

# MEDICINAL PLANTS' USE IN AND AROUND KALINZU CENTRAL FOREST RESERVE, BUSHENYI – WESTERN UGANDA

Mumtaz Ahmed Sohag\*, Musinguzi Danson\*\*

## ABSTRACT

This study assessed medicinal use, the environmental diversity and conservation of medicinal plant species and to evaluate how significant medicinal plants were used in the treatment of various ailments among the local communities. Kalinzu CFR is a natural tropical forest in Western Uganda whose existence is threatened by the increasing human population and pressure for demand of its wood and non-wood resources for medicinal use.

Tools used included stratified random sampling, structured questionnaires, to select and obtain information on local plant species used for medicinal purposes, the parts used, modes of their preparation and applications as well as the ailments treated was obtained. In-situ physical study on the plant species and Floristic information on the plant species was obtained by transects and quadrant methods made from the six sub-counties adjacent to Kalinzu's forest interior. Small eight sample plots of dimensions 30m length by 15m width were made on each transect line separated by a distance of 100m using tape measures and marked with flagging tapes. The study used quantitative techniques of data analysis involving Shannon Weiner Index.

The results showed 18 species, belonging to 13 families and 16 genera used by the local communities. Forest products included fruits; vegetables, medicines, firewood, construction materials or other purposes, but a greater percentage uses the forest for medicinal values (76.7%). Plant leaves (42.5%) and bark (30%) were the most common plant parts used for medicinal purposes. Trees were the major sources of medicines as observed (50%) followed by shrubs (27.8%). The plant species most used were in the families' fabaceae (16.7%) and lamiaceae (16.7%) while the least species used were in the family menispermaceae (5.6%). Plants at the edges of the forest were harvested more frequently than those in the interior of the forest due to proximity. There were minimal local community conservation initiatives of medicinal plants (89%) as compared to 11% of the people who had cultivated plant species that were increasingly harvested or their habitats destroyed.

In conclusion, harvesting methods and traditional status of individuals that make medicinal plants the basic primary health care comparing to expensive and inaccessible western medicines is a factor hindering effective implementation of conservation measures. Besides, there is great need to educate and involve the communities in species conservation projects.

**Keywords:** Diversity, Medicinal plant, Plant species, Fabaceae, Menispermaceae

## 1. INTRODUCTION

Indigenous communities all over the world use plants for various purposes such as medicine, fuel, food, manure, construction materials, crafts and several other domestic uses [1]. Developing countries lying in the tropics like Uganda have used tropical plants as a great source of medicines, especially traditional medicine, which is useful in the treatment of different diseases. The modern pharmaceuticals also rely on medicinal plants for their modern medicines [2]. Traditional medicines derived from plants have not only played a role in providing healing of various ailments, but have also contributed to the discovery of most pharmaceutically active substances

in plants, which have been used in the commercial production of modern medicines. It is estimated that 90% of the population in developing countries rely on the use of medicinal plants to help them meet their primary health care [3]. Apart from the importance of medicinal plants in the primary health care systems of local communities, medicinal plants also improve the economic status of local people involved in their sales in markets all over the world [4]. However, there has been a tendency of deforestation, over-grazing, over harvesting and bush burning, which has contributed to depletion of different useful plant species [5].

The highest numbers of plants collected by the people are

\* Dean – Engineering & Applied Sciences, Kampala International University, Uganda.

\*\* Lecturer & PhD Scholar, Kampala International University, Uganda.

in the category of medicinal and aromatic plants [6]. About 50,000 of the flowering plant species occurring in the world have been studied for their medicinal purposes [7]. These flowering plants occur in many families, with some of the families having more medicinal plant species than others. The most species rich medicinal plant families include Fabaceae, Asteraceae and Lamiaceae [8].

In traditional medicine, different plant parts are used to treat different diseases and are prepared in various ways; and the modes of preparation and application differ from one healer to another [9]. For medicinal purposes, plant leaves, stems, barks, fruits and roots are often used. This is smeared, rubbed or drunk by the patient. The knowledge of use and application of a traditional medicine is closely bound up with the way of life and culture of the people.

However, increasing demands for medicinal plants locally and internationally have resulted in the over-exploitation and indiscriminate over harvesting of medicinal plant species. The degree of distribution and disturbance of the species population and vulnerability depends on the demand and supply; the part used, and the life span, of the scarce slow growing forest species, (Robbins, 2000). The kind of harvesting technique is important in the use and conservation of medicinal plants as some may be destructive [10]. Interests in medicinal plants as re-emerging health aid have been fueled by the increasing costs of drugs prescription in the maintenance of personal

health and well-being, and the bio-prospecting of new plant-derived western drugs. Land clearance and harvesting of forests for charcoal, medicinal and food use, are having a detrimental effect on the wild medicinal resources [11]. However, the value of indigenous knowledge in agriculture, agro forestry and rural development has become increasingly recognized over the decade.

## 2. PURPOSE OF THE STUDY

The study documented medicinal plants used by local communities living around Kalinzu Central Forest Reserve. In the recent years, forests have been viewed as a source of national revenue with timber as the prominent product. However, in the vague of fast disappearing forest cover, great interest is needed to be attached in non-timber forest products which range from gums, resins, fruits, flowers, seeds and seed derivatives, whole plant, leaves, roots, or stem bark and other forms of medicines [12-13]. The traditional medicines and pharmaceuticals derived from forests have today played an important role in the primary health care (PHC) of millions of people [14-15]. The study therefore, was to increase a descriptive capacity and rationality of different medicinal plant taxonomies used by the communities living around Kalinzu forest, and to enhance community awareness by providing information to improve their conservation values.

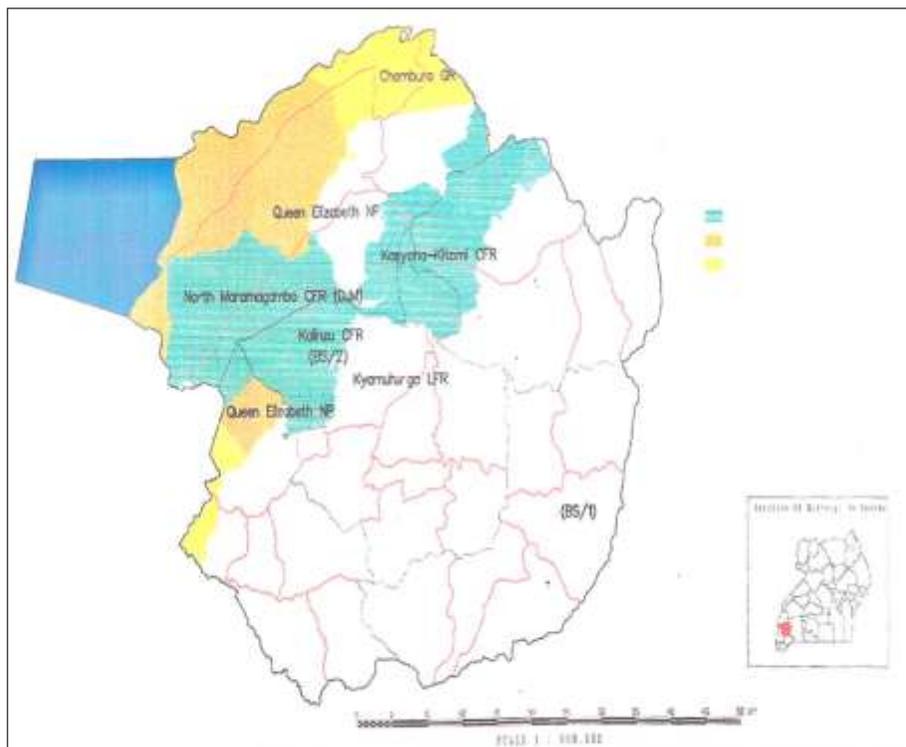


Figure-1: Map of Bushenyi District showing the location of Kalinzu CF

### 3. RESULTS AND DISCUSSIONS

The study results revealed that in traditional medicine, different plant parts are commonly used to treat various diseases, although the modes of preparation and application differ from one species to another and one healer to another [9]. Flowering plants occur in many families, with some of the families having more medicinal plant species than others. The species that are rich belonging to medicinal families are Fabaceae, Lamiaceae and Asteraceae [8]. Therefore, the research findings of the study were in agreement with the findings of above mentioned researchers. The results revealed that medicinal plant species in Kalinzu Central Forest Reserve and grasslands around are diverse in types and their parts used for the treatment of diseases, with the leaves (42.5%) bark (30%) and roots (20%) being the most commonly harvested parts used in herbal medicinal preparations.

The medicinal plants were used to treat many kinds of diseases such as sexual disorders, fevers, pressure, digestive disorders, STDs and common colds to mention a few. For medicinal purposes, plant decoctions of leaves, barks, stems, roots or flowers are often used. This is either

drunk or applied externally on the body or part affected on a patient.

A total of 18 medicinal plant species were identified in the study conducted in the six villages of Swazi, Kishunju, Kyamuhunga, Butare, Kayanga, and Mashonga during the excursions into Kalinzu Central Reserve. Medicinal plant species were observed in different growth forms and morphological structures; these treated either one or more diseases or were found cross-cutting. This meant that some species work best when mixed together during their preparation as decoctions or infusions. In some circumstances, decoctions had common methods of preparation while others could differ in their methods of preparation and applications. Below are descriptions of identified medicinal plants for their preparations, applications and the ailments they treat.

The plant of *Albizia coriaria* belongs to the family fabaceae, local named Runyankole (omusisa) Figure-2 and Figure-3. Growth habit of the tree has bi-pinnate leaves and its trunk is often twisted, with rough and raggedly scaled grey-black bark. It bears many flowers, with sweet smell and is white with red stamen filaments.



Figure – 2: Tree



Trunk



Leaves



Figure-3: Plants of American worm weed are used for children’s convulsions, constipation, chest pain, cough and asthma, stop vomiting, headache, expels intestinal gas and stomachache and treats stomach worms in children.

Results from the forest's sampled plots show that species throughout the forest are not evenly distributed and there was a decline in availability of most medicinal plant species with the increasing distance into interior of the forest. Also, some medicinal species showed a general decline in their abundance due to habitat destruction and unsustainable harvesting methods. Medicinal plant species were reported to re-grow but at a slower rate than individuals could harvest them, an indication that the species were likely to disappear in the future. About 89% of the local people including (THS, TBAs and TMPs); do not practice conservation of medicinal plant species on their farmlands. Only 11% of the population conserves these species by cultivating them in gardens or around

homesteads or in fallow lands.

Eighteen medicinal plants, both cultivated and wild, (Table-1) were documented and identified in the study area. The abundance and distribution of medicinal plant species in different diameter size classes is presented (Table-2). These were grouped into pairs transects for analysis, that is to say, transect TD1 and TD2, transect TD3 and TD4, and transect TD5 and TD6. Most of the medicinal plants utilized by the local populations living around Kalinzu forest are got from wild, often in grasslands within the peripherals of the forest. However, fewer medicinal plant species were cultivated in farmlands or preserved in fallow lands.

**Table-1 Medicinal plant species, cultivated and wild used by communities living around Kalinzu Central Forest Reserve**

Cultivated plant species		Wild plant species	
Botanical	Local name	Botanical name	Local name
Aloe ferox*	Rukaka/ Omujaaja	Aloe ferox *	Rukaka /enkokomtaya Kamaramahano
Ocimum suave*	Omuteete	Eurphobia hirta	Outotoima
Cymbopogon citratus	Ensogasoga	Hoslundia opposita	Ekikuzanyena
Ricinus communis*	Muringa	Warburgia ugandensis	Kifaru
Moringa oleifera	Niimu	Chenopodium ambrosiosides	Omujaaja
Azadirachta indica		Ocimum suave*	Omugabagaba or omukyola ekibirizi
		Senna didymorbortrya	
		Vernonia anygalalina	
		Spathodea campanulata	Omunyara
		Basella Alba	
		Erythrina Abyssinica	Enderema
		Ricinus communis*	Ekiko
		Leonotis nepatae folia	Ensogasoga
		Ficus natalensis	Ekicumucumu
		Albizia coriaria	Omutoma Omusisa

\*Represent those medicinal plant species that exist both cultivated and in the wild

**Table-2 Frequency of distribution of medicinal plant species in Kalinzu Central Forest Reserve (f = 173).**

S. No.	Botanical name	Frequencies of species per transect						Total
		TD1	TD2	TD3	TD4	TD5	TD6	
01	<i>Aloe ferox</i>	00	01	00	00	03	02	06
02	<i>Euphorbia hirta</i>	00	00	01	02	02	00	05
03	<i>Hoslundia opposita</i>	06	00	02	01	00	01	10
04	<i>Warburgia ugandensis</i>	02	05	04	01	00	00	12
05	<i>Chenopodium ambrosioides</i>	00	04	01	00	00	02	07
06	<i>Ocimum suave</i>	03	01	00	00	01	01	06
07	<i>Senna didymorbortrya</i>	04	01	06	00	03	00	14
08	<i>Vernonia amygdalina</i>	02	05	05	07	01	06	26
09	<i>Cymbopogon citratus</i>	00	00	00	00	00	00	00
10	<i>Spathodea campanulata</i>	04	01	01	05	00	00	11
11	<i>Basella alba</i>	01	00	04	06	00	00	11
12	<i>Erythrina abyssinica</i>	00	00	03	02	00	02	07
13	<i>Ricinus communis</i>	08	04	03	05	06	04	30
14	<i>Leonotis nepetae folia</i>	01	03	00	05	00	01	10
15	<i>Ficus natalensis</i>	02	02	00	05	00	03	12
16	<i>Moringa oleifera</i>	00	00	00	00	00	00	00
17	<i>Albizia coriaria</i>	01	00	02	00	03	00	06
18	<i>Azadirachta indica</i>	00	00	00	00	00	00	00
TOTAL								f=173

Key: Transect Name: TD1 = Swazi transect TD2= Butare transect TD3 = Kyamuhunga transect TD4 = Kishunju transect TD5 = Kayanga transect TD6 = Mashonga transect

**Table-3: Medical Plant species' abundance percentages, density and diameter size classes (Dbh) of observed species (n = 18)**

Botanical name	Species (%)	Sp.density	Dbh /cm	Frequency (F)
<i>Aloe ferox</i>	3.2	0.28	-	06
<i>Euphorbia hirta</i>	2.7	0.23	-	05
<i>Hoslundia opposita</i>	5.4	0.46	0.70	10
<i>Warburgia ugandensis</i>	6.5	0.56	160.0	12
<i>Chenopodium ambrosioides</i>	3.8	0.32	-	07
<i>Ocimum suave</i>	3.2	0.28	0.20	06
<i>Senna didymorbortrya</i>	7.6	0.65	12.7	14
<i>Vernonia amygdalina</i>	14.1	1.20	14.4	26
<i>Cymbopogon citratus</i>	3.8	0.32	-	07
<i>Spathodea campanulata</i>	5.9	0.50	125.2	11
<i>Basella alba</i>	5.9	0.50	0.40	11
<i>Erythrina abyssinica</i>	3.8	0.32	109.9	07
<i>Ricinus communis</i>	16.3	1.39	11.1	30
<i>Leonotis nepetae folia</i>	5.4	0.46	0.50	10
<i>Ficus natalensis</i>	6.5	0.56	73.2	12
<i>Moringa oleifera</i>	1.1	0.09	19.7	02
<i>Albizia coriaria</i>	3.2	0.28	179.6	06
<i>Azadirachta indica</i>	1.6	0.14	39.8	03

#### 4. CONCLUSIONS

The study findings suggest that all the people living in communities around Kalinzu CFR utilize the forest as a source of medicinal plant species and for other purposes. However, the use, harvesting and processing of medicinal plant species from Kalinzu forest is not sustainable. Unsustainability is due to poor harvesting methods such as debarking, stem cutting or uprooting of plants that could result into drying of part or the whole plant. Also, over-harvesting of plant parts could reduce the potential of the plants' population to regenerate and meet the increasing demands of the people.

The results identified 18 medicinal plant species belonging to 13 families and 16 genera with some plant species used in the treatment of common diseases, but their methods of preparation and applications could be similar or different, as well as the dosage administered. However, most of the herbal medicines were used in liquid form as decoctions or infusions. To a small extent, dry and powdered herbal medicines would be used externally or chewed when dry-solid. The leaves were mostly used part of the plants (42.5%) and bark (30%) and the least used part were the flowers (0.5%). Hence, the use of leaves and bark could damage the parent plant's tissues and potentials to regenerate easily.

About conservation measures, a greater proportion of the local communities living around Kalinzu forest (89%) did not practice any methods of conservation of medicinal plants, equivalent of 178 respondents interviewed of 200. Those who grow some medicinal plant species in their gardens or homes (11%) grow very few species of these plants (33.3%). Lack of conservation projects in these areas could be one of the reasons to account for this. Also, the belief by the local populations that medicinal plant species are abundant in the forest and that there is no need of growing them in gardens and homes.

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