

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES



**ETHNOBOTANY OF TRADITIONAL MEDICINAL PLANTS IN HAWA GELAN
DISTRICT, KELEM WOLLEGA ZONE OF OROMIA REGION, ETHIOPIA**

FIKIRU AYANA

A Thesis Presented to School of Graduate Studies of Addis Ababa University in Partial
Fulfilments of The Requirements for The Degree of Master of Science in Biology

September, 2017

Addis Ababa, Ethiopia

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Approval Sheet I

This is to certify that the thesis prepared by Fikiru Ayana entitled: ``**Ethnobotany of traditional medicinal plants in Hawa Gelan District, Kelem Wollega Zone of Oromia Region, Ethiopia**`` and submitted in partial fulfillments of the degree of Master of Science(Biology) compiles with regulation of the University and meets the accepted standards with respect to originality and quality.

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Abstract

Ethnobotany of Traditional Medicinal Plants in Hawa Gelan District, Kelem Wollega Zone of Oromia Region, Ethiopia.

Fikiru Ayana.

Addis Ababa University, 2017

An ethnobotanical study of traditional medicinal plants were conducted to identify and document medicinal plant species used by the community to treat both human and livestock disease in Hawa Gelan District, Kellem Wollega Zone of Oromia Region, Ethiopia between December 2016 and August 2017. A total of 100 informants were selected who represent the community of the study area. The ethnobotanical data collection method in this study were semi-structured interview, group discussion, field observation, market survey and others. A total of 102 medicinal plant species which distributed across 47 families were identified. Of these 63 plant species were wild and the remaining 39 were from home garden. The most abundant growth forms of plants were herbs which account 38.23%(39) followed by shrubs which account 27.45%(28), the third life forms were trees which account 24.50%(25) and the rests were climbers, which is only 9.80%(10). Of all the 102 medicinal plants of the study area 73 of them were used to treat human, 15 species were used to treat livestock and 14 species were used to treat both of them. The most abundant families were Fabaceae (10 species) followed by Solanaceae (9 species), Asteraceae (8) and Lamiaceae (6) and others were also observed in study area. The highly utilized parts of plants were leaves then followed by root. The majority of condition of preparation was from fresh materials followed by dried and mixture of both. About 58 health problems were reported in the district out of these 45 were of human, 5 health problem were of livestock only and 9 were of both human and livestock disease identified in study area. The highest mode of preparation were squeezing and pounding which have equal percentage of preparation and the next was crushing mode. The most commonly used route of administration was oral followed by dermal application methods. The results indicate that rural community of Ethiopia are still knowledgeable about traditional medicinal plants despite the impact of land use land cover in the area, as it happens in other parts of the country. The major threatening factor to medicinal plants was agricultural expansion. The fragmented forest left in the study area should be protected from anthropogenic factor and conservation action on medicinal plants should be encouraged.

Key words :Ethnomedicine, Medicinal Plants, Wollega Zone

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Lists of Acronyms

AFI	Acute fever illness.
a.s.l	Above sea level.
HGWANRO –	Hawa Gelan Woreda Agricultural and Natural Resource Office.
HGWEO –	Hawa Gelan Woreda Education Office.
HGWFEDO	Hawa Gelan Woreda Finance and Economic Developments Office
HGWHO –	Hawa Gelan Woreda Health Office.
HGWLDFRO –	Hawa Gelan Woreda Livestock Development and Fish Resource Office.
HGWLALUPLO	Hawa Gelan Woreda Rural Land Administrative and Land Use Planning Office.
IP—	Indigenous People.
IK	Indigenous Knowledge.
ICF	Informant Consensus Factor
NMA	National Meteorological Agency.

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CHAPTER ONE

1. INTRODUCTION

1.1. Background and Justification

Peoples of different cultures have always depend on plants for their primary needs like food,shelter,medicines, firewood, charcoal, etc and have naturally learned diverse application of plants.Thus peoples have deep knowledge on how to use plant resource;classify and conserve plants.Indigenous people of different areas have their own knowledge on how to use plant resource,classify and conserve plants (Cotton, 1996). The term ethnobotany was suggested by John Harshberger in 1895 to delimit specific field of botany and to describe plant uses .Ethnobotany also refers to the study of knowledge and use of plants in primitive societies in the past and present (Cotton,1996). Ethnobotany is the scientific study of the relation ship of people, plants and enviroments on which they live (Martin, 1995, Cotton, 1996).

One way of combating disease starting from the ancient time was through using traditional medicine.Traditional medicine is used throughout the world as it is dependent on locally available plants which are easily accessible,simple to use and affordable (Tesfaye Awas and Sebsebe Demissew,2009). The Ethiopian peoples have been using medicinal plants for treatments of different disease since 15th century (Tilahun Teklehymanot,2009).As Dawit Abebe pointed out (2001), the traditional medicines are the most important and some times the only source of therapeutic for nearly 80% of the population and 95% of the traditional preparations in Ethiopia is of plant origin.It is the only remedy for health problem of society when there was no modernization and still now it was a means for the treatment of the health problem.

The study of ethnobotany play a vital role because of the direct contact that can be estabilished with the authentic information on the uses of plants both wild and cultivated. Those plants are used for the purpose of food, fodder, medicine, clothing, shelter,fiber and fulfilling of cultural and spiritual needs throughout the world (Zemedede Asfawu, 2001, Pareek and Trivedi, 2011) . Indeed Ethiopia is charaterized by having wide variety of flora and fuana (Jansen, 1981),and thus

traditional medicinal plants are popularly used in different parts of the country especially in low income rural parts. However, the indigenous knowledge diminished from time to time due to modern life style as it is the case elsewhere in the world. In many developing countries medicinal plants have not been well studied, tested or documented; and most of the information is in the hands of traditional healers and knowledge of healers is either lost or passed to generation by word of mouth (Giday Yirga, 2010). In Ethiopia, the knowledge on the use of traditional medicinal plants which were developed for many years has now become decreased because the information was handed down by old peoples and transmission is through oral only (Dawit Abebe, 2001).

Knowledge transfer on the use of plants as medicine depends on oral information that the knowledgeable person tells the plants and how to use, parts used, where it is found etc. However, oral information may disappear with the death of holders or can be changed when transferred. Therefore, ethnobotanical research is highly crucial to preserve this knowledge system. Because plants are sources for invention of novel drugs (Wright, 2005). Such ethnobotanical researches are very important in Hawa Gelan District to document the indigenous knowledge of the peoples and to record the existing plant biodiversity that are mainly used by the community as traditional medicine.

1.2 Statement of the Research Problem

Ethnobotanical researches, especially on traditional medicinal plants have been conducted in different parts of Ethiopia. Hawa Gelan, Kelem Wollega Zone, study area of this project is rich in its plant biodiversity. Richness in plant diversity implies richness in associated knowledge. However, no scientific research has been attempted to document this knowledge found in the district. Therefore, this master's project was initiated to document and identify the plant species used to treat both human and livestock animals together with indigenous knowledge. The outcome from this research will contribute to the existing ethnobotanical data of the country.

1.3 Research Objectives

1.3.1. General Objective

The main objective of the study is to identify and document plant species which have medicinal value in Hawa Gelan district, Kellem Wollega Zone and to know the way people use, conserve and the existing threats to the medicinal plant species and also to document indigenous knowledge of the community in Hawa Gelan.

1.3.2 Specific Objectives

- To identify plant species which are used to treat both human and livestock ailments
- To document indigenous knowledge of the community
- To record relevance of medicinal plant species in addition to medicinal value
- To distinguish plant parts used for treatments.
- To assess the current status of medicinal plants of Hawa Gelan.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Ethnobotany and Historical View of Traditional Medicinal Plants

Ethnobotany is considered as to encompass all studies which concern the mutual relationship between plants and traditional peoples. The term was first used by botanist named John W. Harshberger in 1895 (Balick and Cox, 1996). He defined as the use of plant by aboriginal peoples (Martin, 1995). According to Ford (1994), ethnobotany is concerned a wide range of interest of plants in cultural and ecological context. As Cotton (1996) and other pointed out ethnobotany has been developed over a year from simple listing into new scientific field with appropriate methodology of documenting and studying indigenous accumulated knowledge on plants which then brought quantitative methods rather than simple listing of plants.

Ethiopia has along history of using traditional medicinal plants to combat disease through it and there is a large magnitude of use and interest in medicinal plants due to socio-cultural acceptability, accessibility, affordability and biomedical benefits of traditional medicinal plants (Dawit Abebe, 2001).

According to some literatures, in the world it was estimated that 25000 to 75000 species of higher plants have been used in traditional medicine, and in Ethiopia more than 800 plant species are today used in traditional healthcare systems to treat nearly 300 health problems such as mental and physical disorders (Tesema Tanto, *et al.*, 2002). Generally plants have been indispensable and the most important source of both preventative and curative traditional preparations for human beings and livestock.

2.2. Indigenous Knowledge and People

Indigenous knowledge is the knowledge possessed by particular community passed through orally or practically from elders to their youngsters as a culture. Indigenous knowledge is a knowledge originate from and a bound to local experience which is gained as result of careful

observation, trial and error experiments (Martin, 1995). People who lived at certain place for considerable period and who developed knowledge through the day to day interaction to their environment, share knowledge through different means within and across community are considered as indigenous to the area. Over centuries indigenous people of different localities have developed their own specific knowledge on plant resource use, management and conservation (Cotton, 1996).

Systematic application of indigenous knowledge is important for sustainable use of resources and sustainable development (Thomas, 1995). The knowledge and application of traditional medicine is one of the widely used indigenous knowledge systems such type of knowledge is ethnomedical knowledge which involves traditional diagnosis, collection of raw materials, preparations of remedies and its prescription to the patients (Bahil Etana, 2010).

2.3. Medicinal Plants in Ethiopia

Ethiopia is a country characterised by having wide range of climates and varied ecological conditions, possesses enormous diversity of flora and fauna (Pankurst, 2001). The country possesses a wide range of potentially useful medicinal plants, more extensive indeed than available in many other parts of the world (Abebe, 1986). Ethiopia is believed to be home for about 6000 species of higher plants with approximately 10% endemism (Vivero, *et al*, 2006). Medicinal plant species are also part of those many plant species of the country and has long history .

In Ethiopia animal disease is another problem which affects the productivity that people gain from rearing. Therefore the people (especially who engaged in the animal husbandry system) use traditional veterinary methods to treat livestock diseases. Plants comprise the largest component of the diverse therapeutic elements of traditional livestock health care practices (Tashale Sori *et al.*, 2004). In Ethiopia, mostly who lived in rural areas use plant derived medicine not only to their livestock but also to themselves and their families (Asfewu Debela, *et al.*, 1999).

Plants have crucial role in treatment of various health problem of human beings starting from ancient time (Fikadu Fullas, 2007). There are different species of plants are used by different society in traditional way but with only few scientific investigation. Pharmaceutical industries and western research on plant based drugs have now rediscovered that plants have much to contribute to the discovery of new, effective, safe and profitable therapeutic agents (Pistorius and Vanwiik, 1993). Generally plants are used as primary solution for health problem especially for people living in rural areas (Dawit Abebe, 1986).

2.4 How Knowledge of Traditional Health Practitioners Transferred

Popular knowledge of plants used by human is based on thousands of years of experience, by—trial and error—people learnt how to recognize and use plants including those with magic religious function. Even though this knowledge is popular knowledge of the community few individual attain the detailed knowledge about plants that are remedy for various ailments. Such specialists was limited only to those recognized by the community as the knowledgeable person. The narrow possession of the detailed and specialised knowledge because of the system of knowledge transfer which is closed and highly secretive (Miruse Giday, *et al.*, 2003). The local practitioner usually share their knowledge and mechanism to use plants to their relative or family only (Cunningham, 1996).

2.5 Threat and Conservation of Medicinal Plants in Ethiopia

2.5.1 Threats to Medicinal Plants

According to Ensermu kelbessa and *et al.*, (1992), medicinal plants of Ethiopia as elsewhere in Africa was highly threatened. Now days herbal practitioners have to walk far distances for the collections of herbs. This is because of availability of plants in general and medicinal plants in particular have been affected by dramatic decrease in areas of native vegetation. Zemedet Asfawu (2001) made note that medicinal plants are at conservation risk due to overuse and destructive harvesting like root collection.

As a general ,overgrazing ,drought,firewood collection,charcoal production, urbanization, agricultural expansion and constructions are the major threatened factors to medicinal plants and all vegetations(Mirutse Giday,*et al.*,2003).

2.5.2 Conservation of Medicinal Plants

Conservation of medicinal plants refers to the use of medicinal plants in a sustainable way and when necessary conserving those species which are critically endangered. According to Abebe Demissie (2001), conservation should be aimed at conserving maximum diversity within each species to make available for future generation.

The conservation of medicinal plants were achieved through in-situ and ex-situ conservation methods (Cunningham,1996). In-situ conservation is a type of conservation where species are conserved in their natural habitats which include the national park and reservors. This method is especially preferable for those species where domesticationand management is difficult out of their natural and normal habitats and ecosystem (Zemedede Asfawu, 2001). Ex-situ conservation is another method of conservation where endangered species are protected on human made habitat.

CHAPTER THREE

3. MATERIALS AND METHODS

3.1 The Study Area

Location

The study was conducted in Hawa Gelan district which is found in Kelem Wollega Zone, Oromia Regional state, Ethiopia that extending between $08^{\circ} 39' 37''$ - $08^{\circ} 45' 14''$ N and $34^{\circ} 57' 24''$ - $34^{\circ} 56' 19''$ E. It is situated 624km west of Addis Ababa, capital city of Ethiopia and 28km far from Dembi Dollo town in the North West part. The district is boarded by Illu Ababor zone in the South and South West, Dale Wabera District in the North-East, Yemalogi Walal District in the North direction and Sayo District in West direction. It comprises 24 kebeles out of which 2 of them are urban kebeles and the rest 22 kebeles are rural. Geba Robi is the administrative center of the district (HGRLAUO, 2016).

Land Use

According to the district lands office reports the district covers a total area of 51011 hectares. Out of these 23737 hectares are agricultural land, 15309.5 hectares lands with premenant plants, 248 hectares are settlement (constraction) lands, 1039 hectares are grazing lands, 1265.5 hectares are rocky lands, 5592 hectares and 3820 hectares are covered by fragmented forest (HGWRLALUPO, 2016).

Topography, Soil and Dranage

The topography of the District is rigged with elevation varying between 1200-2200m.a.s.l. (HGWANRO, 2014). The lowest and highest point lie in specific area of Tuluma and Fincho, respectively. Soil of the study area classified as fertile, red, clay, etc traditionally (HGWANRO). No further studies were carried out on the soil to catagorize scientifically. It needs scientific study to use the right fertilizers to get high yields (HGWANRO, 2016).

The district is endowed by different rivers like Keto, Hindina, Birbirs, Tibe Chibi, Chokorsa, Horor, Kombolcha and Yankina were the major river of the district. Keto and Birbirs flow on the boarder line of the district (HGWRLALUPO, 2016).

Climate.

Based on the traditional agro-ecological classification system there are two agro clamatic zones in the Hawa Gelan District these are badadare (woyina Dega) and gemoji (kolla) agro-ecological zone with an elevation of 1500-2300 and 500-1500m a.s.l respectively (HGWANRO, 2014). The dominant agro-ecology of the district is the hot to warm moist low lands which covers about 56.25% of the total area of the district. The wayina dega (temperate) agro-ecology of the district accounts 43.75% of the total area of the district. The district receives annual rain fall ranges from the minimum of 600mm to the maximum of 2200mm (NMA, 2014). The major rainy seasons of the district is spring (Appril-May), summer (June-August) and autum (September-November). The average annual temperature of the district is 24⁰C (NMA, 2014).

Vegetation

The major vegetation types of natural vegetation of the study area are woodlands riverines, shrubs and grass lands are common.

The major forest tree species in Hawa Gelan District includes *Croton macrostachyus*, *Acacia abyssinica*, *Cordia africana*, *Eucalyptus spp*, *Ficus sur*, *Ficus vasta*, *Erythrina brucei*, *Millettia ferruginea* and various shrub and herbs. However these natural vegetation found in the district are fragmented forest in some area, and trees left as coffee shade only. According to the information obtained from Hawa Gelan District Agricultural and Rural Development office (2014), currently the district has 540 hectares of natural forest and 3280 hectares of man made forest.



Figure 2: Vegetation photo taken by Fikiru Ayana from Howa Fincho.

3.2. Education and Health

In the district educational participation mainstreams gender and the balance is narrowing across sex from time to time. The district have 23 first cycle primary schools, 23 second cycle primary schools, 3 secondary schools, 1 preparatory school and one Technique and one kindergaten; total of 51 governmental schools and 3 private kindergaten schools (HGWE0,2016).

In the District there are 6 health centers and 30 clinics of governments and 24 private clinics, two drug vender and two drug store. The most common disease reported by the district health center are AFI, typhoid fever, helmentiasis, skin infection, epidemic typhes, diahrea (not bloody), muscle disease, stomache disease and etc are more prevalent in all areas of the district.

3.3. Livestock and Associated Disease of the study area.

The district were known by rearing livestock in addition to farming. The livestock population of the study area is totally about 229,966. From these 75927 cattles, 35,741 sheep, 21,450 goat, 1,087 horses, 7500 donkeys, 1,366 mules and 86,895 poultry; make the total population of livestockes of Hawa Gelan Districts (HGWLDFO,2016).

In case of livestock ailments trapanosomosis, internal parasites, external parasites, mastitis and black leg are the most prevalent disease reported by the district (HGWLDFO,2016)

3.4. People and Socio-economic Activity of the Study Area

The population size of the district is estimated to 129486 of which 65662 are males and 63854 are females (HGWFE0, 2016). From these population about 84% are rural residents and the remaining 16% are urban residents. The Hawa Gelan district has an estimated population density of 3 peoples per hektare. In case of ethnicity the largest group is Oromo people (HGWFE0, 2016).

Mixed farming is common among the district. The district is suitable for the production of different varieties of crops types like cereal, pulses, fruits, cash crops, oil crops, root crops and

spice are cultivated traditionally by the community. The community cultivate maize (*Zea mays*), *sorghum spp* and finger millet (*Eleusine coracana*) in all areas of the district.

However, some crops like teff (*Eragrostis tef*), wheat (*Triticum spp*) and barley (*Hordeum vulgare*) are limited to parts of Hawa Gelan considered as badadare. The people obtain income from coffee (*Coffea arabica*), khat (*Catha edulis*), barbary (*Capsicum spp*) and from livestock rearing.

Table 1: The major crops grown in the study area

Crop category	Scientific name	English name	Local name
Cereal	<i>Zea mays</i> L.	Corn	Boqqollo
	<i>Eleusine coracana</i> Gaertn.	Finger millet	Daagujja
	<i>Sorghum bicolor</i> (L) Moench.	Sorghum	Bisinga
	<i>Eragrostis tef</i> (Zuccagni) Trotter.	Tef	Xaafii
	<i>Hordeum vulgare</i> L.	Barly	Garbuu
	<i>Triticum aestivum</i> L.	Wheat	Qamadii
Pulses	<i>Vicia faba</i> L	Bean	Baaqelaa
	<i>Pisum sativum</i> L.	Pea	Atara
	<i>Phaseolus vulgaris</i>	Horicotbeans	Lojo
Fruit	<i>Musa x paradisiaca</i>	Banana	Muuzii
	<i>Citrus sinensis</i> Osbeck.	Orange	Burtukaani
	<i>Carica papaya</i> L.	Papaya	Paappayya
	<i>Persea americana</i> Mill.	Avocado	Avocado
	<i>Magnifera indica</i>	Mengo	Mengo
Cash crops	<i>Coffea arabica</i> Benth.	Coffe	Buna
	<i>Catha edulis</i> Forssk.	Khat	Caatii
Oil crops	<i>Brassica carinata</i> A.Braun.	Ethiopian rape	Ija goommada

	<i>Linum usitatissimum</i> Griseb.	Linseed	Talba
	<i>Ricinus communis</i> L.	Caster bean	Qobbo
Root crops	<i>Coccinia abyssinica</i> (Lam.).Cogn.	Anchote	Ancootee
	<i>Solanum tuberosum</i> Peopp.Ex.Walp.	Potato	Dinnicha
	<i>Beta vulgaris</i> L.	Sugar beet	Hundee diimaa
Spice	<i>Capsicum annuum</i> L.	Chili	Barbare
	<i>Allium sativum</i> L.	Garlic	Qullubbii adii
	<i>Zingiber officinale</i> Roscoe.	Ginger	Zingibila
	<i>Trigonella foenum graecum</i> L.	Fenugreek	Sunquu
	<i>Allium cepa</i> L.	Shallot	Shunkurta

3.5. Methods

3.5.1. Reconnaissance Survey

Reconnaissance survey of the study area was conducted from September, 20 to 30, 2016. During these time topography, vegetation distribution, border of the district, information about traditional healers and etc was surveyed.

3.5.2. Site Selection

Among the 24 kebeles of the district eighteen kebeles were selected for an ethnobotanical data collection. These kebeles were selected based on the agroclimatic condition of Hawa Gelan district i.e. that is from low lands and middle highlands. The kebeles from which data were collected are Geba Robi, Kella, Geba Sabtdura, Mojo, Kore, Hawa Babo, Hawa Fincho, Hawa Moyi, Hambela, Harere, Botoso, Haro Machera, Lemlem, Boke, Ifa Bas, Masala, Ifa Jiru and Mada Jalala.

3.5.3. Informant Selections.

Informant selection was done following the method suggested in Martin(1995).To obtain tangible data a total of 100 persons,70 male and 30 females were selected ;out of these about 75 individuals were selected randomly and the rest 25 individuals were traditional healers included in the study purposefully . Traditional healers were selected based on information obtained from the local peoples and in some area with the help of kebele administration leaders and as well as my based on my background information on the study area.

3.5.4. Ethnobotanical data collection

Semi-structured Interviews

Semi-structured interviews were constructed following Martin (1995) and Cotton (1996).In the interviews there was hint ideas that initiate the informants to raise their ideas freely.Further more additional idea was raised which strength and necessary for the data (see appendix 1)

Field observation

Field observation was made on the study sites with help of local people.During that observation important points like conservation action of medicinal plants,cultivation practice of medicinal plants and vegetation of an area were observed.

Group Discussion

Group discussion were made in Hawa Babbo, Kella and Geba Robi study kebeles with an estimated number of 10 individuals with one interested traditional practitioners in each groups in each kebeles. One group in each kebeles were formed and during the discussion ideas were allowed to flow and exchange among discussants about the existing indigenous knowledge on medicinal plants, availability of medicinal plants, best plant preferred as medicine to certain disease , best way of preparation and other use of plants was discussed.

Guided field walk.

Field walk was made with traditional healers to look at the natural sites where medicinal plants are growing while talking about local name,uses,mode of preparation and application,conservation status,etc.The information obtained through this method is usually recorded latter on in the day.Specimens were collected while visiting the growth sites of the medicinal plants

Market survey

Market survey was made on two kebeles of the markets to distinguish type of medicinal plants available for markets.During the study the names of medicinal plants sold in markets were recorded and sellers were interviewed concerning medicinal value of the plants and other uses.

3.5.5. Data Analysis

The Data were mainly analyzed and summarized by descriptive statistics, preference ranking,paired comparison and direct matrix ranking as Martin (1995).

Descriptive Statistics

Descriptive statistical analyse were used to analyse the data gathered on total medicinal plants obtained from homegarden and wild together with their habits , parts used,methods of preparation and other useful information accourding to Martin(1995) and Cotton(1996).

Preference Ranking

The preference ranking was made for six most important medicinal plants used to treat toothache.Because toothache is one of the health problems which commonly reported in the study area. These plants were presented to ten of key informants to identify most preferred medicinal plants to treat toothache traditionally. They were oriented to give the highest number to the most preferred plants .In this case 6 was given to the best preferred species. Scores given by all informants were added and the value sum up then ranked.

Paired Comparison

Among the fifty eight (58) traditionally treated disease in study area stomach ache is the common and reported by many individuals. About eleven medicinal plants were reported used to treat stomachache traditionally. Out of these five medicinal plants with highest informant consensus were selected. Pairing and randomizing the pairs were done based on the method in Martin (1995) and the pairs were delivered to ten key informants. Again informants were told to give the highest score to the best pair that they consider best medicinal plants composition to treat stomach ache. The scores were added at the end and ranked.

Direct Matrix Ranking

Direct matrix ranking was done according to Martin (1995) to compare plant species for their multipurpose use. Eight multipurpose plant species were selected based on their highest use reported from the community and seven use attributes were identified including medicinal use, construction, coffee shade, firewood, forage, sources of income and charcoal were listed.

Key informants were told to give values or scores for the different uses of a given plant species. The given values or scores were summed up and ranked. The values used for rank were: 5-best, 4-very good, 3-good, 2-less used, 1-least used and 0-no value.

3.5.6. Plant Specimen Collection and Identification

Plant specimens were collected from both habitats of medicinal plants which are homegardens and wild habitats. Necessary information needed for specimen identification like common name and voucher specimen were recorded during the plant species collection in the field. Plants were pressed and identified by different volumes of Flora of Ethiopia and Eritrea and; the others are taken to National Herbarium of Addis Ababa University then they were identified by experts of National Herbarium of Addis Ababa University using taxonomic keys and the different volumes of the Flora of Ethiopia and Eritrea.

CHAPTER FOUR

4. RESULTS

4.1. General Information of Informants Participated on the Interview

A total of 100 informants were interviewed to gather information. Out of these informants 36% (25 males and 11 females) were between 20-40 age. 42% (29 males and 13 females) were between 40-60 age categories. 17% (11 male and 6 females) were between 60-80 age categories and the rest above 80 years were 5% (5) and were only male. 49% of the informants were illiterate, 45% of them have modern education with different level and finally 6% have religious education. Regarding their marital status majority of them were married; that was 78% (78), 10% (10) informants were divorced and 12% (12) interviewees were single.

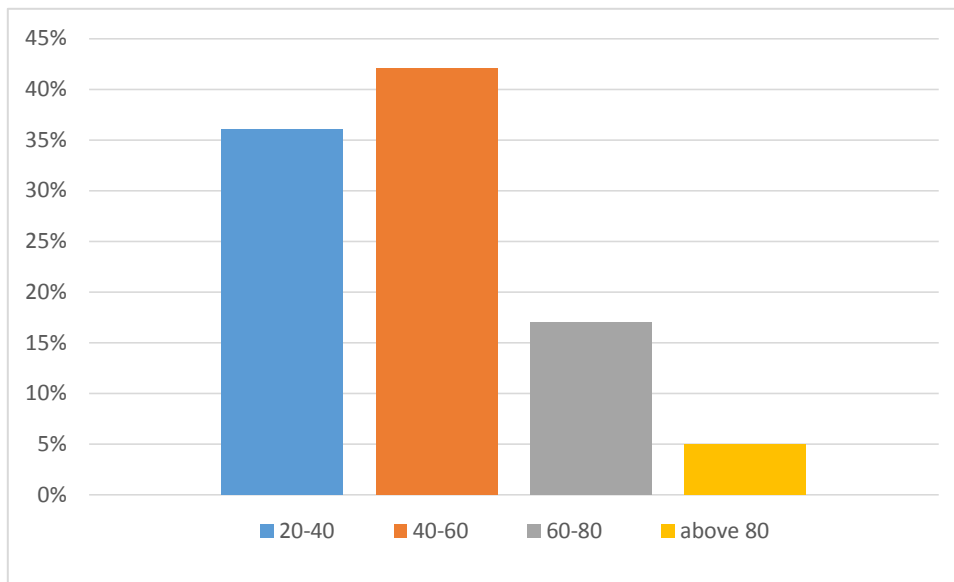


Figure 3: Age of informants

4.2. Ethnomedical/ Indigenous Knowledge of the Local Peoples

The peoples of the study area have indigenous knowledge of ethnomedical, classification of environments, plant habit classification, soil classification and etc. They have very good tradition of treating themselves and their cattle using plants and other environmental components.

The traditional medicines were prepared either by mixing more than one species of medicinal plants or from single species of medicinal plants. They know local name of plants and uses of plants but there was knowledge gap between individuals; that is older peoples know many medicinal plants than younger individuals.

4.2.1. Plant Habit Classification by Indigenous Peoples

Indigenous peoples of the study area classify plants into five groups by looking physical appearances of the plants. These emic classification are biqiltu(herbs), hidda(climbers), micire (shrubs), muka (tree) and marga(grasses)

Bikiltu (Herbs): These types of categories are small in size, non woody, shorter in height that is not more than a metre. Different types of weeds are examples of this types of emic classification. They are commonly found in all study area.

Hidda (Climbers); These types of plants use other plants for support to complete their life cycle. They climb wood plants near to them and move on that tree to give fruits or flowers. Plants like *Climants hirsuta* Guill&Perr., *Cucurbita pepo* Wall., *Cirsium rivulare* (jacq.).All., etc are climbing plants common to sites of the study area.

Micire (Shrubs): These type of plants are wood but they are shorter than larger tree. They are common to all study area. However, they differ in species based on agroclimatic condition. For example species like *Gardenia ternifolia* Schuch.&Thonn. area restricted to gemoji (low lands) .

Muka (Tree): These groups are woody plants with long heights. Found in all study area but they are vary in species depending on agroclimatic condition.

Marga(Grasses): These are plants usually used for grassing and common to all study area. They may grow uprights or simply move on the ground to complete their life cycle.

4.2.2. Vegetation Classification by Indigenous Peoples

They classify the vegetation of an area into different groups based on the nature and density of the plants (See table 2). These are;

Caffee: This refers to types of vegetation in wet land (marshy). The lands of an area of these vegetation are used for irrigation and known by having rich biodiversity. The name called *caffee* was given because usually the plant known as *caffee* (*Cyperus distans* L.f.) together with *Cyperus alopecuroides* was largely grow on that wet lands. And usually home for different types of frogs.

Marga: grasses and grass like vegetation usually used as forage and also home for small mammals like rats.

Bosona fafaca`a (Sparsely growing forests): sparsely growing tree species and shrubs. In the study area there are many sparsely growing tree species which are controlled by human because they use usually species they want as coffee shade and other purpose. Riverine vegetation are an example of sparsely growing forests found in majority of study sites.

Bosona (daggala)/Forest/: This refers to densely populated of different tree species and shrubs which are growing closely to each other. Such like forests are home for different animals however due to human activities like agriculture, deforestation, fire wood collection, charcoal, etc forests of an area are highly depleted and only fragmented forests were left. Especially the forest found in the low lands of the district were deforested due to large scale agricultural expansion.

Table 2: Vegetation Classification by IP

Emic vegetation classification.	Etic categories	Meaning	Location, of vegetation in the area
Caffee	Ripariane	Marshy	Specific parts of Harere, Hawa Babo, Hawa Fincho
Marga	Grass land	Grass like vegetation	Masala ,Boke
Bosona	Forest	Densely populated trees	Specific areas of, Masala, Hawa Fincho and keto forest.

4.2.3. Soil Classification by Indigenous Peoples

In the study area peoples classify soil into different groups. By their knowledge they use the lands for right crops that may produce good yields. For example they use the soil which is mixture of sand for cultivation of *Eragrostis tef*, fertile soil for cultivation of *Zea mays*, *sorghum bicolor*, *Hordium vulgare* and etc. They classify soil into four major groups. These are:

Biyyee suphee (Clay soil): Type of soil which holds water and is used to make different material for household purposes. These type of soils are not suitable for agriculture. Such kinds of soils are found in specific areas of Gaba Robi, Kella and Mojo study kebeles.

Biyyee cirracha (Sandy soil): Soil that has particles like mixture of sands which allow water to pass through. Usually the community uses those type of lands for cultivation of tef. Found in specific areas of Hawa Babo, Hawa Fincho, Hambella, Gaba sanbatdura, Kella, etc study kebeles.

Biyyee diimaa (Red soil): Soil that is red in color and easily eroded. Even though these type of soil is present in specific areas of all districts; it is mostly found in specific areas of Bottoso, Mojo, Gaba Robi and Gaba Sanbatdura, Hambella study kebeles in the study area.

Biyyee gabbataa (Fertile soil): This refers to black soil which is suitable for crop production. Present in all study area however, study kebeles like Masala, Arada ifa bas, Ifa Jiru, Lemlem, parts of Hawa Moyi are known by having fertile soil.

4.2.4. Agroclimatic and Land Form Classification by IP

Agroclimatic classification: The local people classified the agro-climate into different areas based on climate and altitude of an area. The district is split into two agroclimatic conditions. The low land locally called *Gemoji* and the middle area locally called *Badadare* which is more or less near to temperate agro climatic condition (see table 4)

Table 3: Agro-climate of the study area

Local classification	Meaning of the category	Corresponding etic category	Location of the groups in the district
Gammojji	Area, below 1500m a.s.l in altitude.	Low land (desert)	Masala, Arada Ifa bas, Lemlem, Ifa jiru, Kore, Haro machara, Boke, Mada Jalala,
Bada daree	Areas in between 1500-2300m a.l	Temperate.	Hawa Babo, Hawa Fincho, Hawa Moyi, Harere, Hambella, Botoso, Gaba Sanbatdura, Gaba Robi, Mojo, and kella.

Land form: Regarding the topography of the district there are areas with straight position, rugged, valleys, plateau and few areas with locally called bowwa (depression). The land forms of low lands of the districts are straight which is suitable for agriculture; while those of middle high lands are rugged with many streams and rivers (Table 4) Table 4: Topographical classification by IP

Table 4: Land forms of the study area.

Topographical classification by indigenous people	Definition of the category	Corresponding etic category	Location of area in the study area
Horufa	Flat and straight land	Plain	Machara, lemlem, Mada jalala, parts of Kella, Arada ifa bas, Gdina Wacho, Haro Machara, Mojo, Botoso
Sulala	Area found between two steep slopes.	Valley	Parts of Hawa Moyi and Hawa Babo, Kella
Tabba (lafa olkaha)	Flat area found on the hill	Plateau.	Hawa Fincho, Hawa Babo, Hawa, Moyi, Mojo, Harere, parts of Kella, Hambella .
Bowwa	Low depression.	Depression	Specific areas of Tulama, Kella.

4.3. Knowledge Transfer in Study Area

The results of the study indicated that knowledge transfer of the medicinal plants are transferred secretly to interested family members. Eldest son have high opportunity to acquire the knowledge which accounts 55%; followed by other trusted sons in the family (25%) and 12% of them transfer to whole family members and finally 8% to love one .

4.4. Total Medicinal Plants Obtained, Habits and their Sources

A total of 102 medicinal plants were collected from the study area. 63 (61.77%) plant species are collected from wild habitat and the rest 39 (38.23%) medicinal plant species were from homgarden and farm lands.

From Homegarden

The results of the study indicates that from homegarden of the study area 25 herbs, 3 climbers, 7 shrubs and 4 tree species collectively 39 medicinal plants were collected. Homegarden of the study area is one of the important sites where medicinal plants like *Allium sativum*, *Lipidium sativum*, *Zingiber officinale*, *Catha edulis*, etc were cultivated (see appendix 3). Some medicinal plants like *Linum usitatissimum*, *Hordeum vulgare*, *Vicia faba*, *Eragrostis tef*, grouped with homegarden are collected from farm lands.

From Wild Habitat

The results show that from wild habitats; 14 species of herbs, 7 climbers, 21 species shrubs and trees collectively 63 medicinal plants were collected. Majority of the shrubs and tree species of medicinal plants were collected from wild sources.

In general, the most abundant growth form and most widely used habits was herbs which accounts 38.23% and its followed by shrubs (see table 5).

Table 5: Total Medicinal Plants with their Sources and their Habits

Habits	Source					
	Home garden	%	Wild	%	Total	%
Herbs	25	24.51	14	13.73	39	38.23
Climbers	3	2.94	7	6.86	10	9.80
Shrubs	7	6.86	21	20.59	28	27.45
Trees	4	3.92	21	20.59	25	24.51
Total	39	38.23	63	61.77	102	100.

4.4.1. Number of Medicinal Plants used to Treat Human, Livestock and Both

For Human only.

The results of the study indicated that the medicinal plants used for human treatment accounts the largest percentage which is 71.57%(73species) from the total 102. Of these 73 species there are 25 species of herbs,9 species of climbers,18 and 21 species of shrubs and trees respectively(see figure 3).

Only for livestock only.

Of the 102 species medicinal plants; 15 (14.72%) species of medicinal plants were used to treat livestock only. These are represented by 8 species of herbs, 1 species of climbers, 3 species of shrubs and trees(see figure 3).

For both human and livestock disease: The rest 14 (13.72%) species which includes 5 herbs, 2 climbers, 6 shrubs and 1 tree species are used to treat both human and livestock disease.(see

Figure 3)

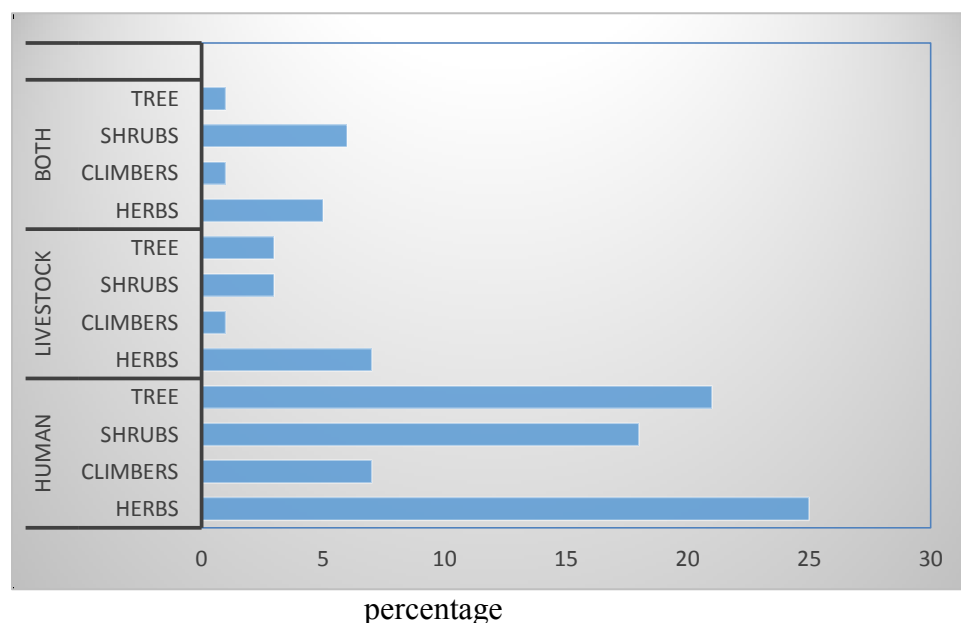


Figure 4: Medicinal plants used to treat human, livestock and both

4.5. Medicinal Plant Families Obtained from the Study Area

The 102 medicinal plant species collected from the sites of the study area were distributed among 85 genera and 47 families.

Table 6: Medicinal plant families of the study area

Family	Number of species	Percentage
<i>Fabaceae</i>	10	9.80
<i>Solanaceae</i>	9	8.82
<i>Asteraceae</i>	8	7.84
<i>Lamiaceae</i>	6	5.88
<i>Euphorbiaceae</i>	4	3.92
<i>Ranunculaceae</i>	4	3.92
<i>Poaceae</i>	4	3.92
<i>Brassicaceae</i>	3	2.94
<i>Capparidaceae</i>	3	2.94
<i>Rubiaceae</i>	3	2.94
<i>Rutaceae</i>	3	2.94
<i>Alliaceae</i>	2	1.96
<i>Boraginaceae</i>	2	1.96
<i>Polygonaceae</i>	2	1.96
<i>Myrtaceae</i>	2	1.96
<i>Rosaceae</i>	2	1.96
<i>Vitaceae</i>	2	1.96
Others	1	32.38
Total	102	100

The most abundant families were *Fabaceae* having 10 plant species and contribute 9.80% of medicinal plant species followed by *Solanaceae* with 9 (8.82%) species (see table 6)

4.5.Disease Reported and Medicinal Plants Used For The Treatments in the Study Area

In the study area people used either single medicinal plants or they use mixture of different medicinal plants for traditional treatments. Table 7 shows that the lists of disease reported in study area together with plants used for the treatments. While table 8 and 9 shows some of the medicinal plants used in study area including condition of preparation, parts used, mode of preparation, routes of administration and disease treated through these processes.

Table 7: Lists of Disease Reported in the Area and Medicinal Plants Used

Lists of disease reported	Lists of medicinal plants used.
Amoeba	-Mixture of <i>Brassica nigra</i> , <i>Lipidium sativum</i> L., <i>Linum usitatissimum</i> , <i>Zingiber officinale</i> Roscoe. and <i>Allium sativum</i> L. - <i>Calpurnia aurea</i> (Ait) Benth.
Ascaries	- <i>Carisa spinarum</i> L., <i>Croton macrostachyus</i> Del., <i>Ethnops kebericho</i> , <i>Lipidium sativum</i> , <i>Brassica nigra</i>
Bone setting	<i>Pentas schimperiana</i> (A.Rich.) Vatke
Blotting	<i>Croton macrostachyus</i> Del., <i>Capsicum frutescens</i>
Back pain	<i>Vicia faba</i> L.
Bleeding after cut	<i>Bidens prestinaria</i> (Sch Bip) Cufod., <i>Brassica carinata</i> .
Common cold	Mixture of <i>Allium sativum</i> L., <i>Zingiber officinale</i> and <i>Brassica nigra</i> , <i>Ruta chalepensis</i> L., <i>Foeniculum vulgare</i> Miller.
Cough	<i>Catha edulis</i> (Vahl) Forssk. ex. Endl., <i>Lawsonia inermis</i> L., <i>Nicotina glauca</i> L.
Diarrhea	<i>Coffea arabica</i> L., <i>Croton macrostachyus</i> Del.
Evil eye	<i>Allium sativum</i> L., <i>Echinops kebericho</i> , <i>Croton macrostachyus</i> Del., <i>Clerodendrum myroides</i> , <i>Lawsonia inermis</i> L., <i>Datura stramonium</i> L.,

	<i>Rhamnus prinoides</i> , <i>Ruta chalepensis</i> , and <i>Vernonia amygdalina</i> Del.
Evil sprit	Mixture of <i>Ehretia cymosa</i> , <i>Clausena anisata</i> , <i>Justicia schimperian</i> and <i>Pycnostachyus abyssinica</i> Mixture of <i>Echinops kebericho</i> , <i>Carisa spinarum</i> L. and <i>Capparis micrantha</i>
Eye disease	<i>Buddleja polystachys</i> Schwind., <i>Erythrina brucei</i> Schwind. , <i>Pycnostachyus abyssinica</i> , <i>Solanum marginatum</i> .
Fever	<i>Magnifera indica</i> L.
Feleria	<i>Lipidium sativum</i> L.
Fibrillness/Mich/	Mixture of <i>Echinops kebericho</i> , <i>Lipidium sativum</i> L. Mixture of <i>Ocimum lamiifolium</i> Hochist., <i>Ocimum urticifolium</i> Roth., <i>Ocimum gratissimum</i> . <i>Ranunculus multifidus</i> Forssk.
Fire burn	<i>Aloe spp</i>
Ear problem	mixture of <i>Accacia abyssinica</i> Hosst.ex Benth., <i>Trigonella foenum graecum</i> L.
Gastritis	<i>Musa x paradisica</i> , <i>Trigonella foenum graecum</i> L., <i>Carica papaya</i> L.
Heart problem	<i>Guizota scabra</i>
Headache –	<i>Nigella sativa</i> L., <i>Eucalyptus globulus</i> Labil., <i>Echinops kebericho</i> Mesfin., <i>Vigna sp.</i>
Hepatitis	-mixture of <i>Croton macrostachyus</i> Del., <i>Accacia abssinica</i> , <i>Phytolaca dodecandra</i> , <i>Ehretia cymosa</i> Thonn., <i>Guizota scabra</i> (Vis.) Choiv., <i>Vernonia amygdalina</i> Del. and <i>Justicia schimperiana</i> . - <i>Croton macrostachyus</i> Del.
Hemorrhoids	-mixture of <i>Clausena anisata</i> , <i>Cirsium englerianum</i> , <i>Phytolaca dodecandra</i> , <i>Vernonia amygdalina</i> Del., <i>Premna schimper</i> Engl. -Mixture of <i>Euphorbia abyssinica</i> Gmel., <i>Gardenia ternifolia</i> , <i>Allium sativum</i> L..
Hypertention	<i>Citrus limon</i> (L.) Burf.
Jundice	<i>Clematis hirsuta</i> Perr.and Guill. , <i>Cordia africana</i> Lam., <i>Sida rhombifolia</i>
Lice	<i>Calpurnia aurea</i> , <i>Erythrina brucei</i> .

Loss of hair	<i>Allium sativum</i> L.
Malaria	mixture of <i>Allium sativum</i> L., <i>Zingiber officinale</i> Roscoe., <i>Brassica nigra</i> , <i>Lidium sativum</i> L. and <i>Linum usitatissimum</i> L.. <i>Carica papaya</i> L., <i>Nigella sativa</i> L.
Male sexual impotency	mixture of <i>Allium sativum</i> , <i>Zingiber officinale</i> Roscoe. and <i>Drymaria cordata</i> (L) .Schultes.
Nasal beeding	<i>Datura stramonium</i> L.
Placental retention	<i>Linum usitatissimum</i> L. , <i>Cana indica</i>
Rabies	Mixture of <i>phytolaccadodecandra</i> , <i>calpurnia aurea</i> , <i>Justicia schimperiana</i> , <i>pycnostachyus abyssinica</i> Fresen.. - <i>Phytolacca dodecandra</i> L.Herit.
Ring worms	<i>Croton macrostachyus</i> Del., <i>Echinops kebericho</i> Mesfin.
Scabies	mixture of <i>Lipidium sativum</i> L., <i>Allium sativum</i> L., <i>Zingiber officinale</i> and <i>Brassica nigra</i> .
Snake bite	<i>Citrus limon</i> , <i>Justicia schimperiana</i> (Hochst.ex Ness) T.Anders., <i>Sapium thuspuncturus</i> , <i>Stereospermum kunthianum</i> , <i>Datura metel</i> L.
Spider poison	<i>Clematis hirsuta</i> Perr.and Guill., <i>Rhmnus prinoide</i> L.Herit.
Stomachache	<i>Albizia gummifera</i> , <i>Artemisia afra</i> , <i>Datura stramonium</i> , <i>Echinops kebericho</i> , <i>Lawsonia inermis</i> L., <i>Ruta chalepensis</i> L., <i>Rumex nepalensis</i> Spreng., <i>Foeniculum vulgare</i> Miller., <i>Indigofera vohemansis</i> , <i>Vigna</i> sp.
Tape worm	<i>Hagenia abyssinica</i> , <i>Croton macrostachyus</i> Del.
Tonsilitis	<i>Artemisia afra</i> , <i>Brassica carinata</i> , <i>Capsicum frutescens</i> , <i>Rhamnus prinoide</i>
Toothache	<i>Clematis hirsuta</i> , <i>Commelina</i> spp, <i>Capparis sepiaria</i> , <i>Premna schimperi</i> , <i>Stereospermum kunthianum</i> , <i>Vernonia amygdalina</i> , <i>Capparis micrantha</i>
Trips	-Mixture of <i>Brassica carinata</i> , <i>Lipidium sativum</i> L, and <i>Brassica nigra</i> . <i>Scadoxus multiflorus</i> .
Urine retention	<i>Lycopersicon esculentum</i> Mill.
Viral disease of hen	<i>Alluim cepa</i> L.
Wounds	<i>Cirsium englerianum</i> , <i>Datura stamonium</i> L., <i>Guizota scabra</i> , <i>Justicia schimperiana</i> , <i>Phytolacca dodecandra</i> , <i>Calpurnia aurea</i> , <i>Pycnostachys</i>

	<i>abyssinica</i> Fresen, <i>Prunus africana</i> (Hook.f.) Kalkm.
Worms	Mixture of <i>Brassica nigra</i> L., <i>Lipidium sativum</i> , <i>Linum usitatissimum</i> L., <i>Zingiber officinale</i> Roscoe., <i>Allium sativum</i> L., <i>Echinops kebericho</i> Mesfin.

Table 8: Some medicinal plants used to treat human prepared from more than two species

Lists,of medicinal plants.	Other medicinal plants added.	Condition	Parts used	Ways of preparation	Route,of administration.	Diseases treated
<i>Ocimum lamiifolium</i> Hochst.	<i>Ocimum gratissimum</i> , <i>ocimum urticifolium</i> .	Fresh	Leaves	Squeezing.	Oral /nasal	Fibre illness.
<i>Datura stramonium</i> L.	<i>Vernonia amygdalina</i> , <i>Ruta chalepensis</i> , <i>Rhamnus prinoides</i> .	Fresh	Tip	Crushing and squeezing.	Oral	Evil eye.
<i>Lipidium sativum</i> L.	<i>Brassica nigra</i> , <i>Linum usitatissimum</i> , <i>Allium sativum</i> (bulb), <i>Zingiber officinale</i> (bulbs).	Dry	Seed	Pounding	Oral	Malaria ,gonorrhea .
<i>Phytolacca dodecandra</i> L.Herit	<i>Calpurnia aurea</i> , <i>Justicia schimperiana</i> , <i>Pycnostachys abyssinica</i>	Fresh	Tip	Pounding and squeezing.	Oral	Rabies.
<i>Ehretia cymosa</i> Thonn.	<i>Clausena anisata</i> , <i>Justicia schimperiana</i> , <i>Pycnostachys abyssinica</i> .	Fresh	Leaves	Putting into hot,water with,hot stone.	Nasal	Divil

Table 9: Some medicinal plants used to treat human prepared from single species

Lists,of medicinal plants.	Condi tion	Parts used	Other substance added .	Ways of preparation.	Routes of admistration.	Diseases treated.
Artimisia afra Jacc.ex wild.	Fresh	Leaves	Water.	Squeezing	Oral	Stomache ,tonsil .
<i>Coffea arabica L.</i>	Dry	Seed	Honey	Powdering and mixing.	Oral	Dhrrhea
<i>Cordia africana Lam.</i>	Dry	Leaf	Butter	Burning and mixing.	Dermal	Jundice
<i>Datura metel L.</i>	Fresh	Leaf	Water	Squeezing	Oral	Snake bite

4.5.1.Medicinal Plants used to Treat Livestock Ailments

The results of the study indicate that there 14 plant species only used to treat livestock disease and some of the plants with their condition necessary,parts used,ingredient added and disease treated were illustrated (See table 10)

Table10: Some Medicinal Plants used to Treat Livestock ailments

Lists of medicinal plants	Condition in which its used.	Parts used	Ingredient added	Disease treated.
<i>Budjaleja polystachya</i> Fresen.	Fresh	Leaf	Salt	Eye problem
<i>Erythrina brucei</i> Schwind.	Fresh	Leaf	Water	Lice
<i>Nicotina tabacum L.</i>	Fresh	Leaf	Water	Cough
<i>Rucinus communis L.</i>	Fresh	Root	Water +salts	Plasental retention.

<i>Prunus africana</i> (Hookf.) Kalm.	Dry	External parts	Salts	Wound
<i>Thalictrum rynchocarpum</i> Dill&Rich.	Fresh/dry	Root	Water	Loha

4.6. Condition of Preparations and parts used .

4.6.1. Condition of preparations of remedies.

From 122 total preparation of remedies 70 (57.37) preparation were from fresh alone and 35(28.69) were from dry and finally 17 (13.94) preparation were possible from fresh or dry condition (see figure 4).

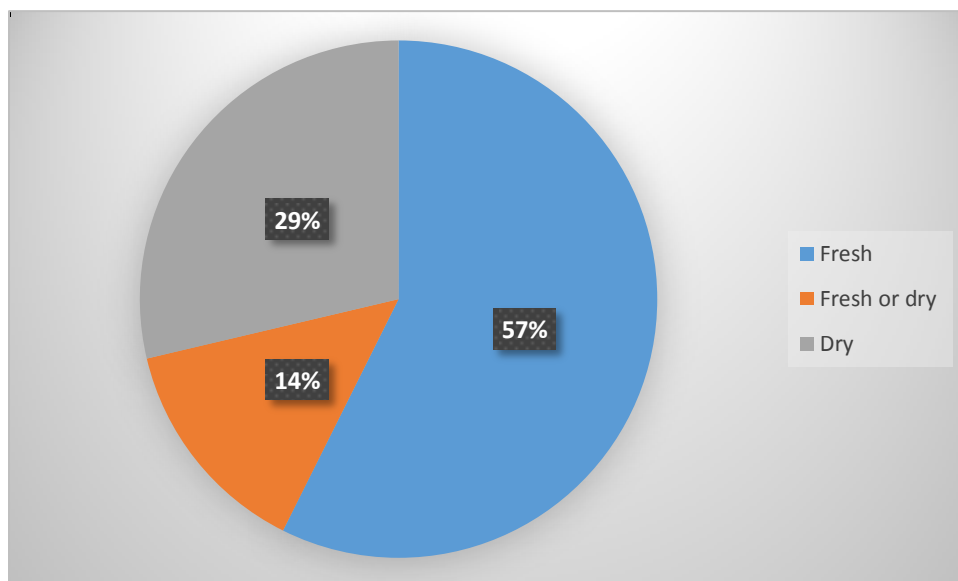


Figure 5: Condition of Preparation

4.6.2.Parts used as Remedies

The results of the study indicated that among the 102 medicinal plants leaves were used for the 31 species , roots for 16 medicinal plants species, seed for 12 medicinal plants ,shoot tips for 6 of the reported medicinal plants and external parts for the 4 medicinal plants (table 11).Therefore the parts highly used was leaves (35.16 %), followed by roots and then seed is the third parts frequently used .

Table 11: Parts used

Parts used	Number of plants	Number of prepatation	Percentage of preparation
Leaf only	31	41	36.94
Root only	16	18	16.22
Seed only	12	15	13.51
Tip only	6	8	7.21
External part only	4	6	5.41
Stem only	5	7	6.31
Fruits only	9	11	9.90
Bulb only	4	4	3.60
Whole part	1	1	0.90
Leaf and root	3	0	0
Leaf and stem	1	0	0
Fruits and stem	1	0	0
Leaf and seed	1	0	0
Leaf and tip	4	0	0
Root,external parts and tip	1	0	0
Root ,external parts,leaf	1	0	0

Leaf,tip and seed	1	0	0
Fruits and seed	1	0	0
Total	102	111	100

4.7.Mode of Preparation,other substance added and Route of Administration

4.7.1.Mode of Preparation

The results of the study indicated that squeezing and pounding have equal value which is 22.38% (32) in terms of preparation of remedies and the third process of preparation was crushing which accounts 17.48% (25) and there also other mode of preparation like powdering,cooking,etc(table 12).

Table 12: Mode of preparation

Mode of preparation	Frequency	Percentage
Crushing	25	16.79
Pounding	36	24.16
Squeezing	36	24.16
Powdering	13	8.72
Cutting	5	3.35
Sniff	2	1.34
Cooking	4	2.68
Placing	4	2.68
burning	4	2.68
Chewing	2	1.34
Washing	2	1.34
Boiling	2	1.34

Brushing	2	1.34
Swallow	2	1.34
Slight heating	2	1.34
Drinking	2	1.34
Baking	2	1.34
Putting	2	1.34
Dissolving	1	0.7
Painting	1	0.7
Roasting	1	0.7
Total	149	100

4.7.2.Other Substance Added to Prepare the Remedies.

Some of the remedies are taken with other substance in addition to medicinal plants. These substances are usually water, alcohol (local arake), honey, butter, salts, coffee(as hot liquid), food, egg ,animal dungs (caw) and etc were taken with medicine as types of ingradient added. From these water accounts high percentage compared to other(See appendix 8).

Route of Administration

The highest routes of administration recorded in this study was oral administration which accounts 63.06% and the next was dermal 18.47% .Other routes of administration applied in this study were nasal 7% , tooth surface 5.1% ,optical 3.18% ,Nasal and Oral 1.91% and finally auricular and anal 0.64 % each are through which remedies were given for the patients in the study area. (See Figure 4)

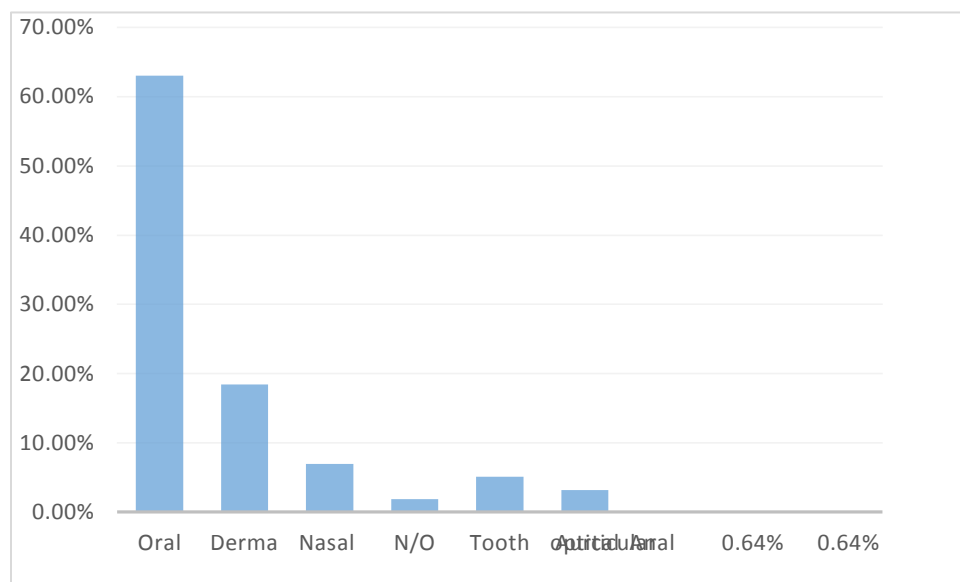


Figure 6: Routes of application of traditional medicine.

4.8.Dosage prescribed by traditional healers.

The amounts of traditional medicine given for patients differ among traditional healers and among patients. That means there is no standardised dosage given for patients. However, there is common consensus among all knowledgeable health practitioners to use small amounts. Usually amounts of traditional medicine given for human beings are measured by size of small finger line, small cups, spoon, glass and putting by two finger only. In case of livestock the amount given can be increased by more than half and some times bottle is used as tool of measurements. The age also considered in usage of doses. The older the patients the more the quantity of the medicine.

4.9.Medicinal Plants Available for Markets of the Study Area

The results obtained from the market survey of the two markets of the districts, on Wednesday (Geba Robi town) and on Thursday (Mojo kebeles) indicated abundant number of medicinal plants are available in markets. More or less the medicinal plants for markets are cultivated or

home garden. The marketable medicinal plants were *Lipidium sativum*, *Brassica nigra*, *Brassica carinata*, *Linum usitatissimum*, *Trigonella foenum-graecum*, *Nigella sativa*, *Coffea arabica*, *Allium sativum*, *Allium cepa*, *Capsicum spp*, *Hordeum vulgare*, *Vicia faba*, *Phaseolus spp*, *Lycopersicone esculentum*, *Rhamnus prinoide*, *Citrus limon*, *Ruta chalepensis*, *Echinops kebericho*, *Zingiber officinale*, *Carica papaya*, *Musa x paradisiu*m, *Catha edulis* and other species not found in the district were also available in the local markets of the study area. Majority of them are marketed for multipurpose like food, spice, stimulants, in addition to their medicinal uses (See table 13).

Table 13: Lists of medicinal plants with their price

Lists of medicinal plants	Measurments	Price
<i>Lipidium sativum</i>	Cup	1
<i>Brassica nigra</i>	Cup	2
<i>Brassica carinata</i>	Cup	2
<i>Linum usitatissimum</i>	Kubaya	6
<i>Trigonella foenum-graecum</i>	Cup	5
<i>Nigella sativa</i>	Cup	5
<i>Allium sativum</i>	Kilo	60

4.10. Preference Ranking

Different plant species were obtained to treat certain type of disease but the peoples can tell which species is with the highest efficacy. Ten traditional healers were selected randomly to give value to Six species reported as useful to treat toothache .This was done to identify the best efficient and the most preferred medicinal plants species among the six.Based on this analysis *Premna schimperi*Engl.ranked first as it was the most effective in treating toothache and followed by a *commelina spp* (Table14)

Table 14: preference ranking of six medicinal plants used to treat toothache.

Lists of medicinal plants.	Growth form.	Informants											
		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	Total	Rank
<i>Clematis hirsuta</i> .	Cl	2	1	3	6	1	3	6	2	2	2	25	5
<i>Commelina spp</i>	H	5	6	5	3	5	6	3	4	3	4	44	2
<i>Capparis sepiaria</i>	Cl	1	2	1	4	2	1	4	1	1	1	17	6
<i>Premna schimperi</i> Engl.	S	6	4	6	2	3	4	3	6	6	5	45	1
<i>Stereospermum kunthianum</i>	S	3	3	2	1	6	2	1	5	4	6	33	4
<i>Vernonia amygdalina</i>	S	4	5	4	5	4	5	5	3	5	3	43	3

4.11. Paired comparison

Among the 12 plant species already identified as traditional medicinal plants to treat stomachache, five pairs were given to ten key informants who were selected randomly. By comparing each pair, most preferred plant species were identified and the key informants were requested to rank these plant species according to their effectiveness of treating stomachache. From the results *Echinops kebericho* Mesfin. ranked first and *Rumex nepalensis* Spreng. was the next choice (Table 15).

Table 15: paired comparison of medicinal plants used to treat stomachache.

Lists of medicinal plants	Parts used	Informants											
		R 1	R 2	R 3	R 4	R 5	R 6	R 7	R 8	R 9	R 10	Total	Rank
<i>Artemisa afra</i> Jacc.ex wild.	Leaf	3	4	4	2	1	5	4	4	1	3	31	3
<i>Datura stramonium</i> L.	Leaf	1	3	1	4	3	2	2	1	2	1	20	5
<i>Echinops kebericho</i> Mesfin.	Root	5	5	3	5	4	3	5	5	3	5	43	1
<i>Ruta chalepensis</i> L.	Leaf	2	1	2	1	2	4	1	3	5	2	23	4
<i>Rumex nepalensis</i> Spreng.	Root	4	2	5	3	5	1	3	2	4	4	33	2

4.12. Direct Matrix Ranking

In the study area the community relies on plants for various purposes like construction, charcoal, fire wood, coffee shade, forage, source of income and etc in addition to their medicinal value. Direct matrix ranking of eight plant species were made by interviewing six key informants. As a result *Accacia abyssinica* Hochst Benth. stood first as it is being used for several purposes (Table 16).

Table 56: Direct matrix ranking of eight plant species

Medicinal plants	Medicine	For age	Construction	Fire wood	Char coal	Sources of income	Coffee shade	Total	Rank
<i>Acacia abyssinica</i>	2	3	3	5	5	3	5	26	1
<i>Albizia gummeferia</i>	2	1	5	5	3	2	5	25	2
<i>Catha edulis</i>	5	2	0	1	0	5	0	13	7
<i>Calpurnia aurea</i>	5	0	2	4	0	1	0	12	8
<i>Cordia africana</i> Lam.	2	1	5	4	3	5	0	20	5
<i>Croton macrostachyus</i> Del.	5	0	5	5	3	5	0	23	3
<i>Prunus africana</i> (Hookf.) Kalm	2	0	5	5	3	3	0	18	5
<i>Vernonia amygdalina</i> Del.	4	5	3	5	0	2	2	21	4

4.13 Informant Consensus

The study reveal that some medicinal plants were popular than others in the study area where as others were held secret by only traditional healers. *Echinops kebericho* and *Ocimum lamiifolium* were cited by 53 and 49 informants respectively in the study area. *Allium sativum* and *Zingiber officinale* was cited by 47 and 44 informants respectively. *Hagenia abyssinica* and *croton macrostachyus* were cited by 34 informants. While *vernonia amygdalina* Del. was cited by 33 informants (See table 17).

Table 17: Informant consensus of some medicinal plants

Scientific name	Number of informants cite the plants	Rank
<i>Lipidium sativum</i> L.	56	1
<i>Echinops kebericho</i> Mesfin.	53	2
<i>Ocimum lamiifolium</i> Hochist.	49	3
<i>Allium sativum</i> L.	47	4
<i>Zingiber officinale</i> Rosc.	44	5
<i>Rumex nepalensis</i> Spreng.	39	6
<i>Hagenia abyssinica</i> Bruce J.F.Gmel.	34	9
<i>Croton macrostachyus</i> Del.	34	9
<i>Vernonia amygdalina</i> Del.	33	11
<i>Rhamnus prinoides</i> L.Herit.	32	12
<i>Buddleja polystachya</i> Fresen.	32	12
<i>Phytolacca dodecandra</i> L.Herit.	31	12
<i>Premna schimperi</i> Engl.	27	15
<i>Catha edulis</i> (Vahl)Forssk.ex	24	16
<i>Bidens prestinaria</i> (SchBip.) cufod.	23	18
<i>Calpurnia aurea</i> (Ait) Benth.	22	20
<i>Clematis hirsuta</i> Perr.&Guill.	22	20
<i>Nigella sativa</i> L.	22	20
<i>Justicia schimperiana</i>	19	26
<i>Artimesia afra</i> Jacq.ex Wild.	20	25
<i>Solanum angulyi</i>	19	26
<i>Linum usitatissimum</i> L.	35	7
<i>Euphorbia abyssinica</i> Gmel.	18	28

<i>Erythrina brucei</i> Schweinf.	16	30
<i>Datura stramonium</i> L	21	23
<i>Lawsonia inermis</i> L.	23	18
<i>Commelina spp</i>	24	16
<i>Ruta chalepensis</i> L.	35	7
<i>Coffea arabica</i> L.	21	23
<i>Grewia bicolor</i> Juss.	17	29
<i>Drymorina cordata</i> (L).Schults	6	36
<i>Xemenia americana</i> L.	4	38
<i>Prunus africana</i> (Hookf.) Kalm.	12	31
<i>Pycnostachys abyssniica</i> Fresen.	11	12

Informant Consensus Factor

In the study area eventhough different diseases were there it was possible to group these diseases based on the organ/body part affected. Therefore informant consensus factors have been calculated for each groups (Table 18) .

Table 18: Informant consensus factor

Groups of diseases	Number of Plant species	Use citation	I CF
Stomache	11	53	0.81
Headache and fibre illness	4	53	0.94
Evil eye and evil sprit	14	49	0.73
Eye disease	6	15	0.64
Rabies	3	31	0.93
cough.	4	12	0.72
Skin,jundice,would and spider poison	17	36	0.54

Trips	8	24	0.69
Back pain and pain.	2	12	0.91
Toothache	10	13	0.25
Liver problem	7	8	0.14
STD	4	5	0.25
Plasental retention and urine retention	2	6	0.8
Snake bite	4	10	0.67
Hemorrhoids	2	7	0.83
Bleeding and wound	8	31	0.77

The informant consensus of medicinal plants used results in ICF ranges from the lowest 0.14 to the highest 0.94 per illness category

4.14.Other uses of medicinal plants in addition to their medicinal uses.

Used as Food

The results of the study revealed that there are different species medicinal plants were used as food plants .Medicinal plants like *Hordeum vulgare*,*Cucurbita pepo* L.,*Eragrostis tef*, *Coccinia abyssinica*, *Magnifera indica* L, *Linum usitatissimum* L. *Ximenia amiricana* L.,*Coffea arabica* L.,*Vicia faba* etc, are used as food plants in addition to their medicinal value.

Used as Spice

The results also reveal that some of the medicinal plants are used as spice;for flavouring food.Medicinal plants like *Capsicum spp*, *Trigonella foenum graecum*, *Allium sativum* L. *Allium cepa* L.,*Zingiber officinale*,*Nigella sativa*,*Coriandrum sativum*,etc are used as spice .

Used as Coffe Shade

As the results indicated that shade is another importance of medicinal plants in study area. Medicinal plants like *Acacia abyssinica*, *Albizia gummifera*, *Erthrina brucie* , *Vernanoa amygdalina* , etc were used as coffe shade tree in addition to their medicina uses.

Forage

The results of the study showed that some medicinal plants are used as forage plants. Plants like *Buddleja polystachya* , *Bidens prestinaria*, *Vernonia amygdalina* , *recinus communis*, *Acacia abyssinica*, etc are used as forage plants for livestock like sheep, caw and goats.

Construction

The results of the study indicate that many of the medicinal plants are used for construction purposes. People uses locally available plants to construct fence, house, house hold materials and others.

4.15. Threat and Conservation Practice to Medicinal Plants

In the study area there were major factors reported as the probable cause to decline of medicinal plants and other plants . These factors are agricultural expansion, fire wood collection, charcoal trading, harvesting mechasim of medicinal plants, overgrazing and construction were known (see table 19). Due to very large agricultural expansion in low lands of the district people destruct the habitats, deforest and run monoculture agricultural system. There is no any action of saving forests for the next generation and for them selves because they repeal wild animals like monkey by destroying the living place of those organism. Plant species like *Ficus ovata* D. Don., *Ficus sur* Forssk. and others were removed despite their vitality to support the growth of many organisms as food source as well as furbishing habitat.

Informants agreed that medicinal plants like *Ximenia americana*, *Cordia africana* and *Prunus africana* are dwindling in the study area from time to time. Specially *Ximenia americana* was critically endangered in the area. It was encountered rarely during the feild walk and

observation. This mainly due to overharvesting and because of the parts used. The parts used as medicine is the root and users harvest the plant in destructive way to uproot the plant which enhance the drying condition of the plants .

Some medicinal plants like *Catha edulis*, *Coffea arabica* and *Eucalyptus globulus* were protected well since they are used as means of income. *Accacia abyssinica*, *Albizia gummifera* and others were reserved in *coffea arabica* plantation since they are used as coffee shade. However the number of those plants were controlled by the owners because they need only for shade. *Croton macrostachyus* were the most abundant medicinal plants available in majority of the study area

Table 19: Threatened factor of medicinal plants

Factor threatening medicinal plants	Informants								
	A	B	C	D	E	F	G	Total score	Ranks
Agricultural expansion	4	5	4	5	5	4	5	32	1
Charcoal and fire wood collection.	5	4	5	4	4	3	2	27	2
Overharvesting	2	1	2	1	1	1	1	9	5
Construction.	3	2	3	3	2	5	3	21	3
Overgrazing	1	3	1	2	3	2	4	16	4

From the results of ranking agricultural expansion is the major factor affecting the status of medicinal plants in the study area like that of other area.

CHAPTER FIVE.

5. DISCUSION, CONCLUSION AND RECOMMENDATION.

5.1.Discusion

5.1.1.Ethnomedical and other Indigenous Knowledge of the Local Peoples

As it is well stated in the result section , the local people have potential knowledge about their environment. They could recognize and classify different taxa of plants, plant habits including agroclimatic zones. This indicates that the existence of remnants of knowledge and the biodiversity. This emic classification was similar with that of the indigenous peoples of Goma Wereda, Jima Zone presented by Bahailu Etana (2010) and with indigenous peoples of Seru Wereda, Arsi zone (Mengistu Gebrehiwot, 2014). Further also connected to the indigenous peoples of DeBarka woreda Amhara Region presented by Eskedar Abebe (2011) and with indigenous peoples of Ankober district (Ermias Lulekal, 2014).

Regarding with the ethnomedical knowledge even though the local people of the study area have accumulated knowledge there is knowledge gap among age groups. This means that older individuals have highest accumulated knowledge than younger. This result is similar with that of Tigist Wondimu *et al.*, (2006) and Tesfaye Awas and Sebsebe Demissew (2009). Local communities knowledge can be depleted due to lack of interest by the younger groups. Many peoples consider using traditional medicine as backwardness, effects of modernization and also the traditional healers secret (Dawit Ababe, 2001). This problem was also one of the factors that threaten the IK of the community. Some traditional healers fear to give the traditional medicine because they consider as this activity was banned by the governments .

In the study area some people have completely forgotten using their traditional medicine because they rely only on modern medicine. However, traditional medicinal plants are very important in healthcare system and also important in development of modern medicines (Dawit Abebe, 1986, Tilahun Teklehaimanot and Miruste Giday, 2007).

In case of knowledge transfer the medicinal plant knowledge transfer carried out in secret form orally to eldest son, other trusted son, member of families and to relatives or loved one. The results of the study was similar with that of Ermias Lulekal(2014), Zewdie Kasa(2009).

5.1.2. Source medicinal plants, habits and parts used.

In study area majority of the medicinal plants were collected from the wild habitat which accounts 61.76% and remaining percentage was collected from home garden and from cultivation land. The results of the study were similar with the study of many of the ethnobotanical studies done in different parts of the country, Ethiopia. As Tesfaye Awas and Sebsebe Demissew (2009) state the wild habitat was where the diversified medicinal plants obtained. Among the habits of the medicinal plants herbs accounts the largest percentage than other growth forms and the results was similar with works of Eskedar Abebe (2011) and others. As the results of the study indicate the parts of the plants highly used for the preparation of remedies were leaves (36.94%) and the next was roots (16.22%). The results of the study agrees with the works of (Mirusta Giday, *et al.*, 2003; Fissaha Mesfin, 2007; Mengistu Gebrehiwot, 2014) and elsewhere in the country.

5.1.3. Condition of Preparation, Mode of preparation and Route of administration.

As in the result section showed the majority of remedies were prepared from fresh material which is about 57% followed by dry (29%) and finally dry or fresh (14%) were used as alternative. The results was similar with works of Mengistu Gebrehiwot (2014), Eskedar Abebe (2011), Bahilu Etana (2010) and consistent with most of findings. As it was well stated in the results section Pounding and squeezing preparation methods have equal which is 24.16% each and the next preparation process was crushing which accounts 16.79%. In case of route of administration oral administration accounts the largest percentage which is 63.06% followed by dermal 18.47% and then nasal. The results match with the findings of (Bahilu Etana, 2010; Ermias Lulekal, *et al.*, 2008) and consistent with elsewhere in the country.

The people of the study area some times prepare remedies from more than one medicinal plant species. For example pounding the seed of *Lipidium sativum*, *Brassica nigra*, *Linium*

usitatissimum, with the bulbs of *Allium sativum* and *Zingiber officinale* and these remedies were used to treat malaria, worms, amoeba, gonorrhea, and used as anti pain.

5.1.4. Dosage Prescribed by traditional healers.

As is known the amounts of traditional medicinal remedies given for patients were differ among traditional healers. According to Sofowara (1982) and Dawit Abebe (1986) there is no standardised known measurements of remedies given. Therefore dosage is one of the problem of using traditional medicines. However, the local community uses measurements like small coffee cup, small finger line digits for powerful traditional medicine, putting by two fingers only, spoon, glass and hands. Similar units of measuring style were identified by different researchers (Ermias lulekal, 2014 and Zewude Kasa 2010). Some traditional healers consider age of patients, sex and status of the patients before starting the treatments.

5.1.5. Marketable medicinal plants .

As the results of the study revealed that market is one of the source of medicinal plants in the study area. Especially cultivated medicinal plants are available in the local markets of the site of the study. The results are similar with that of Eskedar Abebe (2011), and similar researches in the country.

5.1.6. Informant consensus of Some medicinal plants

As the results of the study indicate that from all informants 26% of them cited 1-3 medicinal plants, 42% of them cited 4-7 medicinal plants, 15% of them cited 8-11 medicinal plants, 13% of them cited 12-16 medicinal plants and the rest 4% cited above 20 medicinal plants.

Medicinal plants like *Lipidium sativum*, *Echinops kebericho* were cited by high number of informants compared to other this is because that these medicinal plants were used to treat both human and livestock on all study area. The informant consensus of medicinal plants used results in ICF ranges from the lowest 0.14 to the highest 0.94 per illness category. The highest informant consensus factor goes to headache which is 0.94 as it is used by high number of individuals and it is

indication of agreements by informants .Low value is the indication of disagreements on the use of the medicinal plants

5.1.7. Other uses of Medicinal plants.

The results of the study indicated that some of the medicinal plants identified in the study area were used as food and medicine. Human beings rely on plant products for their survival.Plants are essential to our survival because they produce virtually all our food and any life cannot survive without plants.The results were similar with the findings of Tigist Wondimu *et al.*,(2007).Some of the medicinal plants of the study area used as fodder,spice ,construction, firewood,charcoal (Zemedu Asfawu,2001).Others are used as coffee shade tree .peoples of the study area selected some tree species as coffee shade to increase the the product gained from coffee.Obviously plants are used sources of oxygen i.e keep our survival,habitats of organism and etc.

5.1.8.Threat and Conservation Action of Medicinal Plants.

From the results of the study there were major factors that decline the status of medicinal plants and other plant species.These factors are agricultural expansion, fire wood collection, charcoal trading, harvesting mechanism and construction were the major threatening factor the medicinal plants.Similar threatening factors were also identified by different researchers in different parts of country,Ethiopia.This is because the life of community was related to agriculture.The second major factor eroding the medicinal plants were charcoal trading and firewood collection.This is because the community rely on plants for energy needed in house for food preparation.

According to Abebe Demissie (2001) the biodiversity of Ethiopia is eroded by natural and anthropogenic factors.This was true in the study area , Hawa Gelan district.Ethiopian traditional medicine is faced with problem of continuity and sustainability primarily due to loss of taxa, habitat of medicinal plants and other factors (Ensermu Kelbessa and *et al.*, 1992). Medicinal plants like *Ximenia americana*,*Cordia africana*,*Hagenia abyssinica* and others are were critically endangered.As Zemedu Asfawu(2001) state especially those medicinal plants which their root is needed for remedies were at risk.

There are some conservation action in the study area on farmers cultivation lands for different purposes. Plants such as *Albizia gummifera*, *Accacia abyssinica*, *croton macrostachyus* and other were conserved in *coffea arabica* plantation as a coffe shade (Bahailu Etana,2010). There are also some conservation practice of some medicinal plants on home gardens. However the action is not equally observed in all study area. *Lipidium sativum*, *Linium usitatissium*, *Allium sativum*, *Buddleja polystchya*, *lawsonia inerms*, *Catha edulis*, *Coffea arabica* and others were conserved on home garden. The cultivation of medicinal plants like *Brassica nigra*, *Nigella sativa* and *Echinops kebericho* were conserved but compared to other it is not sufficiently cultivated on homegardens of community.

5.2. Conclusion

The study showed that the people of the study area have accumulated indigenous knowledge of using traditional medicine from plant origin and the area is rich in plant diversity. In the study area, diseases like fever, illness, evil eye, evil spirit, toothache, spider poison, jaundice, hepatitis, stomachache, hemorrhoids, headache, wounds, malaria, common colds, rabies, etc. are mostly treated using plant remedies traditionally. Livestock diseases like leech, ticks, ectoparasites, stomachache and wounds are commonly treated by using traditional medicine. Now days even though a modern health center was established at most parts of the district people still now they use their traditional medicine. Because there is no solution locally for some diseases like evil eye, evil spirit, hepatitis, spider poison, etc. from a health center of the area.

Regarding the habitats of medicinal plants of the study area 63 plant species were collected from the wild vegetation and 39 plant species were from home garden and farm lands. The 102 medicinal plants are distributed among 47 plant families from that *Fabaceae* constituted the highest proportion 9.80% and they are represented by 10 species. The next family having high number of species were *Solanaceae* with 9 species and *Asteraceae* represented by 8. The most frequently parts used were leaves, root, seed, shoot tips, external parts, fruits of plants. Regarding the condition of preparation preparing remedies from fresh condition accounts the highest percentage followed by dry condition and finally fresh or dry condition was used as alternative to prepare remedies for the patients.

Squeezing, pounding, crushing, powdering, cutting, chewing, burning, and etc are mode of preparation of remedies in the study area. Oral administration is the highest route of application; followed by dermal. The units of measurements locally used by traditional healers are coffee cups, measuring by small finger line digits, glass, putting by two fingers and bottle is used commonly. The main threat to medicinal plants are agricultural expansion, fire wood collection, charcoal production, overgrazing, over harvesting, etc.

5.3. Recommendation

The indigenous knowledge of local peoples and knowledge of traditional healers must be encouraged and protected by community of the study area..

The local community and traditional healers must protect the indigenous knowledge from threat by transferring in the knowledge to the next generation.

The traditional healers must make cooperation to standardise the dosage of traditional medicinal remedies given for human and livestock by negotiating on the dosage the using correct tools of measurements .

Agricultural expansion, firewood collection, construction, overgrazing, overharvesting and charcoal trading were identified as the main threat of medicinal plants in study area due to this the district administration of Hawa Gelan should protect the fragmented forest left in the study area.

Traditional healers should have to conserve the medicinal plants on their garden .Community of the study area must participate in conservation of plant species at all.

The Hawa Gelan District Administration Office must facilitate and encourage the conservation practice of medicinal plants and all plants on their natural habitat or by forming new habitat or green area on all kebeles.

Fragmented forests found in different parts of the district must protected from anthropogenic factors like fire wood collection, overgrazing, charcoal trading etc by all community of the district.

Preparation of remedies from root affects the plants life due to this the traditional healers and community must replace the plants by replanting before use .

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7. Appendices

Appendix 1: Questionnaire set for informants

Addis Ababa University

School of Graduate studies

Biology Departments

Semi-structured interview

Questionnaire to be answered by informants.

Information about informants

Name _____ .Sex _____ .Age _____ Religion _____

Marital status _____ .Educational status _____ .

These questionnaires are designed to identify the plant species used as medicinal for the treatments of human and livestock ailments as well as to document indigenous knowledge of the community.

1. Questionnaires refers to indigenous knowledge.

1.1. Is there relation between human and plants?

1.2. How do you classify plants that are found in your area?

1.3. Is the community use traditional medicinal plants ?

1.4. What are the major human and livestock diseases in this area?

1.5. Are there plants used to treat these diseases?

1.6 How do you classify the soil of the area?

2.questionaries refers medicinal plants.

2.1 would you list the plants used to treat human.

2.2.Which parts of the plants are used ? A. Root. B. leaves. C. stem. D.Latex .
E. Flower. F. Seed. G. Any parts.

2.3.Dry or fresh form of the plants are used?

2.4.how did the medicinal plants is given for patients?

2.5.Is the dosage is differ among age or sex?

2.6.Where do you obtain these plants?

2.7.Is the plants are easily accessibly?if not why?

2.8.what are plants used to treat livestock ailments?,which part is used?Dry or fresh is used?,in what way it is prepared? How did the medicine is given for the animals?

2.9.Is there any plants used to treat both human or livestock?

3.where did you obtain these plants?

3.1 compared to previous time what is the status of medicinal plants currently?

3.2.what are importance of those plants in addition to medicinal?

3.3 .Is modernization has effect on traditional medicinal plants?

3.3.What do you think about the transfer of knowledge from traditional healers to the next generation?

Appendix 2: List of informants interviewed during data collection

Key: I _illiterate

D-Divorced

O-Orthodox

Ms –Musim

Pr -Protestant

Ed -educational status

R-religious

M -Married

*-key informants

Um-unmarried

RE –Religious education

s.no	Name	Sex	Age	Ed	Marital status	Kebele	Religions	
1	Hasan Gemechu	M	57	No	M	Kella	Mu	4
2*	She Mohamad said	M	74	RE	M	H/Moyi	Mu	13
3	Mokonin Deresa	M	37	5	M	H/Fincho	Pr	3
4*	Mohammad Gommol	M	61	No	M	H/MOYI	Mu	14
5 *	Shibiru Bulcha	M	57	No	M	H/Moyi	O	3
6	Dasale kejela	M	38	6	M	H/Moyi	O	4
7	Galane Gebisa	F	67	No	M	H/Moyi	O	2
8*	She Abriham Galmo	M	68	RE	D	H/Moyi	Mu	7
9 *	Herega Tumsa	M	86	RE	D	H/Moyi	Mu	16
10 *	Fekade Negesa	M	58	6	M	H/Babo	O	21
11	Abdisa Wage	M	83	No	M	H/Fincho	O	4
12	Gamme Gute	M	67	No	M	H/Babo	O	2
13	Alami Sori	F	63	No	M	H/Babo	O	3
14	Tujube Daka	F	71	No	M	H/Babo	Pr	6
15	Tesema Birr	M	64	3	D	Hambella	O	3

16	Tilahun Sori	M	47	11	M	Hambela	Pr	7
17	Tariku Regasa	M	27	Degree	Um	Hambela	Pr	5
18	Bayessa Degefa	M	41	6	M	G/Robi	O	6
19	Sintayo Tesfa	M	31	5	Um	G/Sanbatdura	O	1
19	Jirata Mamo	M	37	4	M	Kella	Pr	4
20	Diribe Gemechu	F	40	No	M	Kella	O	7
21	Getacho Mokonin	M	32	3	M	Kella	Pr	2
22	Muzamil Hasan	M	23	No	M	Kella	Mu	5
23*	Buseri Dula	M	67	No	M	Kella	Mu	14
24*	Fatuma Hordofa	F	63	No	M	Kella	Mu	8
25*	Marsha Zerihun	M	41	10	M	G/Robi	Pr	43
26	Ayimad Ayela	M	40	No	M	G/Sanbatdura	Mu	3
27*	Olika Wayessa	M	96	No	M	Mojo	O	32
28	Kenea Danki	M	52	No	M	Mojo	O	11
29	Diriba Hambisa	M	47	No	M	Mojo	O	3
30	Kenatu Sima	F	50	No	D	Mojo	O	7
31	Wajira Dano	M	82	No	M	H/Babbo	O	9
32	Shashitu Ayana	F	62	No	D	Harere	Pr	3
33	Tafesa Adeba	M	45	3	M	Harere	O	6
34	Desaleny Dinka	M	50	3	M	Harere	O	4
35	Merga Wayessa	M	70	3	D	Harere	O	5
36*	Birhane Megersa	F	38	8	M	Harere	O	11
37*	Askala Mammade	F	75	No	D	Harere	O	4
38	Solomon Bekela	M	36	6	M	Harere	O	10
39	Desaleny Dheressa	M	29	7	Um	Harere	O	3

40	Nazifa Dalju	F	40	6	M	Botoso	Katolik	7
41	Getacho Birhanu	M	24	10	Um	Botoso	Pr	4
42*	Rashida Aliyi	M	25	10	Um	Botoso	Pr	5
43	Idris Lamu	M	70	No	M	Botoso	Mu	12
44	Tariku Asefa	M	23	10	Um	Bottoso	Pr	1
45	Gemechu Megersa	M	22	9	M	Botoso	Pr	4
46*	Tayechi Tesema	F	21	7	Um	Botoso	O	6
47*	Ashanafi Tesema	M	27	10	Um	Botoso	Pr	12
48	Gutu Tamiru	M	22	6	Um	G/Sanbatdura	Pr	1
49	Tariku Tarefa	M	54	5	Um	G/sanbatdura	Pr	2
50	Nabiyu Shabe	M	26	DIP	Um	G/Sanbatdura	Pr	6
51*	Diriba Suki	M	75	3	M	H/Fincho	Pr	23
52	Yosef Jaleta	M	39	DIG	M	G/Robi	Pr	3
53*	Qancher Diriba	M	35	4	Um	H/Fincho	Pr	14
54	Motu Werkina	F	54	DIG	M	G/Robi	Pr	7
55	Ligdi Kusa	M	87	No	M	H/Babo	O	11
56*	Masrasha Simagn	M	45	7	M	H/Babo	O	9
57	Itafa Disasa	M	56	RE	M	H/Babo	O	4
58	Merga Teka	M	32	Dig	M	G/Robi	Pr	2
59*	Belewu Damto	M	48	7	M	Boke	O	5
60	Aster Kebeda	F	38	4	M	Boke	O	2
61	Almaz Siyum	F	40	8	M	Buke	O	6
62	Abrham ayimad	M	28	10	M	Boke	Mu	6
63	Tesfu Fikre	M	29	9	M	Boke	Pr	3
64	Gizawu Tsegaye	M	35	7	M	Ifa bas	Pr	8

65*	Mohamad Ahimad	M	42	5	M	Ifa Bas	Mu	12
66	Chaltu Mohamad	F	43	3	M	Ifa Bas	Mu	2
67	Tsehayi Bekalu	F	47	No	M	Ifa Bas	O	3
68	Mogos Demile	M	34	10	M	Ifa bas	O	6
69*	Bashatu sima	F	62	No	M	H/Babo	O	8
70	Alemnash Ayana	F	46	No	M	Haro Mechara	O	5
71*	Bungule Dasi	F	53	No	M	Kore	O	13
71*	Bungule Dasi	F	53	No	M	Kore	O	13
73	Moroda Hinsene	M	78	No	M	Kore	O	8
74	Galitu Bula	F	42	No	D	Kore	O	5
76	Chaltu Furi	F	32	No	D	Kore	Pr	6

Continued.

77	Shafi Mohammad	M	54	No	M	Lemlem	Mu	9
78	Sadiya Taha	F	40	No	M	Lemlem	Mu	3
79	Mohamad Sayid	M	44	No	D	Lemlem	Mu	2
80	Marema Kedir	F	42	No	M	Lemlem	Mu	7
81*	Abdu Tofik	M	47	4	M	Lemlem	Mu	15
82	Harun Hasan	M	35	9	M	Lemlem	Mu	12
83	Zara husen	F	25	No	M	Lemlem	Mu	2
84	Menistu Tebeka	M	36	No	M	Lemlem	O	7
85*	Mezgebu Ali	M	43	No	M	Lemlem	O	8
86	Meka kedir	F	36	No	M	Lemlem	O	2
87*	Shusha Gada	F	44	No	M	Haro Mechara	Pr	6
88*	Yasin Ali	M	55	No	D	Haro Mechara	Mu	10

89	Gadisa kena	M	57	3	M	Haro Mechara	Pr	7
90	Hike chalsisa	F	45	No	M	Haro Mechara	O	11
91	Mamahad Hasan	M	46	RE	M	Mada jalala	Mu	12
92	Abrihim Ahimad	M	56	No	M	Mada jalala	Mu	3
93	Sara Nura	F	34	No	M	Mada jalala	Mu	5
94	Mohamad Aliyi	M	49	No	M	Mada jalala	Mu	7
95	Fatuma Hasan	F	43	No	M	Mada jalala	Mu	6
96	Bakele Baganasa	M	45	No	M	Meda jalala	Or	7
97	Shafi Musa	M	49	No	M	Meda jalala	Mu	4
98	Aimad Aliyi	M	44	No	M	Meda jalala	Mu	9
99	Diribe Merga	F	56	No	M	Meda jalala	Pr	12
100	Tesfaye Bulcha	M	43	No	M	Meda jalala	Or	3

Appendix 3: Lists of medicinal plants collected from home garden and farm land .

VCN- Vernacular name.

VN-Vouche number

NIC-Number of informant cited

* --Endemic.

Gf –Growth form. T –Tree

H –Herbs

S ---Shrub

NO	Scientific name	Family	VCN	Gf	NIC	VN
1	<i>Allium cepa</i> L.	<i>Alliaceae</i>	Shunkurti	H	8	FA058
2	<i>Allium sativum</i> L.	<i>Alliaceae</i>	Qullubbi	H	47	FA030
3	<i>Artemisia afra</i> Jacq.ex wild.	<i>Asteraceae</i>	Koddo	H	20	FA053
4	<i>Brassica carinata</i> A.Br.	<i>Brassicaceae</i>	Ija gomada	H	17	FA081
5	<i>Brassica nigra</i>	<i>Brassicaceae</i>	Sanafica	H	26	FA059
6	<i>Cana indica</i>	<i>Canaceae</i>	Abaabo	H	4	FA105
7	<i>Capsicum annum</i> L.	<i>Solanaceae</i>	Barbare	H	12	FA007
8	<i>Catha edulis</i> (Vahl)Forssk.ex Endl.	<i>Celastraceae</i>	Caatii	S	23	FA021
9	<i>Capsicum frutescens</i> L.	<i>Solanaceae</i>	Mimita	H	19	FA008
10	<i>Carica papaya</i> L.	<i>Caricaceae</i>	Pappaya	T	11	FA040
11	<i>Citrus limon</i> (L.) Burnf.	<i>Rutaceae</i>	Lomi	S	5	FA015
12	<i>Cucurbita pepo</i> L.	<i>Cucurbitaceae</i>	Buqqe	C	7	FA035
13*	<i>Coccinia abyssinica</i>	<i>Cucurbitaceae</i>	Anchote	C	7	FA134
14	<i>Coffea arabica</i> L.	<i>Rubiaceae</i>	Buna	S	21	FA061
15	<i>Coriandrum sativum</i>	<i>Apiaceae</i>	Dinbilala	H	9	FA039
16*	<i>Echnops kebericho</i> Mesfin.	<i>Asteraceae</i>	Karabicho	S	53	FA002
17	<i>Eleusine coracana</i>	<i>Poaceae</i>	Dagujja	H	8	FA048
18*	<i>Eragrostifef</i> (Zucc.) Trontter.	<i>Poaceae</i>	Xaafii	H	10	FA104
19	<i>Foeniculum vulgare</i> Miller.	<i>Apiaceae</i>	Inchilala	H	6	FA132

20	<i>Heliantus annus</i> L.	<i>Asteraceae</i>	Abba boru	S	7	FA119
21	<i>Lawsonia inermis</i> L.	<i>Lythraceae</i>	Hennaye	T	23	FA028
22*	<i>Hordeum vulgare</i> L.	<i>Poaceae</i>	Garbu	H	18	FA120
23	<i>Linum usitatissimum</i> L.	<i>Linaceae</i>	Talba	H	35	FA014
24	<i>Lipidium sativum</i> L.	<i>Brassicaceae</i>	Shinfa	H	56	FA001
25	<i>Lycopersicon esculentum</i> Mill.	<i>Solanaceae</i>	Timatimi	H	4	FA037
26	<i>Magnifera indica</i> L.	<i>Anacardiaceae</i>	Mango	T	7	FA045
27	<i>Musax paradisiaca</i> L.	<i>Musaceae</i>	Muzi	T	6	FA031
28	<i>Nigella sativa</i> L.	<i>Rununculaceae</i>	Gurra	H	22	FA034
29	<i>Nicotiana tobacum</i> L.	<i>Solanaceae</i>	Timbo	H	14	FA057
30	<i>Phaseolus Spp</i>	<i>Fabaceae</i>	Lojo gafe	H	22	FA99.
31	<i>Piper nigrum</i>	<i>Piperaceae</i>	Qunda barbare	T	6	FA 128
32	<i>Pentas schimperiana</i> (A.Rich.) Vatke	<i>Rubiaceae</i>	Suruma leenca	S	54	FA145
33	<i>Rhamnus prinoide</i> L.Herit.	<i>Rhamnaceae</i>	Geesho	S	32	FA018
34	<i>Ruta chalepensis</i> L.	<i>Rutaceae</i>	Cilaaddama	H	35	FA016
35	<i>Lagenaria siceraria</i>	<i>Cucurbitaceae</i>	Buqqee hadhawa	C	5	FA135
36	<i>Trigonella-foenum graecum.</i> .	<i>Fabaceae</i>	Sunqo	H	31	FA009
37	<i>Cymbopogon citrus</i> (DC) Stapf.	<i>Poaceae</i>	Marga urgaha	H	9	FA103
38	<i>Vicia faba</i>	<i>Fabaceae</i>	Baqela	H	11	FA043
39	<i>Zingiber officinale</i> Rosc.	<i>Zingiberaceae</i>	Zingibila	H	44	FA029

Appendix 4: Lists of medicinal plants collected from wild.

VCN-Vernacular name

Gf –Growth form.

H -Herb

NIC –Number of Informant cited.

S –Shrub. T –Tree.

VN –Vouche number.

* ---Endemic.

No	Scientific name	Family	VCN	Gf	NI C	VN
1	<i>Acacia abyssinica</i> Hoch.ex Benth	<i>Fabaceae</i>	Lafto	T	4	FA095
2	<i>Acacia seyal</i> Del.	<i>Fabaceae</i>	Waaccu	T	11	FA100
3	<i>Agave sisalana</i>	<i>Agavaceae</i>	Wabara	A	12	FA096
4	<i>Albizia gummifera</i> (J.F.Gmel.)CA.Sm.	<i>Fabaceae</i>	Hambabessa	T	8	FA027
5	<i>Aloe vera</i>	<i>Aloaceae</i>	Algisa	H	21	FA079
6	<i>Bersama abyssinica</i> Fresen.	<i>Melanthaceae</i>	Lolchisa	S	3	FA003
7	<i>Bidens prestinaria</i> (SchBip.) cufod.	<i>Asteraceae</i>	Kello	H	23	FA069
8	<i>Buddleja polystachya</i> Fresen.	<i>Capparidaceae</i>	Qayisa	Tre e	32	FA090
9	<i>Calpurnia aurea</i> (Ait) Benth.	<i>Fabaceae</i>	Ceeka	S	22	FA042
10	<i>Capparis sepiaria</i>	<i>Capparidaceae</i>	Harangama	C	13	FA047
11	<i>Capparis micrantha</i>	<i>Capparidaceae</i>	Harangama boyye /gmaro/	C	6	FA088
12	<i>Carissa spinarum</i> L.	<i>Apocynaceae</i>	Agamsa	T	10	FA073
13	<i>Cirsium englerianum</i> O.Hoffm.	<i>Asteraceae</i>	Tarbofi	C	12	FA033
14	<i>Clausena anisata</i> (Wild.) Benth.	<i>Rutaceae</i>	Ulmayya	S	8	FA036
15	<i>Clematis hirsuta</i> Perr.&Guill	<i>Ranunculaceae</i>	Fiitii	C	22	FA010
16	<i>Clerodendrum myricoides</i> (Hochst.) Vatke.	<i>Lamiaceae</i>	Marasisa	S	6	FA012

17	<i>Commelina spp</i>	<i>Commelinaceae</i>	Gororsisa	H	24	FA005
18	<i>Cordia africana Lam.</i>	<i>Boraginaceae</i>	Waddesa	T	4	FA026
19	<i>Croton macrostachyus Del.</i>	<i>Euphorbaceae</i>	Makkanisa	T	34	FA066
20	<i>Cyphostemma sp</i>	<i>Vitaceae</i>	Qoricha dima	H	37	FA139
21	<i>Cypostemma cyphopetalum</i> (Fresen.) Discoings ex Wild and Drummond.	<i>Vitaceae</i>	Hidda reeffa	C	9	FA064
22	<i>Datura metel L.</i>	<i>Solanaceae</i>	Qoricha bofa	S	7	FA125
23	<i>Datura stramonium L.</i>	<i>Solanaceae</i>	Asangira	S	21	FA006
24	<i>Drymorha cordata</i> (L).Schults.	<i>Caryophyllaceae</i>	Sayid ashajal	H	6	FA098
25	<i>Eucalyptus globulus</i> Labill.	<i>Myrtaceae</i>	Barzafi adii	T	7	FA076
26	<i>Ehretica cymosa</i> .Thonn.	<i>Boraginaceae</i>	Ulaaga	T	8	FA106
27*	<i>Erythrina brucei</i> Schweinf.	<i>Fabaceae</i>	Waleensuu	T	7	FA056
28	<i>Euphorbia abyssinica</i> Gmel.	<i>Euphorbiaceae</i>	Adaamii	T	9	FA080
29	<i>Gardenia ternifolia</i> Schumach and Thonn.	<i>Rubiaceae</i>	Gambela	S	10	FA004
30	<i>Guizotia scabra</i> (Vis) chiov.	<i>Asteraceae</i>	Tuufu	H	13	FA093
31	<i>Grewia bicolor</i> Juss.	<i>Tiliaceae</i>	Haroresa	T	17	FA019
32	<i>Hagenia abyssinica</i> (Bruce)J.F.Gmel.	<i>Rosaceae</i>	Koso	T	34	FA071
33	<i>Indigofera vohemarensis</i> Bill.	<i>Fabaceae</i>	Heennaa	H	12	FA067
34	<i>Ipomoea cairica</i> (L.) Sweet.	<i>Convolvulaceae</i>	Kalala	C	8	FA038
35	<i>Justicia schimperiana</i> (Hochst.ex Nees).T.Anders.	<i>Acanthaceae</i>	Dhumuga	S	19	FA126
36	<i>Kalanchoe marmorata</i>	<i>Crassulaceae</i>	Bosoqqe	H	5	FA060
37	<i>Lepisorus excavatus</i> Ching.	<i>Polypodiaceae</i>	Ballessa	H	8	FA140
38	<i>Lippia adoensis</i>	<i>Verbenaceae</i>	Kusaye	S	3	FA020
39	<i>Ocimum lamiifolium</i> . Hochst.	<i>Lamiaceae</i>	Damakase	S	49	FA063

40	<i>Ocimum urticifolium</i> Roth.	<i>Lamiaceae</i>	<i>Hancabbii</i>	S	32	FA138
41	<i>Ocimum gratissimu</i> L.	<i>Lamiaceae</i>	<i>Kefo sare</i>	H	28	FA144
42	<i>Maesa lanceolata</i> .Forrsk.	<i>Myrsinaceae</i>	<i>Abbayyii</i>	S	3	FA082
43	<i>Phytolacca dodecandra</i> L.Herit.	<i>Phytolacaceae</i>	Handode	C	31	FA013
44	<i>Premna schimperi</i> Engl.	<i>Lamiaceae</i>	Urgessa	T	27	FA034
45	<i>Prunus africana</i> (Hook f.) kalm.	<i>Rosaceae</i>	Homi	T	12	FA022
46*	<i>Pycnostachys abyssinica</i> .Fresen.	<i>Lamiaceae</i>	Yero	S	11	FA068
47	<i>Ricinus communis</i> L.	<i>Euphorbiaceae</i>	Qobbo	S	6	FA024
48	<i>Rumex nepalensis</i> Spreng.	<i>Polygonaceae</i>	Timijji	H	39	FA051
49	<i>Rumex nervosus</i> Vahl.	<i>Polygonaceae</i>	Dhangaggo	S	4	FA025
50	<i>Sapium thuspunctatus</i>	<i>Euphorbiaceae</i>	Bosoqa	T	7	FA077
51	<i>Ranunculus multifidus</i> Forssk.	<i>Ranunculaceae</i>	Abba warqe	H	46	FA011
52	<i>Scadoxus multiflorus</i>	<i>Amaryllidaceae</i>	Qulubi daljessa	H	3	FA050
53	<i>Sida rhombifolia</i>	<i>Malvaceae</i>	Karabi	H	3	FA075
54	<i>Solanum angulyi</i> L.	<i>Solanaceae</i>	Hiddi	S	19	FA086
55	<i>Solanum marginatum</i>	<i>Solanaceae</i>	Hiddi	S	2	FA091
56	<i>Solanum dyphyllum</i> Schumach.	<i>Solanaceae</i>	Hiddi warabessa	S	14	FA052
57	<i>Stereospermum kunthianum</i> Cham.	<i>Bignoniaceae</i>	Botoro	T	10	FA023
58	<i>Syzygium guineense</i> (Wild.) DC.	<i>Myrtaceae</i>	Badesa	T	6	FA094
59	<i>Thalictrum rynchocarpum</i> Dill & Rich.	<i>Ranunculaceae</i>	Fosso	S	22	FA115
60	<i>Vernonia amydalina</i> Del.	<i>Asteraceae</i>	Ebicha	S	33	FA044.
61	<i>Vernonia spp</i>	<i>Asteraceae</i>	Rejjii daljessa	S	8	FA117.

62	<i>Vigna sp</i>	<i>Fabaceae</i>	Abdusalib	C	24	FA142
63	<i>Ximenia americana</i> L.	<i>Olacaceae</i>	Hudha	T	13	FA049

Appendix 5: Lists of human disease in study area .

No	Type of disease	Local name of the disease
1	Ameoba	Ameba
2	Ameobiasis	Marumaan bu`a
3	Fibrillness	Michi
4	Scabies	Cittoo
5	Stabing pain	Waraansa
6	Ring worms	Roobbii
7	Hemorrhoids	Kintaarotii
8	Syphilis	Copxoo
9	Tape worms	Koso
10	Tinea corporis	Robbi
11	Urine retention	Fincaan dhowwu
12	Placental retention	Ofkaltiin turu
13	Diarrhea	Garaa kaasa
14	Common cold	Utaallo
15	Evil eye	Buda
16	Cough	Qufaa
17	Tonsillitis	Huuba qoonqo
18	Wounds	Madaa
19	Hypertension	Dhiibbaa dhiigaa
20	Hepatitis	Dhukkuba sabbataa
21	Snake bite	Hiddaa bofaa

22	Dandruff	Forforii
23	Nasal bleeding	Fununa
24	Stomachache	Dhukkubbii garaa
25	Gastiritis	Dhukkubbii garaacha
26	Ear problem	Dhukkubbii gurra
27	Eye problem	Dhukkubbii ijaa
28	Ascaries	Maagaa
29	Malaria	Busaa
30	Toothache	Dhukkubbii ilkanii
31	Rabies	Dhukkuba saree maratuu
32	Headache	Mataa bowwoo
33	Evil spirit	Seexanaa
34	Juandice	Simbira
35	External parasite	Maxxantu qaama alaa
36	Sexual impotence	Dadhabbii saalqunnamtii
37	Swelling leg	Dhiita miila
38	Skin rash	Shife
39	Spider poison	Fincoftu
40	Loss of hair	Rifeensii dhumuu
41	Back pain	Dhukkuba dugda
42	Constipation	Goga garaa
43	Fire burn	Guba ibidda
44	Bone setting	Midhama
45	Fungal disease	Barille
46	Fever	Tikusatii

47	Xxx	Qorsa
48	feleria	Hooxxo
49	Syphilis	Fanxoo
50	Bleeding	Dhiiguu
51	TB	TB
52	Weight loss	Huqachuu
53	Loss of apetaite	Fedhii nyaataa dhabu

Appendix 6: Lists livestock disease in the study area.

Type of disease	Local name of the disease
Blotting	Bokoksa horii
Placental retention	Ofkaltiin turu
Leech	Dhulaandhula
Diarrhea	Garaa kaasa
Cough	Qufaa
External parasite	Maxxantu qaama alaa
Xxx	Loha
Wounds	Madaa
Trips	Gandii
Stomachache	Dhukkubbii garaa
Rabies	Dhukkuba saree maratuu
Common cold	Utaallo
Eye problem	Dhukkubbii ijaa
Evil eye	Buda
Disease of hen	Dhukkuba lukkuu.

Appendix 7: The tables shows lists of medicinal plants, families, local name, habits, sources, condition needed, parts used, disease treated, preparation method, routes of administration.

In the following table the following abbreviation are used.

T –tree,S-shrub,H-herbs ,Hu-human,PU-parts used,UT-used to treat, RA-Route of administrationEp- external parts ,B-Bulbs,LV- Livestoches,St-stem,R-root,Sd-Seed, Ft-fruit,W-Wild,Hg –homegarden Tp-tip , F-fresh,D-Dry,F/D-Fresh or Dry,Tdt-Types of disease treated,Cp-condition of preparation.,Sr-source,Gf-Growth form,Ts –tooth surface .

Family.	Scientific name	Local name	Gf	Sr	Pu	Ut	Cp	Tdt	Preparation method.	RA
Acanthaceae	<i>Justicia schimperiana</i> (Hochst.ex Nees).T.Anders.	Dhumuga	S	W	L	Both	F	Wound	Squeezing on the area.	D
					L	Hu	F	Snake bite	Squeezing,mix with dung drunk,one cup.	O
					L	Hu	F	Abortion .	Squeezing,drunk one cup.	O
Agavaceae	<i>Agava sisalana.</i>	Waabara	A	W	wp	Hu	F	Fire burn .	Painting,area burned.	D
Alliaceae	<i>Allium sativum</i> L.	Qullubbiadi	H	Hg	B	H	F/D	Malaria	Crushing with,the rhizobium of <i>Zingiber officinale</i> ,eating,during meal.	O
					B		F/D	Common cold.	As above.	O
					B		F/D	Loss of hair.	Squeezing on area.	D
	<i>Allium cepa</i> L.	Shunkurti	H	Hg	B	Hen	f/d	Hen disease	Crushing, then giving.	O
Aloaceae	<i>Aloe vera</i>	Algisa	H	W	L	Hu	F	Fire burn	Cutting,then putting,its internal parts on the area.	D
Amaryllidaceae	<i>Scadoxus</i>	Qullu	H	W	B	Lv	F/	Weight	Pounding ,giving.	O

<i>ae</i>	<i>multiflorus</i>	bbi jalde sa.					D	loss		
<i>Anacardaceae</i>	<i>Magnifera indica</i> L.	Mang o	T	Hg	Tp	Hu	F	Fever	Cooking,add sugar drunk one cup.	O
<i>Asteraceae</i>	<i>Echinops kebericho</i>	Kabar icho	S	Hg	R	Hu	D	Fibre illness.	Putting on fire with <i>Lipidium sativum</i> , ,inhanting,	N
						Hu	D	Stomac hache	Chewing with salts.	O
						Hu	D	Worms, ascaries .	Powdering with seed of <i>Lipidium sativum</i> , and <i>Brassica nigra</i> , eating during meal.	O
							D	To repeal snake	Burning the root.	
						Lv	D	Stomac hache	Pounding then dissolving in water then giving one bottle.	O
<i>Bignoniaceae</i>	<i>Stereospermum kanthianum</i> Cham.	Botor o	T	W	Ep	Hu	F	Snake bite	Pounding add water squeezing, drunk one cup.	O
								Tootha che	Crushing,putting between teeth.	Ts
<i>Boraginaceae</i>	<i>Cordia africana</i> Lam.	Wade sa	T	W	L	Hu	D	Spider poison.	Burning,roasting and powdering the seed of brassica carinata,mix with butter painting the area.	D
								Jundice	panitng	D

Cont...

	<i>Ehretica cymosa</i> .Thonn.	Ulaga	T	W	L	Hu	F	Evil sprit.	Collecting the leaf of, <i>Clausena anisata</i> , <i>Justicia schemperiana</i> , <i>Pynostachyus abyssinica</i> together with the leaf,of, <i>Ehretica cymosa</i> placed in boiled water then inhaling the vopour by wearing cloth on head.	N
<i>Brassicaceae</i>	<i>Brassica carinata</i> A.Br.	Gome nze	H	Hg	L	Hu	F	Bleeding after injured.	Squeezing on the area.	D
					Sd	Hu	D	Tonsilits	Crushing,the,seed ,swallowing.	O
					Sd	Lv		Trips	Pounding with the seed Lipidium <i>sativum</i> , <i>Brassica nigra</i> then dissolve in water giving half bottle.	O
					Sd	Hu	D	Meganga	Crushing,with rhizobium,of <i>Zingiber officinale</i> and, <i>Allium sativum</i> ,then eating during meal.	O
					Sd	Hu	D	Comman cold.	As above.	O
					Sd	Hu	D	Ameoba ,malaria, worms.	Pounding, the seed of with, <i>Linum usitatissimum</i> , bulbs of <i>Allium sativum</i> and rhizobium of <i>Zingiber officinale</i> ,then eating.	O

Cont...

	<i>Lipidium sativum</i> L.	Shinfa	H	Hg	Sd	Hu	D	Scabies.	The seed of <i>Lipidium sativum</i> , bulbs of <i>Allium sativum</i> , and <i>Zingiber officinale</i> were , pounded together and eating as part of food .	O
						Lv		Trips	Seed of <i>Lipidium sativum</i> , <i>Brassica nigra</i> , <i>Brassica carinata</i> , <i>Foeniculum vulgare</i> , <i>Coriandrum sativum</i> ; were pounded together and dissolving in water then giving 1 bottle.	O
			H	Hg	Sd	Hu	D	Gonorrhea, amoeba, internal disease, malaria	Pounding equal amounts seed of <i>Brassica nigra</i> , <i>Linum usitatissimum</i> ,bulbs of <i>Zingiber officinale</i> and <i>Allium sativum</i> and, eating,during meal.	O
					Sd	Hu	D	Amebiasis	Dissolving in water,and drunk one cup .	O
<i>Canaceae</i>	<i>Canna indica</i>	Ababa	H	Hg	R	Lv	F	Placental retention	Pounding,adding and salts giving as food.	O
<i>Caricaceae</i>	<i>Carica papaya</i> L.	Papaya	T	Hg	L	Hu	D	Malaria	Crushing ,adding to boiled water drunk,2 cups,for five consecutive days.	O

Cont...

<i>Caricaceae</i>	<i>Carica</i>	Papaya	T	Hg	L	Hu	D	Malaria	Crushing ,adding to boiled water drunk,2	O
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	<i>papaya</i> L.								cups,for five cosecutive days.	
					St			Fungus	Putting the fluid of stem on the body.	
<i>Capparida ceae</i>	<i>Buddleja polystachya.</i> Fresen.	Qayisa	T	W	L	Lv	F	Eye disease	Squeezing into eye.	Optic al.
	<i>Capparis micrantha</i>	Harang a boye.	Cl	W	L	Hu	F	Skin wound.	Squeezing,painting throught.	D
					R	Hu	F	Toothache	Crushing,then putting,between teeth.	Ts
					R	Hu	D	Evil sprit.	Pounding,with roots of <i>Echinops kebericho</i> ,putting on fire then inhaling.	N
	<i>Capparis sepiaria.</i>	Hareng a guracha .	Cl	W	R	Hu	F	Toothache	Crushing,then putting between teeth.	Ts
<i>Cryophylla ceae.</i>	<i>Drymorina cordata</i> (L). Schultes.	Saydasa jal	H	W	R	Hu	f/d	Sexual impotenc e.	Cutting,with bulbs of <i>Zingiber officinale</i> , <i>Allium sativum</i> ,and then eating, by spoon.	O
<i>Commelina ceae</i>	<i>Commelina spp.</i>	Gororsi sa	H	W	R	Hu	F	Toothache	Crushing ,then placing between teeth.	Ts
					R	Hu	F	Rabies	Pounding,add water,then giving.	O
<i>Clelastrace ae</i>	<i>Catha edulis</i> (Vahl) Forssk.ex Endl.	Cati	S	Hg	L	Hu	F	Cough.	Boiling,the leaves,stay until cool down and then add sugar to its fluid drunk 2 cups,every morning for five days.	O

Cont...

<i>Cucurbitaceae</i>	<i>Cocinia abyssinica</i>	Anchote	Cl	Hg	R	Hu	F / D	Broke	Cooking, and pounding, then eating as food.	O
	<i>Cucurbita pepo</i> L.	Buqe	Cl	Hg	Sd	Hu	D	Ascaries .	Roasting powdered and giving.	O
	<i>Lagenaria siceraria</i>	Buqqe hadhaw a	Cl	Hg	L	Hu	F	Micire	Squeezing and painting on the area.	D
<i>Convululaceae</i>	<i>Ipomaea carica</i> (L.) Sweet.	Kalala.	Cl	W	St	Hu	F	Wound of head	Cutting, into many, then placing on neck as jewelry.	D
<i>Crassulaceae</i>	<i>Kalanchoe marmorata</i>	Bossoqe	H	W	St	Hu	F	Hemorrhoids	Placing the stem on fire for few minutes, then inserting, into anus.	Anal
<i>Euphorbaceae</i>	<i>Croton macrostachyus</i> Del.	Makani sa	T	W	R	Hu	F	Liver disease.	Crushing , adding water then giving by measure of digits of small finger line.	O
					Tp	Hu	F	Ascaries	Crushing odd tips then drunk few.	O
					Tp	Lv	F	Blotting	Mixture of tips , capsicum frutescens and oil were placed in mouth.	O

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<i>Euphorbaceae</i>					Ep	Both	F	Weight loss	Pounding the with mixture of roots of <i>Echinops kebericho</i> , <i>Alluimsativum</i> , leaves of <i>Ruta chalenpesis</i> , homogenizing in tea then drunk one cup for three consecutive days.	O
					Ep	Hu	F	Diarrhea	Crushing homogenizing, with water filtering then drunk ½ cup.	O
								Liver problem.	The mixture of tips of <i>Acacia abyssinica</i> , <i>Phytolocca dodecandra</i> , <i>Calpurnia aurea</i> , <i>Ehretia cymosa</i> , <i>Guizotia scabra</i> , <i>Cirsium englerianum</i> , <i>Vernonia amygdalina</i> were pounded, squeezed and adding water full cup is given for adults and ½ cup is given for children.	
	<i>Euphorbia abyssinica</i>	Adami	T	W	St	Hu	F	Hemmoroids	Drinking once, the fluids of this plants, by measuring small finger line.	O
							F	Gonorrhea	Baking bread tef by, using fluid, of this, plants then, eating the	O

									bread.	
	<i>Ricinus communis</i> L.	Qo bbo	S	Hg	R	Lv	F	Placental retention	Pounding, adding water then giving.	O
	<i>Sapium thuspunctatus</i>	Bos oqa	T	W	Ep	Hu	F	Snake bite	Pounding, mix with fresh cow dung drunk few.	O
Fabaceae	<i>Acacia abyssinica</i> Hochst. ex. Benth.	Laf to	T	W	Tp	Hu	F	Ear problem	Cooking with seed, of <i>Trigonella foenum graecum</i> add few, add drops, from the solution.	Aur ticu lar.
	<i>Acacia seyal</i> Del.	Wa cu	T	W	St	Hu	F	Toothache	Brushing teeth by the stem.	Ts
	<i>Albizia gummifera</i> (J.F. Gmel) CA .Sm.	Ha mb abe sa	T	W	Tp	Hu	F	Stomache	Squeezing, then drunk few drops.	O
	<i>Calpurnia aurea</i> (Ait) Benth.	Ce ka	S	W	L	Lv	F	Ectoparasi te	Washing the body using the leaves.	D
					L	Hu	F	Dandroff	Washing the head with leaves.	D
	<i>Erythrina brucei</i> Schwind.	Wa len su	T	W	L	Lv	F	Eye disease.	Squeezing into eyes.	Opt ical
					L	Lv	F	Ectoparasi te	Washing the body using leaves.	D
	<i>Indigofera vohemarensis</i> Bail.	He enn a	H	W	R	Lv	F	Stomache	Pounding, adding water giving half bottle.	O
	<i>Trigonella foenuwm graecum</i>	Sun qo	H	Hg	Sd	Hu	D	Gastritis	Powdering, dissolving in water drunk one, glass before break fast.	O
Fabaceae	<i>Vicia faba</i>	Ba qel	H	Hg	Sd	Hu	F /D	Back pain.	Powdering then, drunk its soup.	O

		a								
	<i>Vigna sp</i>	Ab dus alib	C	W	R	Hu	F/ D	Evil eye	Pounding then adding one spoon to tea or coffe then drunk one cup once.	O
						Hu		Stomache	As above	O
						Hu		Worms	As above	O
						Hu		Headache	Powdering the root and,then smoking as cigarets.	N
						Lv	F/ D	Lack milk product.	Pounding ,adding this to their forage.	O
<i>Lamiacea</i> <i>e</i>	<i>Clerodendrum</i> <i>myricoides.</i> (Hochst).Vatk e.	Ma rasi sa	S	W	R	Hu	D	Evil eye	Crushing,and powdering,add to local arake ,drunk.	O
	<i>Ocimum</i> <i>lamiifolium.</i> Hochist.	Qor ich a mic hi	S	W	L	Hu	F F	Fibre illness	The leaves of <i>Ocimum</i> <i>lamiifolium</i> , <i>Ocimum urticifolium</i> and <i>Ocimum</i> <i>gratissimum</i> were squeezed, then giving few through oral or nasal.	O& N
								Eye disease	As,above then,adding few drops	Opt ical.
	<i>Premna</i> <i>schimperi</i> .Engl.	Urg esa	T	W	Tp	Hu	F	Toothache	Placing between teeth.	Ts
	<i>Pycnostachyu</i> <i>s abyssinica</i> .Fresen.	Yer o	S	W	L	Hu	F	Eye disease	Slighty heating,the leaves placing,on surface,of eye.	D

			S	W	L	Hu		Leg problem.	As above.	D
Linaceae	<i>Linum usitatissimum</i> L.	Talba	H	Hg	Sd	Hu	D	Gastritis	Powdering, dissolving in warm water drunk one glass.	O
			H	Hg	Sd	Both	D	Placental retention.	As above.	O
Lythraceae	<i>Lawsonia inermis</i> L.	Hina ye	T	Hg	L	Hu	D	Cough	Crushing, using as tea	O
					Ep	Hu	D	Stomache	Crushing dissolving in water drunk one cup.	O
					R	Hu	D	Evil eye	Crushing, add 1 spoon to, coffee then drunk	O
					L	Hu	F	Any pain	Squeezing, drunk ½ cup.	O
Malvaceae	<i>Sida rhombifolia</i>	Karabi	H	W	L	Hu	F	Jundice	Pounding the leaves, mix with butter then, painting.	D
Melanthaceae	<i>Bersama abyssinica</i> Fresen.	Lolchisa	S	W	St	Lv	D	Loha	Burning placing, its ash, on, the tungus.	D
Musaceae	<i>Musa x paradisiaca</i> L.	Muzi	T	Hg	Ft	Hu	F	Gastritis	Eating	O
Myrsinaceae	<i>Maesa lanceolata</i> Forssk.	Abayi	S	W	L	Hu	F	Qora	Boiling fresh leaves, then washing, the body	D
					L	Lv	F	Leech	Squeezing into nose.	N
Myrtaceae	<i>Eucalyptus globulus</i> Labil.	Barzafadii	T	W	Ft	Hu	F/D	Headache	Sniff	N
	<i>Syzygium guineense</i> (Wild.) Dc.	Badesa	T	W	Tp	Hu	F	Fever	Squeezing and drunk ½ cup.	O

<i>Olacaceae</i>	<i>Ximenia americana</i> L.	Hudha	T	W	R	Hu	D	Worms, internal pain, qora	Pounding mix, with honey eating, two spoon every morning until healed.	O
<i>Phytolacaceae</i>	<i>Phytolacca dodecandra</i> . L.Herit.	Handode	Cl	W	R	Both	F	Rabies	Pounding, homogenizing with, water drunk, by measuring digits, of small fingers line.	O
					L	Both	F	Rabies	<i>The leaves of Calpurnia aurea, Justiciciaschimperiana, Pycnostachys abyssinica</i> , were pounded, with leaves, of <i>phytolacca dodecandra</i> . after, the solution were filtered giving half and full cup for, human and, cattle respectively.	O
<i>Piperaceae</i>	<i>Piper nigrum</i>	Kunda barbare	T	Hg	Sd	Hu	F/D	Tonsilitis	Swallow	O
<i>Poaceae</i>	<i>Hordeum vulgare</i> . L.	Garbu	H	Hg	Sd	Hu	D	Back pain	Powdering , the, and drunk soup.	O
						Hu	D	Gastritis	Powdering with seed of <i>Trigonella foenum graecum</i> then dissolve in warm water and drun before break fast.	O
	<i>Eleusine coracana</i> .	Daguja	H	Hg	Sd	Hu	D	Bone TB	Powdering, making tella locally calledborde, and drunk as part of food	O
						Hu	D	Diarrhea	Making bread of this crop, then eat with honey.	O

Cont...

<i>Poaceae</i>	<i>Eragrostif tef .(Zucc.) Trontter.</i>	Tafi	H	Hg	Sd	Hu	D	Back pain	Powdering, then drinking its soup	O
	<i>Cymbopogon citrus (DC) Stapf.</i>	Marg urga	H	Hg	R	Hu	F/ D	Stomache	Pounding,filtering,dru nk.	O
<i>Polygona ceae</i>	<i>Rumex nervosus Vahl.</i>	Dhanga ggo	S	W	R	Hu	F/ D	Fungal infection.	Pounding,adding citrus limon painting the area.	D
	<i>Rumex nepalensis Spreng.</i>	Timijji	H	W	R	Hu	F /D	Stomache	Chewing with salts.	O
<i>Polypodi aceae</i>	<i>Lepisorus excavatus ching</i>	Balessa /fern/	H	W	R	Hu	F	Toothache	Crushing,putting between teeth.	Ts
<i>Ranuncul aceae</i>	<i>Nigella sativa L.</i>	Gurra	H	Hg	Sd	Hu	D	Headache	Sniffing	N
								Heart problem	Poweding ,mix with honey then eating.	O
								Malaria	Powdering,mixing with honey and eating two spoon every morning until healed.	O

Cont...

	<i>Ranunculus multifidus</i> Forssk.	Abba warqe	H	W	L	Hu	F	Fibre illnes	Squeezing then drunk few and sniffing.	O &N
					L	Hu		Evil sprit	Squeezing then drunk and sniff at morning for five days.	O &N
					L	Hu		Eye disease	Squeezing, painting the diseased eye and adding few drops to eyes.	Op
					L	Hu		Spider poison	Squeezing,painting the area.	D
	<i>Thalictrum rynchocarpum</i> Dill&Rich.	Fosso	S	W	R	Lv	F/D	Loha	Pounding,homogenizing with water giving one bottle for large and ½ for calf.	O
					R	Hu	F/D	Spider poison	Pounding the root then painting.	D
Rhamnaceae	<i>Rhamnus prinoidea</i> L.Herit.	Geshe	S	Hg	L	Hu	F	Spider poison.	Squeezing then painting.	D
					Sd	Hu	F	Fungal infection.	Pounding the seed ,mix with citrus limon painting.	D
					Tp	Hu	F	Tonsilitis	Swallowing the tips.	O
Rosaceae	<i>Hagenia abyssinica</i> (Bruce). J.F.Gmel.	Ducha /koso.	T	W	Ft	Hu	F/d	Tape worms	Crushing with tips of croto macrostachyus then add water drunk one glass.	O
	<i>Prunus africana</i> (Hook f.) Kalm	Homi	T	W	Ep	Lv	D	Wound	Pounding and powdered the applying on the wounds.	D

Cont...

<i>Rubiaceae</i>	<i>Coffea arabica</i> L.	Buna	S	Hg	Sd	Hu	D	Diarrhea	Roasting powdering mix with honey eating 2 spoon.	O
	<i>Gardenia ternifolia</i> Schumacher & Thonn.	Gambela	S	Hg	Ft	Hu	F/D	Hemorrhoids	Cooking adding <i>Allium sativum</i> and butter eating as food.	O
	<i>Pentascimperiana</i> (A.Rich.) Vatke	Suruma	S	Hg	L	Hu	F	Bone setting	First washing the lives removing its thorns then squeezing adding honey/sugar/egg/ as ingredients then drunk one glass before breakfast for three days.	O
<i>Rutaceae</i>	<i>Citrus limon</i> L.	Lomi	S	Hg	Ft	Hu	F	Hypertension	Drinking its fluid.	O
					Sd	Hu	F	Snake	Crushing the seed mix with cows dung and drunk one cup.	O
	<i>Clausenianisata</i> (Wild.) Benth.	Ulmaya	S	W	Tp	Hu	F	Hemorrhoids.	The mixture of <i>Clausenianisata</i> , <i>Cirsium englerianum</i> , <i>Phytolacca dodecandra</i> , <i>Vernonia amygdalina</i> , <i>Premna schimperiana</i> were pounded together ;filtered measured by digits of small finger line then drunk.	O
	<i>Ruta chalenpesis</i> L.	Cilaaddama	H	Hg	L	Hu	F	Common cold	Placing into coffee.	O

Cont...

					L	Hu	F	Stomachache	Squeezing ,drunk few.	O
Solanaceae	<i>Capsicum annum</i> L.	Barbare	H	Hg	St	Hu	D	Micire	Cutting stem into many then tieing on neck	D
	<i>Capsicum frutescens</i> L.	Mixmixa	H	Hg	Ft	Hu	D	Tonsilits	Pounding, with the seed of, <i>Brassicanigra</i> ,and <i>Brassicacarinata</i> then eating one tea spoon.	O
	<i>Datura stramonium</i> L.	Asangir a	S	W	Tp	Hu	F	Evil eye	The mixture of <i>Vernonia amygalina</i> , <i>Ruta chalepensis</i> , <i>Rhamnus prinoides</i> were pounded;fitered;half coffe cup is given.	O
					L	Hu	F	Nasal bleeding	Squeezing into nose.	N
					L	Hu	F	Stomache	Squeezing ,drunk,by measuring digits,of small finger line.	O
	<i>Datura metel</i> L.	Qorichabofa	S	Hg	L	Hu	F	Snake bite	Squeezing and,drunk half cup .	O
	<i>Lycopersicon esculentum</i> Mill.	Timati mi	H	Hg	L	Both	F	Urine retention	Squeezing,then drunk half cup.	O
	<i>Nicotina tobacum</i> L.	Tambo	H	Hg	L	Lv	F	Loha	Pounding ,adding water then giving	O
	<i>Solanum angulyi</i> L.	Hiddi	S	W	Ft	Hu	F	Ecto parasite	Squeezing, fluid found in fruits to leg.	D

					R	Hu	F	Micire	Cutting the roots into many place;then wearing on neck.	D
	<i>Solanum dyphyllum</i> Schumach.	Hiddi warabe ssa.	S	W	Ft	Lv	F	Comman colds	Squeezing into nose.	N
	<i>Solanum marginatum</i>	Hiddi	S	W	Ft	Hu	F	Eye disease	Swallow 9 or 11 fruits.	O
<i>Tiliaceae</i>	<i>Grewia bicolor</i> Juss.	Harores a	T	W	Ep	Hu	F	Miidhama	Pounding the external parts;squeezing;filterin g,ading honey or sugar drunk one grass.	O
<i>Verbenaceae</i>	<i>Lippia adoensis</i>	Kusaye	H	W	L	Hu	F	Eye problem	Brushing eyes by the leaves of this plants	op
<i>Vitaceae</i>	<i>Cyphostemma</i> sp..	Qorichadiima	H	W	R	Lv	F /D	Trips	Pounding,then adding to their food.	O
<i>Zingiberaceae</i>	<i>Zingiber officinale</i>	Zingibila	H	Hg	B	Hu	F /D	Loss of apitate	Crushing with bulbs of <i>Allium sativum</i> and fruits,of <i>Capsicum annum</i> then eating during meal.	O
					B	Hu	F /D	Comman colds	Crushing and boiling with sugar then drunk	O

Appendix 8: Family,genera and species of medicinal plants of the study area.

Family	Genera	Species	Total number of spp
<i>Acanthaceae</i>	<i>Justicia</i>	<i>Justicia schimperiana</i>	1
<i>Agavaceae</i>	<i>Agave</i>	<i>Agava sisalana</i>	1
<i>Alliaceae</i>	<i>Allium</i>	<i>A .cepa</i> <i>A .sativum</i>	2
<i>Aloaceae</i>	<i>Aloe</i>	<i>A .vera</i>	1
<i>Amryllidaceae</i>	<i>Scadoxus</i>	<i>S .multiflorus.</i>	1
<i>Anacardiaceae</i>	<i>Magnifera</i>	<i>M .indica</i>	1
<i>Apiaceae</i>	<i>Foeniculum</i> <i>Coriandrum</i>	<i>Foeniculum vulgare</i> <i>C .sativum</i>	2
<i>Apocynaceae</i>	<i>Carisa</i>	<i>C .spinarum</i>	1
<i>Asteraceae</i>	<i>Artemisia</i> <i>Echinops</i> <i>Heliantus</i> <i>Bidens</i> <i>Circium</i> <i>Guizotia</i> <i>Vernonia</i>	<i>Artemisia afra</i> <i>Echinops kebericho</i> <i>Heliantus annus</i> <i>Bidens prestinaria</i> <i>Circium engrianum</i> <i>Guizota scabra</i> <i>Vernonia amygdalina</i> <i>Vernonia spp</i>	8
<i>Bignoniaceae</i>	<i>Stereospermum</i>	<i>S .kunthianum.</i>	1
<i>Boraginaceae</i>	<i>Cordia</i>	<i>C .africana</i>	2

	<i>Ehretica</i>	<i>E .cymosa</i>	
<i>Brassicaceae</i>	<i>Brassica</i>	<i>B .carinata</i> <i>B .nigra</i> <i>B .sativum</i>	3
<i>Canaceae</i>	<i>Cana</i>	<i>C .indica</i>	1
<i>Caricaceae</i>	<i>Carica</i>	<i>C .papaya</i>	1
<i>Capparidaceae</i>	<i>Buddleja</i> <i>Capparis</i>	<i>B .polystachya</i> <i>C .micrantha</i> <i>C .sepiaria</i>	3
<i>Cryophyllaceae</i>	<i>Drymorina</i>	<i>Drymorina cordata .</i>	1
<i>Commelinaceae</i>	<i>Commolina</i>	<i>Commolina spp</i>	1
<i>Convululaceae</i>	<i>Ipomaea</i>	<i>Ipomaea carica</i>	1
<i>Clelastraceae</i>	<i>Catha</i>	<i>Catha edulis.</i>	1
<i>Crassullaceae</i>	<i>Kalancho</i>	<i>Kalancho mormorata</i>	1
<i>Cucurbitaceae</i>	<i>Cucurbita</i> <i>Coccinia</i> <i>Lagenaria</i>	<i>C .pepo</i> <i>C .abyssinica</i> <i>L .siceraria.</i>	3
<i>Euphorbaceae</i>	<i>Euphorbia</i> <i>Ricinus</i> <i>Sapium</i> <i>Croton</i>	<i>E .abyssinica</i> <i>R .communis</i> <i>S .thuspunctatus</i> <i>C .macrostachyus.</i>	4
<i>Fabaceae</i>	<i>Acacia</i> <i>Albizia</i> <i>Calpurnia</i> <i>Erythriana</i>	<i>A .abyssinica</i> <i>A .seyal.</i> <i>A .gummifera.</i> <i>C .aurea.</i> <i>E .brucei</i>	9

	<i>Indigofera</i> <i>Phaseolus</i> <i>Trigonella</i> <i>Vicia</i>	<i>I.vohemarensis.</i> <i>Phaseolus vulgare</i> <i>T.foenum graecum.</i> <i>Vicia faba</i>	
<i>Lamiaceae</i>	<i>Clerodendrum</i> <i>Ocimum</i> <i>Premna</i> <i>Pycnostachyus</i>	<i>C.myricoides.</i> <i>O.lamiifolium.</i> <i>O.urticifolium</i> <i>O.gratissimum.</i> <i>P.schimperi</i> <i>P.abysinica.</i>	6
<i>Linaceae</i>	<i>Linum</i>	<i>L.sativum</i>	1
<i>Lythraceae</i>	<i>Lawsonia</i>	<i>L.inermis</i>	1
<i>Malvaceae</i>	<i>Sida</i>	<i>S.rhombifolia.</i>	1
<i>Melanthaceae</i>	<i>Bersama</i>	<i>B.abysinica.</i>	1
<i>Musaceae</i>	<i>Musax</i>	<i>Musax paradisiaca</i>	1
<i>Myrsinaceae</i>	<i>Maesa</i>	<i>M.lanceolata</i>	1
<i>Myrtaceae</i>	<i>Eucalytus</i> <i>Syzygium</i>	<i>E.globulus</i> <i>S.guineense</i>	2
<i>Olacaceae</i>	<i>Ximenia</i>	<i>X.americana</i>	1
<i>Phytolaccaceae</i>	<i>Phytolacca</i>	<i>Phytolacca dodecandra.</i>	1
<i>Piperaceae</i>	<i>Piper</i>	<i>P.nigrum.</i>	1
<i>Poaceae</i>	<i>Cymbopogon</i> <i>Eleusine</i> <i>Eragrostif</i> <i>Hordeum</i>	<i>C.citrus</i> <i>E.coracana</i> <i>E.tef.</i> <i>H.vulgare</i>	4
<i>Polygonaceae</i>	<i>Rumex</i>	<i>Rumex nepalensis</i>	2

		<i>Rumex nervosus.</i>	
<i>Polypodiaceae</i>	<i>Lepisorus</i>	<i>L .excavatus.</i>	1
<i>Ranunculaceae</i>	<i>Nigella</i> <i>Clematis</i> <i>Thalictrum</i>	<i>Nigella sativa</i> <i>C .hirsuta</i> <i>Thalictrum rynchocarum.</i>	3
<i>Rhamnaceae</i>	<i>Rhamnus</i>	<i>Rhamnaceae</i>	1
<i>Rosaceae</i>	<i>Hagenia</i> <i>Prunus</i>	<i>H .abyssinica</i> <i>P .africana</i>	2
<i>Rubiaceae</i>	<i>Coffea</i> <i>Gardenia</i>	<i>C .arabica</i> <i>G .ternifolia.</i>	2
<i>Rutaceae</i>	<i>Clausena</i> <i>Citrus</i> <i>Ruta</i>	<i>C .anisata</i> <i>C .limon</i> <i>Ruta chalepensis</i>	3
<i>Solanaceae</i>	<i>Capsicum</i> <i>Lycopersicon</i> <i>Nicotiana</i> <i>Datura</i> <i>Solanum</i>	<i>C .annum</i> <i>C .frutescens</i> <i>L.esculentum.</i> <i>N .tobacum.</i> <i>D .metel</i> <i>D .stramonium</i> <i>S .angulyi</i> <i>S .marginatum</i> <i>S .dyphyllum</i>	9
<i>Tiliaceae</i>	<i>Grewia</i>	<i>G .bicolor</i>	1
<i>Veberaceae</i>	<i>Lippia</i>	<i>L .adoensis.</i>	1
<i>Vitaceae</i>	<i>Cypostema</i>	<i>C .cyphopetalum.</i> <i>Vigna sp.</i>	2

<i>Zingiberaceae</i>	<i>Zingiber</i>	<i>Zingiber officinale</i>	1
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Appendex 9.Llists of photo taken during field study.



Photo taken by Fikiru Ayana from Geba Robi riverine forest.



***Croton macrostachyus* Del.** Photo taken by Fikiru Ayana



Approval sheet II

I, the undersigned supervisor of **Fikiru Ayana** have read and evaluate his thesis entitled **–Ethnobotany of traditional medicinal plants in Hawa Gela District, Kelem Wollega Zone of Oromia Region, Ethiopia**” and approved for submission in partial fulfilment of the requirements for the degree of Master of Science in Biology.

Name of principal advisor

Signature

Date

Name of co-advisor

Signature

Date