trouble
<i>Piper umbellatum</i> (Piperaceae)	Infertility	The infusion of the leaves and flower is taken orally
<i>Markhamia lutea</i> (Bignoniaceae)	Abdominal pain	leaves added to <i>Acanthus montanus</i> roots and bark are boiled in white wine and taken orally
<i>Canarium schweinfurthii</i> (Burseraceae)	Diarrhea	fruit almonds are burned and made into powder before being taken with palm oil
<i>Croton macrostachyus</i> (Euphorbiaceae)	Facilitates childbirth	The decoction of the bark is taken orally

It is noted from Table 1 that plants like *Embelia schimperi*, *Cassine aethiopica*, *Zehneria scabra*, *Canarium schweinfurthii* are useful for the gastrointestinal tract, while *Croton macrostachyus*, *Markhamia lutea*, *Piper umbellatum*, *Albizia gummifera*, *Bridelia speciosa*, *Prunus africana* are used by the local population to correct reproductive system disorders. Using plants to treat illnesses such as malaria and cough were rarely mentioned; certain affections such as liver, diabetes and cancer are absent. The lack of plants reported to have been used for the treatment of these diseases could be a sign of ignorance on the part of the people because they would be unable to determine at their level certain symptoms of diseases. It could also be a possible indication that rural people are less exposed to such diseases. These therapeutic plants are known to treat the same diseases in different regions and even on a continental scale. *Bridelia speciosa* for example treats sexually transmitted diseases in Bafoussam [10], [16], [11]. It is worth noting that there are dissimilarities between diseases treated by the same medicinal plants like in the case of *Croton macrostachyus* used to treat breast pain and sexual impotence in Bahouan villages [10] and Bangang [16] while in Ethiopia it is used for the for the treatment of jaundice,

intestinal worms and ear inflammations [1], [4]. This serves as proof that these medicinal plant species in its natural state might possess several active chemical compounds that may in different aspects act specifically on different disease.

### Socio-cultural Activities and Importance of Sacred Forests

In site the use of plants and plant parts for food and medication, several socio-cultural activities are conducted within these relic forests. These activities include secret meetings held in hut built in the forest (Figure 2) where the notables discuss, debate and elaborate on the laws that govern the village. These forests are equally considered as places where the "gods" of the village resides and the chief and his notables are tied to offering sacrifices in the forest. A typical example is when a family has misfortune or when a couple is in difficulties of procreation the "gods" of the forest are being consulted for possible solution through ritual performance.



**Figure 2: Hut of "gods" (right) outer view and inside view (left) in Mbing Mekoup forest.**

In Mbing Mekoup forest, there is a waterfall (Figure 3) which forms a stream that is being used by villagers downstream. The "seers" draw this water precisely in a specific area within the sacred forest and according to the indigents; this water is blessed and contains therapeutic properties. Generally traditional healer uses it as remedy for some sick person whose illnesses are linked to spiritual routes and in particular cases when the healer become "seers" he can pour this water in newly dug pit toilets in homes to prevent evil spirits from invading. Permanently in the same water, some future "seers" take a bath to appease the spirits who are the source of their "evil" when they have mental disorder symptoms. This bath is oriented by an initiated person who coordinates a little ritual at the end of swimming in the name of the patient.



**Figure 3: Waterfall of the sacred forest Mbing Mekoup**  
Source: Photo ZAPFAK

Traditional believe have enabled local communities to protect the environment. According to previous research, these relic forests are of considerable interest to the indigents in that they harbor ancestral spirits of the village and safeguard the notable's totems. It equally serves as a place of refuge for the populations in case of trouble or war. People also believe that it is an excellent area where benediction can be obtained. Similar findings have equally been demonstrated in Togo and in Ivory Coast with different forest settings [8], [14]. Ecologically, these sacred forests preserved and conserved plants of medicinal importance thus safeguarding them for the present and future generations. They provide habitat for species and preserve some endangered or endemic animal and plant species and contributes in the fortification and maintenance of many African tradition in relation with plants. Just as community forests, sacred groves also purify nature through photosynthesis. They slow down soil erosion and can equally serve as good touristic sites.

Nowadays, the local populations are urged at obtaining better methods for preserving and protecting sacred forests species. Thus, they report to public authorities, civil society asking for support to complete the indigenous or traditional practices of biodiversity conservation. Despite the effort put in place to conserve and manage these forests in a typical traditional manner by the indigents, poverty, limited cultivable land accelerate the rate at which these forests are being destroyed. It is the case of Bamendjinda and Bamendjo sacred forest which are destroyed and transformed progressively as corn fields or *Eucalyptus* sp. plantations.

### Indigenous Conservation

A survey based on interviewing 110 people in the neighborhoods of these forests show that these forests have been protected for a long time by local authorities. Table 2 shows the structure of the interviewees and outcome of the interview.

**Table 2: Frequency and percentage of interviewees by village according to sex and age**

Catégories	Bangang		Bamendjinda		Bamendjo		Frequency	Percentage
	M	F	M	F	M	F		
Young girls and boys	4	1	0	0	0	0	5	4
Adult women	0	25	0	12	0	7	44	40
Adult men	30	0	18	0	13	0	61	55.55
Total	34	26	18	12	13	7	110	100

M: masculine, F: feminine

Table 2, shows that 60, 30 and 20 people were interviewed at Bangang (Zindong), Bamendjinda and Bamendjo, respectively. Among the interviewees, 56 percent were adult men, 40 percent adult women and four percent youths. The high percentage of men is explained by the importance and attachment they possess to these sacred forests unlike women who has little or no attachment due to gender. It is being affirmed by most communities that these places are reserved for the men and traditional healers. The low value observed for the young might serve as a clear indicator that they are unavailable; show little or no interest, ignorance to an extent, and their uprooting due to the influence of globalization. Most of these youths were equally not equipped with enough information concerning these forests which can be linked to the fact that the youth in these communities nowadays are not more initiated to traditional practices. The issues of schooling and the mixing of cultures also should not be rule out. To add, taken into account the indiscretion of youth today, some initiations rites are kept as top secrets from them to prevent the consequence of an incorrect practice related to these rites that are believed that can cost them their lives. Only initiated person, traditional healers and "seers" or preachers of futures have access to such secret forests. The permission of people categorized as ordinary people to access the forest must pass through negotiations. Being an initiated member is not a guarantee of having access to all the huts in the forest move, access to other compartments requires further initiation. Agricultural activities, cutting of dry tree branches for firewood as an energy source, wood for construction and hunting are strictly prohibited in these forests. The animals in these forests are considered to be totem of the notable. The plants with medicinal properties are harvested with the basis of the chief's permission. However, in Mbing Mekoup villagers enter massively in the forest every 23<sup>th</sup> December every year for community labour in cleaning the road that lead to the hut "gods"; it is during the cleaning up that the local community is allowed to gather firewood and harvest some medicinal plants. This is also the day where everyone asks blessing from the village "gods" and ancestor spirits for the New Year. Villagers who in one way or the other do not obey the access rules in the forest

are believed to be exposed to high risk of developing serious illness and/or malediction from the ancestral spirits which are being hosted in these forests. This malediction might not be immediate; it can be until when the victim dies and his corpse turn "red" will be proof that he violated some of the forest rules. When people realized that they have violated such rule, they must counteract by offerings thing like salt, palm oil, white wine, money a, goat, hen, and cock as sacrifices to appease the anger of "gods"; the village protector.

#### IV. CONCLUSION

This study assessed the ethnobotany role of Mbing Mekoup, Bamendjinda and Bamendjo sacred forests. Through interviews with the populations, it is now known that the sacred forests are preserved by local communities through prohibited and mythical beliefs. These forests contain timber and non-timber coveted by local communities. However, changing attitudes and scarcity of cultivable land force people to encroach on these forests. These indigenous conservation methods become increasingly fragile and should be strengthened to prevent the complete disappearance of these relic forests which are very important in safeguarding biodiversity. It would be important for traditional authorities to contact the administrative authorities in order to consolidate the customary protection methods of these forests. They could show to local people through associations and campaigns organization of awareness, the importance of forests for their well-being. The density of medicinal species and other species use daily from these forests should be increased through afforestation so that people can use them while ensuring their sustainability for future needs. This will undoubtedly contribute to improving the health of the populations without much effect on the balance of these forests. In addition, forests administrators and wildlife, experts from civil society should also develop laws and rules of sacred forest management to ensure their protection. This will be done with surrounding populations without neglecting the preexisting indigenous mode of conservation. Indeed, it would be necessary to forest agents to work with local communities to better manage these relic forests.

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