Traditional Medicinal Use of *Ensete ventricosum* (Welw.) Cheesman in Gedebano Gutazer Welene District, Gurage Zone, SNNP Region, Ethiopia

Kedir Abdella Nudego

Addis Ababa University

Addis Ababa, Ethiopia

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Kedir Abdella Nudego

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This is to certify that the thesis prepared by Kedir Abdella entitled: "*Traditional Medicinal plant of Ensete ventricosum*, *Gedebano Gutazer Welene District Gurage zone of SNNP Region, Ethiopia*" and submitted in partial fulfillment of the requirements for the degree of master of science in Biology complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ABSTRACT

This study was conducted in Gedebano Gutazer Welene Destrict, Gurage Zone of SNNP Regional state aiming at assessing and documenting the overall traditional medicinal uses of *Ensete ventricosum*. The plant, locally known as ENSET, is drought tolerant multipurpose crop originally domesticated in the region. Traditional medicinal knowledge of the community was collected and documented using quantitative and qualitative ethnobotanical methods. Data were analyzed using simple descriptive statistics. Different clones of the species available in the study area have reported various medicinal uses. Utilization of the plant in relation to health care was also found to be clone specific. Plant parts used and methods of preparations were also documented in the current study. The most frequently used plant parts were the leaves and then stem. Crushing and pounding were the most widely used methods of preparation. A part or a mixture of plant parts mixed with water during preparation for different purposes. Notably, both cultural and spiritual beliefs positively contributed to the managements and conservations of this important food and medicinal plant. However, the dramatically increasing population growth, demand for additional land for other crop production, overgrazing, etc. are undoubtedly affecting the sustainability of *Ensete ventricosum* if not given due attention. This study evidenced the enormous uses of the plant and the associated traditional medicinal knowledge. Further studies regarding nutritional contents and active ingredients are recommended to maintain the sustainability of this drought resistant multipurpose crop.

KEY WORDS: *Ensete ventricosum,* Gedebano Gutazer Welene, Medicinal plant,

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CHAPTER ONE

1. Introduction

1.1.Background and justification of the study

ETNSET is an indigenous plant classified under the monocarpic genus ENSET and family Musaceae. It is commonly known as false banana, the Ethiopian banana or the Abyssinian banana. Locally the plant is called ENSET. Botanically, it is named as *Ensete ventricosum* (Welw.) Cheesman. The plant is herbaceous (non-woody) having a size of medium tree growing up to the height of 12 m. It has a stout and fleshy pseudostem bearing leaves that resemble banana leaves. The leaves are also tightly overlapped at their bases. Mature leaves may attain a leaf blade size that grows to a size of 5m length by 1m width. The plant bears flower it is late age, which appear in massive pendant thyrses covered by large pink bracts. Fruits bear hard, black and rounded seeds. The plant dies soon after flowering and seed bearing. Although the ENSET plant is widely distributed in tropical regions of Africa and Asia, the knowledge to use its pseudostem and root is well developed in Ethiopia. It is particularly used as a major source of food in southern Ethiopia and is an important plant contributing to food security. It is believed that southern Ethiopia is an area of ENSET domestication where it became a crucial crop establishing the farming system in the area. Although its cultivation is highly localized. ENSET is cultivated as perennial plantation in homestead rings in association with other companion crop species that are growing in main agricultural land (Beker and Simmands (1953) .The flowers of *Ensete ventricosum* are hermaphrodite (have both male and female organs). It is suitable for light (sandy), medium (loam) and heavy (clay) soil and it is also suitable for the PH

with acidic, neutral and basic (alkaline) soil. But it is more suitable or prefers the neutral soil. It cannot grow in the shade. It mostly prefers moist soil. The edible parts of *Ensete ventricosum* are corm, seed, and stem. The edible uses were the chopped and grated pulp of the corm and leaf sheath is fermented and used as flour in making kocho bread. And also the edible parts are used as traditional medicine. E.g. corm. This thesis primarily explores the medicinal potential of ENSET super bum for several human ailments including diabetes, kidney stone, and dysuria (cultural and tourism office). It also regards the present status of the medicinal plant.

1.2. The need for the research on ENSET

The study will give awareness about medicinal use of *Ensete ventricosum* traditionally and to give more emphasis about specific medicinal value of ENSET plant for others. And also to stimulate other researcher works on *Ensete ventricosum* plant in a modern way i.e. the modern medicinal uses of *Ensete ventricosum* to solve the problem of giving unbalance dosage for the patient. The researcher also tried to announce overall importance of *Ensete ventricosum* and how to prepare its dosage administration traditionally in gurage zone of gedebano gutazer welene district.

The study assesses the overall medicinal use of *Ensete ventricosum* traditionally to improve the treatment method in the district. There are many works done on the *Ensete ventricosum*, such as the diversity and cultural uses of *Ensete ventricosum* (Yemane Tsehay and Fassil Kibebew, 2006). Genetic variability and biotechnological studies for the conservation improvement of *Enset ventricosum* (Genet Birmeta, 2004), Farmers indigenous knowledge and assessment of *Ensete ventricosum* (Bizuayehu Tesfaye, 2002)

Nevertheless, little is known about the ethnobotany and traditional medicinal uses of *Ensete ventricosum*.

1.3.Statement of the problem

Ensete ventricosum is a very important traditional medicinal plant. It is used to cure wound and other health problems in the body. But in the society the treatment ways and procedures are different from place to place based on the age of the plant used for medicinal value and dosage administered with regard to the age of the patient. People utilizing ENSET as medicine are also believed to identify the use of different varieties to treat different ailments. However, no proper documentation was found to support this evidence so far. This study was aimed at generating rigor evident with regard to the best medicinal age of the plant. The plant parts used to treat diseases and how the local communities prepare the plant for the purpose of medicine as well as the different varieties of ENSET treating specific health problems were examined in this study.

1.4.Research questions

1) How many varieties of *Ensete ventricosum* occur in the study area?
2) Which varieties of *Ensete ventricosum* are known for their medicinal value in the study area?
3) Which particular variety is specific to which disease?

1.5Hypothesis

1) Population growth increases agricultural demands; this affects the expansion of *Ensete ventricosum*.
2) Agricultural expansion affects the landraces of *Ensete ventricosum* used as medicine.
3) People have the knowledge about the loss of *Ensete ventricosum* caused by agricultural expansion.
4) Most of local community members are planting *Ensete ventricosum* around their home.

1.6. Objectives of the study

1.6.1. General objective

The main objective of this study is to assess the overall medicinal uses of *Ensete ventricosum* and to document treatment methods used by the communities using the landraces in Gedebano Gutazer Welene District.

1.6.2. Specific objectives

1) To determine the ENSET varieties grown in Gedebano Gutazer Welene District
2) To identify the specificity of ENSET varieties working against different ailments.
3) To determine the appropriate age of the plant for use as medicinal plant.
4) To contribute base line data about medicinal uses of *Ensete ventricosum*

CHAPTER TWO

2. Literature review

2.1. Ethnobotany and medicinal Plants

Ethnobotany is a broad term referring to the study of the relationship between people, plants and the environment involving wide range of disciplines (Martin, 1995 & Cotton, 1996). Over centuries, indigenous people of different localities have developed their own specific knowledge on plant resource, use, management and conservation (Cotton, 1996).

One precondition for making ethnobotanical work effective is to be aware of the range of methods and approaches and to be able to choose the most appropriate ones for the problem at hand. Equally, one has to be aware of the work already done. About 85% of the traditional medicines used for primary health care are derived from plants (Farnsworth, 1988). It was also reported that the use of medicinal plants is a common phenomenon in Ethiopia.

According to Dawit Abebe (2001), traditional remedies are the most important and sometimes the only source of therapeutics for nearly 80% of the population in developing countries. It is also known about 95% of the traditional medicine used in Ethiopia is of plant origin.

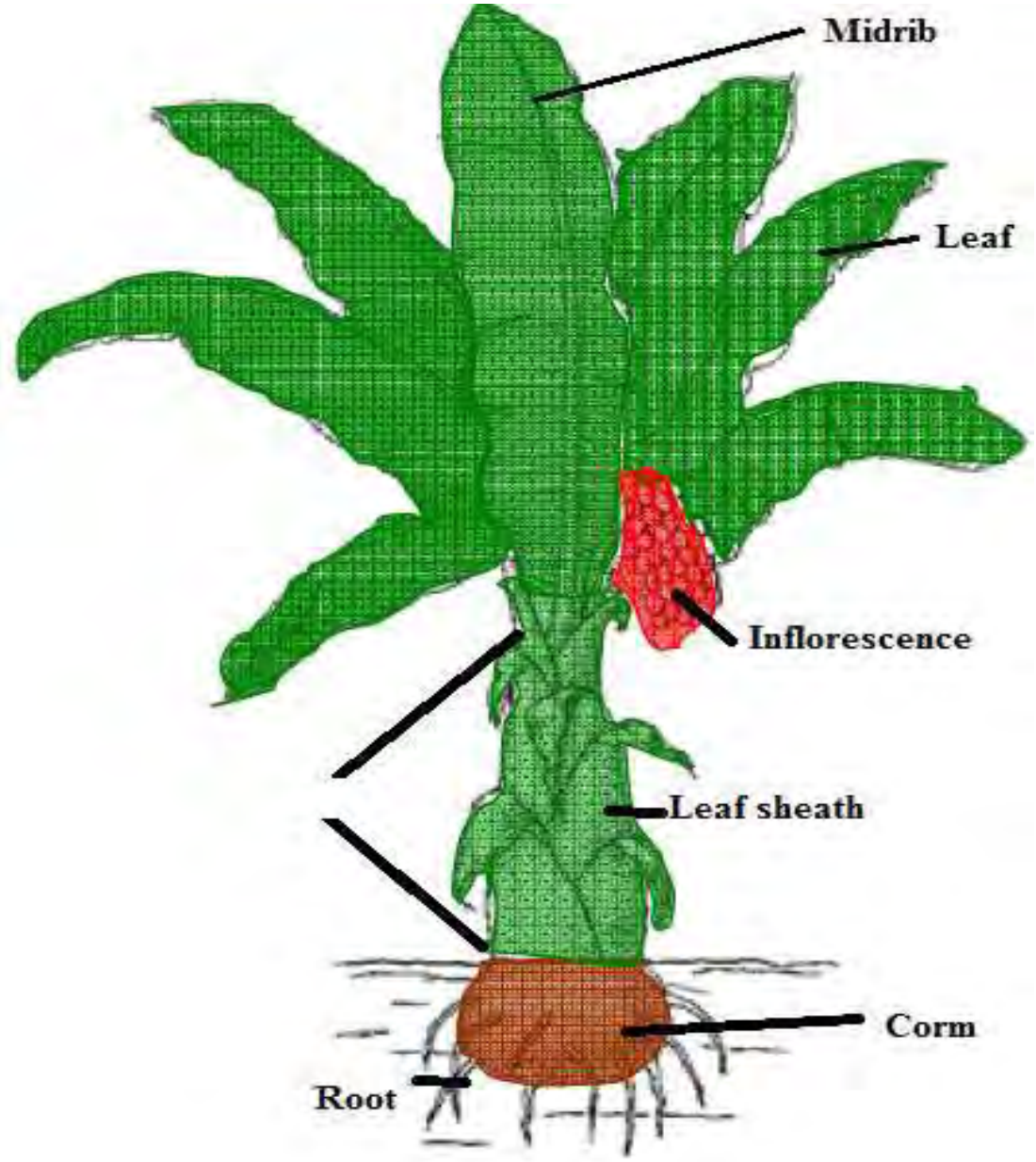
2.2. ENSET (*Ensete ventricosum*)

ENSET *(Ensete ventricosum*) is a perennial herbaceous root crop with long broad leaves and bulky pseudostem. Sizes of ENSET plants vary depending upon: management, the ENSET type or landrace, soil fertility, distribution of rainfall, and altitude of the area. It reaches up to 12 m in height and the girth at the fattest point can be up to 4m (Kefale and Sandford, 1991). The plant is monocotyledon and does not have a true branched pseudostem‟ it is formed by the imbricated over lapping base of petiole (leaf stalk) means leaf behind when old leaves dies. The pseudostem is broader towards the base and this gives rise to the species name called *ventricosum*, which means with swelling. The simple large leaves with a thick rose pink midrib and numerous pinnate parallel nerves extending to the margins are spirally arranged. This multi-purpose root crop is widely grown in the central, south and southeastern part of Ethiopia for its food, forage, fiber, and to some extent for medicinal uses. The corm and the pseudostem are the main sources of human food and animal feed.

The plant is known to provide more amount of food stuff per unit than cereals (Tsegaye, & Struik, 2001). It is estimated that 40 to 60 ENSET plants can provides enough food for families of 5 to 6 people in an area of 250-375 square meter (Smeds, 1955). *Ensete ventricosum* (Ethiopian banana) is a staple food crop in most parts of southern Ethiopia where it is believed to be its origin and domestication. The Ethiopian banana is also popular ornamental plant planted by people in the area of its domestication as well as in other home gardens. Although the crop is very important to the people who use it for various purposes, there is inadequate information regarding its production systems, intraspecific diversity and distribution. Moreover, the role of indigenous people in cultivation, management, utilization and classification is not well documented, perhaps

due to its narrow knowledge distribution (since it is domesticated and cultivated as a crop only in Ethiopia) and lack of consistent research. The fact that the plant has a prolonged life cycle which usually takes from three to ten years (even more in some cases) might have contributed to the difficulties of conducting persistent researches about the plant.

However, farmers have amazing knowledge of ENSET, which has been accumulated over many generations. As the first cultivators and experts, their knowledge will have profound importance for both the recent and the future sustainable use and conservation. As Bezuneh (1993), mentioned during the last several decades, ENSET cultivation has evolved as one of the most stable and sustainable agricultural development systems, because the system has been efficient in building and sustaining the fertility of the soil. It seems that it would be valuable to learn from the centuries of farmers‟ practical experience and benefit from their understanding. This will not only help to improve the ENSET dependent farmers' livelihood and their immediate needs but also have implications for better utilization and future conservation of this promising, multipurpose and very high yielding crop. The ENSET agricultural system of Ethiopia is changing or has changed in its social, biological and environmental context. Nonetheless, ENSET and its farming system remains scarcely supported by formal researches, and its resources are underutilized as compared to its potential. This limited effort has meant that the potential of ENSET is underexploited, and its genetic resources and associated indigenous knowledge system (IKS) are put at risk of continuous erosion.



(Source internet)

Figure 1 Parts of *Ensete ventricosum*

2.3. Growing ENSET plant

In areas of ENSET growing societies of southern Ethiopia, there is a tradition of planting ENSET. During planting the men want to plant the ethno-male ENSET and the women want to plant the ethno-female ENSET plants. The female farmers make the decisions and are responsible during the harvest as women have the strongest interest in getting something to be harvested and cooked. On the other, during planting the men want to plant the male ENSET and the female wants to plant the female ENSET plants. The male farmer does not want ENSET plants to be harvested at their earlier (immature stage), even if he knows, the product will be consumed by themselves and their families. Fearing the long-term effect on the age and sex structure of the plantation and the consequence of food shortage, they will not always be comfortable during the harvesting of immature ENSET plants. The early growth and development of *Ensete ventricosum* (Musaceae) are seedlings. Vegetative propagation of ENSET enforces cutting down of an ENSET plant close to the ground. Afterwards, the apical meristem is removed and leaf sheaths are either removed or pulled apart (Brandt et al, 1997). This breaks the apical dominance and enables development of callus, from which numerous adventitious sprouts appear after about three months.

Treatments during the propagation process vary regarding climate and ethnic group (Brandt et al, 1997 and Zippel, 2002). This includes

1) Uprooting of mother plants,

2) Drying the corm,

3) Splitting the corm,

4) Wounding the apical meristem

5) Filling the corm with soil, manure or gravel, and

6) Planting, protection and manuring of the propagated corm. All measurements must not be performed. Sometimes the same mother plant was used two times for propagation. At altitudes above 2800 meters special treatment could be applied before planting the corm into the final plot (agree 80% of informants).

Fig 2. Growing ENSET plant.

There are about four different farming systems predominantly practiced all over the country:

1. pastoralism,
2. shifting cultivation,
3. grain-based cultivation, and
4. ENSET based cultivation.

Four major ENSET subsystems can be recognized (Brandt et al, 1997).

1) Such sub-system is where ENSET is the staple food and main crop. Such systems are highly dependent upon cattle to produce manure for fertilizing ENSET fields. The main ENSET product is kocho, a fermented decorticated pseudo stem mixed with chopped corm. Population densities in these communities are commonly 200 to more than 400 persons per square kilometer (Brandt et al, 1997).

2) ENSET sub-system uses ENSET as a co-staple with cereals and tuber crops. Cattle are important for manure to fertilize ENSET fields, while oxen are used to plow cereal fields. Both kocho and amicho (boiled ENSET corm) are eaten. Population density among these groups is high, sometimes with more than 200 people per square kilometer (Brandt et al, 1997 and Zippel, 2002).

3) The sub-system relies upon cereals as the most important crops, with ENSET and root crops of secondary importance (Brandt, 1997 and Hartmann, 2004). ENSET is grown largely for International Journal of Engineering Research & Technology (IJERT).

4) The fourth ENSET sub-system is where root crops are of prime dietary importance, cereals are of secondary importance, and ENSET is of minor importance (Brandt et al, 1997). In this sub-system **yams** and **taro** are the most important crops, while ENSET, cereals, and cattle-herding are of minor importance. Traditionally, ENSET is processed for eating simply by cutting the corm into pieces and cooking. Population densities are low in these groups, and settlements are small and dispersed (Brandt et al, 1997). ENSET is one of the major food crops supporting many people in Southern Nations, Nationalities and People‟s Regional State. The crop requires intensive management and high amount of nutrients; however, only limited work has been done on fertilizer requirement of the crop. ENSET cultivation is among the tremendous potential of the country to withstand the rapidly increasing percentage of population portion below food poverty line. It supports more than 10 million people in the South and South-western parts of Ethiopia. Under usual circumstances, plants flower, fruit and die. Mostly the ENSET crop is cultivated for food, animal feed and conservation of natural resources. The different plant parts and the by-product of the ENSET plant have also various uses. ENSET has multipurpose uses and nothing will be left from the plant and can be dependable source of income. Thus, farmers in ENSET growing areas describe the importance of ENSET by saying that it is everything for us: our food, cloths, beds, houses, cattle feed and plates (Brandt et al., 1997).

In ENSET-based cultivation, ENSET (*Enset ventricosum*) traditionally ranked first in importance as cultivated food crop and it is an important staple food. It is the main food source among Gurage, Sidama and related groups. It is not only staple food, but exists side

by side as a co-staple to other crops, tuber crops or cereals. The presence of ENSET in the farming system contributes significantly to the stability of the food supply by several mechanisms. ENSET can:

1) Be stored for long periods

2) Be harvested at any time during the year

3) Be harvested at any stage over a several year period and

4) Survive stress years that reduce other food sources.

The three major products utilized as food are commonly known as Kocho, Bulla and Amicho. Kocho is a fermented product from the scrapped parenchymatic tissue of leaf sheath and pulverized corm.

Bulla is made by dehydrating the juice arising from the mixture of scrapped parenchymatic tissue of leaf sheaths, pulverized corm and granted stalk of inflorescence.

Amicho is the stripped corm of younger plants of ENSET which is boiled and consumed in a way similar to Irish potato, sweet potato and cassava.

2.4. ENSET processing

ENSET processing, the most tedious job left for women, are divided in to five main operations:

1) Uprooting the mature stand, separating the individual parts and fermentation pit preparation,
2) Shredding and cleaning the leaf sheath,
3) Decortications of the sheath,
4) Grating the corm, squeezing the decorticated sheath and grated corm to produce bulla,
5) Final mixing of the squeezed decorticated sheath and the grated corm; placing it in the already prepared and ENSET leaves mated pit and covering it to create suitable environment for fermentation. To facilitate fermentation, starters made from various herbs and spices together with small portion taken from already fermented kocho are used. Daily turning, mixing, rinsing and chopping continues over a period of the fermentation. The fermentation takes 15 to 20 days (Brandt et al, 1997and Zippel, 2002). After fermentation, by reducing the moisture, the product can be stored for several months (personal experience).

The major food products obtained from the ENSET plant are kocho, bulla and amicho, all of which are simple to produce once the plant is harvested, and can be stored for long periods without spoiling. Kocho bread is starch rich piece which is made from the fermented mixture of the decorticated leaf sheaths and grated corm. Combined with Ethiopia‟s spicy kitfo (minced meat), it is now an expensive dish in virtually all restaurants in the country. One of the tedious jobs in kocho processing is extraction of water from the fermented ENSET.

The wild form of *Ensete ventricosum* is wide spread in tropical Africa from Ethiopia through similar to other Musaceae plant. The leaf of *Ensete ventricosum* is fully developed prior to emergence. The origin and geographic distribution of ENSET is wide spread in

tropical Africa from Ethiopia through Kenya, Uganda and south to Mozambique and South Africa and west to the Democratic Republic of Congo. ENSET is cultivated only in Ethiopia, where it was first domesticated possibly about 2000 years ago. The center of ENSET cultivation is the mountain of south western Ethiopia (Sandford, (1991). Though the white or grey colored bread or porridge, which is produced from the fermented plant Kocho, can be strange and foul-tasting to an outsider, ENSET has been having a far-reaching impact on the lives of the Southern highland dwellers for generations. The adaptation of the plant for varying environmental conditions coupled with its diverse functions in the farming system made attractive to establish ENSET plant husbandry

Men prepare the land, split and bury corms for vegetative propagation of suckers, plant and replant ENSET plants of different ages, so they usually decide which area of land is to be use ENSET plantation. They will also have a strong say as to which varieties are to be planted, although women do offer their opinion (Sandford, 1991). The corm is split into two or four parts and buried in the ground at about a 30 degrees angle. The management of the suckers is different from the management of other ENSET plants that are found at different growing stage. When splitting and burying the corm they not only consider the season (usually dry season) but also the movement of the moon. Farmers strictly believe that the movement of the moon not only affects ENSET harvesting and propagation but also other crops and plant species.

2.5. Indigenous Knowledge and ENSET Sustainability

In addition to its uses as food, forage, construction material, medicine, as source of raw material to material culture, ENSET provides ample benefit to the livelihood of the society including sustainability in biodiversity conservation. The nature of the leaf and its pseudo-stem helps it not only to cover the ground and protect the soil from direct rain damage, detachment and transportation of topsoil, but also it enables it to harvest water in its loose leaf sheath (pseudo-stem) pockets. ENSET protects the soil from both wind and rain erosion throughout the year. The broad and long leaves of ENSET intercept the kinetic energy of rain drops and absorb it harmoniously into the pseudo-stem and the surface of the earth. Kena (1993) indicated that ENSET fields when compared to other crop fields are less subject to erosion. In addition it protects the soil from direct sun's heat and decreases evapotranspiration both from the plants and from the land surface. It also has profound importance as a windbreak by decreasing the velocity of the wind (evapotranspiration will be considerably decreased). As a homestead plant it protects the farmer‟s local houses from strong wind destruction. It is also the guardian of small coffee seedlings, vegetables, medicinal, and other useful plant species in homesteads. As its pseudostem is large and has a big corm and well established strong roots it controls runoff and conserves soil and moisture.

To date land scarcity caused by population growth and the consequent food shortage has threatened this valuable plant. Shack (1963) mentioned that population density in ENSET growing areas of Ethiopia is exceptionally high. The average density in the ENSET growing areas as a whole is over 200 persons/ha, more than six times the national average

(Pankrust, 1997). According to the farmers in ENSET growing area, there are some indications of the loss of the late maturing (ethno-male) ENSET plants because of the farmer‟s immediate need to plant the female varieties, which are early maturing and more palatable at their earlier stage. At maturity, the total yield obtained from the male ENSET plant exceeds considerably the total yield obtains from the mature ethno-female ENSET plant.

Because of food shortage, farmers are forced to consume the immature ENSET plants which have already seen as a threat to the sustained ENSET based farming systems. A threat to ENSET plants means a threat to the knowledge about ENSET that has been accumulated over time. Loss of some plants and their habitat will ultimately cause loss of some of the above uses, services and cultural values. It seems that we are not only losing the variety and the variability of living things and the complex ecosystems in which they occur but also the knowledge that has been gathered over time. The present generation does not store because of food shortage and as a result lost knowledge of storage techniques. Balick and Cox (1996) have also mentioned the many challenges facing ethno botanists in future years, particularly the rapid loss of biodiversity and the concomitant loss of indigenous knowledge systems.

2.6. Sociocultural importance

Farmer‟s-ENSET interaction and relations are found to be very interesting in ENSET cultured areas. This reflects the indigenous knowledge of the crop, their values, folklore and culture associated with the plant. In ENSET growing areas traditional houses are constructed (thatched) using its dried mi-rib and pseudostem leaf sheaths. ENSET is a food for humans and feed for animals. It conserves soil and moisture in and around the

ENSET plantations, vegetables and short annual crops enjoy the always-available moisture because of its broad leaf canopy coverage. It is ornamental, a windbreak that protects the house from strong wind, giving pleasure to the household and to visitors. A farmer with large ENSET plantation and many mature (big) ENSET plants can immediately be recognized by outsiders as a rich and respected man. Just by looking the farmer‟s house, his ENSET plantation and the vegetables in the garden one can tell whether he is food self-sufficient or not. A household's status and wealth is often assessed in terms of the number and age of ENSET plants, and also in terms of the size of the plants at his homestead.

ENSET plantations with many matured ENSET plants are available in almost all ENSET growing areas of Ethiopia. Therefore, as Balick and Cox, (1996) emphasized, the study of the interaction of plants, and people, including the influence of plants on human culture, is the focus of the interdisciplinary field of ethnobotany. Bezuneh (1993) has also suggested that in addition to regular agronomic research themes, the central focus should be the homestead environment (family decision, culture, etc.) that incites ENSET culture and agriculture.

ENSET cultivation requires careful nurturing. There is a very intimate relationship between the whole household and the ENSET plant in the homesteads. On his study on the Ari ENSET growing areas of southern Ethiopia, Shigeta, (1990) mentioned farmers‟ intimacy with ENSET through daily associations with and their proximity to ENSET plants. They often know not only the vernacular name but also the life history of individual ENSET plants. That is why in most cases it grows near the farmer‟s house. Since farmers live near their ENSET gardens manure and house refuse can be applied on daily basis and plants can be protected from wild and domestic animals. If a diseased

ENSET plant appears in the plantation the house hold members will immediately uproot and throw it somewhere far from the plantations (so as to protect the healthy plants).This proximity to the house is also convenient for the day to day management, harvesting, processing, for every day preparation of food either from the corm or from the already fermented (kocho) product. As Kefale and Sandford, (1991) mentioned women harvest and process ENSET in-situ in the gardens. Harvesting is usually undertaken by small working parties formed by group of female friends and close relatives. Even very small children with their parents or alone visit the homestead frequently i.e. when they harvest their daily food either from the ENSET or from other garden crops. They enter the plantation to take the broad leaves to make bread or to serve their daily food etc.

The males prefer male ENSET plants because there is less temptation for the women to harvest the plant before maturity for the sake of eating the delicious boiled corm of the female plant (Kefale and Sandford, 1991).However, farmers always (except the poorest) combine and, row various types of male and female ENSET plants. On the other hand it was disclosed by the farmers that even though the corm of the male ENSET plant is sour and unpalatable, during critical food shortage times it could be uprooted and consumed at its earlier stage.

The males prefer male ENSET plants because there is less temptation for the women to harvest the plant before maturity for the sake of eating the delicious boiled corm of the female plant (Kefale and Sandford 1991). However, farmers always (except the poorest) combine and, row various types of male and female ENSET plants. On the other hand it

was disclosed by the farmers that even though the corm of the male ENSET plant is sour and unpalatable, during critical food.

Fig 3 the different clones of ENSET plant

2.7. Uses of *Ensete ventricosum*

Ensete ventricosum is primarily grown to produce a starchy food from the pseudo-stem, corm and the stalk of the inflorescence. The mixture of pseudo-stem pulp and the pivoted corm and stalk of the inflorescences is put in to pit for fruit with seed fermentation and the resulting product is locally called “kocho” and “bulla”. Bulla is prepared from the starchy liquid obtained by squeezing the mixture. “Kocho” is a prestige food kept for rents and Ceremonies and also loved bread made from Koch and wheat flour is sometimes served. Bulla is also eaten as porridge. The ENSET corm is eaten as “amicho” that cooked fresh and consumed in a war similar to potato or cassava. The leaf sheath of *Ensete ventricosum* provides good quality fiber for making rope, twine, baskets, mats and others. The dried leaf sheath aroused as packing and warping to materials in fences, matters, mats and house construction. The fresh leaves provide shadow in nurseries. The entire plant or parts of it except root are used to food for lives stalk. (Brandt et al (1997).

Food for Human: Kocho, Bulla, and Amicho are eaten by humans.

ENSET as an animal feed: all parts of ENSET are good sources for animal feed. Especially during the dry season the domestic livestock are fed on remnants of ENSET parts, which are not normally eaten by humans.

Fiber use: the fiber from ENSET is used in the weaving of products such as shopping bags, handbags, suitcases, sieves, pouches and mats. The variety, the age of the plant, and the way in which the fiber is extracted and stored all determine its length and quality

(Kefale and Sandford, 1991). Farmers strongly believe that fiber extracted from the male is of a very high quality and strength.

Medicinal uses: some ENSET cultivars are believed to have medicinal value. Farmers use ENSET plants as medicines not only for human beings but also for their animals. House construction and fencing: the moderately dried ENSET leaf-sheaths and midribs (which are locally called kacha) are used for local house in ENSET growing areas. Farmers say kacha is the most important raw material obtained from an ENSET and indispensable for fencing, wrapping and packing of every material land product and for tying and keeping animals in and around the house.

Other uses: ENSET is a decorative plant that gives grace to the homesteads and is used as a shade for humans and domestic animals. It is also a good windbreak to protect the small grass roofed farmer‟s houses from strong wind, conserves soil and moisture. Leaves of ENSET can be used as an umbrella during rains, for serving oily food, for rapping butter, and spices, for sleeping and sitting. Stores water for Small domestic animals like chicken at the bottom part of the loose leaf sheath.

2.8. The medicinal Uses of *Ensete ventricosum*

Ensete ventricosum is a very good indigenous food plant having great medicinal value in relation to infections that are caused during broken bone cases. ENSET plant is well known for its use as setting broken bones. Outside Ethiopia uses of ENSET are only reported from Vietnam the growing point is used as the vegetable (Brandnt, 1997).

CHAPTER THREE

3. Material and Method

3.1. Study area

The study was conducted in Gedebano Gutazer Welene District. The district is found in SNNP Region, and Gurage Zone. It is located in the North east parts of the region. It shares boundary with the following: in the south Meskan District, in the north Kebena District, in the west Muhurnaaklil District of gurage zone of the SNNP region in the East Chulule District of Oromia and it is also located 119km West of Addis Ababa along the main high way that leads to Jimma via Tulubolo town, after Tulu bolo town leave the main road and bends toward south. After 39km. journey there is District town Known as Mehal-Amba. The distance from zone town Welkite to District town Mehal-Amba is 64km. According to the federal statistics agency in 1999 E.C. The total population is 99,889 and the total land area is 54,500 hector. The altitude range from 1800-3662m and the average rain fall of 900 mm-1400 mm per-year. The average temperature of the area is from 15-24^0C.

Table 1.List of name of the kebeles in the District of the district

Gichedimtu	Zere
Sodoabigeren	Kesibena marento
Enge bone	Ameto
Beder	Ereso
Fite	Gomra
Ambelta	Borebor sefto
Teyba	Asefedine
Muguragur	Kentuwate
Hutter	Gereno
Jimma	Kurbano
Kecha	Adero
Desa	Welegadesie
Wabon	Mehal gutazer
Zeluwansefato	Deneb
Ochenankedi	Sefatonakersa
Tilamo	Areda

The agroecological zones of the District are classified traditionally as:

- Having dega environment

  -Desa

  - Sefatonakersa
- Having weynadegadega environment

  -Ochena ankede

  -Beder

  - Tilamo
- Having kola enviroment

  -Jimawelene

  -kecha

Figure 4 Map of study area

3.2. The study design

This study used a descriptive study design. The design used to describe the interest and knowledge of the particular individual involved in the study. And the study also described practice of the community to used plant for medicinal value particularly "Qibnar, Astara, Guare, Lemmat, Dere Etc. ENSET. The study was due to investigate the medicinal value of *Ensete ventricosum* plants. The kebele which selected for this study are based on their environment (such as dega, weynadega and kola), having different ENSET varieties and the area grow mostly the medicinal ENSET plant. The research design and sampling procedure were consistent to arrive at good outcome of the study.

3.3. Sampling Study Sites and Informants

Sampling study sites (Kebles) was done purposively on the basis of the abundance of ENSET farms. 7 kebeles were selected in the Gedebano Gutazer Welene District. This kebeles contains 28.03% of the total population i.e. contains 28,000 populations. Informants were selected by employing both purposive and simple random sampling techniques. Knowledgeable persons from the District"s health center, who are community elders and traditional healers, were selected to involve in the study as key informants. A total of 130 (0.5%) informants involved in the study, of which 10 have participated as key informants. Thirty five percent of the informants were also female while 100 informants were above the age of 20. See Table5 below;

Table 2 information's about respondents.

No.	Respondent identity	Identity based on,	Amount	Total
1	**Sex**	**M**	**84**	**130**
		F	**46**	
2	**Farmer community**	**M**	**40**	**70**
		F	**30**	
3	**Traditional healers**	**M**	**30**	**40**
		F	**10**	
4	**Health professionals**	**M**	**6**	**10**
		F	**4**	
5	**Age in range**	**Adolescent**	**30**	**130**
		Adult	**100**	
6	**Interviewer**	**F**	**3**	**10**
		M	**7**	
7	**ENSET cultivators**	F **Present**	120	130
		Absent	10	

3.4. Data Collection Methods

The method that the researcher used to collect data is both primary and secondary data assessment.

The **primary data assessment;** consists of a set of semi structured question given in the Appendix, which included both closed and open ended questions and interviews that would be administered to farmers, traditional healers and health professional. The respondents have different age and different profession of the seven kebeles.

The **secondary data assessment;** was document that consists of information of the sampled kebeles. The quantitative data would be collected using questionaries‟ that

consists of socio demographic phenomena of the respondent and questions which are used to assess knowledge of the participant on the traditional medicinal uses of *Ensete ventricosum* and its characteristics. And also the qualitative data consists of interviews and observation. All the above methods of data collection were conducted on sampled kebeles of the district of sampled respondents. The questions have been prepared by English but translated in to Amharic and then translated to English by professional. The data were collected using documents, questioners and interview. The documents contained a manual which was written in 2003E.C. about advantage of ENSET and hand out, which tell the role and relationship of ENSET with in Gedebano Gutazer Welene District people.

3.5. Data analysis and interpretation

After the data was collected in the forms of questionnaires", interviews and observations has been checked again and again and then categorized and analyzed using descriptive statistics in the forms of their distribution which is used to describe the demographic characteristics of respondent. And the result was presented in the form table and figure. The interview response are categorized and identified based on the objective of the study. And then the sample ideas were collected together and grouped according to their importance. The data were also processed by grouping in to plants age. Additionally, this data were analyzed by descriptive analysis by the tabulation and other relevant analysis techniques. The qualitative data were first organized and categorized and then interpreted with respect to basic questions. Finally, both qualitative and quantitative data were integrated to reach concrete result.

CHAPTER FOUR

4. Result

4.1 Traditional classification of ENSET

Traditionally farmers in the study area classify ENSET plant based on the morphologies and types of use. Around 88% of ENSET growing farmers also recognize the plant as „male" and „female". This division has nothing to do with reproduction but it is according to perceived characteristics of strength (male) and tenderness (female). See the Table 3 shows.

Table 3.Farmers' criteria for classification of ENSET in to ethno-male and ethno-female plants

Criteria	Ethno-Male plant	Ethno-Female plant
Maturity	Late maturing	Early maturing
Fibrosity	Strong, high in quality and quantity	Low strength, low in quality and in quantity
Size	Big	Smaller
Susceptibility to disease & pests	Highly resistant	Susceptible
Corm	Fibrous(unpalatable)	Delicious , low fiber
Kocho	Ferments slowly	Ferment quickly
Leaves	Hard and stiff	Soft
Pseudo stem & leaf sheath	Hard and stiff	Soft
Qacha	Hard and stiff	Soft and fragile
Average yield	High	Lower

ENSET growing farmers of the study area are able to differentiate the cultivars of ENSET based on their uses, vulnerability to disease, products, and length of life cycle. See also

Table 4. Farmer's perception of ENSET clone based on their uses, immunity, products and length of life cycle

Names of ENSET clone in Gedebano Gutazer Welene District	Character states of the clone
• Astara • Guare • Qibnar • Mymote • Lemmat • Charkima • Dere	Have great importance as medicine
• Badedet • Lemmat • Biras	Disease Resistant, Produce strong fiber
• Astara • Guare • Qibnar	Weak with regard to disease resistance
• Biras • Bchem	Short flowering season: produce SHILLA (inflorescence) in shorter years than other cultivars
• Agade • Lemmat • Biras	Short maturity time: can be productive in shorter period than other cultivars

4.2 Medicinal values of ENSET clone used in Gedebano Gutazer Welene District

Almost all informants agree that ENSET plant has a very important medicinal use in setting broken bones, boosting immunities during child birth, etc. Pounded ENSET leaves are taken to stimulate labor or induce abortion; Hepatitis and other liver sick are treats with ash and infusion from the fruit and leaves. A number of different ENSET varieties were reported to have medicinal and religious (ritual) significance for preventive treatment, healing and other therapeutic purposes, and as protection against evil spirits. These medicinal and ritual varieties are given special care and the most important cultivars based on their efficacy as broken bone settler are known as **ASTARA** and **QIBNAR**.

ASTARA is a variety with a light red pseudostem and midrib and deep green leaf. The boiled corm amicho and starchy powder bulla are eaten with milk to cure ailments such as broken bones fractures, joint displacement and swelling with pus. It is used to cure similar ailments in domesticated animals, specifically dairy cows when eaten with salt. **QIBNAR** is a variety with a deep red pseudo stem, midrib and leaf. The corm amicho of this ENSET is eaten with cheese specially prepared with butter and milk by women who have just delivered babies and whose discharge of the placenta is delayed. It stimulates the placental discharge during delivery. For dairy cows the amicho is given with salt for similar purposes. This variety also has a ritual significance with the people and is found in Gedebano districts of the study area. Farmers plant *Ensete ventricosum* in front of their house as a safe guard against devils‟ and all evil spirit attacks.

Some of the cultivars reported by informants in the study area have specific value in settling broken bones and when utilized to other health related life practices. Examples are given below and also in Table 5.

BUSH-WYSE: is a landrace/clone with a deep red color of pseudostem petiole, midrib and leaf. It has medicinal value to both human and cattle. The corm of this ENSET is boiled and eaten with butter or milk by women who have just delivered and whose discharge of the placenta is delayed. It is believed that the amicho stimulates the placenta discharge following delivery and the leaf of the ENSET is eaten with salt by cow, it stimulates the placental discharge after delivery. Most of the time it is planted in front of the home and ENSET land as a safe guard of the child and other ENSET plant against devils and all evils sprite attacks.

Fig 5 The BUSH WYSE landraces of ENSET plant

QIBNAR: the boiled amicho are eaten with milk to cure ailments i.e. broken bone and joint displacement

ASTARA: the corm of this cultivar is boiled in water and eaten with milk or drinking of boiled water by women, which stimulates placenta and mammary gland for production of milk to babies.

MYMOTE: is important to dried the wounds and KINTAROT and it has other importance uses.

GUARE: is used for treatment of broken bone especially back bone. It has mostly medicinal value with that of **QIBNAR**. It is also important to cure cough.

LEMMATE: is recommended for the development of strong bones, muscle and Joints.

Table 4 Type and characteristics of ENSET clone and specificity in their importance in Gedebano Gutazer Welene District

No-	**Name of ENSET clone/ landrace**	**Color of the psedostem**	**Maturity age**	**Thickness**	**Importance (uses)**
1	Astara	Reddish	-5-6 years in cold env‟t -3 in warm env‟t	-short & thick	-repair & soften the broken body (bone) -initiate milk production for mammary gland for women.
2	Qibnar	Roan	-6-7 years in cold env‟t & -4 years in warm env‟t	-longer than astara & thick	-used to join the broken body(bone) -importance for lung disease & cough. -used to harden the damaged organ.
3	Guare	White	-6 years in cold env‟t -4 years in warm env‟t	-long & thin	-to dried ulcer -important for normal functioning of the body. -it can cure from cough
4	Dere	Yellow	-6 years in cold env‟t -4 years in warm env‟t	-thick & short.	-used for dried the operation part of the patient -mostly similar importance like Qibnar & Astara -it is the most needed ENSET.
5	Mymote	Brownish	-6 years in cold env‟t -3 years in warm env‟t	-thin & medium length	-used to dried ulcer Used to dry KINTAROTE.
6	Badedet	White-reddish	-6 years in cold env‟t -3 years in warm env‟t	-thick and long/short based on the env‟t	-used for only food -not easily affected by ENSET disease.
7	Lemmat	White	-5-6 years in cold env‟t -2-3 years in warm env‟t	-thick and medium length	-used for strengthen bone, muscle, joint -it is very important type of ENSET. -it can resist ENSET disease.
8	Biras	Reddish	-5-6 years in cold. -2-3 years in warm env‟t	-very long & some-what thick	-especially it is used for food.
9	Aychore	Reddish	-5-6 years in cold env‟t -3 year in warm env‟t	-thick medium length	-used for high productions of „Bulla‟& gives pure KOCHO

10	Bicham	Whitish-red	-6 years in cold env‟t -2-3 years in warm env‟t	-very thin & long	-important for pure KOCHO & BULLA
11	Teteret	Roan	-6-7 years in cold env‟t -4 years in warm env‟t.	-thick and medium length	Mostly used for food.
12	We‟a	White	-6-7 years in cold -3-4 years in warm	-thick & long	-mostly used for food
13	Anzone	Yellow	-6-7 years in cold -4 years in warm	Thick & long	-mostly used for food.
14	Zigbot	Yellow	--6-7 years in cold env‟t -4 years in warm env‟t	-thick & long.	-it is mostly used for food purpose.
15	Fegiyet	Black	-6-7 years in cold env‟t -4 years in warm env‟t	Medium thick & long.	-mostly used for food.
16	Hyrete	Roan	-6-7 years in cold env‟t -3 years in warm env‟t	-medium thick & long	-important for only food.
17	Kanchaybane	Roan	-5-6 years in cold -3 years in warm env‟t	Thick & long	-importance for food.
18	Anduate	Red	-6-7 years in cold env‟t -4 years in warm	Thick & long	-used for food only.
19	Ferezea	Red	-6-7 years in cold env‟t -3 years in warm env‟t	-thick & medium long	-importance for food.
20	Necho	White	-3 years in cold & less than 3 years in warm env‟t	-thin & short	-important for only food & bulla production.
21	Agade		4 years in cold env‟t& 3-years in warm env‟t	-long & thick	-used for food & bulla production
22	Wennade	Red	4 years in cold env‟t 2-3 years in warm env‟t	Long & thin	
23	Enneba	Green	2-3 years in cold env‟t 2 years in cold env‟t	Medium length & thin	-mostly for production of quality food.
24	Derbuate	Light-whit	5-6 years in cold env‟t	-long & thick	-for food production & bulla production.

25	Sebbare	Black	-5-6 years in cold envˇt -3 years in warm envˇt	-short & thick	-important for food.
26	Temoysie	Black	6 years in cold envˇt 3-2 years in warm in envˇt	-short & thick	- Important for food.
27	Charkimma	White	6-7 years in cold envˇt 4 years in warm envˇt	-short & thin	-important to contains protein -used for food production.
28	Gimbuate	Red	5 years in cold envˇt 3 years in warm envˇt	-long & thick	-important for food & bulla production.
29	Zobirr	Braon	6 years in cold envˇt 2-3 years in warm envˇt	-long & thick	-mostly important for food.
30	Emmine	-	6 years in cold envˇt 4 years in warm envˇt	-short & thick	-Important for food production.
31	Gaznnar	Red	6 years in cold envˇt 3 years in warm envˇt.	-short & thick	-important for food production & BULLA.
32	Yewerete	White	-3 years in cold envˇt --2 years in warm envˇt	-medium & thin	-important for food. & BULLA production.

Except health professional, all respondents (~92%) suggested the different clone of ENSET had their own characteristics, importance, thickness and color. The clone/ landrace which listed above have their own specific medicinal value.

Fig 6 The *Enset ventricosum* at their mature stage

4.3 Impact of population size on ENSET production in the past and at present

When farmers were asked how long ENSET products can be stored most of the middle aged people said that they didn't know. At present because of food shortage ENSET products will be consumed immediately after harvest i.e. they do not store ENSET products for many years as they did in the past. It is only when we talked to old people that they told us it can be stored up to eight years. From this we can learn that ENSET production was good in the past (because of low population density) and people could produce enough food and used to store it for some years.

According to Welene farmers in the past (some say even today) guests prefer to go in to houses where large Medicine, ritual and construction purposes could attribute to the existence of various different ENSET varieties in the gedebano in situ conservation site. These are identified, named and categorized by the farmers in the area based on pseudostem, petiole and midrib color, size (width and length), and various end-use and disease resistance characteristics.

4.4 Medicinal uses and efficacy of ENSET in relation to age differences

About 90 % of the informants agreed that the efficacy of ENSET increases as it gets old. Accordingly, a six year old ENSET plant is reported by many informants (98%) as the most valuable medicinal plant (Table 6). Some informants (2%) also considered ENSET up to eight years old can be utilized as efficient medicinal plant.

Table 5 The age of ENSET plant and its medicinal value

AGE OF THE PLANT IN YEARS	MEDICINAL VALUES OF THE PLANT IN PERCENT BASED ON THE AGE OF PLNT
1 Year plant	Have no medicinal value
2 Year plant	Have no medicinal value
3 Year plant	Have no medicinal value
4 Year plant	Have 10-20% medicinal value
5 Year plant	Have 40-80% medicinal value
6 Year plant	Have 90-100% or best medicinal plant.

4.5 Dosage of administration in relation to age difference of patients

The local community of Gedebano Gutazer Welene District has also a very good knowledge of prescription, which assumes age of patients. An analysis from the semi-structured interview indicates that dosage increases as age increases (Figure 3)

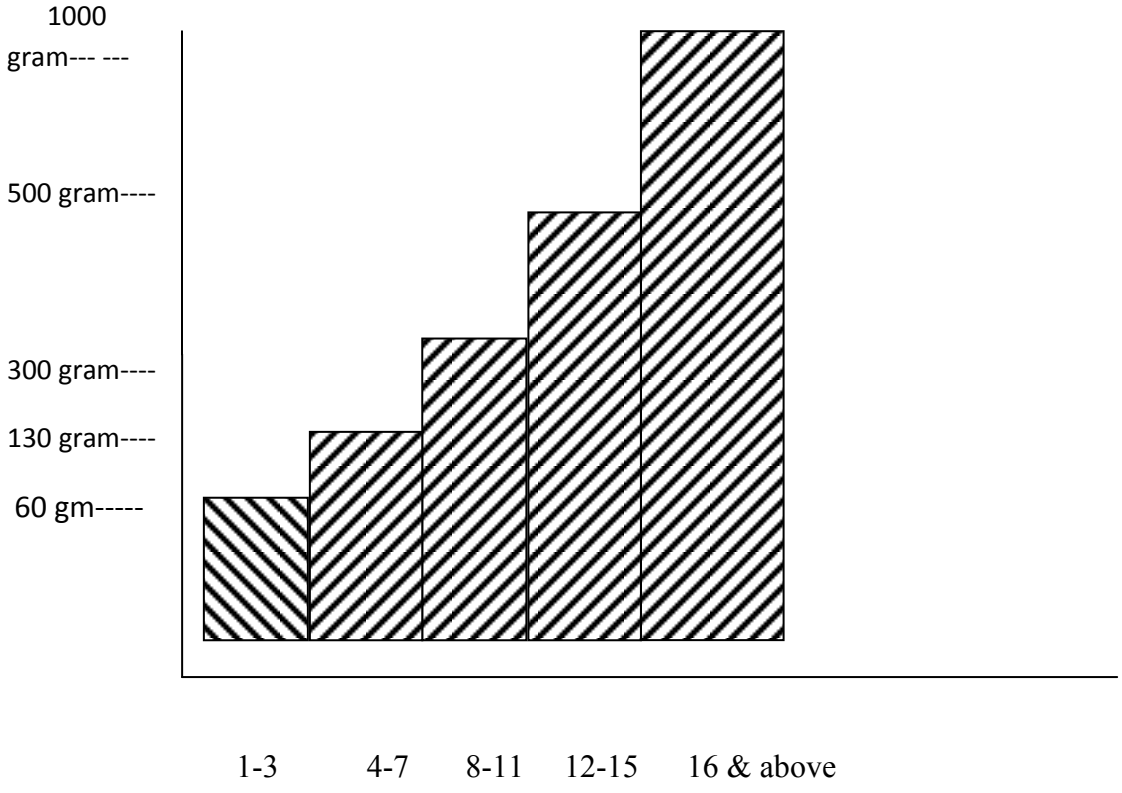


Figure 7 Dosage as per patients' age

4.6 Parts of the ENSET plant and diseases treated

Different parts of ENSET plant are applied to treat different ailments in Gedebano Gutazer Welene District. Corms are the most frequently used parts of ENSET used in the study area while leaf and fruit were reported as traditional medicine for unique health problems, each (Table 7).

Table 6 the parts of *Ensete ventricosum* and their importance to treat diseases

No=	Plant part	Diseases	Preparation	Administrations
1	Leaf	Blood clotting	Take the juice with equipment	Pouring the juice on bleeding area and covered.
2	Corm	Broken bone	Washing and cocking with water	Through eating.
3	Corm	Wound	Washing and cooking with water.	Through eating.
4	Corm(mymote)	To stop breast milk production	Washing and cooking with water.	Through eating.
5	Fruit and leaves	Stimulate labor	Infusions with water	Through drinking.
6	Corm (Astara)	To stimulate milk production	Washing and cooking with water.	Through eating and drinking.

The prolonged time that ENSET takes to mature (more than five years) together with acute land shortage forced farmers in Gedebano area in to consumption of immature plants. Hence, farmers were overexploiting their ENSET reserves thereby causing gradual losses and disappearance of the false banana as an important household food security crop. This situation could be reversed

by shortening the maturity period of the crop through improving the fertility of the soil where it grows. The yield of ENSET is also higher than the yield of cereals (personal experience) in the study area.

CHPTER FIVE

5 Discussion, conclusion and recommendation

5.1 Discussion

The traditional system of classifying ENSET in Gedebano Gutazer welene district is similar to the way ENSET farmers in Kembata district perceive and classify (Kefale and Sandford 1991). Due to the importance of ENSET plants as food and medicine, it is sometimes difficult even for the farmers to put them in one of these two categories. For example during a field survey farmers in Gedebano gutazer welene argued amongst themselves and finally agreed that there are Medicine, ritual and construction purposes that could attribute to the existence of various different ENSET varieties in the District. These are identified, named and categorized by the farmers in the area based on pseudostem, petiole and midrib color, size (width and length), and various end-use and disease resistance characteristics.

ENSET farmers repeatedly report that ENSET plants per capital are falling from year to year. The causes according to them are population growth and the subsequent land scarcity, which again leads the area‟s people to food shortage. Fighting for their existence farmers always prioritize their immediate copping needs, which can change the whole farming/land use systems. They may tend to grow early maturing and short season crops. Previous work by FARM Africa at Gedebano district of gurage has revealed the replacement of some of the homesteads by banana plants and the expansion of sweet potato farms from year to year. These are good examples. But why do farmers replace their fields by the above crops understanding the

importance of ENSET and the bad consequence? The answer is that they are forced by food shortage to do and have no choice.

This study offer information on the health benefits of ENSET in its origin of domestication and diversification. The people of the study area have shown a great potential of knowledge about the uses of each single ENSET cultivar. This indicates the existence of strong interaction, which has stayed for a very long period and passed through generations. Not only on the different cultivars of ENSET used as medicine with specific application but also on the dosage of the prescription as per the age of the patients is a magnificent knowledge reflected by the people in the study area. The dosage increases as the age of the patient increases. The most probable explanation of this may be as dosage the traditional medicine increases the chemical concentration in the plant might increase. The more the dosage of the traditional medicine plant contains the more the biochemical concentration in the plant which may affect internal organs or may cause health complication rather than treating and curing the patient when unbalance used.

A very striking local peoples‟ knowledge on the use of ENSET is its effect on the mammary glands. One cultivar of ENSET called ASTARA stimulates the mammary gland and increases milk production while another cultivar called MYMOT inhibits mammary gland. The local people use these varieties during child birth (the ASTARA) and when the need arises to stop breast feeding (the MYMOT). Milk production is related to the presence of lactose sugar, which is important to stimulate lactation hormone that is used to initiate milk production. The fact that ASTARA stimulates the mammary gland for milk production explains that the cultivar is rich in milk sugar (lactose). Lactose enhances lactogenesis II or the production of lactation which stimulates milk

production (Cox, et al, 1999). However, the content of sugar in this particular ENSET cultivar should be further analyzed.

After lactogenesis II, there is a switch to the autocrine (local) control system. This maintenance stage is called lactogenesis III, which is also a stage milk synthesis is controlled. In this stage a production of whey protein called feedback inhibitor of lactation (FIL) takes place (Hartman and Prosser, 1984). MYMOT cultivar is used to stop milk production. This cultivar perhaps contains the bioactive ingredient, which inhibit the activity of lactation hormone by increasing production of progesterone. Thus, further research needed to understand inhibitory process of this variety.

When the *Enset eventricosum* was compared to other finding, ENSET has Therapeutic potential for several human ailments including Diabetes, Kidney stone and Dysuria.(cultural and tourism office) *Ensete ventricosum* traditional medicine was treated based on eating cooked main root (amicho) and pseudo stem (muke) of the plant. Amicho and muke were local name of the area.

5.2 Conclusion

This study reported on the knowledge system, socio-cultural process and community practices that drive the maintenance of intraspecific on-farm ENSET diversity, Southern Ethiopia. ENSET plant is highly popular in the study areas as traditional medicine in addition to its use as staple food. The people in Gedebano Gutazer Welene district are highly knowledgeable in the medicinal use of ENSET, particularly in treating health problems related with broken bones wounds, blood clotting and fetus development and mammary gland functioning.

Prescription of the ENSET derived medicine also depends on age ranges in which, the older the patient the more the possible dose prescribed. On the other hand the ENSET associated traditional medicinal knowledge shows that efficacy of the plant increases as the plant gets older. The best medicinal ages of the plants are six years old. But mostly the people used 5-8 years old plant. This study documented IKS of ENSET intra-specific diversity, in order to identify the community practices and socio-cultural processes that drive on-farm maintenance of ENSET diversity in the Gurage area.

5.3. Recommendation

This study evidenced the great medicinal and food value of the multipurpose ENSET plant. The strong interaction of the ENSET growing societies with these plants also developed great potential of knowledge about the plant. However, little attention has been given to this resource of the country. Therefore, it is highly recommendable to give due attention to the plant and devise a strategic plan to increase the yield, devise technologies to ease the processing mechanism, devise a means to promote the products in industry based system, especially the medicinal values. It is also very important to develop the traditional system of classification that contributes to strategic plan of genetic resource conservation and also to achieve sustainable development. To effect these, it is important to:

1. Continue further research.
2. To provide a better awareness to the community about the precious resources and the associated knowledge.
3. Promote the traditional knowledge system in the dosage application and develop scientific standards.
4. Compliment it with the modern treatment.
5. *Ex-situ* and *In-situ* conservation should be given due attention to the ENSET plant together with the associated knowledge for safeguarding the genetic resource as well as the knowledge.

Reference

Admasu Tsegaye and Struik, P. C. (2001). ENSET (*Ensete ventricosum* (Welw) Chessman kocho yield under different crop establishment methods as compared to yield of other carbohydrate rich food crops. *Netherlands Journal of Agricultural Science*. 49: 81-94.

Alemu Kefale and Sandford, S. (1991). *ENSET in North Omo Region.* Farmer‟s Research Project Report, Farm Africa. Addis Ababa, Ethiopia.

Balick, M. and Cox, P. (1996). *Plant, people and culture*: *the science of ethnobotany*. Scientific American library. A division of HPHLP. New York. USA. Pp. 89-102.

Beker, R.E.D and Simmands, U.W. (1953). *The genus ENSET in Africa*, Kew Bulletin 8:405 -416.

Bizuayehu Tesfaye. (2002). *Studies in landrace diversity, in-vitro & in-vivo regeneration of ENSET (Ensete ventricosum.Welw.).* PhD Thesis Dissertation. Humbolt University, Verlage, Berlin, Germany. Pp. 1-4 & 61-62.

Brandt, S.A, Spring, A, Hiebsch, C, McCable, J.T, Tabogie, E, Diro, M, Michael, B, Yntiso, G. (1997) and Zipple, K. (2002). The "*Tree against Hunger"*: *ENSET-Based Agricultural system in Ethiopia*. University of Florida. Florida. Pp. 56.

Cotton, C. M. (1996*). Ethnobotany*: *principles and Application*. Jhon Wiley and Sons, Chichester, England. Pp. 347.

Cox, D.B, Kent, J.C, Casey, T.M, Owens, R.A, Hartmann, P.E, (1999). Breast growth and the urinary Excretion of lactose during human pregnancy and early lactation: endocrine relationships. *Experimental Physiology* 84: 421-434.

Dawit Abebe (2001). The role of medicinal plant in health care coverage of Ethiopia, the possible benefits integration. In: conservation & sustainable use of medicinal plant in Ethiopia. (Medhin Zewdu & Abebe Demissie, eds.). Pp: 107-118. Ethiopia, Addis Ababa.

Farnsworth, N.R. (1988). *Screening plants for new medicine*. National Agency press, Washington, D.C. Pp: 83-92.

Hartman, I. (2004). *The management of resource & marginalization in societies of south Western Ethiopia*. Pp: 98-99.

Hartmann, P.E & Prosser, C.G. (1984). *Physiological basis of longitudinal change in human milk yield and composition*. Pp: 2448-53.

Kena Kassa (1993). Soil problems associated with ENSET production. *Sustainable agriculture in Ethiopia, Proceeding from the international ENSET*. Addis Ababa, Ethiopia. Pp: 120-27

Martin, J. G. (1995). *Ethnobotany*: A method manual chapman & Hall, London. Pp: 343-45.

Pankrust, R. (1997). *The status and availability of oral and written knowledge on traditional health care*. In: conservation and sustainable use of medicinal plant in Ethiopia. Medhin Zewdu and Abebe Demissie (eds.). Pp.: 92-106. In Ethiopia, Addis Ababa.

Sandford, J. (1991). *ENSET in north omo region*. Farmers research project, technical pamphlet. No .1.farm Africa. Addis Ababa.

Shack, W. A. (1963). The Gurage: *a people of ENSET culture*. Oxford University Press, London. Pp.: 187-198.

Shigeta, M. (1990). *Folk in-suit conservation of ENSET (Ensete ventricosum) (Welw) chessman)* In: towards the interpretation of indigenous agricultural science of the Ari, southwestern Ethiopia. *Africa studies monographs* (Japan). 10: 93-104.

Smeds, A. (1955). *The ENSET planting Eastern, Sidamo, Ethiopia*. *Acta Geographical.* pp. 1-39.

Tesfaye Bezuneh (1993). *An overview of ENSET research and further Technological needs for enhancing its production and its utilization*. Proceedings from the international workshop on ENSET held in Addis Ababa, Ethiopia. Pp. 72-93.

Yemane Tsehay and Fassil Kebebew (2003 E.C). Diversity and cultural use of Ensete ventricosum (Enset ventricosum (Welw.) Cheesman) in Bonga in situ Conservation Site, Ethiopia. *Ethnobotany Research and Application* 4: 147-157.

Zippel, K. (2002). *Ensete ventricosum*: In: Subsistence Farming Systems in Ethiopia. Huber, B.A, & Lampe, K. (eds.). Conference on International Agricultural Research for Development. Pp: 423-438.

Appendix

APPENDIX-1

1. General Question

-Age----------

-Sex----------

-Family size----------

-M--------

-F----------

-T------

2. Basic Questions

1. What is the medicinal value of *Ensete ventricosum*?

2. Do you think that *Ensete ventricosum* can cure broken bone?

3. What is the procedure used to treat broken bone?

4. What age of the plant is best for treatment of disease?

5. Who can give the traditional medicine?

6. Is there any side effect on the medicine?

7. List plant part used for medicinal purpose?

8. Do all *Ensete ventricosum* used for medicinal purpose?

9. Which plant part is used to treat, which disease?

10. Discuss the amount of medicine given for the patient?

11. What is the overall importance‟s of *Ensete ventricosum* plant?

Appendix-2

Questioner

ADDIS ABABA UNIVERSITY

COLLEGE OF NATURAL SCIENCE

DEPARTMENT OF ZOOLOGICAL SCIENCE

I am very much thankful for your cooperation in advance and here I am kindly requested you to provide the necessary information based on the questions included in this questioner form.

Below are stated questionnaires used for data collection from the 7 kebeles" households and elder people of Gedebano Gutazer Welene District.

I am MSC student in Addis Ababa University in the department of Zoological science. The title of my research is "*Traditional Medicinal use of Ensete ventricosum plant in Gedebano Gutazer Welene District Gurage zone of SNNP"* Target population- local people in 7 kebeles of Gedebano Gutazer Welene District.

Data collection techniques- structured interview questionnaires

Name of respondent (optional) _____

Kebele Name_____

Part I. Demographic characteristics of respondent.

Instruction: Circle the answer that suits you.

1. Sex

    A. male

    B. female

2. Age

A. 18-25 years

B. 26-35years

C. 36-45 years

D. 46-60 years

E. above 60 years

3. Marital status

A. Single

B. Married

C. Divorced

D. Widowed

4. Educational level

A. No schooling

B. Primary school (1-6)

C. Junior secondary school (7-8)

D. Senior Secondary school (9-10)

E. Completed Secondary school (10^{th} and 12^{th})

F. If others, please specify_____

5. Composition of family member

A. 1-3

B. 4-6

C. 7-10

D. Above 10

7. What is your major occupation?

A. Agricultural production

B. Traditional healers

C. Health professionals

D. If others. Please specify_____

Part II. Questionnaires related to traditional medicinal value of *Ensete ventricosum* in the area.

1. Do you think that *Ensete ventricosum* has a medicinal value?

A. Yes B. No

2. What are the medicinal values of *Ensete ventricosum?*

A. Repair and soften broken body

B. Dry ulcer and kintarot

C. Treat for cough

D. Initiate milk production

E. If others. Please specify_____

3. What are the plants used for medicinal purpose?

A. Astara

B. Qibnar

C. Guare

D. Mymote

E. If others. Please specify_____

4. What age of the plant is best for treatment of disease?

A. 4 years

B. 5 years

C. 6 years

D. 7 years

E. If others. Please specify_____

5. Which plant part is used to treat disease?

A. Leaf

B. Corm

C. Pseodosteam

D. Fruit

6. What are the dosages of administration in relation to age difference of patients?

A. 60 grams for 1-3 years of patients

B. 130 grams for 4-7 years of patients

C. 300 grams for 8-11 years of patients

D. 500 grams for 12-15 years of patients

E. 1000 grams for 16years and above years of patients

E. If others. Please specify_____

Part III. Questionnaires related to food value of *Ensete ventricosum* in the area.

7. What are the plants used for food purpose?

A. Production of Bulla

B. Production of Kocho

C. Production of Amicho

D. If others. Please specify_____

Part III. Questionnaires related to food Classification *Ensete ventricosum* in the area

8. What are the criteria‟s for classification of INSET being males or females?

A. Maturity

B. Fibrosity

C. Size and leave

D. Susceptibility to disease & pests

E. If others. Please specify_____