



Ethnobotanical Study of Medicinal Plants in Alefa District, Central Gondar Zone ,Amhara Regional State,Ethiopia.

Meiraf Getahun



Addis Ababa University

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**Ethnobotanical Study of Medicinal Plants in Alefa District Central Gondar
Zone, Amhara Regional State, Ethiopia.**

Meiraf Getahun

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GRADUATE PROGRAM

This is to certify that the thesis by Meiraf Getahun Tsegaw, entitled: **Ethnobotanical Study of Medicinal Plants in Alefa District, Central Gondar Zone, Amhara Regional State, Ethiopia.** and Submitted to the department of Zoological Science in partial Fulfilment of the Requirements for the Degree of Master of Science in Biology complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

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Name	Signature	Date
1. Dr. Misganaw Meragiaw (Examiner)	-----	-----
2. Dr. Ermias Lulekal (Advisor)	-----	-----

Abstract

Ethnobotanical Study of Medicinal Plants in Alefa District Central Gondar Zone, Amhara Regional State, Ethiopia.

Meiraf Getahun Tsegaw

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An Ethnobotanical study of medicinal plants was conducted to document and identify medicinal plant based indigenous knowledge of people in Alefa District, Central Gondar Zone, Amhara Regional State, Ethiopia. A total of 140 informants were selected to collect Ethnobotanical data. Out of these 26 key informants were selected purposively while general informants were selected randomly. Data were collected by using semi-structured interviews, group discussion, field observation and guided field walk and market surveys. The data were analyzed using descriptive statistics such as percentage and frequency: informant consensus factor, preference ranking, direct matrix ranking and fidelity level. The results show that a total of 108 medicinal plants species belonging to 94 genera and 53 families were collected and identified. Family Solanaceae and Poaceae were contributed the highest number of species. A total of 74 human and livestock ailments were recorded. From the total of 108 medicinal plants species (70.37%) were used to treat only human ailments, (11.11%) were used to treat livestock ailments only and (18.51%) for treating both human and livestock ailments. The most frequently used plant parts were leaves (39.15%). From the total of 108 medicinal plants specie (38.88%) were herbs, (30.55%) were shrubs, (22.22%) were trees and (8.33%) were climbers. The most widely used method of remedy preparation was crashing (38.16%). The most commonly reported route of administration was oral constituting (59.11%). Disease categories with relatively higher ICF values were dermatology ailments (0.81). The most serious threats to medicinal plant species were agricultural expansion. Therefor prior and special attention to preserving highly threatened medicinal plants is recommended.

Key words:- Alefa District, ethnobotany, indigenous knowledge, medicinal plants

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List of Abbreviations and Acronyms

ADADO	Alefa District Agriculture and Development office
ADAO	Alefa District Adiministrative Office
ADCO	Alefa District Communication Office
ADHO	Alefa District Health Office
CDB	Convention on Biodiversity
FL	Fidelity level
HSDP	Health sector development program
ICF	Informant consensus factor
IK	Indigenous knowledge
MPs	Medicinal plants
SPP	Species
TM	Traditional medicine
WHO	World health organization

1. Introduction

Medicinal plants are very vital in their uses for medication, besides providing ecological, economic and cultural services. The world's primary means of treating disease and fighting of infections have been based on the use of medicinal plants. People have a long history of the use of traditional medicinal plants for medical purposes in the world and now a day this is highly actively promoted, 79-90% of the rural population in the world uses traditional medicines (Getnet Chekol, 2017).

Medicinal plants have played a vital role in providing a healthcare system to human beings since the dawn of civilization. Starting from ancient times plants have been very important sources in both preventive and curative traditional medicine preparations for human beings and livestock (Dery, 1999). From ancient times up to now people have used several species of plants for medicine, food, clothing, shelter, fuel, fiber, fence, source of income and to fulfill their cultural and religious needs all over the world (Zemedede Asfaw, 2002). Traditional medicine has remained the most affordable and easily accessible source of treatment in the primary healthcare system among communities unable to get modern medication (Mersha Ashagre and Ermias Lulekal, 2021). Indigenous people of a given community have their own local specific knowledge of plant use, management and conservation (Cotton, 1996).

This knowledge of a community about plants in a surrounding related to their use, classification and management practices is generally known as indigenous knowledge or traditional knowledge (TK) (Martin, 1995). One such knowledge of indigenous people on plants of their surrounding is related to their use in traditional medicine to treat human and livestock ailments.

In Africa the majority of the populations (80% of the population) primarily rely on traditional medicinal plants for their healthcare (WHO, 2002). The country Ethiopia is located in the horn of Africa between 3 and 15° northing, latitude and 33 and 48° easting longitude, and characterized by a wide range of ecological, edaphic and climatic conditions. Ethiopia is also very diverse in its flora composition (Abebe Demssie and Ayehu Ahadu, 1993). The flora of Ethiopia is estimated to contain close to 6500-7000 species including medicinal plants, of those 12-19% are endemic to the country (CBD, 2008).

In present-day Africa, including Ethiopia, the majority of people lack access to health care and where available the quality is largely below standard (Abbiw, 1996). In Ethiopia, the utilization of medicinal plant remedies plays a significant role in preventing or curing various ailments in most parts of the country (Birhan Wubet *et al.*, 2011). Ethiopian traditional medicine is an integral part of the local culture and is a major public health system (Hawkins, 2008). Thus traditional medicine (TM) is an important means of primary health care for achieving the goal of 'health for all'. The various literature sources available also support the fact that more than 70% of the human and 90% of the livestock population in Ethiopia depend on traditional medicine (Fassil Haile, 2003). Particularly, traditional herbal healing systems are widely practiced throughout the rural population as their primary healthcare system (Haile Yineger and Delenasaw Yewhalaw, 2007).

However, medicinal plants are affected by different factors such as environmental degradation, deforestation, agricultural encroachment, over harvesting and/or indiscriminate harvesting and alarming population growth with increasing demand and consumption are the principal problems that aggravate the rate of extinction of medicinal plants from their habitat and consequently the loss of important resources of globally significant plant species (Tesfaye Seifu, 2004).

Ethiopian traditional medicinal plant inventories like (Erimias Lulekal, 2014; Haile Yineger, 2005; Tilahun Teklehaymanot and Miruste Giday, 2007; Bogale Haile, 2018; Mirutse Giday *et al.*, 2010; Mengistu Gebrehiwot, 2010; Eskedar Abebe, 2011; Tebkew Mequanent, 2015; Tesfaye Seifu, 2004) have attempted to document the importance of traditional medicinal plants in some cultural groups however, it is found insignificant when compared to the wide ethnolinguistic communities found in country. This study was aimed to fill this gap by identifying and documenting the utilization, management, and conservation of traditional medicinal plants in the Alefa District.

1.1 Statement of the study

The indigenous knowledge of traditional healing practice by using medicinal plants generally decreases in the country (Seyoum Getaneh and Zerihun Girma, 2014) and also in the study area. This is because of in developing countries like Ethiopia, the indigenous knowledge about traditional medicinal plants is transferred secretly from generation to generation orally, modern education making the younger generation underestimate its traditional values. As it was reported by (Seyoum Getaneh and Zerihun Girma, 2014) traditional healers do not convey their knowledge to the next generation. In addition the indigenous knowledge on the usage of medicinal plants has been declining as remedies are getting lost along with the wild plants and forests due to human impact like deforestation, agricultural expansion, exploitation and population growth and hence there is evident loss of biodiversity. All these factors have resulted in a gradual disappearance of indigenous medicinal plant practices and indigenous knowledge. But now a day many ethnobotanical studies on medicinal plants are conducted in different parts of Ethiopia. In many parts of Ethiopia, considerable research has been done on those practices of traditional plant medicine (Aschalew Lata and Takele Etana, 2014).

Even though the number of research on medicinal plants practices and related indigenous knowledge, there is a continuous loss of medicinal plant species and indigenous knowledge on traditional healing practices, conducted research is not enough and does not cover all parts of the country thus, there is a clear gap in the documentation of medicinal plants in the country.

As in other parts of Ethiopia, until now, there is no ethnobotanical data documentation on medicinal plants of the Alefa District, Central Gondar Zone Amhara Regional State. Thus, the main purpose of this ethnobotanical study is to identify and document medicinal plants and to investigate the associated traditional knowledge applied by the local community on the application of these medicinal plants to treat both human and livestock diseases, to record diseases treated by medicinal plants and for conservation of medicinal plants in Alefa District.

1.2 Objective of the study

1.2.1 General Objective

The general objective of the study was to identify and document Medicinal plants and related indigenous knowledge used by local people to treat human and animal ailments in Alefa District, central Gondar Zone.

1.2.2 Specific Objectives

1. To document medicinal plants and indigenous knowledge used by local people to treat human and livestock ailments in the Alefa District.
2. To identify the plant parts that are used as medicine and document ways of preparation, application and route of administration of medicinal plants in Alefa District.
3. To identify the major threats to medicinal plants in the Alefa District
4. To assess local conservation and management methods of medicinal plants in Alefa District.

1.3 Research Questions

The findings of the study attempts to answer the following main research questions.

- ✓ What medicinally plant species are used to treat different human and livestock ailments in the Alefa District?
- ✓ Which parts of the medicinal plants are useful to treat ailments?
- ✓ What method of preparation and usage practices of medicinal plants are practiced in Alefa District to treat different ailments?
- ✓ What are the major threats to medicinal plants and what local conservation and management methods are practiced to save medicinal plants in Alefa District?

2. Literature review

2.1 Beginning and Development of Ethnobotany

Ethnobotany is formed from two Greek words, ‘ethno’ which means the study of people and botany’ which means the study of plants as it was reported by Cotton (1996). The term ethnobotany was for the first time mentioned orally by John Hershberger in 1895 during a public lecture (Hamilton *et al.*, 2003; Cotton, 1996) defined ethnobotany as the study of the use of plants by aboriginal people. Martin (1995), Balick and Cox (1996) defined ethnobotany as the study of direct interaction between humans and plants. Similarly Farnsworth (1994) defined ethnobotany as the study of direct interrelations between humans and plants, including plants used as food, medicines and for any other economic applications. Ethnobotany is an interdisciplinary and multi-disciplinary science that focuses on documenting, analysis and use of indigenous knowledge, beliefs and practices related to plant resources (Martin, 1995).

2.2 Traditional medicines and Indigenous Knowledge

2.2.1 Traditional Medicines

Traditional medicine has been defined by the World Health Organization (WHO, 2008) as “the sum total of all knowledge and practices, whether explicable or not, used in the diagnosis, prevention and elimination of physical, mental or social imbalances and relying exclusively on practical experience and observation handed down from generation to generation, whether verbally or in writing.” This system of health-care is also known as folk medicine, ethno-medicine, or indigenous medicine.

The practice of traditional medicine is widespread in China, India, Japan, Pakistan, Sri Lanka and Thailand. In Africa, traditional medicine is a part of the people's culture despite the fact that this form of medicine is not as well organized as, for example, in India and China (Khan and Islam, 2007). According to Dawit Abebe (2001) the traditional medicinal system of Ethiopia is a medico-religious systems due to close interaction of traditional medicinal systems in the country. Practitioners include herbalists, bonesetters, village midwives or traditional birth attendants, traditional psychiatrists, herb sellers, and other specialists.

Traditional medicinal plants play typical role in the lives of many people in terms of health support, financial income and livelihood security (Hamilton, 2003, 2004; Abdulhamid Bedri et

al., 2004). Plants in general and medicinal plants in particular are invaluable, fundamental and most useful to almost all life on the earth, one of the most significant uses of plants is the phytomedicinal role, i.e., the benefits of medicinal plants. Traditional medicine has also drawbacks as various authors stated (Amare Getahun, 1976 and Dawit Abebe, 1986). Lack of precision and standardization is one drawback for the recognition of the traditional healthcare system. Lack of precise dosage which could lead to toxicity is also the other disadvantage of traditional medicine (Dawit Abebe, 1986). The measurements used to determine the dosages are not standardized and depend on the age and physical appearance of the patient, socio cultural explanation of the illness, diagnosis and experience of individual herbalist (Dawit Abebe and Ahadu Ayehu, 1993).

2.2.2 Indigenous Knowledge

Indigenous Knowledge is the local knowledge that is unique to a given culture or society and the base for agriculture, health care, food preparation, education, environmental conservation and a host of other activities. It is a systematic body of knowledge built up by a group of people through generations of living in close contact with nature and it is cumulative and dynamic (Stephan and Justin, 2003). This concept includes indigenous technical knowledge, traditional environmental Knowledge, rural knowledge, local knowledge and farmer's or pastoralist's knowledge. Indigenous knowledge is important for an essential first step for development projects, allows better innovation and adaptation of technologies, adds to scientific knowledge, increases understanding between researchers and local people, increases the local capacity to experiment and innovate and empowers local people (Warburton and Martin, 1999). One important feature of indigenous knowledge system is its adaptive skills for local people are acquired informally through interaction with the natural environments (Zemedede Asfaw and Tigist Wondimu, 2007). One of the widely used indigenous knowledge system in many countries is the knowledge and application of traditional medicine. Such knowledge known as ethnomedicinal knowledge (EMK) involves traditional diagnosis, collection of raw materials, preparation of remedies and its prescriptions to the patients (Khan and Ahmad, 2014). Indigenous knowledge on remedies in many countries including Ethiopia passed from one generation to the other generation verbally with great secrecy (Fisseha Mesfin *et al.*, 2009). Such secret and crude transfer makes IK or EMK vulnerable to distortion and in most cases, some of the lore is lost at

each point of transfer. Hence there is a need for systematic documentation and record of such useful knowledge through ethno botanical research (Brihanu Adibaru, 2018).

2.3 History of Medicinal Plants

Since ancient times, plants have been vital sources of both preventive and curative traditional medicine preparations for human beings and livestock. Historical accounts of traditionally used medicinal plants depict that different medicinal plants were in use as early as 5000 to 4000 BC in China and 1600 BC by Syrians, Babylonians, Hebrews and Egyptians (Dery *et al.*, 1999). From ancient time up to now people use a number of species of plant for medicine, food, clothing, shelter, fuel, fiber, fence, source of income and to fulfill their culture and religious needs all over the world (Zemedede Asfaw, 2002). In Africa the majority of populations (80% of the population) primarily rely on traditional medicinal plants for their healthcare (WHO, 2002). Medicinal plants have been the basis of treatment of various diseases in Africa traditional medicine as other form of treatment from diverse cultures of the world (Theophine *et al.*, 2014).

Ethiopia has a long history of using traditional medicines from plants and has developed ways to combat diseases through it. Traditional medical practice has been in existence before the growth of modern medicine and continues to be widely accepted and used in the prevention and treatment of ailments (Asfaw Debela *et al.*, 1999).

2.4 The Importance of Traditional Medicinal Plants in Human Health Care Service

Plant diversity remains crucial for human well-being and still provides a significant number of remedies required in healthcare (Bogale Haile, 2018). Plants in general and medicinal plants in particular are important, fundamental and most useful to almost all life on the earth, one of the most significant uses of plant is the phytomedicinal role. Traditional medicinal plants have remained as the most affordable and easily accessible source of treatment in the primary healthcare system of resource poor communities and the local therapy is the only means of medical treatment for such communities. Like any other developing and list developed nations, the available modern health care services of the country are not only insufficient but also inaccessible and unaffordable to the majority (Haile Yineger *et al.*, 2008).

This problem along with the rapidly increasing human population and cultural resistances towards the use of modern medicines means that the majority of the people in Ethiopia are

dependent on traditional medicines of mainly plant origins to manage various human ailments (Dawit Abebe, 2001).

According to Konno (2004), easy accessibility efficacy on treatment and affordable cost in getting health services are main reasons in preferring tradition medicine to modern medication. Plants have been indispensable and the most important sources of both preventive and curative traditional preparation for human beings and livestock since time immemorial. They keep ecological and climatic balances and helping to control rainfall through the process of transpiration. And all these benefits of plants are directly or indirectly linked with health care (Hamilton, 2004; Kelbessa Urga et al., 2004). Therefore, health care and botany have evolved as inseparable domain of human activities since various plant products are of paramount importance in traditional health care systems.

According to Mekonnen Bishaw (1990) and Tesema Tanto *et al.*, (2003) about 80% of human population and over 90% livestock in Ethiopia rely on traditional medicine. The livestock or Ethnoveterinary medicine provides traditional medicines which are locally available and usually cheaper than standard treatments. Not only in Ethiopia but also globally and in all developing countries and especially in tropical Africa, using traditional medicinal plants is common and form the back bone of traditional therapy since the majority of the people depend on these traditional medicinal plants for their health care, and this global importance and utilization of medicinal plants has considerably increased in the last two 13 decades. And thus, today, medicinal plants play a great role also world wide of the health services. Traditional medicine has also disadvantage, lack of precision and standardization is one drawback for the recognition of the traditional healthcare system as stated by Amare Getahun (1976). The main disadvantage of traditional medicine is the lack of scientific proof of its efficacy which could result in the decrement of its acceptance especially by educated and most urban dwellers who entirely depend on modern medicine (Dawit Abebe, 1986). In addition, the imprecise diagnosis given by some traditional healers and when they use several types of medicinal plants species and other types of traditional medicine in combination (without scientific proof) which could result in health damage is the other negative side of the traditional medicine. Lack of precise dosage which could lead to toxicity is also the other disadvantage of traditional medicine (Dawit Abebe, 1986). In addition to traditional healers had no accurate value of the medicines prescribed to patients. They

administered the same amounts of medicine to people who have the same disease regardless of age, body weight or sex (Gidey Yirga, 2010). Local healers did not have enough awareness about cleanness of the equipment's which are to prepare the medicines.

2.5 The Importance of Medicinal Plants for Development of Modern Drugs.

Historically, plants have provided a source of inspiration for novel drug compounds, as plants derived medicine have made large contribution to human health and well-being. Their role in the development of new drugs could be either by serving as a natural blue print for the development of new drugs, or as phytomedicine to be used for the treatment of diseases (Andrew *et al.*, 2000). Rapid developments and advances in science, technology, and the world economy have drastically changed the world and environment. With remarkable improvement in human health care on one hand and environmental deterioration on the other, a growing demand for natural products and phytomedicine has shifted research and development works toward new drug discovery.

Many research institutions in this field have turned to traditional medicine, mainly the use of plants as source of new drugs. Traditional medicines play a key role in the development and advancement of modern studies by serving as a starting point for the development of novelty in drug (Pramono, 2002). Furthermore, chemical structures derived from plants can be used as models for synthetic compounds (WHO, 2000). Most of plant derived drugs were originally discovered through the study of traditional cures and folk knowledge of indigenous people (Balick and Cox, 1996).

In general, many investigations indicate the relevance of ethnobotanical information on medicinal plants to guide chemical screening for drug development. Traditional herbs, which have been proven for clinical efficacy and safety, were the first chosen for screening. Then plant materials collected and identified with reference to ethnobotanical information and photochemistry analysis were screened in consultation with local users of the herbal medicines are tested through photochemistry, animal experiments and clinical trials. It is then possible to use them in the formulation of new medicines according to government regulations concerning new medicinal developments (Sheng-Ji, 2001).

2. 6 Plants in ethnoveterinary medicine

Ethnoveterinary medicine and related study is one of the most important means of controlling livestock diseases. Livestock disease has often been described as serious of constraints to both macro-level economic development in Africa and the well-being of millions of poor livestock keepers (Andy, 1999). Ethnoveterinary medicine which refers to traditional animal health care knowledge and practices comprising of traditional surgical and manipulative techniques, traditional immunization, magico-religious practices and beliefs, management practices and the use of herbal remedies to prevent and treat arrange of disease problems encountered by livestock holders (Tafesse Mesfine and Mekonnen Lemma, 2001).

In Ethiopia, livestock production plays an important role in the lively hood and economy of majority of the population. In Ethiopia as well as in most developing countries, animal disease remains one of the principal causes of poor livestock performance, leading to an ever increasing gap between the supply of, and the demand for, livestock products (Teshale Sori *et al.*, 2004). Ethiopia is one of the leading countries of Africa in livestock population (Mirutse Giday and Gobena Ameni, 2003). Although Ethiopia is rich in its livestock population, it is one of the countries in the world with the lowest unit output. The poor health condition and of its livestock has partially been responsible for the low productivity (Mirutse Giday and Gobena Ameni, 2003).The ever declining provision of animal health services has resulted in the appearance of a number of epizootic diseases reducing the economic efficacy of livestock production in Africa (Mirutse Giday and Gobena Ameni, 2003).

Creation of awareness on Ethnoveterinary medicine emphasizing on useful plants used for treatment of live stock has paramount importance to live stock management. In addition, proper documentation and understanding of farmer's knowledge, attitude and practices about the occurrence, cause, treatments, prevention and control of various ailments is important in designing and implementing successful live stock production (Tafesse Mesfine and Mekonnen Lemma, 2001).

2. 7 Medicinal plants and ethnomedicine in Ethiopia

In Ethiopia, about 70% of human and 90% of livestock depend on traditional medicine (Endalew Amenu, 2007). Plants are fundamental to almost all lives on the earth providing protection and

nourishment for organisms from bacteria to large mammals. The existence and utilization of diversity of plant species for medicinal purpose attributes to the still reliance of local people on traditional medicine as their central health care system. The majority of plant species recorded in the district found to be used in other parts of the country which shows their potential efficacy (Mohammed Adefa and Berhanu Abraha, 2011).

In Ethiopia, little emphasis has been given to ethnobotanical studies over the past decades (Dawit Abebe, 2001) even if there has been some attempt in investigating medicinal plants and indigenous knowledge on sustainable use and management of plant resources. Traditional medicine has played a significant role in Ethiopia in treating health problems in both livestock and humans. Knowledge of medicinal plants of Ethiopia and of their uses provides vital contribution to human and livestock health care needs throughout the country (Belayneh Eyasu *et al*, 2012).

2.8 Source of medicinal plants in Ethiopia

The natural ecosystems of the forests, grasslands, woodlands, wetlands, field margins, contain a significant number of medicinal plant species. These are places where traditional healers and other members of the community collect medicinal plant species (Endashaw Bekele, 2007). As the findings of Tesfay Awas and Sebsebe Demsisew Ethnobotanical study in Kafficho people ,SouthWestern Ethiopia (2009) indicated most of the MPs in Ethiopia are collected from the wild, some are cultivated and some others are grown in home gardens either purposely for medicinal use or non-medicinal purpose.

Most of medicinal plants used by the herbalists are collected from the natural vegetation. Home based medicinal plants use relies on plants of the home garden, crops, weeds and that grow wild around human habitation. The cultivated medicinal plants are mostly produced in home gardens either for medicinal or rather primary purposes. Medicinal plants of home garden are known to the public as the knowledge on them is open or public (Zemedede Asfaw, 2001). Many medicinal plants are also harvested for non-medicinal values such as for timber. Medicinal plants obtained from wild habitats are found in different natural ecosystems of the forests, grasslands.

2.8.1 Diversity and distribution of medicinal plants in Ethiopia

Ethiopia is a country with a great range of ecological edaphic and climatic conditions (Dawit Abebe and Ahadu Ayehu, 1993; Dawit Abebe *et al.*, 2003). The number of plant species in each corner of the country and the vegetation type is also varied ranging from arid low land to Afroalpine vegetation (Abebe Demissie, 2001). Similarly as reported by (TewoldeBrehan Gebre Egziabhar, 1991) the variation in vegetation type of the country is due to the country's significant geographical diversity.

The wood lands, mountain vegetation including grassland, forests and the evergreen scrubs and rocky areas contain more medicinal plants which indicated that traditional medicinal plant species are not equally distributed throughout the country similar to the distribution of the total plant species (Edwards, 2001). According to Edwards (2001) the vegetation types found in the wood lands contain more medicinal plant species while the Afro-alpine vegetation consists of the least medicinal plants of all the vegetation types.

According to Ethiopian CBD institute 4th country report in, 2022 more than 95% of traditional medicinal preparations in Ethiopia are made from plant origin. There are about 887 medicinal plant species that are currently used by the Ethiopian people. The majority of medicinal plants are herbs followed by shrubs and trees (Table 1). Twenty-four (2.7%) medicinal plant species are found in the wild (Table 2) and therefore, the treats and trends are similar to those of the forest plant species (Ethiopian CBD institute 4th country report in, 2022).

Table 1. Distribution of medicinal plants by growth pattern

Growth habit	No. of species	Percent
Herbs	271	30.5
Shrubs	168	19.0
Trees	110	12.4
Climbers	74	8.3
Reed	2	0.2
Unidentified	262	29.6

Source : Ethiopian CBD institute 4th country report in, 2022

Table 2. Distribution of medicinal plants by their state of existences

State of existence	No. of species	Percent
Wild	357	40.2
Cultivated	89	10
Weed	52	5.9
Undetermined	389	43.9

Source: Ethiopian CBD institute 4th country report in, 2022

2.9 Ethnobotanical study of medicinal plants in Ethiopia

WHO established a worldwide program to promote and develop basic and applied research in traditional medicine (WHO, 1978). Medicinal plants then have got special attention and regional offices were established by world health organization to coordinate basic and applied research activities on medicinal plants. To preserve indigenous knowledge of plant use in general and traditional medicine in particular, an ethnobotanical survey of losses studied socio cultural group is very crucial.

However in Ethiopia research and documentation on medicinal plants have been started only very recently (Mesfin Tadesse and Sebsibe Demissew, 1992). As this was neglected and considered irrelevant in the past (Dawit Abebe and Ahadu Ayehu, 1993) only little effort has so far been made to record and documents the medicinal plants use and the associated knowledge. And also a limited number of papers dealt with specific socio cultural groups in specific areas when compared to the countries varied Flora and the socio cultural diversity this studies incomplete as medicinal plants healing systems differed from culture to culture. Hence, attention should be given to the field of ethnobotanical studies of the country with all necessary endeavors to have a full picture of the countries medicinal plant potentials.

2.9.1 Parts of Medicinal Plants used as medicine

Different plant parts used for preparation of traditional medicine, such as leaves roots, fruit, flower latex, buds and others. From this plant parts leaves and roots were the dominant respectively. This is because of leaves are easy for preparation of traditional medicines and the presence of more bioactive ingredients. It was also established that the leaves are mostly used because of their potency as well as their fast regeneration ability (Moa Megersa, 2010).This

contradicts with the findings of others studies carried out in other parts of country where roots are the most widely used plant parts (Fsseha Mesfin *et al.*, 2009; Teferi Flatie *et al.*,2009).

2.9.2 Preparation, dosage and administration of traditional medicine

The preparation of traditional medicine for human and livestock ailments; the local people used a number of methods of preparing herbal medicine for different types of ailments. Among this principal method of plant parts remedy preparations are squeezing, pounding, powdering and latex collection. Squeezing was the most dominant preparation methods of remedy (Endalew Amenu, 2007; Getaneh Gebeyehu, 2011). The techniques of remedy preparations involved crashing, squeezing followed by concoction and immersed (Eskedar Abebe, 2011).

The local people used to determine different traditional measurements such as dosage cup, glass, and spoon and in some cases a handful for measuring the dose of traditional medicine. The doses are not standardized and do not consider variation of sex, age and health condition of the patient. Thus there is a risk of treatment failure due to under dosage and over doses and it is one drawback of traditional medicine (Dawit Abebe, 2001). Various ethnobotanical research in Ethiopia have indicated oral routes as the predominant route of administration (Etana Tolosa, 2007).

2.10 Threats and conservation of medicinal plants in Ethiopia.

2.10.1 Threats to medicinal plants in Ethiopia

Many people of our world exploit our Earth mercilessly, as if there were no tomorrow, the greatest danger elsewhere in our country is losing the indigenous knowledge of our own cultural and our biodiversity resource including the medicinal plants of our locality (Eskedar Abebe, 2011). Recent evidence from Ethiopia as well as other countries indicates that the existences of these indigenous resources are threatened. The most serious proximate threats generally are habitat loss, habitat degradation and over-harvesting (Hamilton, 1997).

According to report of Ensermu Kelbessa *et al.*, (1992) there are two sources of threats to medicinal plants, i.e. man made and natural causes. Rapid increase in population, the need for fuel, urbanization, timber production, over-harvesting, destructive harvesting, invasive alien species, honey collection degradation, agriculture expansion and habitat distraction are caused

threat to medicinal plants. Likewise, natural causes include recurrent drought, bushfire, disease and pest outbreaks.

(Mirutse Giday *et al.*, 2003) have also explained the threatening factors can be elaborated as lose of cultural diversity including traditional knowledge due to, uncontrolled grazing, drought, agricultural expansion, fire wood, charcoal, urbanization and construction. According to Maundu *et al.*, (2004) the main threats of the medicinal plants (unsustainable use of medicinal plants) in Africa are a high population growth rate, competing land uses of natural vegetation to other forms of land use such as agriculture, environmental degradation, loss of local knowledge, increasing commercialization of traditional medicine, increasing demand in the local and world market, lack of appropriate policies and legislation or failure to enforce, poverty and high unemployment rate, low prices of medicinal plants, invasive species, undue pressure on specific preferred species and slow plant growth.

According to Ensermu Kelbessa *et al.*, (1992) and Edwards *et al.*, (2001) also habitat and species are being lost rapidly as result of the combined effect of environmental degradation, agricultural expansion, deforestation and over harvesting of species. There is no organized cultivation of plant species for medicinal purpose in Ethiopia except few aromatic species. The reason for this is that the quantities of medicinal and aromatic plants traded are very small. In most scenarios the traditional knowledge in Ethiopia is transferred verbal communication from one generation to the next generation and valuable information can be lost whenever a traditional medicinal practitioner passes without conveying his or her traditional medicinal plant knowledge (Abebe Demssie, 1986; Bech *et al.*, 2016). It has also been reported that medicinal plant species are affected by unsustainable harvesting for export and extraction of pharmaceuticals (Farnsworth, 1985 and WHO, 1998). Beside to these known factors which treat medicinal plant species, other condition like the types of the medicinal plant and the part used also affect the medicinal plant. for example harvesting the roots and barks of medicinal plant possess more of a threat than collecting leaves for medicinal value (Edwards 2001; Haile Yineger, 2005). Besides to other factor, the younger generation under estimate the traditional system of healing (Sofowara, 1982) and this is bad fortune for the advancement and the conservation of medicinal plants and associated knowledge.

2.10.2 Conservation of medicinal plants in Ethiopia

In Ethiopia about 80% of human population and 90% of livestock rely on traditional health care practice is mainly dependent on medicinal plants collected from the wild. In spite of this, the medicinal plant biodiversity is being depleted due to man-made and natural climate as reported by Ethiopia Institute of biodiversity conservation (IBC, 2022). Medical plant species of Ethiopia is vulnerable to problems of continuity and sustainability primary due to loss of taxa of medicinal plants and loss of habitats (Ensermu Kelbessa *et al.*, 1992).

There is urgent need to document the valuable knowledge of medicinal herbs in Ethiopia. Ethnobotanical studies are imperative and concomitant sustainable programs that support the sustainability of herbal medicine traditions may be considered as a way to collect and disseminate information thereby supporting communities in their efforts to maintain their heritage (Elizabeth *et al.*, 2014).

The word conservations indicate to the care of wise use and appropriate management of natural environment and its natural resources. So, conservation is defined as the sustainable use of biological resources. In different parts of the world, medicinal plants are mostly harvested from the wild sources either local use or trade purposes (Eskedar Abebe, 2011). In situ and ex-situ should be complementarily implanted in Ethiopia to conserve valuable plant species which are threatened due to natural or manmade factors (Abebe Demissie, 2001).

According to (Ethiopian biodiversity institute in, 2022) reported that, the indigenous knowledge associated with conservation and use of medicinal plants is also disappearing at an alarming rate. In sight of the importance of these resources that provide the health care needs for the majority of human and livestock population in Ethiopia, and also that medicinal plants could be used as source of revenue for farmers, the institute of biodiversity conservation (EBI) has initiated the development of a project on conservation and sustainable use of medicinal plants (CSMPP) in collaboration with relevant stakeholders in October 2001. and the project accomplishments activities includes:- medicinal plant *Ex situ* field Gene banks established in Wondo Genet and Bale, Medicinal plant *in situ* conservation sites established in Bale mountain, Medicinal plant seeds and herbarium specimens were collected from different parts of the country and stored in storage facilities, Medicinal plant data base established, Bale Mountain National park management plan prepared, capacity built and awareness on medicinal plants biodiversity raised.

In-situ conservation is a type of conservation where species are conserved in their natural habitats which include the national park and reservoirs. This method is especially preferable for those species where domestication and management are difficult out of their natural and normal habitats and ecosystem (Zemedede Asfaw, 2001). *Ex-situ* conservation is another method of conservation where endangered species are protected by removing part of them from a threatened habitat and place them in a new location which may be a wild area or within the care of humans which includes seed gene banks, field gene banks, arboreta, botanic gardens. In situ and ex-situ should be complementarily implanted in Ethiopia to conserve valuable plant species which are threatened due to natural or manmade factors (Abebe Demissie, 2001).

3. MATERIALS AND METHODS

3.1 Description of the study area

3.1.1 Geographical location of the study area

The study was conducted in Alefa District, central Gondar Zone Amhara Regional state, Ethiopia. Amhara national region is subdivided in to 11 zones and 167 Districts and there are 3429 kebeles. Alefa is one of the District in central Gondar zone which consists 37 kebeles (sub Districts) and located at 11°40' 24"-12° 11' 56" N latitude and 36° 31' 31"-37° 7' 39" E longitude. Alefa District is far 649 km north of the capital city of Ethiopia Addis Ababa, 88 km west the admin capital of Amhara region Bahir dar and 142 km central Gondar Administrative Zone. The District is bordered on the south west by Agew awi zone, on the north by Takusa woreda, on the west by Qura, on the east by Lake Tana and on the south east by Mirab Gojjam zone. The administrative center of Alefa is Shahura city (Figure-1) and other towns include in the wereda are Dengel ber, Atsede mariam and Esey deber(ADAO, 2022).

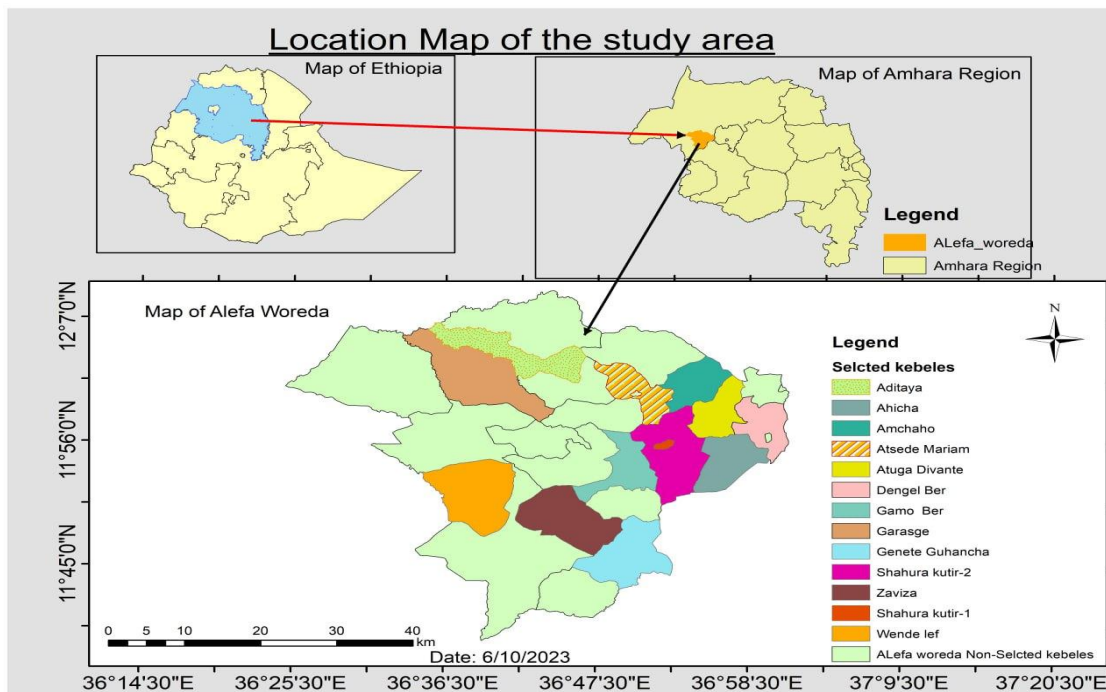


Figure 1. Map of Ethiopia showing Amhara Region and study district

3.1.2 Topography

According to ADAO (2017), the main land features of the wereda are mountainous (21%), rugged terrains (30%), plain (42%), valley (1%) and water (6%). The altitude of the wereda ranges from 750m-2250m above sea level.

3.1.3 Climate

Based on the wereda agricultural and rural development office document, the wereda has two main agro-climatic conditions: Woynadega which accounts for 75%, and Qolla covering 25% of the total area (ADAO, 2017). The average annual rainfall of the wereda is 1429mm and the annual average temperature is 17.1° (ADAO, 2021).

3.1.4 Soil and vegetation

The total area of the wereda is 189,285km square land (ADARO, 2021). The largest portion of land of the wereda has brown, reddish, dark and grey soil. About 38,874 hectare of land is covered with forest (ADAO, 2021).

The vegetation of the study area consists of various trees, shrubs and herbaceous plant species some of common plant species includes *Buddleja polytachya*, *Vernonia amygdalia*, *Acacia abyssinica*, *Rosa abyssinica*, *Combretum collinum*, *Cordia africana*, *Croton macrostachyus*, *Carissa spinarum*, *Capparis tomentosa*, *Ficus sur*, *Maytenus arbutifolia*, e.t.c

3.1.5 Demography and Economic Activity

From the total area of the wereda, 49,264 hectare is cultivable land, 7,898 hectare is covered with water and valley, 53,319 hectares is pastureland, 19,085 used for settlement, 12,150 hectare potentially useless and 38,874 covered by forests and for other purpose 1965 hectare (ADAO, 2017). The average land holding size of a household is about 1ha (ADAO, 2017).

3.1.6 Health care status

The District has 5 health centers, 15 health posts, 1 primary hospital, 18 private medium clinics, 2 private lower clinics, 14 private primary drug stores, 4 private medium drug stores and the total number of physicians in the District are 230,(ADHO, 2023).

3.1.7 Population health status

Based on the 2007 national census the estimated total population number of the District are 239,725. Males are 122439 and females are 117286. 205,704 (85.8%) are rural inhabitants, the rest 34,021(14.2 %) are urban inhabitants (ADAO, 2022). Ethnic groups are found in the District which are Amhara, Negede Woyto, Felasha, and Agew. 98 % are Amhara and the rest 2% are others (ADAO, 2022).

According to the report of (ADHO, 2023), the first Ten common diseases are amoebiasis, dyspepsia, pneumonia, conjunctivitis, diarrhea, helminthiasis, urinary tract infection, low back pain and acute tonsillitis (Table-3).

Table 3. Top ten diseases in the District in 2023

Disease	Year(2023)
	Cases
Upper respiratory tract infection	1025
Amoebiasis	854
Dyspepsia	845
Pneumonia	579
Conjunctivitis	400
Diarrhea	337
Helminthiasis	260
Urinary tract infection	245
Acute tonsillitis	177
Low back pain	202

source:-ADHO(2023)

3.1.8 Livestock production and health status

Livestock population is relatively high in Alefa wereda how ever their products (milk, meat, egg and honey) are not much, due to poor management, low food supply and prevalence of some common livestock ailments (ADVHO, 2022). livestock populations includes,cattle, Goat, Sheep, Donkey, Horse, Mule, Indigenous Chickens and exotic Chicken (ADAO, 2020).The estimated livestock resource in the wereda are:- 218,066 cattle, 13,515 donkey , 4505 mule, 9011 horse, 57,165 sheep, 87,143 goats, 217,591 hens and 15,161 dogs ADAO (Alefa District and Agricultural office 2023) (Table-4). The main livestock diseases include antrax, black leg, and pasteurellosis.

Table 4.The total livestock resource in the District in 2023

No	Type of livestocks	Urban	Rular	Total
1	Cattles	54,541	163,525	218,066
2	Equines	4507	22,524	27,031
3	Sheep	9528	47,637	57,165
4	Goats	4360	82,783	87,143
5	Hens	43,577	174,014	217,591
6	Dogs	2050	13,111	15,161
7	Total	118,563	503,599s	622,162

3.1.9 Agriculture

Major crops grown in the District are *Eragrostis tef*, *Eleusine coracana*, *Eleusine coracana*, *Hordeum vulgare*, and in addition farmers produce legumes and pulses such as *Pisum sativum*, *Cicer aestivum*., from cash crops like *Capsicum annuum*, *Guizotia abyssinica*, from vegetable and fruits, *Solanum tuberosum* , *Citrus aurantifolia*, *Lycopersion esculentum*, *Citrus limon*, *Carica papaya*, *Alliun sativum* and *Allium cepa*, from spice *Nigella sativa*, *Ocimum basilicum*, *Shinus molle*, *Coriandrum sativum*L, *Ruta chalepensis*, *Trigonella foenum graecum*L, *Trachyspermum ammi* e.t.c. (ADAO 2022).

Table 5. Major food crops grown in the District

Crope category	Scientific name	Local name	English name
Cerals	<i>Eragrostis tef</i>	Teff	Tef
	<i>Triticum aestivum</i>	Sinde	Wheat
	<i>Hordeum vulgare</i>	Gebbs	Barley
	<i>Zea mays</i>	Bekolo	Mazie
	<i>Sorghum bicolor</i>	Mashila	Sorghum
	<i>Eleusine coracana</i>	Dagusa	Finger millet
Oil crops	<i>Guizotia abyssinica</i>	Nug	Niger seed
	<i>Linum usitatissimum</i>	Telba	Lin seed
	<i>Brassica carinata</i>	Gomen zer	Kale seed
	<i>Ccalthamus tinctorius</i>	Suf	Sunflower
	<i>Ricinus communis</i>	Kachima/bulka	Castor bean
Fruits	<i>Citrus limon</i>	Lomi	Limon
	<i>Carica papaya</i>	Papaya	Papaya
	<i>Persea Americana</i>	Avocado	Avocado
	<i>Musa x paradisiacal</i>	Muz	Banana
	<i>Mangifera indica</i>	Mango	Mango
	<i>Citrus sinensis</i>	Brtukan	Orange
	<i>Citrus aurantifolia</i>	Brtolomi	Bitolomi
	<i>Psidium guajava</i>	Zeytun	Guava
Vegetables	<i>Capsicum sp</i>	Mitmita	Chilis
	<i>Capsicum annuum</i>	Berberie	pepper
	<i>Allium sativum</i>	Nech shingurt	Garlic
	<i>Allium cepa</i>	Key shinkurt	onion
	<i>Cucurbita pipo</i>	Duba	Pumpkin
	<i>Lycoperscion esculentum</i>	Timatim	Tomato
Pulses	<i>Vicia faba</i>	Bakela	Broad bean

	<i>Pisum sativum</i>	Ater	Pea
	<i>Cicer aestivum</i>	Shimbra	Chickpea
	<i>Vicia sativa</i>	Guaya	vetch
	<i>Glycine max</i>	Akuri ater	Soya bean
Root crop	<i>Solanum tuberosum</i>	Dinch	Potato
	<i>Daucus casrota</i>	Carot	Carrot
	<i>Ipomoea batatus</i>	Sikuar dinch	Sweet potato
	<i>Beta vulgaris</i>	Key sir	Sugar beet
Stimulants	<i>Coffea Arabica</i>	Buna	Coffee
	<i>Chatha edulis</i>	Chat	Chat

3.2 Reconnaissance survey and selection of study site

A reconnaissance survey of study area was conducted from October 17- November 02/ 2022 and the data were collected from November 24/2022- April 09/2023. The District has a total of 37 kebeles. Out of these 13 kebeles where as (Shahura kutir-1, Shahura kutie-2, Zaviza, Gamo ber, Dengel ber, Atsede mariam, Aditaya, Garasge, Wondedef, Amchaho, Geneteguancha, Ahicha and Atuga divate) were selected to cover at list 35% of area of the District. And these 13 kebels were selected based on the ratio of woyna dega and qolla (climate), four kebeles: Aditaya, Garasge, Wondedef, and Geneteguancha from qolla and the remaining nine kebeles from woyna dega, the availability of medicinal plants and traditional healers, transport access and security of the area to collected ethnobotanical data. The traditional healers, used as key informants were identified by the assistance and recommendation ADHO workers, ADARO kebele livestock health workers, and knowledgeable elders.

3.3 Sampling of informant

A total of 140 informants (85 male and 55 female), ten and above individuals from each kebele were selected. Out of these 26 (17 male and 9 female) informants were key informants (traditional medicinal healers) were selected purposively by assistance of Alefa District Health Office (ADHO) and by collecting information from Alefa District Agricultural Development

Office kebele livestock health workers and knowledgeable elders, the rest 114 individuals (68 male and 46 female) were general informants selected randomly from local people of the study area. This was done by tossing a coin if he or she were volunteer to participate by following (Abebe Demesie, 2001) Non practitioners of traditional medicine will be selected randomly while traditional medicine practitioners will be selected purposively based on the information gathered from local people.

The informant size should be determined by using Cochran's (1977) formula as indicated by Bartlett *et al.* (2001) as follows:

$$n = \frac{N}{1+N(e)^2}$$

Where:

n=sample size for research

N=total number of households in the study kebeles

e= maximum variability or margin of error 5% (.05);

1= the probability of the event occurring

3.4 data collection

Data collection methods for ethnobotanical study included:- semi-structured interview, group discussion, field observation (guided field walk) with informants and market survey.

3.4.1Semi-structured interview

Interview were based on semi-structured interview (Appendix-10) prepared in English language and translated to local language (Amharic). Interview checklist was prepared with the following major components includes (A) personal information like name, age, address, gender and religion. (B) questions which help to take information related to indigenous practices of local community towards traditional plant medicine such as local name of the plant, disease it threats, parts of plant used as medicine, ways of preparation, dose, applications, routes of administration, ingredients added, source of knowledge, method of indigenous knowledge transfer ,factors that threaten traditional medicinal plants, marketable plants, other uses, current status of medicinal plants, ways of management and conservation of medicinal plants and common human and livestock ailments in the study area were recorded.



Figure 2. Semi-structured interview with the informants at atsedemariam, amchaho and shahura kutir-1 kebeles

3.4.2 Group discussion

Group discussion was conducted in randomly selected six kebeles these are Atsede mariam, Amchaho, Dengel ber, Gamober, Zaviza and Shahura kutir-2 with the knowledgeable informants who were suggested by respective kebele elders about the status of distribution. Discussion was conducted based on checklists (Appendix 10- B) which was prepared in English language and translated to local language Amharic. Questions that informants were discussed include why

medicinal plants are threaten, how do people in the study area manage and conserve medicinal plants, how do people transfer the indigenous and local knowledge.



Figure 3. Group discussion with informants in Atsedemariam kebele

3.4.3 Field observation

Field observation was carried out with guidance of the local people who have provided traditional healer which was known famous individuals to take information on medicinal plants which were used by healers and households in the study area. All important information including plant parts used, mode of preparation, route of administration, application and disease to be treated were recorded. Information on the status of medicinal plant in each visually, identified plant community type and cultivation practice of medicinal plants by the local people were also recorded.

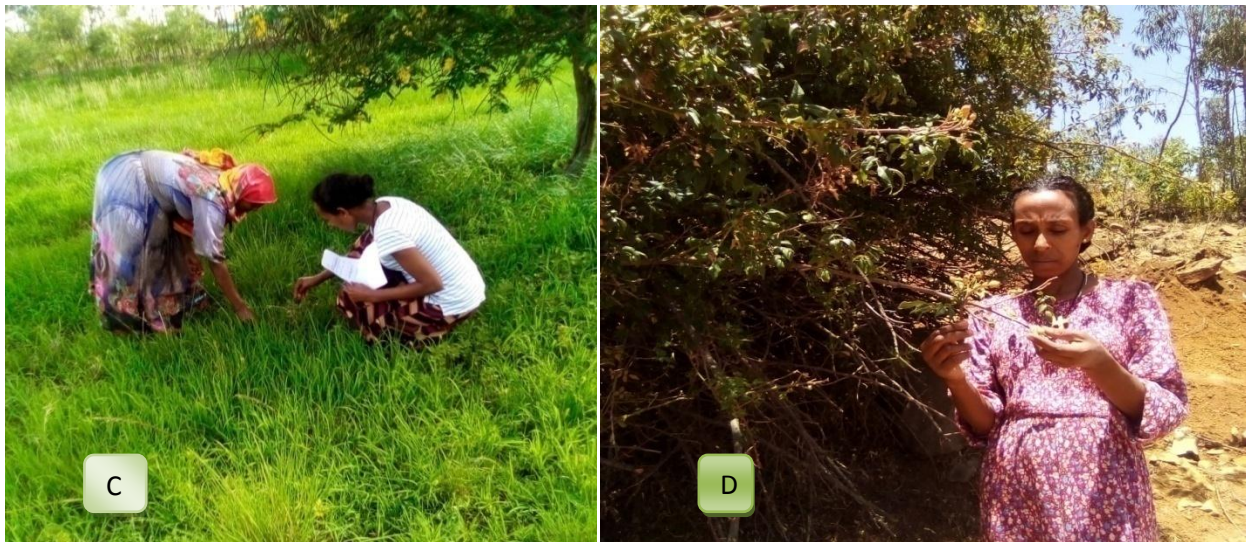


Figure 4. Field observation in the study area in Ahicha ,Shahura kutir-2, Shahura kutir-1, Zaviza and . Dengel ber kebeles respectively.

3.4.4 Field walk (guided field walk)

Guided field walk and field observation is a method of data collection of fields walk and interviews. Guided field walk and field observation was conducted to check the availability of the plant in the study area, to know plants habit and habitats. It took place with traditional healers and local guides, they were interviewed questions like habitats of medicinal plants, current status of medicinal plants in the area, local name of plants to obtain available data in the study sites.



Figure 5. Guaded field walk in the study area in Gamober kebele

3.4.5 Market survey

Market survey of medicinal plants of the district was conducted at two selected kebeles (shahura kutir-2 gult gebiya and shahura kutir-1 Saturday market) to assess other use value of medicinal plants rather than medicinal value and to record names of medicinal plants and herbal drugs sold in the local markets in the study area. Then the market survey was made to gather ethnobotanical information by conducting semi-structured interview (Appendix- 10).



Figure 6. Medicinal plants available in the local market of the study area

3.5 Specimen collection and identification

Medicinal plant species were collected from the study area. The local name, habits and associated information of plant specimen were recorded for each medicinal plant species, and then plant specimens were pressed and dried. The collected voucher specimens were taken to National Herbarium of Ethiopia (Addis Ababa University). The identification was done from May to June by using various volumes of the Flora of Ethiopia and Eritrea. Finally, the identification of the voucher specimens were confirmed by my advisor Dr. Ermias Lulekal and deposited at National Herbarium of Ethiopia (Addis Ababa University) (Figure -7).

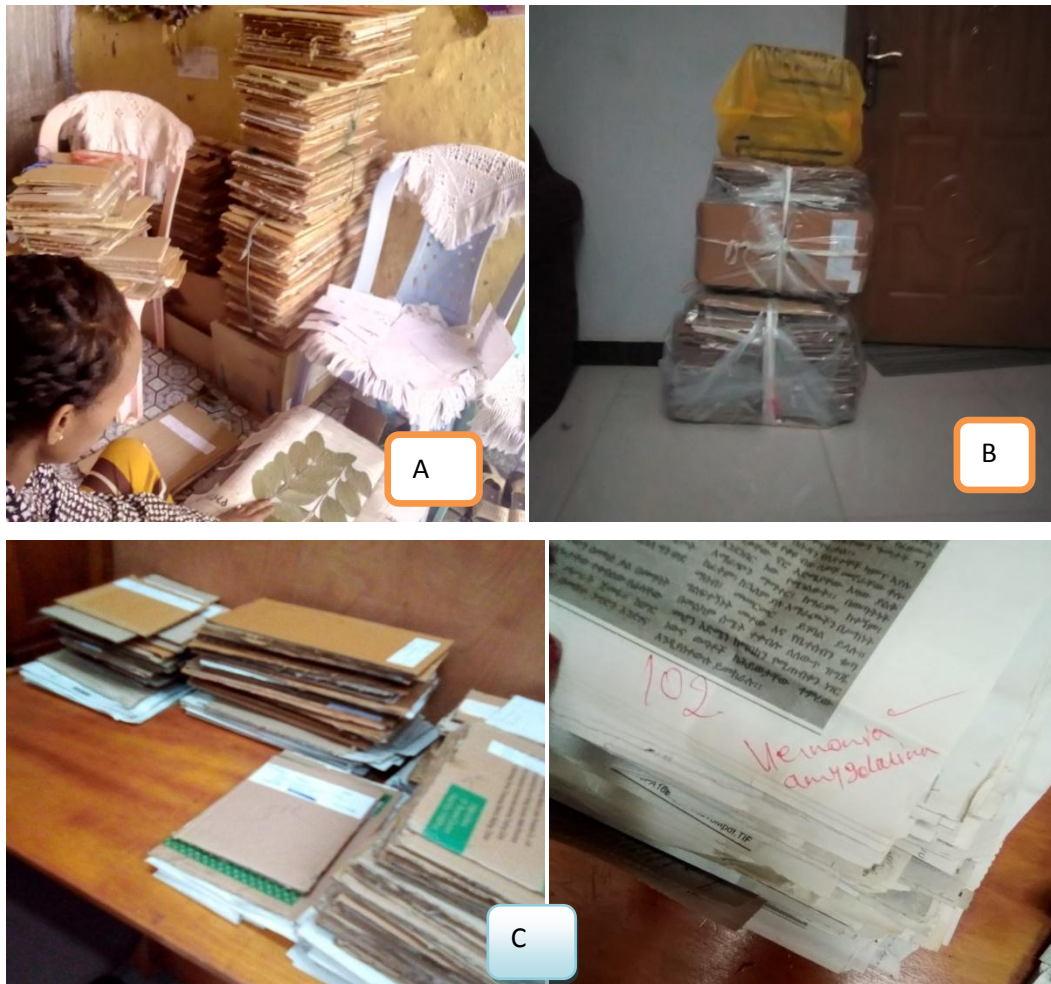


Figure 7. Plant specimen pressing, drying (A) preparation to move in to National Herbarium of Ethiopia (AAU) and identification (B and C)

3.5.1 Ethical considerations

Data collection was performed after permission was obtained from Alefa Woreda Administrative Offices, Alefa wereda culture and turism office and from Kebele administration of sample kebeles by showing them collaboration letter of Addis Ababa University and the purpose of the study were briefly explained to each informants, ask their willingness politely and knowledge them for their verbal consent before starting recorded data.

3.6 Data analysis

3.6.1 descriptive statistics

Descriptive statistical method such as percentage and frequency were employed to summarize and analyze Ethnobotanical data (percentage or frequency of species, genera, and families of plant species, their growth form, proportion of plant parts used for remedy preparation, route of administration and application. Ethnobotanical data were entered in to micro soft excel spread sheet and organized for statistical analysis. Ethnobotanical data were analyzed by informant consensus factor, preference ranking, data matrix ranking and fidelity level.

3.6.2. Informant consensus factor (ICF)

Informant consensus factor was calculated for categories of ailments to identify the agreements of the informants on the reported cures using the formula used by Heinerich *et al*, (1998), and Tilahun Teklehaymanot and Mirutse Giday (2010). It may be used to analyze the data gathered through group discussion (Martin, 1995). ICF was calculated as follows: number of use citations for each ailment (n_{ur}) minus the number of species used (n_s) for that ailment, divided by the number of use citations for each ailment minus one.

$$ICF = \frac{n_{ur} - n_s}{n_{ur} - 1}$$

3.6.3 Preference ranking

To compare the most effective medicinal plants used by the community to treat a particular disease, Preference ranking Exercise was done following Martin (1995) and Cotton (1996) for most important medicinal plants used in treating a particular illness. Preference ranking was conducted using 10 key informants to rank 5 medicinal plants reported to cure evil eye which was the most commonly reported disease with different parts of medicinal plants used being paper tagged then asked to assign the highest value (5) for the most preferred species against this illness and the lowest value (1) for the least preferred plant and in accordance of their order for the remaining ones. The value of each species was summed up and the rank of each species determined based on the total score. This helps to indicate the rank order of the most effective medicinal plants used by the community to treat the disease.

3.6.4 Direct matrix ranking

Direct matrix ranking was done following Martin (1995) and Cotton (1996). This was conducted considering several attributes of medicinal plants such as their uses as charcoal, fire wood, forage, spiritual value food(eat fruit or any other part), medicine, house building material(construction) and fencing. These were use reports of medicinal plants mentioned by the informants. Based on the information gathered from the informants eight multipurpose tree species were selected out of total medicinal plants and eight use diversities of these plants were identified by eight selected informants to assign Rank values to each species (Table-22). Based on the information gathered from informants, the average value of each use diversity for a species was taken and the value of each species summed up and ranked.

3.6.5 Fidelity level

The fidelity level (FL) the percentage of informants claiming the use of a certain plant for the same major purpose, was also calculated for the most frequently reported diseases or ailments using the following equation (Tilahun Teklehaymanot,2007).

$$FL(\%) = \frac{NP}{N} \times 100$$

Where N_p is the number of informants that claim the use of a plant species to treat a particular disease, and N is the number of informants that use the plants as a medicine to treat any given disease.

4. RESULTS

4.1 socio-demographic characteristics of respondents

In the study area a total of 140 informants were involved 85(60.7%) were male and 55(39.2%) were females. According to their age 11 (7.8%) were 18-25 years old, 40(28.5%) were 26-35 years old, 39(27.8%) were 36- 45 years old and 50(35.7%) were above 45 years old. While the least percentage of the respondents were at the age between 18- 25 years old and age of above 45 were high percentage. Among the number of religious respondents 132(94.2%) were orthodox, 3(2.1%) were Muslim and the rest 5(3.5%) were protestants (Table-6) implying most of the respondents were Orthodox Church followers. Concerning to the marital status of respondent 87(62.1%) were married, 42(30%) respondents were single and the remaining 11(7.8%) were divorced. The educational status of the respondents indicated that 56(40%) uneducated, 27(9.2%) can read and write, 10(7.1%) educated from1-8, 10(14%) were educated from 1-12, 6(4.2%) educated from 1-8 grades and religious education, 2(1.4%) educated from 1-12 grades and religious educators and the rest 25(17.2%) were college or university educators. The occupation of the respondents also described as 65(46.4%) farmers, 32(22.8%) wives, 29(20.7%) were self employed and the rest 15(10.7%) were civil servants (Table-6).

Table 6. Socio demographic characteristics of informants

Evaluated Factors	Assesed variavles	Studied kebeles													Total of percentage	Percentage
		Atsede mariam	gamober	ahicha	Shahura kutr-1	Shahura k-2	Zaviza	Aditaya	Atuga	Geneteguacha	Amchaho	Garasge	Wondelef	Dengel ber		
Sex informants	M	8	7	8	7	9	5	5	6	7	5	6	7	5	85	60.7
	F	4	6	4	3	2	5	4	6	3	5	4	4	5	55	39.2
	T	12	13	12	10	11	10	9	12	10	10	10	11	10	140	100

Age of informants in year	18-25	1	1	-	-	1	-	1	1	-	1	2	2	1	11	7.85
	26-35	4	4	2	3	3	5	1	2	3	4	3	4	3	40	28.5
	36-45	3	2	4	4	3	2	3	4	5	3	1	2	2	39	27.8
	Above 45	4	6	6	3	4	3	5	5	2	1	4	3	4	50	35.7
Religious	Orthodox	12	13	11	8	11	10	7	12	10	9	10	9	10	132	94.2
	Muslim	-	-	-	1	-	-	-	-	-	-	-	2	-	3	2.1
	Protestant	-	-	1	1	-	-	2	-	-	1	-	-	-	5	3.5
	Others	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Marital Status of	Married	7	8	9	9	6	4	6	8	6	4	5	8	7	87	62.1
	Single	5	4	2	1	3	4	2	3	4	4	4	3	3	42	30
	Divorcee	-	1	1	-	2	2	1	1	-	2	1	-	-	11	7.8
Educational Status	Uneducated	3	7	4	2	3	3	5	4	5	6	5	2	7	56	40
	Read &	4	3	2	-	-	3	3	3	4	2	1	2	1	27	19.2
	1-8	2	-	1	1	-	-	-	3	-	-	2	1	1	10	7.1
	1-12	2	2	1	-	-	1	1	-	-	2	-	4	1	14	10
	1-8&rel. Education	-	-	2	1	2	-	-	-	-	-	-	1	-	6	4.2

	1-12 &ren.e du	-	-	-	-	-	-	-	-	1	-	-	1	-	-	2	1.4
	Colleg e/Univ ersity	1	1	2	6	6	3	-	1	1	-	1	1	-	25	17.8	
Occupation	Farme r	4	4	5	3	5	5	5	5	7	6	4	6	6	65	46.4	
	Wives	3	4	1	1	-	2	2	6	3	2	3	2	3	32	22.8	
	Self emplo yed	4	4	4	1	1	3	2	1	-	1	3	2	3	29	20.7	
	Civil servan t	1	1	1	5	5	-	-	-	-	1	-	1	-	15	10.7	

4.2 Diversity of traditionally used medicinal plants in the district

A total of 108 traditional medicinal plant species belongs to 94 genera and 53 families, used to treat different human and livestock ailments was collected, identified and documented in the study area. Intems of family distribution the families Solanaceae and Poaceae contributed highest number of species 7 each(6.4%) followed by Asteraceae and Fabaceae 6 species each(5.5%), and the third most dominant family are Rutaceae and Lamiaceae 5 species each(4.6%), Euphorbiaceae and Rosaceae 4 species each(3.7%),Ranunculaceae, Moraceae, Myrtaceae and Cucurbitaceae contributed 3 species each (2.7%), Apiaceae, Celastraceae, Acanthaceae, Malvaceae, Capparidaceae, Myrsinaceae, Sapindaceae, Anacardiaceae, Polygonaceae and Alliaceae contributed 2 species each (1.85%) where as the remaining 29 species were represent single family (Table-7).

Table 7. Distribution of traditional medicinal plants in to families in the study district

No	Family	No of genera	Percentage	No of Species	Percentage
1	Solanaceae	7	7.44%	7	6.48%
2	Poaceae	6	6.38	7	6.48
3	Fabaceae	6	6.38	6	5.55
4	Asteraceae	5	5.31	6	5.55
5	Rutaceae	3	3.19	5	4.62
6	Lamiaceae	3	3.19	4	3.70
7	Euphorbiaceae	3	3.19	4	3.70
8	Rosaceae	3	3.19	4	3.70
9	Ranunculaceae	3	3.19	3	2.77
10	Myrtaceae	3	3.19	3	2.77
11	Cucurbitaceae	3	3.19	3	2.77
12	Moraceae	1	1.06	3	2.77
13	Apiaceae	2	2.12	2	1.85
14	Celastraceae	2	2.12	2	1.85
15	Acanthaceae	2	2.12	2	1.85
16	Alliaceae	1	1.06	2	1.85
17	Malvaceae	1	1.06	2	1.85
18	Capparidaceae	1	1.06	2	1.85
19	Myrsinaceae	2	2.12	2	1.85
20	Sapindaceae	2	2.12	2	1.85
21	Anacardiaceae	2	2.12	2	1.85
22	Polygonaceae	1	1.06	2	1.85
23	Other 31 species	1	32.97	1 spp each	28.70
	Total=53	94	100.00	108	100.00

4.2.1 MPs used to treat human and livestock ailments in the study area

From the total 108 medicinal plant species collected in the District 76 species (70.37%) used to treat only human health problem (Appendix-5). A total of 12 medicinal plant species (11.11%) were reported to treat only livestock ailments (Appendix-6) and the remaining 20 species (18.51%) were reported to treat both human and livestock ailments (Appendix- 7) .

4.2.2 Medicinal plants used treat only human ailments

Out of the total 108 identified traditional medicinal plant species from the selected 13 kebeles, 76 medicinal plant species (70.37%) which belongs to 59 genera and 38 family were reported as traditional medicinal plants that used to treat only human health problem (Appendix-5, Table-8).

Table 8. Familial distribution of medicinal plant species that used to treat human ailments only

No	Family	No. of Genera	percentage	No. of Species	Percentage
1	Ranunculaceae	3	5.08	3	7.89
2	Lamiaceae	2	3.38	3	7.89
3	Rosaceae	3	5.08	4	10.52
4	Rutaceae	3	5.08	5	13.15
5	Celastraceae	2	3.38	2	5.26
6	Poaceae	4	6.77	4	10.52
7	Cucurbitaceae	2	3.38	2	5.26
8	Acanthaceae	2	3.38	2	5.26
9	Moraceae	1	1.69	2	5.26
10	Asteraceae	3	5.08	4	10.52
11	Alliaceae	1	1.69	2	5.26
12	Solanaceae	4	6.77	5	13.15
13	Fabaceae	3	5.08	3	7.89
14	Capparidaceae	1	1.69	2	5.26
15	Anacardiaceae	2	3.38	2	5.26

16	Polygonaceae	2	3.38	2	5.26
17	Balsaminaceae	1	1.69	1	2.63
18	Moringaceae	1	1.69	1	2.63
19	Cyperaceae	1	1.69	1	2.63
20	Olacaceae	1	1.69	1	2.63
21	Scrophulariaceae	1	1.69	1	2.63
22	Rubiaceae	1	1.69	1	2.63
23	Lauraceae	1	1.69	1	2.63
24	Plantaginaceae	1	1.69	1	2.63
25	Loganiaceae	1	1.69	1	2.63
26	Oleaceae	1	1.69	1	2.63
27	Santalaceae	1	1.69	1	2.63
28	Rhamnaceae	1	1.69	1	2.63
29	Melianthaceae	1	1.69	1	2.63
30	Simaroubaceae	1	1.69	1	2.63
31	Utricaceae	1	1.69	1	2.63
32	Caricaceae	1	1.69	1	2.63
33	Celastraceae	1	1.69	1	2.63
34	Sapotaceae	1	1.69	1	2.63
35	Asclepiadaceae	1	1.69	1	2.63
36	Laminaceae	1	1.69	1	2.63
37	Apiaceae	1	1.69	1	2.63
38	Combretaceae	1	1.69	1	2.63

4.2.2.1 Human ailments and diagnosis methods

In the study a total of 67 human ailments, were recorded to be treated by 96 medicinal plant species. One medicinal plant species can be treated a single disease or a number of diseases (Appendix- ,2, 5 and 7).The traditional healer in the study area reported to diagnose health problems by interviewing the patient what symptoms he or she fills and by visual observation of the patient.

4.2.3 Medicinal plants used to treat only livestock ailments.

Out of the total 108 medicinal plant species identified and documented in the study area 12 medicinal plants species (11.11%) which belong to 12 genera and 11 families were reported for the treatment of livestock health problem only,(Appendix -6), (Table_9).

Table 9.Family distribution of medicinal plant species used to only livestock ailments

No	Family	No of genera	Percentage	No. of species	Percentage
1	Apiaceae	1	9.09	1	8.33
2	Myrtaceae	1	9.09	1	8.33
3	Asteraceae	1	9.09	1	8.33
4	Poaceae	2	18.18	2	16.66
5	Euphorbiaceae	1	9.09	1	8.33
6	Sapindaceae	1	9.09	1	8.33
7	Brassicaceae	1	9.09	1	8.33
8	Fabaceae	1	9.09	1	8.33
9	Musaceae	1	9.09	1	8.33
10	Moraceae	1	9.09	1	8.33
11	Cappridaceae	1	9.09	1	8.33

4.2.3.1 Common livestock ailments and number of plant species

A total of 16 livestock ailments were reported as common livestock health problems in the area and 12 medicinal plant species were also identified by the local communities for the treatment of only livestock health problems(Appendix-6),(Table-10). From the common livestock ailments eye disease were treated by 4 species (33%), bloating and leech 3 species(25%), bone cell shrinkage, epidemics, rabies, bone fraction, and calf warm treated by 2(16%) plant species and the remains viral or bacterial infection, anthrax, retained placenta, Rhfactor, diarrhea, constipation, labor pain treated by single(8.33%) medicinal plant species each.

Table 10. Common livestock ailments and number of plant species used to treat them

Livestock ailments treated	Number of medicinal plant species	Percentage of species used
Eye disease	4	33.3%
Bloating	3	25%
Leech	3	25%
Tigen	2	16.6%
Wound	2	16.6%
Epidemics	2	16.6%
Antrax	2	16.6%
Bone fracture	2	16.6%
Calf warm	2	16.6%
Rabbis	2	16.6%
Kuro	1	8.33%
Retain placenta	1	8.33%
Rh factor	1	8.33%
Diarrhea	1	8.33%
Constipation	1	8.33%
Labour pain	1	8.33%

4.2.4 Medicinal plants used to treat both human and livestock ailments

Out of the total 108 medicinal plant species in the study area 20 species (18.51%) belonging to 20 genera and 17 families were reported as medicinal plants used to treat both human and livestock health problems (Appendix-6-7)(Figer-8).

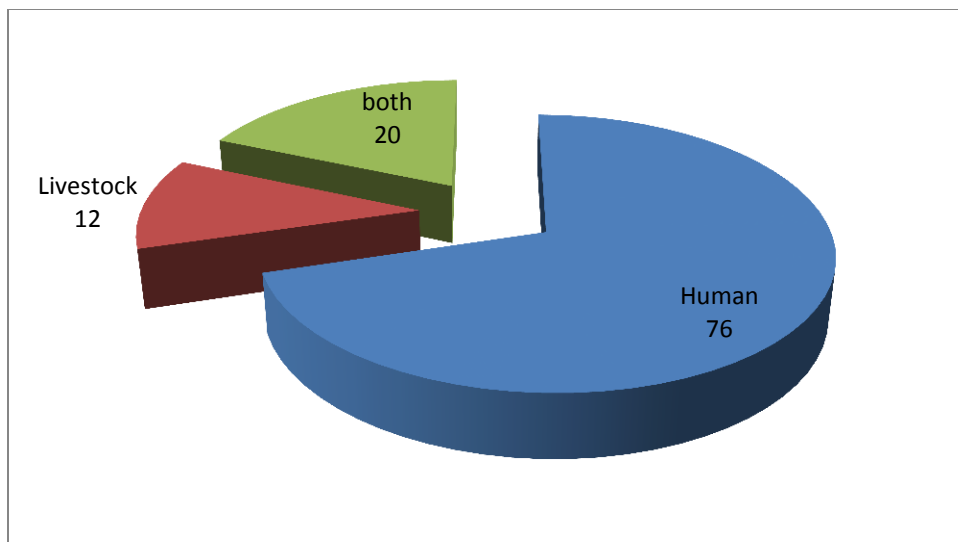


Figure 8. Percentage of medicinal plant species that used to treat human, livestock, both human and livestock ailments.

4.3 Sources of medicinal plants

Sixty three medicinal plant species (58.33%) were harvested from the wild in different natural ecosystems in the study area including grazing lands, forests, road side, farm lands, Clift edge, around river and around churches. In contrast to natural habitats, home gardens contributed 45 (41.6%) of the medicinal plants (Figure-9).

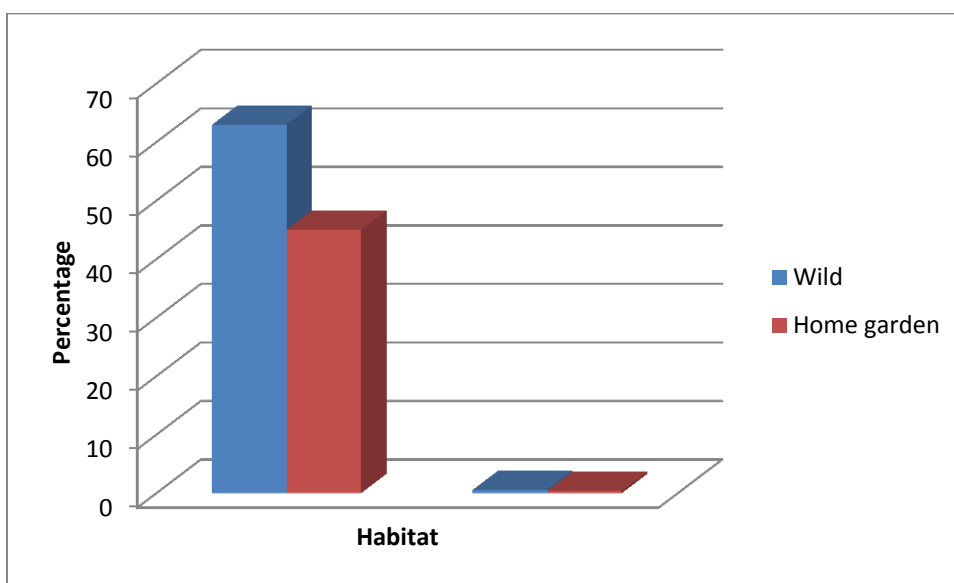


Figure 9. Habitat of medicinal plants in the study area

4.4 Habits/ growth form

Interms of the growth habit of traditional medicinal plants in the study area, herbs contributed the largest category with 42 species (38.88%), followed by shrubs with 33 species (30.55%), tree 24 species (22.22%) and the remaining climbers were 9 species (8.33%)(Figure-10).

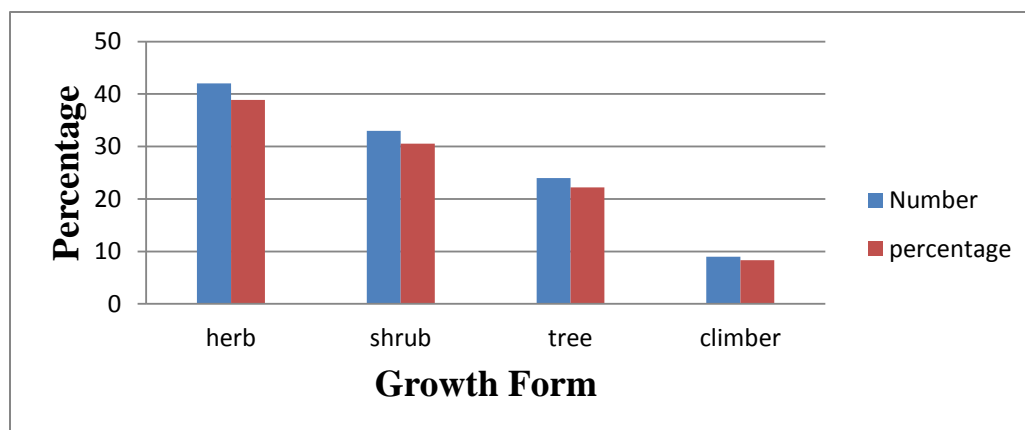


Figure 10. Growth form of medicinal plants in the study area

4.5 Parts of medicinal plants used for remedies

The local communities in the study area collected different plant parts for preparation of remedies (eg leaf, fruit, roots, flower, latex).The most dominate plant parts used for remedy preparation were Leaves (39.15%) followed by seeds(22.16%), roots(13.20%), stem bark(4.71%), fruit(6.13%), and others(14.62%) (Table-11).

Table 11 . Parts of medicinal plants used for remedy preparation

No	Parts used	No. of frequency	percentage of total
1	Leaf	83	39.15%
2	Seeds	47	22.16%
3	Roots	28	13.20%
4	Stem bark	10	4.71%
5	Fruit	13	6.13%
6	Above ground part	4	1.88%
7	Whole part	3	1.41%
8	Leaf and root	4	1.88%
9	Latex	4	1.88%
10	Root and latex	2	0.94%
11	Root bark and stem bark	1	0.47%

4.6 Condition of preparation of herbal remedies

The majority of medicinal plants were used in fresh form 140(66.34%) followed by dried 57(27.40%) and either of the two 13(6.25%) for preparation of remedies (Figure-11).

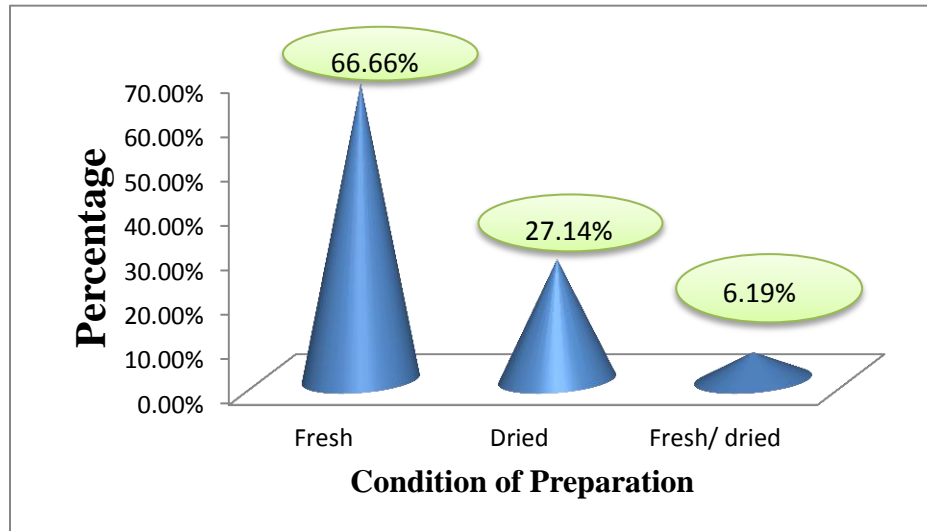


Figure 11. Condition of preparation of medicinal plants

4.7 Methods of preparations

Regarding to the preparation method of medicinal plants for human and livestock ailments, local people employ various methods of preparation of remedies for different types of ailments. The major methods of remedy preparation form of medicinal material were crashing (38.91%) followed by squeezing (22.16%), boiling (14.46%), burning (4.92%), roasting (4.92%, chewing (3.94%), immersing (2.41%), crashing and decanting (2.14%), (Table-12).

Table 12. Methods of preparation medicinal plants in the study district

No	Methods of preparation	No. of frequency	Percentage
1	Crashing	79	38.16%
2	Squeezing	45	22.16%
3	Boiling	29	14.28%
4	Burning	10	4.92%
5	Roasting	10	4.92%
6	Chewing	8	3.94%
7	Immersing	5	2.41%
8	Crashing ,mixing and decanting	5	2.41%
9	Cutting	6	2.95%
10	Peeling and coiled	3	1.47%
11	Macerating and spinning	1	0.49%
12	Powdering and beaking	1	0.49%

4.8 Ways of application of plant material remedies

The prepared traditional medicines are applied in a number of methods (table-13).The most frequent application is drinking (45.32%), creaming (18.22%), eating (8.37%), swallowing (4.92%), dropping (4.43%) put on and tied (3.94%), fumigating and inhaling (3.49%) and streaking was the relatively list application methods (0.49%) (Table 13).

Table 13. Application of plant material remedies in the study area

No	Applications	Total No. of application	Percentages
1	Drinking	92	45.32
2	Creaming	37	18.22
3	Eating	17	8.37
4	Dropping	9	4.43
5	Swallowing	10	4.92
6	Fumigating and inhaling	7	3.49
7	Put on and tied	8	3.94
8	Smoking	4	1.97
9	Tied	5	2.46
10	Chewing	4	1.97
11	Sniffing	4	1.97
12	Washing	5	2.46
13	Streaking	1	0.49

4.9 Dosage and route of administration of plant material remedies

The local people in the study area determine doses depending on heaviness of herbal remedies and use various units of measurement to determine the dosage. Local units such as finger length, (e.g., for bark, root, stem,), different measuring materials (e.g., spoon, coffee cup, tea cup, can) and numbers (e.g seeds, fruits, bulbs, flowers and latex), finger line(squeezed solution) in some cases they used handful and half handful for leaves, seeds, to measure doses of herbal remedies. But, which are not standardized and not consider the variation of age, sex, and physical and health conditions of patients.

Route of administration depends on the nature of ailments to be treated. In this study the most popular ways of route administration of herbal remedies were oral (59.11%) and dermal (27.58%) (Table-14).

Table 14. Route of administration of prepared herbal remedies in the study area

Route of administrations	No	Percentage
Oral	120	59.11
Dermal	56	27.58
Oral and nasal	10	4.92
Tooth surface	4	1.97
Eye	5	2.46
Ear	5	2.46
Neck	2	0.94
Oral and dermal	1	0.49

4.10 Solvents and additives

After the traditional medicinal plants are prepared the remedies are taken with different solvents and additives, like water, honey, milk, sugar, tea, butter, and flour (Table-15). These additives were reported to have important effect including give better taste to drink and eat medicines, they reduce adverse effects like vomiting, diarrhea and pains, enhance efficacy and healing conditions as the traditional healer's explanations. Example local people uses stem bark of *Brucea antidysenterica* to treat liver disease then the stem bark crashed and squeezed by water, measure the squeezed solution by using coffee cup with length of small finger second line, and adds sugar to gave better taste to drink it before meal at morning and it prevents from vomiting.

Table 15. Solvents and additives used in the study area

Solvents and additives	No of informants who sited species	% of total
Water	40	52.62
Honey	11	14.47
Milk	2	2.63
Sugar	9	11.84
Tea	4	5.26
Butter	11	14.47
Flour	1	1.3

4.11 Source and transfer of indigenous and local knowledge

4.11.1 Source of indigenous knowledge

Large number of traditional indigenous and local knowledge practice was reported to be gained from family (fathers and mothers, older brother and sisters (43.57%) followed by partners (wives and husbands, 20.71%), grand family (grandmother and fathers and also uncle and aunt (20.00%) , friends(10.7%) and neighbors (5%),(Table-16).

Table 16. Source of indigenous and local knowledge of traditional healers

Source of indigenous and local knowledge for traditional healers	Number	Percentage
Family members (father, mother, sister and brother	61	43.57
wives and husbands	29	20.71
Grand family and Aunt and uncle	28	20.00
Friends	15	10.71
Neighbors	7	5

4.11.2 Transfer indigenous knowledge of medicinal plants

The local people in the study area mostly transfer their indigenous knowledge of traditional medicinal plants to their elder son and daughter (50%) followed by sister and brother (26.42%), wife and husband (13.57%) all family members (7.14%) friends (2.13%), and for any one (0.71%) (Table-17).

Table 17. Transfer of indigenous and local knowledge

Indigenous knowledge transfers to whom	Number	Percentage
Elder son and daughters	70	50
Sister and brothers	37	26.42
Wives and husbands	19	13.57
All family members	10	7.14
Friends	3	2.13
For anyone who wanted to received IK	1	0.71

4.12 Marketable medicinal plants

In the study area different parts of medicinal plants are sold in the local market for different other use value rather than medicinal value. Parts of medicinal plant species cultivate in home garden used as food and spices are source of income for women and house wives for instance for food (fruits and seeds), for fumigation (roots and stem parts) and spice (seeds, leaves shoots). During the time of market survey conducted in Shahura town Saturday market and Shahura gult gebiya, medicinal plants such as *Rosa abyssinica*, *Dodnaea agunstifolia* and *Otostegia integrifolia* were sold for fumigation purpose, fruits of *Syzygium guineense*, *Mimusops kummel* and *Ximenia Americana* were sold for food, *Trachyspermum ammi*, *Nigella sativa*, *Ocimum basilicum*, *Allium sativum*, *Allium cepa*, *Shinus molle*, *Coriandrum sativum*, *Ruta chalepensis*, *Trigonella foenum graecum* and *Ricinus communis* were sold for the purpose of spice (Table-18).

During interview the informants explained that medicinal plants are not sold in the market for medicinal value. The local people prefer either collecting these plants by themselves from the area in the District to prepare the medicines or they prefer to go directly to the local healers to get treatment.

Table 18. Medicinal plants sold in the local market of study area and their parts

Scientific name	Local name	Parts sold in the local market	Different use value rather than medicinal value
<i>Trachyspermum ammi</i> (L.) Sprague ex Turrill.	Nech azmude	Seeds and flower	Spice
<i>Nigella sativa</i> L.	Tikur azmude	Seeds	Spice
<i>Ocimum basilicum</i> L. Var.	Zikakibe	Leaves, seeds and flower	Spice
<i>Citrus sinensis</i> (L.) Osb.	Brtukan	Fruits	Food
<i>Syzygium guineense</i> (Willd.) DC	Dokma	Fruits	Food
<i>Hordeum vulgare</i> L.	Gebis	Seeds, stems	Food and alcoholic drink,
<i>Allium sativum</i> L.	Nech shinkurt	Fruits	Spice, food
<i>Allium cepa</i> L.	Key shinkurt	Bulb	Spice, food
<i>Cucurbita pepo</i> L.	Duba	Fruits	Food
<i>Eragrostis tef</i> (Zucc.)	Key tef	Seeds	Food
<i>Cyperus atroviridis</i> C.B. Clarke	Giramita	Above ground part	To prepare house hold material

<i>Ximenia americana</i> L	Enkoy	Fruits	Food
<i>Rosa abyssinica</i> Lindley.	Kega	Roots, stem and stem bark	Fumigation
<i>Brassica carinata</i> A.Br.	Gomen zer	Seeds	Spice
<i>Sacchurum officinarum</i> L.	Shenkora ageda	Stem	Food
<i>Shinus molle</i> L.	Kondo berbere	Seeds	Spice
<i>Citrus limon</i> (L.) Burm.f	Lomi	Fruit	Food
<i>Olea europaea subsp. cuspidata</i> L.	Woirra	Stem and roots	Fumigation
<i>Dodonaea angunstifolia</i> L.f	Kitkita	Stem	Fumigation
<i>Capsicum Sp</i> L.	Mitmita	Seed	Food
<i>Capsicum annuum</i> L.	Kariya	Seeds	Food
<i>Rhamnus prinoides</i> L.Herit.	Gesho	Leaves	Drink
<i>Citrus aurantifolia</i> (Christem.) Swingle.,	Birto lomi	Fruits	Food
<i>Coriandrum sativum</i> L.	Kuzbzra/dinbilal	Seeds	Spice
<i>Cicer arietinum</i> L.	Shimbra	Seeds	Food
<i>Pisum sativum</i> L.	Ater	Seeds	Food
<i>Solanumlycope rsicum</i> (L.)	Timatim	Fruits	Food
<i>Musa</i> .L.	Muz	Fruits	Food
<i>Combretum collinum</i> Feresen.	Abalo	Stem bark and root	Fumigation
<i>Carica papaya</i> L.	Papaya	Fruits	Food
<i>Otostegia integrifolia</i> Benth.	Tingit	Above ground part	Fumigation
<i>Ruta chalepensis</i> L.	Tenadam	Seeds	Spice
<i>Guizotia abyssinca</i> (L.f) Class.	Noug	Seeds	Food
<i>Trigonella foenum graecum</i> L.	Abish	Seeds	Spice
<i>Carthamus tinctorius</i> L.	Yabesha suf	Seeds	Food
<i>Mimusops kummel</i> A.DC.	Eshe	Fruits	Food
<i>Lagenarias siceraria</i> (Mol.)Standl.	Qil	Fruits	House hold material
<i>Ricinus communis</i> L.	Bulka	Seeds	To soften leather

4.13 Most important medicinal plants in the study area

4.13.1 Informant consensus

Here study has shown that, there are some medicinal plants repeatedly mentioned by many informants than others due to their wide range of treating disease and they are preferable by most members of local people. The result of this study shows that there were 15 medicinal plants are popular and had high informant consensus. This 15 plant species were independently cited by many of informants for their medicinal uses against common human and livestock ailments. Example, *Nigella sativa* was cited by (20 informants, 14.28%) as remedy for common cold, *Zehneria scabra* was cited by (42 informants, 30%) as remedy for fibril illnesses *Brassica carinata* was cited by (39 informants, 27.85%) as remedy for bloating for livestock's (Table-19).

Table 19. The most popular medicinal plants

Scientific name	Local name	No of informants	Percentage of informants
<i>Nigella sativa</i>	Tikur azmud	20	14.28
<i>Zehneria scabra</i>	Harege resa	42	30
<i>Allium sativum</i>	Nech shinkurt	37	26.42
<i>Withania somnifera</i>	Gizewa	19	13.57
<i>Sida schimperium</i>	Achir gurgegi	21	15
<i>Brassica carinata</i>	Gomen zer	39	27.85
<i>Rhamnus prinoides</i>	Gesho	28	20
<i>Datura stramonium</i>	Astenagir	40	28.57
<i>Ocimum forskolei</i>	Damakase	47	33.57
<i>Eucalyptus globuleus</i>	Nech bahir zaf	33	23.57
<i>Otostegia integrifera</i>	Tinjut	35	25
<i>Ruta chalepensis</i>	Tenadam	37	26.42
<i>Phytolacca dodecandra</i>	Endod	22	15.71
<i>Croton macrostachyus</i>	Misana	29	20.71
<i>Venonia amygdalina</i>	Girawa	18	12.85

4.13.2 Informant consensus factor (ICF)

The informant consensus factor was calculated on the identified different categories of human and livestock ailments. Diseases of the study area were categorized into 9 categories based on the nature of disease, site of ailment and symptoms of disease, namely respiratory and throat problem, dermatology problem, abdominal and gastrointestinal problem, organ disease, snake bite, scorpion bite, malaria and rabies, sudden sickness, sexual and delivery problem, livestock health problem and hemorrhoid. Disease categories with relatively high ICF value were dermatology problem (0.81) followed by respiratory and throat problem (0.79), malaria, snake bite, scorpion bite and rabies (0.75) abdominal and gastrointestinal problem (0.71), sudden sickness (0.60) livestock disease (0.45), organ disease (0.42), hemorrhoid (0.30) and sexual and delivery problem (0.16), (table-20). High ICF value (close to one) indicates that the informants rely mostly on the same taxa to treat specific disease, while lower ICF value (close to zero) indicates that the informants disagree to treat a given ailment (Tilahun Teklehaymanot and Mrutse Giday, 2010).

Table 20. Informant consensus factors for eight disease categories

Categories of disease	No. of use of situation	No. of spp	ICF
Ailments associated with respiratory organ and throats:- cough, common cold, asthma, lung tuberculosis	60	13	0.79
Dermatology problem:- eczema, wound, circumcision wound, skin disease skin cut, cancer, dandruff.	70	14	0.81
Ailments associated with abdominal and gastrointestinal problem :- stomachache, gastritis, diarrhea, blotting, vomiting	47	14	0.71
Organ disease:- eye disease, kidney disease, headache, tooth, ear disease	15	9	0.42
Malaria, rabies. Snake bite, scorpion bite.	53	16	0.75
Sudden sickness:- fever illness, evil eye, hypertension,	26	11	0.6
Sexual and delivery problem:- retained placenta, stillbirth, syphilis	8	7	0.16
Livestock health problem:- leeches, bloating, eye injury, viral or bacterial infection	21	12	0.45
Hemorrhoid	27	19	0.30

4.13.3 Preference ranking of medicinal plants

Preference ranking was conducted for five medicinal plants species with highest informant consensus used to treat evil eye in the district. Evil eye disease was the common ailment for the local communities. The result show that six medicinal plant species were used to treat evil eye disease, among these five medicinal plants species with highest informant consensus were selected and ten key informants ranked them based on their perception on their efficacy degree of priority. Then *Allium sativum* stood first followed by *Withania somnifora* (Table-21).

Table 21. Preference ranking of medicinal plants

List of Medicinal plants	Key informants (R1-R10)										Total	Rank
	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	R-10		
<i>Withania Somnifora</i>	5	4	3	2	3	3	4	4	5	4	37	2
<i>Ruta Chalepensis</i>	4	5	1	1	5	4	2	1	3	5	31	3
<i>Allium sativum</i>	3	4	5	3	4	4	5	5	4	3	40	1
<i>Capparis tomentosa</i>	2	1	3	3	1	1	3	4	2	2	22	4
<i>Artemisia abyssinica</i>	1	2	2	4	2	2	1	3	1	1	19	5

4.13.4 Direct matrix ranking for multipurpose medicinal plants

Local people in the study area reported medicinal plant species that had multiple uses. Direct matrix ranking for multipurpose medicinal plants species FW-fire wood, CH- charcoal, FO- forage for livestockes, SP.V spiritual value, FE-fencing, CO- construction, EF- edible fruit, MD- medicine. Average score for direct marix ranking of eight medicinal plant species based on their multipurpose uses (5=best,4=very good, 3=good,2=less use, 0= not use), (table-22).

The result of direct matrix ranking shows that *Vachellia abyssinica* stood first as the most multipurpose medicinal plant species followed by *Olea eroupaea* L. suspp cuspidata, *Eucalyptus globulus*, *Ficu sycomorous*, *Combretum collinum*, *Cordia africana*, *Syzygium guineense* and *Juniperus procera* respectively. The value of multipurpose use of medicinal plants were summed up and ranked. The result shows that the local people harvest multipurpose plant species mainly for fire wood, construction, charcoal, fencing, medicine, spiritual value, edible fruits with ranking of 1st, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th respectively.

Table 22. Average direct matrix ranking score of ten key informants for eight medicinal plant species with additional value.

Examples of medicinal	Use categories								Total	Rank
	FW	CH	FO	SP.V	FE	CO	EF	MD		
<i>Olea euroupaea</i> L. <i>Subspp cuspidata</i>	5	5	0	5	4	5	0	4	28	2 nd
<i>Cordia Africana</i>	5	1	0	0	3	5	4	4	22	6 th
<i>Combretum collinum</i>	5	4	4	0	3	3	0	4	23	5 th and
<i>Vachellia abyssinica</i>	5	5	5	0	5	5	0	4	29	1 st
<i>Syzygium guineense</i>	4	4	0	0	3	4	5	1	21	7 th
<i>Ficus sycomorous</i>	5	4	4	0	3	3	2	3	24	4 th
<i>Juniperus Procera</i>	4	1	0	0	2	4	0	2	13	8 th
<i>Ecucalyptus globuleus</i>	5	5	0	0	5	5	0	5	25	3 rd
Total	38	29	13	5	28	34	11	27	193	
Rank	1 st	3 rd	6 th	8 th	4 th	2 nd	7 th	5 th		

4.13.5 Fidelity Level (FL) Index

Fidelity level value (FL) were calculated for commonly used medicinal plant species against some commonly reported ailments:- *Otostegia integrifolia* (against stomachache), *Allium*

sativum (against common cold), *Rumex nervosus*(against cercumsion wound), *Datura stramonium*(against dandruff), *Embelia schimper* (agaist tape warm) and *Croton macrostachyus* (against warts). In this study FL value for this selected medicinal plant species various from 34 to 96% (Table-23).

Table 23. Fidelity level index commonly used medicinal plant species in the study area

Scientific name of medicinal plant species	Examples of ailments	NP	N	FL	% of FL
<i>Ostostegia integrifolia</i>	Stomachache	9	26	0.34	34
<i>Allium sativum</i>	Common cold	29	30	0.96	96
<i>Asparagus africanus</i>	Toothache	13	31	0.41	41
<i>Rumex nervosus</i>	Circumsion wound	25	27	0.9	90
<i>Datura stramonium</i>	Dandruff	13	17	0.76	76
<i>Embelia schimper</i>	Tape warm	10	14	0.71	71
<i>Croton macrostachyus</i>	Wart	37	41	0.90	90

4.14 Threats to medicinal plants and conservation practice in the study area

4.14.1 Factors which threat medicinal plant species in the study area

People need plants for their daily life activity. From the interview of informants both natural and anthropogenic factors were the major threats of medicinal plant species diversity and indigenous and local knowledge in the District. Anthropogenic factors such as deforestation due to over exploitation of plants for different uses such as fire wood collection, charcoal, construction, cut dawn of plants to create new agricultural land and settlement, over grazing, urbanization and drought were one of natural factors that were dwindling medicinal plant species in particular and natural vegetation in general. The most serious cited threats to medicinal plant species in the study area were agricultural expansion followed by charcoal making and the least threats were drought.

Table 24. Ranking of threat to medicinal plants species (value 1-5:- the less destruction threat and 5 is the most destruction one)

Major threats	Informants (R1-R10)											Total	Rank
	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	R-10			
Construction material	5	3	3	1	3	2	4	2	3	3	29	4 th	
Drought	3	3	2	4	3	1	1	4	2	1	24	6 th	
Urbanization	2	2	3	1	2	3	1	4	1	1	20	7 th	
Agricultural expansion	4	4	5	3	5	5	4	3	4	5	42	1 st	
Fire wood collection	2	4	5	3	3	3	4	5	4	3	36	3 rd	
Charcoal making	4	2	5	4	3	4	4	3	5	4	38	2 nd	
Over grazing	2	1	3	3	1	5	2	4	3	2	26	5 th	

4.14.2 Threatened medicinal plants

As traditional healers report finding medicinal plants is difficult in recent times as compared with the past and they must travel far away from their home or area in searching of medicinal plants. The ranking of six medicinal plants based on the degree of threats was conducted using ten key informants. The result (Table-25) indicates that *Olea europaea L. subspp Cuspidata* is

the most threatened followed by *Hagenia abyssinica*, *Embelia schimperi*, *Rubus steudneri*, *Combretum collinum* and the least threatened one is *Cordia africana*.

Table25. Ranking of threatened medicinal plants

Threaten medicinal plants	key informants (R1-R10)											Tot al	Ran k
	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	R-10			
<i>Combretum collinum</i>	3	3	2	1	2	4	5	3	2	4	29	5 th	
<i>Cordia Africana</i>	2	2	4	1	5	1	1	3	4	1	24	6 th	
<i>Olea europeae L.sup spp.caspidata</i>	2	5	5	4	4	5	4	5	5	4	43	1 st	
<i>Embelia schimperi</i>	4	3	4	4	2	2	4	3	4	3	33	4 th	
<i>Hagenia abyssinica</i>	5	4	5	5	4	3	2	5	4	4	41	2 nd	
<i>Rubus steudneri</i>	2	5	3	3	5	5	1	4	3	5	36	3 rd	

4.14 Conservation of medicinal plants

As visually observed members of the community and also the District ADAO (Alefa District Agricultural Officee 2023) have started conserving medicinal plants through *in-situ* (in original / natural habitat) such as *Croton macrostachyus* and *Cordia africana*, *Millettia ferruginea* and *Albizia schimperiana* in zaviza, and aditaya kebeles, and *ex-situ* (outside the natural habitat) methods such as *Rhamnus prinoides*, *Gravilia robusta* in amchaho and Atsede mariam kebele. The results of this study showed that medicinal plants can be categorized as home gardens and wild plant species. Thus, the finding showed that 45 of 108 species are collected from the home gardens and the remaining 63 were from the wild state (Appendix-3).

In most situations, the home gardens are fenced to protect the medicinal plants from grazing and unwise harvesting. Thus, home gardens are good places for conservation of medicinal plants and for better transfer of indigenous knowledge to the younger generation. A few members of local communities in the study area try to conserve plants ex-situ and in-situ conservation methods (eg. People that planted and protect plants in fencing lands like churches, mosques, around their homes and farm places). *Olea europaea subsp cuspidata L.*, *Arundo donax*, *Euphorbia ampliphylla*, *Euphorbia trirucelli*, and *Juniferus perocera* were preserved around Churches. A few farmers but not most try to cultivat and conserve plants including medicinal plants for fence value and other use value in their home garden like *Woithania somnifera*, *Justica schimperiana*, *Ocimum forkolei*, *Shinus molle*, *Venonia amygdalina*, *Coffea arabica*, *Citrus sinensis*, *Citrus Limon*, and *Rhamnus prinoides*.

5. Discussion, conclusion and recommendation

5.1 Discussion

5.1.1 Ethnomedicinal plant species in the study area

A total of 108 medicinal plant species used to treat different human and livestock health problems collected, identified and documented in Alefa District. These 108 medicinal plants were grouped in to 94 genera and 53 families. Family solanaceae and poaceae contributed highest number of species (7each) followed by Asteraceae and Fabaceae 6 species each. 31 medicinal plant species had single family representation and the rest 77 species share common families. This studies agrees with the findings of Mesfin Woldearegay *et al.*, (2021) family Solanaceae had the highest number of medicinal plants followed by Asteraceae and Fabaceae in the Kelala District.

These identified total 108 medicinal plant species used by local people of 13 selected kebeles in the District to treat 74 different human and livestock ailments. This is good indication of the deep rooted culture of medicinal plants use in the study area and the presence of traditional knowledge and practice on large number of medicinal plant species by the people. Most of (70.37%) of identified plant species were used to treat human health problem only. This result shows that the local communities have a lot of indigenous knowledge and they use of medicinal plants to treat human ailment than livestock ailments. This result were similar with the findings of other Ethnobotanical studies carriedout in other parts of the country (Eskedar Abebe, 2011; Bogale Haile, 2018; Tebkew Mekuquant *et al.*, 2015 and Yilkal Bezie *et al.*, 2018) in Debark, Woldia, Chilga and Gozamin districts respectively.

5.1.2 Growth form and source of medicinal plant species in the study area

In this Ethnobotanical study of medicinal plants (58.3%) were collected from the wild in different cliff including, river side, road side, in the forests, farm land, clift edge, the rest (41.6%) of medicinal plant species collected from home gaurden. This finding in line with other findings elsewhere (Yilkal Bezie *et al.*, 2018; Leul Kidane *et al.*, 2018; Banchiamlak Nigussie and Young D. 2019; Moa Megersa, 2018; Haile Yineger and Delenasaw Yewhalaw, 2007; Ermias Lulekal *et al.*, 2008; Getu Alemayehu, 2010; Nigussie Amsalu, 2010) in which wild areas are

the most sources of medicinal plants. This indicates that the practitioners inhabiting the study area mostly depend on the wild sources or the natural environment rather than home gardens to obtain the medicinal plants

From the total of 108 medicinal plants collected in the study area herbs contributed the highest number 42(38.88%), followed by shrubs 33 (30.55%), trees 24(22.22%) and climbers counted 9(8.33%). As the result shows local community in the study area widely used herbaceous medicinal plants, which means the abundance and distribution of herbaceous plants are higher than the other forms of growth, shrubs, trees, and climbers this is due to the fact that herbs can grow in every habitat including grazing land, road side, river side, home garden, farmland and wild and also easily available mainly during the wet seasons compared with other species such as trees, shrubs and climbers. In addition, herbs are not exposed to various threats compared with shrubs and trees and also easily harvested and cultivated by the local people.

Different Ethnobotanical study of medicinal plants carried out in different parts of the Country and reported dominant use of herbs for traditional medicine preparation such as (Getnet Chekol, 2017; Eskedar Abebe, 2011; Mirutse Giday *et al.*, 2003; Endalew Amenu, 2007; Tadeyose Mesfin and Wendawek Abebe, 2022).

5.1.3 Plant parts used, condition of preparation and ways of preparations in the study area.

The result of this Ethnobotanical medicinal plants study indicates people in the 13 selected kebeles in Alefa District mostly used leaves (39.15%) followed by seeds (22.16%), roots,(13.20%) stem bark (4.71%), fruit (6.13%), above ground part (1.88%), the whole part (1.41%), leave and root (1.88%), latex 1.88%) root and latex (0.94%) and root bark and stem bark (0.47%). The reason why leaves are most preferred to prepare remedies could be due to ease of preparation, active chemical contents and removing leaves does not cause permanent damage on plant life as other parts like roots and stem. This findings agree with the findings of (Behailu Bizuayehu, et al, 2019; Tadese Brihanu *et al.*, 2015) Ezha District and Hurro Gudurru District respectively, where leaves were predominantly used plant parts followed by seeds and fruits. This result disagree with the findings of other Ethnobotanical researchers , they carry out in

other part of the country, where roots are most widely used plant parts(Ermias Lulekal *et al.*, 2008; Alemayehu Kefalew, 2015).

The majority of medicinal plants were used in fresh form (66.34%) followed by dried (27.40%) and either of the two (6.25%) for preparation of remedies. This result is similar with the findings reported by (Leul Kidane *et al.*, 2018; Yalew Addis *et al.*, 2012) majority of remedies were prepared using fresh materials.

There are various methods of plant remedy preparation employed by local people, for different types of ailments and the preparation methods vary based on site of ailments and type of disease treated, the reported various methods of remedy preparations are:-crashing, squeezing, boiling, roasting, chewing, powdering and beaking, cutting, peeling and coiling, macerating and spinning, immersing. Among those methods crashing was predominantly employed method (38.16%) followed by squeezing (22.15%). This result lined with (Mesfin Woldearegay *et al.*, 2021 and Gadissa Melkamu, 2021) all states that most principal method of medicinal plant preparation was in the form of crashing. These results also disagree with the findings of (Jarso Belay, 2016 and Eskedar Abebe, 2011) squeezing was predominant preparation method of remedies in Jigjiga and Debark District respectively.

5.1.4 Route of administration, applications and their doses

The prepared traditional remedies had various routes of administrations such as oral, dermal, tooth surface, ear, eye, neck, and oral and dermal as the local community reported during data collections, the predominant route administration of herbal remedies were oral, (59.11%), followed by dermal (27.58%), oral and nasal (4.92%), tooth surface (1.97%), eye(2.46%), ear(2.46%), neck(0.94%) and the rest oral and dermal administration (0.49%). The result of various Ethnobotanical researches carry out in different parts of the country indicates that oral routes as the predominant route of administration (Ermias Lulekal *et al.*, 2008; Eskedar Abebe, 2011; Yimer Assen *et al.*, 2021) The prepared traditional remedies were applied in a number of ways as reported by local communities in the study area, drinking was the most frequent application (45.32%) followed by creaming (18.22%), eating (8.37%), dropping (4.43%), swallowing (4.92%), fumigating and inhaling (3.49%), put on and tied (3.94%), smoking (1.97%), tied (2.46%), chewing (1.97%), washing (2.46%), and streaking (0.49%). This result

was agree with the findings of (Eskedar Abebe, 2011) the most frequent application was drinking followed by creaming and eating.

The local person in the study area uses various units of measurement to determine the dosage. Local units such as finger length (e.g., for bark, root, stem,), different measuring materials (e.g., spoon, coffee cup, tea cup, can) and numbers (e.g seeds, fruits, bulbs, flowers and latex) in same cases they used handful and half handful for leaves, seeds, to measure doses of herbal remedies. Which are not standardized and not consider the variation of age, sex, physical and health conditions of patients. There is risk of treatment failure due to under dose or over dose (Amare Getahun, 1979 and Dawit Abebe, 1986) have discussed lack of precision and standardization as one drawback for the recognition of the traditional healthcare system.

5.1.5 Ranking of most important medicinal plants

The result of this study shows that some medicinal plant species were more popular than others. Medicinal plant species reported be effective in treating certain diseases which had high ICF value which means these plants are effective in treating certain diseases and well-known by the local community.

As the result shows all listed health problems were categorized in eight (8) disease categories and the value of ICF were ranged from 0.16 to 0.81 per illness categories. Dermatological problem had the highest ICF value (0.81) followed by respiratory organ and throat problems (0.79), sudden sickness (0.75), abdominal and gastrointestinal problem (0.71). This high ICF value may indicates the common occurrence of these diseases, so that more number of local people are exchanging information and agree on the plant species that can be used to treat certain ailments and well known by community members. (Mengistu G/Hiwot, 2010). On the other hand the rest diseases categories which are livestock diseases (0.45), organ disease (0.41), sexual and delivery problem (0.16) and hemorrhoid (0.36) had lower ICF value, indicating that diseases had less common occurrence in the members of the local community and the people of study area have less knowledge on their treatments.

Traditional medicinal plants that are presumed to be effective in treating certain diseases have higher ICF value. A higher ICF value close to (1) indicates that the respondents rely most on the same taxa to manage specific disease conditions. While low value of ICF close to (0) indicates

that the informants disagree on the taxa to be used in the treatment of a given ailments (Tilahun Teklehaymanote and Mirutse Giday, 2007).

Ten informants were asked to compare *Withania somnifora*, *Ruta chalepensis*, *Allium sativum*, *Capparis tomentosa*, and *Artemisia abyssinica* based on their efficacy to identifying the most effective medicinal plants used to treat evil eye disease. So the informants were asked to compare the given five medicinal plants based on their efficacy and give the highest number (5) for medicinal plant which they thought most effective in treating evil eye ailment and lower number (1) for least effective plant in treating evil eye ailment. Then *Withania somnifora*, score (37), *Ruta chalepensis* (31), *Allium sativum* (40), *Capparis tomentosa* (22) and the remaining one scores (9). As the result shows that *Allium sativum* is the most widely agreed plant with high efficacy across the community in the study area.

A number of medicinal plants were found to be multipurpose species utilized for various uses including fire wood, construction, charcoal, fencing, medicine and forage for livestock's. Eight commonly reported multipurpose plant species and eight use categories were involved in direct matrix ranking in order to evaluate their relative importance to local people and the extent of the existing threats related to their use value for local communities in the study area. *Vachellia abyssinica* ranked first followed by *Olea europaea* subspp *cupsidata*, and *Eucalyptus globules*, *Ficus sycomorous*, *Combretum collinum*, *Cordia africana*, *Syzygium guineense* and *Juniperus procera*.

Medicinal plant species which are widely used by the local community in the study area to treat one or very few health problem will have high FL value than those less popular (Tilahun Teklehaymanot and Mirutse Giday, 2007). In this study FL values vary from 34 to 96% , most of the recorded species of medicinal plants including *Allium sativum*, *Rumix nervosus*, *Embelia schimperii*, *Croton macrostachyus* and *Datura stramonium* have high FL 100% and near to 100%. The rest *Otostegia integrifora* and *sparagus africanus* had less FL 34 and 41 % respectively.

5.1.6 Marketable medicinal plants

In the study area parts of medicinal plants are sold in the local market for different purposes rather than medicinal value. During the time of market survey conducted in Shahura tawon Saturday local market and Shahura gult gebiya fruits and seeds of *Syzygium guineense*, *Mimusops kummel* and *Ximenia Americana* for food , roots and stem parts of *Rosa abyssinica*,

Dodnaea agunstifolia and *Otostegia integrifolia* for fumigation purpose and seeds, leaves and shoots of medicinal plants such as, *Trachyspermum ammi*, *Nigella sativa*, *Ocimum basilicum*, *Allium sativum*, *Allium cepa*, *Shinus molle*, *Coriandrum sativum*, *Ruta chalepensis*, *Trigonella foenum graecum* and *Ricinus communis* were sold for spices. During interview the informants explained that medicinal plants are not sold in the market for medicinal value. In most situations medicinal plant species cultivated in home garden are used as food and spices and they are sources to generate income for women and house wives. The result is lined with the finding of (Eskedar Abebe, 2011) most of the medicinal plants are not widely traded for medicinal purposes, but mostly for other different uses. Most healers prepare and sold medicines in home rather than selling in the market, since the local people prefer either collecting these plants by themselves from the area in the District to prepare the medicines or they prefer to go directly to the local healers to get treatment instead of buying medicinal plants in the market.

5. 1.7 Threats to medicinal plants and conservation practices.

Both natural and anthropogenic factors were the major threats of medicinal plant species diversity indigenous knowledge in the study area. Anthropogenic factors such as deforestation due to over exploitation of plants for different uses such as fire wood and fumigation wood collection, charcoal, construction, agriculture expansion, urbanization and drought were one of natural factors that were decline medicinal plant species in particular and natural vegetation in general. The most serious cited threats to medicinal plant species in the study area were agricultural expansion followed by charcoal making and the least threats were drought. This result lined with the findings of (Yimer Assen *et al.*, 2020; Eskedar Abebe 2011) agricultural expansion, charcoal production and fire wood collection are the most threatening factors for medicinal plants in the study area. This result disagrees the finding of (Bogale Haile, 2018) drought were mentioned as the leading factor that threatens medicinal plants followed by agricultural expansion.

A few members of local people in the study area attempt to conserve plants in ex-situ and in – situ conservation methods (eg.local People cultivate and protect plants in fencing lands like churches, mosques, around their homes and farm places). *Olea europaea subspp Cupcidata*, *Arundo donax*, *Euphorbia ampliphylla*, *Euphorbia triucalli*, and *Juniperus perocera* were

preserved around churches. Few farmers but not most try to cultivate plants including medicinal plant species in home garden for fencing purpose, in farm lands for fencing and to protect soil erosion and harvest it wisely. This result agrees with the findings of (Mengistu G/ hiwot, 2010) some places are protected for their spiritual and cultural purposes and these places include medicinal plants such as *Podocarpus falcatus*, *croton macrostachyus*, *Juniperus procera*, *Ricinus comunis*, and *Olea europaea*. Thus, these places are good sites for the protection of the medicinal plants since cutting and harvesting are not allowed. AWAO have started conserving medicinal plants through *in-situ* (in original / natural habitat) such as *Croton macrostachyus* and *Cordia fricana*, *Millettia ferruginea* and *Albizia schimperiana*, and *ex-situ* (outside the natural habitat) methods such as *Rhamnus prinoides*, *Gravilia robusta*.

5.2 Conclusion

One hundred eight (108) medicinal plant species which belong to 94 genera and 53 families were collected, identified and documented. The ethnobotanical study of medicinal plants indicates that the study area is rich in its medicinal plant composition and the associated indigenous knowledge. Solanaceae and Fabaceae were the chief families represented by seven plant species. From the total 108 medicinal plants, seventy six species were used to treat human ailments, twelve species were documented to treat livestock ailments and twenty species used to treat both human and livestock ailments. Seventy four human and livestock ailments were reported to be treated by traditional medicine in the study area.

Leaves were found to be the most regularly used plant parts followed by seeds for preparation of traditional medicine. This is due to easy preparation and presence of more bioactive ingredients in leaves. In addition, collecting leaves does not cause a great hazard to the continuation of an individual plant when compared with the collection of other parts, including stem or whole plant. Most (63) of medicinal plant species were collected and identified from the wild vegetation. However, home gardens are very important source of delivering 45 species, implying the need for the local people to enhance home gardening in their area. The introduction of modern education in to the area has partially contributed in making the younger generation undermine traditional medicinal knowledge and practices because such practices have been considered backward practices.

Herbs (38.80%) were set up to be the governing growth forms used for grounding of traditional remedies followed by shrubs (30.55%), trees (22.22%) and climbers (8.33%). Crashing was the most applied application to prepare traditional remedies followed by squeezing (38.16 and 22.16 %) respectively. Most of the herbal remedies are set from fresh materials and administered orally. The remedies are taken with different additive and solvents and water is more frequently used for this purpose. The results showed that many wild medicinal plant species were facing growing pressure from various manmade factors. Moreover, it exposed that the major threats to medicinal plants are agricultural expansion and charcoal making followed by fire wood collection, construction, urbanization and drought. Charcoal, fuel woods, and construction materials in the area are the main causes for reduction in quantity of medicinal plants and associated knowledge.

5.3 Recommendations

Based on the findings of the study, the following recommendations are forwarded.

- The District's culture and health offices should encourage and support traditional practitioners to share their local awareness on medicinal plants not only for their families but also for other local communities in order to reduce the loss of indigenous knowledge on medicinal plants.
- The District's culture and health offices should encourage local people to be educated about the sustainable utilization and management of medicinal plants.
- The District's Agriculture offices should encourage the people to cultivate medicinal plants in their home gardens
- Attention should be given to standardization of measurements and hygiene of the medicines made from plants by training both the healers and other members of the local community.
- Encourage the local people to give prior and special attention to preserve highly threatened medicinal plants *Olea europea L.subspp cuspidata*, *Hagenia abyssinica*, *Embelia schimperi*, *Rubus steudneri* and *Combretum collinum* in the District.
- Researchers should encourage to conduct further studies for more phytochemical investigation on medicinal plant species *Allium sativum*, *Rumex nervosus* and *Croton macrostachus*.
- The Districts culture and health offices should encourage the literate and younger generation to be understand and know the value of indigenous knowledge and traditional herbal remedies.

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Appendices

Appendix 1. List of human and livestock ailments treated by medicinal plants in the study area

No	Local name	English name	No	Local name	English
1	Yayn himem	Eye disease	38	Yekulalit teter	kidney stone
2	Wosfat	Ascariasis,	39	Yesiquar beshita	Diabetes
3	Dem gifit	Hypertantion	40	Yesanba nekera	Tuberculosis
4	Tirs kurtimat	Toothachess	41	Ye gero kuslet	Ear wound
5	Hode medrek	Constipation	42	Ye hode tilatil	Intestinal Parasite
6	Ye sewunwt kurtimat	Body ache	43	Kiting	Syphilis
7	Ye guroro ebtet	Tonsillitis	44	Buginge	Furncle
8	Tekimat	Diarrhia,	45	Kortim	Abdominal pain
9	Ye kulalit himem	Kidney infection	46	Woreshign,	Epidemic
10	Eti	Tumor	47	Yemit himem	Labour pain
11	Rih	Gout	48	Kurtimat	Rheumatism
12	Sal	Cough	49	Ye afincha himem	Nose disease,
13	Yatint sibrat	Bone fracture	50	Gunfan	Common cold,
14	Chifie	Eczema	51	Amoeba	Amoeba
15	Woba	Malaria	52	Bigur	Acne
16	Ekek	Itch	53	Gormit,	Bone purification
17	Ye girzat kusil	Circumcision wound,	54	Buda	Evil eye
18	Cheguara	Dyspepsia	55	Ye engidi lij mekret	Retained placenta
19	hode menefa	Bloating	56	Gerefita	Fibril illness,
20	Asim	Asthma	57	Tigen	Bone cell shrinkage
21	Forefor	Dandruf	58	Yesewunet ebtet	Body swelling
22	Ye gero himem	ear disease,	59	Ye entil mewured	Uvulitis
23	Kusil	Wound	60	Chirt	Shirt(wort
24	Ye ebab nikisha	Snake bite	61	Yewofitu	Liver disease
25	Ye lib himem	Heart disease	62	Dingetegna	Sudden sickness
26	Ye esat katelo	Fire burn	63	Ye gero degif	Mumps
27	Kintarot	Hommroid	64	Nekera	Cancer
28	Yekoda beshita	Herpes	65	Lashit	Ring warm

29	Kureba	Antrax,	66	Kuro	Cough
30	Ras himem	Headache	67	Wugat	Stabbing pain
31	Koso	Tapeworm.	68	Yehode kurtet	Bellyache
32	Ye gubet beshita	Hepathites	69	Kinkin	Ear parasite
33	Ye gint nidfiya	Scorpion bite	70	Alekit	Leech
34	Yewusha beshita	Rabis,	71	Dem manes	Anemia
35	Yayin malkes	Eye nivel	12	Nesir	Nose bleed
36	Yemit himem	Labour pain	73	Shotelay	Rh factor
37	Chebit	Gonorrihea	74	Azurite	Epilepsy

Appendix 2. List of most frequent human ailments and number of species used to treat

Local name	English name	Number of species	Percentage
Yayn himem	Eye disease	3	3.94
Wosfat	Ascariasis,	4	5.26
Dem gifit	Hypertantion	3	3.94
Tirs kurtimat	Toothache	5	6.57
Ye sewunwt kurtimat	Body ache	1	1.31
Ye guroro ebtet	Tonsillitis	4	5.26
Tekimat	Diarrhia,	3	3.94
Ye kulalit himem	Kidney disease	5	6.57
Eti	Tumor	3	3.94
Rih	Gout	1	1.31
Sal	Cough	11	14.47
Yatint sibrat	Bone fracture	2	2.63
Chifie	Eczema	3	3.94
Woba	Malaria	3	3.94
Ekek	Itch	5	6.57
Ye girzat kusil	Circumcision wound,	1	1.31
Cheguara	Dyspepsia	4	5.26
Asim	Asthma	8	10.52
Forefor	Dandruff	5	6.57

Ye gero himem	ear disease,	3	3.94
Kusil	Wound	8	10.52
Ye ebab nikisha	Snake bite	2	2.26
Ye lib himem	Heart disease	5	6.57
Ye esat katelo	Fire burn	3	3.94
Kintarot	Homorriod	6	7.89
Yekoda beshita	Herpes	3	3.94
Kureba	Antrax,	2	1.31
Ras himem	Headache	4	5.26
Koso	Tapeworm.	2	2.26
Kiting	Syphilis	1	1.31
Ye gint nidfiya	Scorpion bite	3	3.94
Ye cheguara beshita	Dyspepsia	4	5.26
Yayin malkes	Eye nive	1	5.26
Yewusha beshita	Rabbis	1	1.31
Yekulalit teter	kidney stone	4	5.26
Yesiquar beshita	Diabetes	3	3.94
Yesanba nekera	Tuberculosis	2	2.26
Ye gero kuslet	Ear wound	2	2.63
Ye hode tilatil	Intestinal Parasite	5	6.57
Chebit	Gonorrihea	1	1.31
Buginge	Furncle	3	3.93
Ye megetatemiya Kurtimat	Rheumatic disease	4	5.26
Ye afincha himem	Nose disease,	1	1.31
Gunfan	Common cold,	7	9.21
Amoeba	Amoeba	2	2.26
Bigur	Acne	3	3.94
Gormit,	Bone purification	1	1.31
Buda	Evil eye	6	7.89

Gerefitu	Fibril illness,	5	6.57
Tigen	Bone cell shrinkage	4	5.26
Yesewunet ebtet	Body swelling	2	2.26
Ye entil mewured	Uvulitis	1	1.31
Chirt	Shirt(wart)	2	2.26
Yewofitu	Liver disease	5	6.57
Dingetegna	Sudden sickness	1	1.31
Ye gero degif	Mumps	2	2.26
Nekersa	Cancer	1	1.31
Lashit	Ring worm	1	1.31
Wugat	Stabbing pain	2	2.26
Kinkin	Ear parasite	2	2.26
Dem manes	Anemia	2	2.26
Nesir	Nose bleed	1	1.31
Yemitil beshita	Epilepsy	1	1.31
Yehode kurtet	Bellyache	11	14.47

Apeendix 3. List of family of medicinal plants collected in the study area with number of genera

No	Family	No of genera	Percentage	No of Species	Percentage
1	Solanaceae	7	7.44%	7	6.48%
2	Poaceae	6	6.38	7	6.48
3	Fabaceae	6	6.38	6	5.55
4	Asteraceae	5	5.31	6	5.55
5	Rutaceae	3	3.19	5	4.62
6	Lamiaceae	3	3.19	4	3.70
7	Euphorbiaceae	3	3.19	4	3.70
8	Rosaceae	3	3.19	4	3.70
9	Ranunculaceae	3	3.19	3	2.77
10	Myrtaceae	3	3.19	3	2.77
11	Cucurbitaceae	3	3.19	3	2.77
12	Moraceae	1	1.06	3	2.77
13	Apiaceae	2	2.12	2	1.85
14	Celastraceae	2	2.12	2	1.85
15	Acanthaceae	2	2.12	2	1.85
16	Alliaceae	1	1.06	2	1.85
17	Malvaceae	1	1.06	2	1.85
18	Capparidaceae	1	1.06	2	1.85
19	Myrsinaceae	2	2.12	2	1.85
20	Sapindaceae	2	2.12	2	1.85
21	Anacardiaceae	2	2.12	2	1.85
22	Polygonaceae	1	1.06	2	1.85
23	Apocynacea	1	1.06	1	0.92
24	Menispermacea	1	1.06	1	0.92
25	Balsaminacea	1	1.06	1	0.92
26	Moringacea	1	1.06	1	0.92

27	Cyperacea	1	1.06	1	0.92
28	Olacaceae	1	1.06	1	0.92
29	Scrophulariaceae	1	1.06	1	0.92
30	Rubiaceae	1	1.06	1	0.92
31	Lauraceae	1	1.06	1	0.92
32	Brassicaceae	1	1.06	1	0.92
33	Asparagaceae	1	1.06	1	0.92
34	Plantaginaceae	1	1.06	1	0.92
35	Loganiaceae	1	1.06	1	0.92
36	Lieaceae	1	1.06	1	0.92
37	Santalaceae	1	1.06	1	0.92
38	Rhamnaceae	1	1.06	1	0.92
39	Melanthaceae	1	1.06	1	0.92
40	Simaroubaceae	1	1.06	1	0.92
41	Urticaceae	1	1.06	1	0.92
42	Musaceae	1	1.06	1	0.92
43	Combretaceae	1	1.06	1	0.92
44	Caricaceae	1	1.06	1	0.92
45	Laminaceae	1	1.06	1	0.92
46	Amaranthaceae	1	1.06	1	0.92
47	Meliaceae	1	1.06	1	0.92
48	Tiliaceae	1	1.06	1	0.92
49	Sapotaceae	1	1.06	1	0.92
50	Boraginaceae	1	1.06	1	0.92
51	Asclepiadaceae	1	1.06	1	0.92
52	Phytolaccaceae	1	1.06	1	0.92
53	Cupressaceae	1	1.06	1	0.92
Total	53	94	100	108	100

Appendix 4. List of medicinal plant species collected in the study area with scientific name, family name, local (Amharic) name, habit,habita and availability or distribution status and collection code.

Scientific Name	Family name	Local name	habit	Habitat	Status	Code
<i>Bersama abyssinica</i> Fresen.	Milianthaceae	Azamir	Shreb	Wild	Rare	MG-94
<i>Asparagus africanus</i> Lam.	Asparagaceae	Yeset-kest	Climber	Wild	Rare	MG-95
<i>Buddlejapolystachya</i> Fresen.	Scrophulariaceae	Anfars	Shreb	Wild	Medium	MG-59
<i>Zea mays</i> L.	Gramineae	Bekolo,	Herb	Homegarde n	Common	MG-10
<i>Coriandrum sativum</i> L.	Apiaceae	kuzbara	Herb	Homegarde n	Medium	MG-79
<i>Cynodon dactylon</i> L.	Poaceae	Sedo sar,	Climber	Wild	Rare	MG-87
<i>Doodnaea agunstifolia</i> L.f.	Sapindaceae	Kitkita,	Shreb	Wild	Medium	MG-88
<i>Rumex nervosus</i> Vahl.	Polygonaceae	Embacho	Shreb	Wild	Common	MG-93
<i>Rhamnus prinoides</i> L.	Rhamnaceae	Gesho	Shreb	Homegarde n	Medium	MG-38
<i>Eragrostis tef</i> (Zucc.)	Poaceae	Key tef	Herb	Wild	Common	MG-63
<i>Ximenia americana</i> L	Olacaceae	Encoy	Tree	Wild	Medium	MG-33
<i>Brassica carinata</i> A.Br.	Brassicaceae	Gomenzer	Herb	Homegarde n	Common	MG-56
<i>Moringa stenopetala</i> (E.G.Baker)	Moringaceae	Shiferaw	Tree	Homegarde n	Rare	MG-14
<i>Datura stramonium</i> L	Solanaceae	Astenagir	Herb	Wild	Medium	MG-13
<i>Solanumlycope rsicum</i> L.	Solanaceae	Timatim	Herb	Homegarde n	Medium	MG-25
<i>Carica papaya</i> L.	Caricaceae	Papaya	Shreb	Homegarde n	Rare	MG-15
<i>Verbascum sinaiticum</i> Benth.	Scrophulariaceae	Debtera kitel	Herb	Wild	Medium	MG-76
<i>Trigonella foenum graecum</i> J.MSuttie.	Fabaceae	Abish	Herb	Homegarde n	Medium	MG-41
<i>Ruta chalepensis</i> L.	Rutaceae	Tenadam	Herb	Homegarde n	Medium	MG-82
<i>Ficus sycomorus</i> L.	Moraceae	Bamba	Three	Wild	Rare	MG-81

<i>Rosa xrichardii</i> Rehd.	Rosaceae	Tigereda	Shreb	Homegarde n	Medium	MG-09
<i>Capsicum annuum</i> L.	Solanaceae	Karia	Herb	Homegarde n	Commo n	MG-24
<i>Combretum collinum</i>	Combretaceae	Abalo	Tree	Wild	Rare	MG-24
<i>Maesal lanceolata</i> Forssk.	Myrsinaceae	Kilabo	Shreb	Wild	Rare	MG-52
<i>Pisum sativum</i> L.	Fabacea	Ater	Climbe r	Wild	Commo n	MG-37
<i>Trachyspermum ammi</i> L.	Apiaceae	Nech azmude	Herb	Homegarde n	Medium	MG-42
<i>Shinus molle</i> L.	Anacerdiaceae	Kondo berbere,	Tree	Homegarde n	Rare	MG-98
<i>Nigella sativa</i> L.	Ranuncula	Tikurbazm ude	Herb	Homegarde n	Medium	MG-34
<i>Premna schimperii</i> Engl.	Laminaceae	Checho	Shreb	Wild	Medium	MG-77
<i>Sida cuneifolia</i>	Asteraceae	Rejim gurjejit	Herb	Wild	Commo n	MG-83
<i>Sida tenuicarpa</i> Vollesen.	Malvaceae	Achir gurjejit	Herb	Wildd	Commo n	MG-84
<i>Cordia africana</i> Lam.	Boraginaceae	Wanza	Tree	Wild	Rare	MG-22
<i>Citrus sinensis</i>	Rutaceae	Birtucan	Shrebr\	Homegarde n	Rare	MG-27
<i>Psidium guajava</i> L.	Myrtaceae	Zeytuna	Tree	Homegarde n	Medium	MG-26
<i>Withania somniafer</i> (L.)Dunal in DC.	Solanaceae	Gizewa	Shreb	Homegarde n	Rare	MG-23
<i>Grewia ferruginea</i> Hochst.ex.A Rich.	Malvaceae	Lenquta	Shreb	Wild	Medium	MG-64
<i>Hydnora abyssinica</i> A.Braun.	Hydnoraceae	Dech- merch	Herb	HG	Rare	MG-01
<i>Carissa spinarum</i> L.	Apocynaceae	Agam	Shreb	W	Commo n	MG-65
<i>Clausena anisata</i> Willd.Benth	Rutaceae	Limch	Shreb	Wildild	Medium	MG-65
<i>Eucalyptus globules</i> us Labill.	Myrtaceae	Nech bahirzaf,	Tree	Wild	Commo n	MG-101
<i>Lagenaria siceraria</i> (Mol.)Standl.	Cucurbitaceae	Qil	Climbe r	Wild	Commo n	MG-57
<i>Cicer arietinum</i> L.	Fabaceae	Shimbra	Herb	Homegarde n	Commo n	MG-35
<i>Croton macrostachyus</i> L.	Euphorbiaceae	Misana	Tree	Wild	Commo n	MG-40
<i>Brucea antidysenterica</i>	Simaroubacea e	Adegevalo	Shreb	Wild	Commo n	MG-78

J.F.Mill.						
<i>Calotropis procera</i> (Ait)Ait.f.	Asclepiadaceae	Tobiya	Shreb	Wild	Rare	MG-92
<i>Plantago lanceolata</i> L.	Plantaginaceae	Worteb	Herb	Wild	Common	MG-16
<i>Capsicum Spp</i>	Solanaceae	Mitmita	Herb	Homegarde n	Rare	MG-69
<i>Ocimum basilicum</i> L.Var.basium.	Lamiaceae	Ziqakibe	Herb	Homegarde n	Medium	MG-03
<i>Citrus limon</i> Burn.f.	Rutaceae	Lomi	Shreb	Homegarde n	Rare	MG-31
<i>Acacia abyssinica</i> Hochst.ex.Benth.	Fabaceae	Girar	Tree	Wild	Rare	MG-60
<i>Cyperus atroviridis</i> C.B.Cl.	Cyperaceae	Giramta	Herb	HG	Rare	MG-66
<i>Stephania abyssinica</i>	Menispermaceae	Yayit haregh	Climber	Wild	Common	MG-85
<i>Cucurbita pepo</i> L.	Cucurbitaceae	Duba	Climber	Homegarde n	Medium	MG-58
<i>Cirsium englenum</i> O.Hoffm.	Asteraceae	Kosheshile	Herb	Wild	Common	MG-12
<i>Carthamus tinctorius</i> L.	Asteraceae	Yabesha Suf	Herb	Homegarde n	Medium	MG-96
<i>Zehneria scabra</i> (Linn.f.)	Cucurbitaceae	Hareg resa	Climber	Wild	Common	MG-08
<i>Sacchurum officinarum</i> L	Poaceae	Shenkora ageda,	Herb	Homegarde n	Rare	MG-97
<i>Maytenus arbutifolia</i> (A.Rich.)Wilczek.	Celastraceae	Atat	Tree	Wild	Common	MG-71
<i>Clutia abyssinica</i> jaub.and spach.	Euphorbiaceae	Figele fej	Herb	Wild	Medium	MG-45
<i>Melia azedarach</i> L.	Meliaceae	Mim	Tree	Homegarde n	Common	MG-04
<i>Ocimum lamiifolium</i> Hochst.ex Benth.	Lamiaceae	Damakase	Herb	Homegarde n	medium	MG-91
<i>Mangifera indica</i> L.	Anacardiaceae	Mango	tree	Homegarde n	Medium	MG-32
<i>Solanum Incanum</i> L.	Solanaceae	Embuay	Herb	Wild	Common	MG-89
<i>Phytolancca</i>	Phytolaccaeae	Endod	Climber	Wild	Common	MG-70

<i>dodecandra</i> L. Herit.			r		n	
<i>Olea europaea</i> L.	Oleaceae	Woirra	Tree	Wild	Rare	MG-21
<i>Emelia schimperi</i> Vatke.	Myrsinaceae	Enkoko	Climber	Wild	Rare	MG-43
<i>Venonia amygdalina</i> Del.	Astraceae	Girawa	Tree	Homegarde n	Common	MG-80
<i>Ricinus communis</i> L	Euphorbiaceae	Kachima	Tree	Wild	Common	MG-06
<i>Persea americana</i> Mill.	Lauraceae	Avocado	Sghreb	Homegarde n	Rare	MG-05
<i>Juniperus procera</i> Hochst ex. Engl.	Cuppressaceae	Yabeshatid	Tree	Wild	Medium	MG-04
<i>Catha edulis</i> (Vahl)Forssk.ex. Endl.	Celastraceae	Chat	Shreb	Homegarde n	Medium	MG-07
<i>Euphorbia ampliphylla</i> Pax.	Euphorbiaceae	Qulqual	Tree	Homegarde n	Medium	MG-20
<i>Allium ativum</i> L.	Alliaceae	Nechshinkurt,	Herb	Homegarde n	Common	MG-29
<i>Coffea arabica</i> L.	Rubiaceae	Buna	Shreb	Homegarde n	Rare	MG-17
<i>Thilictrum rhyocarpum</i> Tourn.ex. L.	Ranunculaceae	Sire bizu	Herb	Wild	Common	MG-53
<i>Artemisia abyssinicus</i> Sch.Bip.ex Engl.	Asteraceae	Chikugn	Herb	Wild	Medium	MG-51
<i>Nicotiana tabacum</i> L.	Solanaceae	Timbaho	Herb	Wild	Common	MG-100
<i>Rosa abyssinica</i> Lindley.	Rosaceae	Kega	Shreb	Wild	Common	MG-48
<i>Allophlus abyssinicus</i> (Hochst)Radlk	Sapindaceae	Embis	Tree	Wild	Rare	MG-50
<i>Hagenia abyssinica</i> (Brace)J.F.Gmel	Rosaceae	Koso	Tree	Wild	Rare	MG-61
<i>Myrica salicifolia</i> Hochst.ex.A	Myrsinaceae	Shinet	Tree	Wild	Rare	MG-49
<i>Achyranthes aspera</i> L.	Amaranthaceae	Telenge	Herb	Wild	Medium	MG-102
<i>Hordeum vulgare</i> L.	Poaceae	Geps	Herb	Homegarde n	Common	MG-86
<i>Calpurnia aurea</i> (Ait) Benth)	Fabaceae	Zigita	Shreb	Wild	Common	MG-74
<i>Capparis mycgantha</i> A.Rich	Cappardaceae	Dandi zaf	Tree	Wild	Medium	MG-73
<i>Urtica simensis</i> Steudel.	Urticaceae	Sama	Herb	Wild	Meium	MG-11
<i>Clerodendrum myricoides</i> Hochst.	Verbenacea	Misrich	Shreb	Wild	Rare	MG-02
<i>Rubus steudneri</i> Schweinf.	Rosaceae	Enzoriya	Shreb	Wild	Rare	MG-46

<i>Osyris quadripartite</i> Benth.	Santalaceae	Keret	Shreb	Wild	Rare	MG-44
<i>Capparis tomentosa</i> Lam.	Capparidaceae	Gimero	Shreb	Wild	Medium	MG-62
<i>Malva verticillata</i> L.	Malvaceae	Jardiyan(tult)	Herb	Homegarde n	Common	MG-54
<i>Clematis simensis</i> Fresene.	Ranunculacea e	Azo hareg	Climber	Wild	Common	MG-103
<i>Otostegia integrifolia</i> Benth.	Lamiaceae	Tingut	Shreb	Wild	Common	MG-90
<i>Justicia schimperian</i> (Hochst.ex.Nees)T.Anders.	Acanthaceae	Simiza	Shreb	Homegarde n	Common	MG-18
<i>Artemisia absinthium</i> L.	Asteraceae	Nech riyen	Herb	Homegarde n	Rare	MG-19
<i>Ficus Carica</i> L.	Moraceae	Beles	Shreb	Wild	Rare	MG-47
<i>Syzygium guineense</i> (willd.)DC	Myrtaceae	Dokima	Tree	Wild	Medium	MG-72
<i>Impatiens rothii</i> Hook.f.	Balsaminacea	Gurshit	Heeb	Wild	Rare	MG-55
<i>Musa</i> .L.	Musaceae	muz	Shreb	Homegarde n	Medium	MG-106
<i>Cymbopogon citrates</i> (DC Nees)Stapf.	Poaceae	Tej sar	Herb	Homegarde n	Common	MG-
<i>Guizotia abyssinca</i> Cass.	Asteraceae	noug	Heb	Wild	Rare	MG-107
<i>Ficus sur</i> Forssk.	Moraceae	shola	Ttree	Wild	Rare	MG-99
<i>Mimusops kummel</i> Benth.	Sapotaceae	eshe	Tree	Wild	Rare	MG-30
<i>Citrus aurantifolia</i> swingle	Rutaceae	Birtolomi	Shreb	Homegarde n	Medium	MG-28
<i>Vicia faba</i>	Fabaceae	Bakela	Heeb	Homegarde n	Medium	MG-36
<i>Euphorbia trirucalli</i> L.	Euphorbiaceae	KInchib	Shreb	Wild	Rare	-MG-107
<i>Allium cepa</i> L.	Alliaceae	Key shinkurt	Herb	Homegarde n	Medium	MG-108
<i>Arundo donax</i>	Poaceae	Shenbeko	Herb	Wild	Rare	MG-109

Appendix 5. List of medicinal plant species collected in the study area treat only human ailments with scientific name, family name, local (Amharic) name, habit(H herb,C climber ,S shrub and T tree) condition of preparation(F -fresh ,D-dry and F/D-fresh or dry), parts used(L-leaf, R-root, SB-stem bark, S-stem, SE-seed,FR- flower) applications and route of administration.

Scientific name	Family name	Local Name and habit	Disease treated	Parts used ,condition oa preparation and mode of preparation	Route	Co ll. Co de s
<i>Bersama abyssinica</i> Fresen.	Miliantha ceae	Azami r Shrub	Eye disease	Stem bark, dry:- the dry stem bark of <i>Bersama abyssinica</i> grounded and mix with butter then applies on infected eye.	dermal	M G-94
			Ascariasi s	Leaf , fresh:- fresh leaf of <i>Bersama abyssinica</i> squeezed and mix with grounde seed of <i>Cucurbita pipo</i> , then mix honey and swallow	oral	
			Hypertan tion	Leaf, fresh:- the fresh leaf of <i>Bersama abyssinica</i> crushed squeezed and drinks.	Oral	
<i>Coriandrum sativum</i> L.	Apoaceae	Kuzba ra herb	Tumor	Leaf, dry:- The dry seed of <i>Coriandrum sativum</i> is grounded with <i>Allium sativum</i> then mixed with honey and taken it before meal at morning.	oral	M G-79
			Kidney disease	Seed, dry:- The dry seed of <i>Coriandrum sativum</i> is grounded with <i>Allium sativum</i> then mixed with honey and taken it for seven days before meal at morning	oral	
<i>Buddleja polystachya</i> Fresen.	Scrophul ariaceae	Anfar, Shrub	Body ache	Stem bark,fresh:- the fresh bark of <i>Buddleja polystachya</i> boil with water and drink it.	oral	M G-59
			Homorro hiod	Root and latex, fresh:- the fresh root and latex of <i>Buddleja polystachya</i> crushed and grounded with beam, seed of <i>Lepidium satvum</i> by water and applied it on infected part .	dermal	
			tonsilitis	Latex, fresh:- fresh latex of <i>buddleja polystachya</i> with shoot of <i>Rumex nervosus</i> crashed and mix together with water and put on the crown of the head.	Derma l	
<i>Cynodon</i>		Serdo	Gout	Root, fresh:- The fresh root of <i>Cynodon</i>		

<i>dactylon</i> L.	Poaceae	Sar climber		<i>dactylon</i> pounded and tie on infected body part. or Crash fresh root boil with water and drinks as tea for same days.	oral	M G- 87
<i>Rhamnus prinoides</i> L.	Rhamnaceae	Gesho Shrub	Itch	Fruit fresh:- the fresh fruit of <i>Rhamnus prinoides</i> and <i>Phytolacca dodecandra</i> crashed and mixed with butter then cramed and set on sun light.	dermal	M G- 38
			Wound	Seed, fresh or dry:- The seeds of <i>Rhamnus prinoides</i> are grounded and applied to the affected area.	dermal	
			Wound	Seed, fresh or dry:- The seeds of <i>Rhamnus prinoides</i> are grounded and applied to the affected area.	dermal	
			wound	Seed, fresh or dry:- The seeds of <i>Rhamnus prinoides</i> are grounded and applied to the affected area.	Derma l	
			Wound	Seed, fresh or dry:- The seeds of <i>Rhamnus prinoides</i> are grounded and applied to the affected area.	Dserm al	
			malaria	Leaf, fresh:- One hand full fresh leaf of <i>Rhamnus Prinoides</i> pounded and mixed with one glass of pure water , stay for 12 hours then at the morning squeezed, decant and mixed with two spun of honey then drinks it for aweek by missing one and take next day.	Oral	
<i>Eragrostis tef</i> (Zucc.)	Poaceae	Keytef Herb	Dyspepsia	Seed, dry:- One spun of dry seed of <i>Eragrostis tef</i> mixed with honey then swallowing it.	oral	M G- 63
<i>Ximenia americana</i> L.	Olacaceae	Enkoy Tree	Granule	Stem bark, dry/fresh:- The bark of <i>Ximenia asmericana</i> is crushed, ground and creamed on the affected part.	dermal	M G- 33
<i>Moringa stenopetala</i> (E.G.Baker)	Moringaceae	Shiferaw Tree	Astma	Leaf and root, fresh:- boiling the fresh root and leaf of <i>Moringa stenopetala</i> , then drinks as tea by mixed with honey.	oral	M G- 14

<i>Datura stramonium</i> L.	Solanaceae	Astengir, herb	Dandruff	Leaf ,fresh:- Fresh leaves pounded and mix with butter then creamed the head.	dermal	M G-13
			Toothache	Seed fesh:- The fresh seeds of <i>Datura stramonium</i> are roasted, boil with milk and fumigated the vapor during bed time.	oral& nasal	
			ear disease	Seed, fresh:- the seed of fresh <i>Datura stramonium</i> crashed, squeezed and drops in to infected ear.	ear	
			Astma	Leaf dry:- smoking the dry leaf of <i>Datura stramonium</i> and inhaled the smoke.	oral& nasal	
<i>Lycopersicon esculentum</i> L.	Solanaceae	Timati herb	Hemorroid	Fruit fresh:- the fruit is crushed into piece and held or tied on the pain area.	dermal	M G-75
			rheumatoid arthritis	Fruit fresh:- the fresh fruit of <i>Lycopersicon esculentum</i> crashed drink the juice.	oral	
<i>Carica papaya</i> L.	Caricaceae	Papaya shrub	stomach pain	Leaf dry:- drying the leaf of <i>Carica papaya</i> by hoting with fire, then boiling with water the dry leaf and drinks as a tea.	oral	M G-15
<i>Vetbasium sinaiticum</i> Benth.	Scrophulariaceae	Debtara kitel/ ketetina herb	Snake bite	Root fresh:- Chewing the fresh root of <i>Vetbasium sinaiticum</i> and swallow the solution.	oral	M G-76
			Cough and tonsillitis	Leaf dry:- Pounded the dry leaf of <i>Vetbasium sinaiticum</i> and boils with water and drinks as tea.	oral	
			Fire burn	Leaf dry:- Crashed and pounded the dry leaf of <i>Vetbasium sinaiticum</i> then mixed with honey and creamed on to burn body.	dermal	
<i>Trigonella foenum graecum</i> J.M Suttie.	Fabaceae	Abish herb	Cough	Seed dry:- heating the dry seed of <i>Trigonella foenum graecum</i> then crashed with <i>Allium sativum</i> boilind with water and drinks	oral	M G-41
			Kidney Stone	Seed, dry:- Crashed dry seed of <i>Trigonella foenum graecum</i> , powdered mixed with pure water, stay for 12 hrs, then decant water wix with honey and drinks it.	oral	

			homorrhoid and diabetes	Seed dry: -Crashed dry seed of <i>Trigonella foenum graecum</i> , powdered mixed with pure water, stay for 12 hrs, then decant water mix with honey and drinks it.	oral	
<i>Ruta chalepensis</i> L.	Rutaceae	Tenad am herb	Stomachache	Leaf fresh: -The fresh leaf of <i>Ruta chalepensis</i> boiling with water and drunk as a tea during ach.	oral	M G-82
			Eye pain	Seed fresh/dry: -fresh or dry seed of <i>Ruta chalepensis</i> boiling with water,then cool and wash the eye.	dermal	
			Cough	Fseed fresh/dry: -resh or dry seed of <i>Ruta chalepensis</i> boiling with milk then drink.	oral	
			Asthma and tuberculosis	Seed dry: -Mix one hand full dry seed of <i>Ruta chalepensis</i> of with leaf of bosobila, crashed together then squeezed with one cup of water adds two cup of honey . then adds one spun squeezed solution in to one glass of milk, boil and drinks it for same days.	oral	
<i>Rosa richardii</i> Rehd.	Rosaceae	Tsiger eda shrub	Ear wound	Flower and leaf fresh: -The fresh flower and leaf of <i>Rosa xrichadii</i> then boiled with water,cool decant and drops in to ear the solution.	ear	M G-09
<i>Capsicum annum</i> L.	Solanaceae	Karia herb	Intestinal Parasite	Seed dry: -The dry seed of <i>Capsicum annum</i> is crashed, powdered then mixed with water make thin it and drinks a glass from it.	oral	M G-24
<i>Combretum collinum</i> Feresen.	Combretaceae	Abalotree	Chifie	Seed dry: -The dry seed of <i>Combretum collinum</i> is crashed, powdered and mixed with butter then creamed the infected body part until treated	dermal	M G-25
			Tumor	Leaf fresh/dry: -The dry or fresh leaf of <i>Combretum collinum</i> is Pounded and placed on the wound and tie it.	dermal	
<i>Shinus molle</i> L.	Anacardiaceae	Kondoberberetree	Tonsil	Seed ,dry: -The seed of <i>Schinus molle</i> is pounded, powdered, mixed with honey and then drink.	oral	M G-
			Wound	Leaf, fresh: -crashed the fresh leaf of		

				<i>Chinus molle</i> placed on wund.	dermal	98
			Cough	Seed, dry: -crashed the dry seed of <i>Chinus molle</i> cooked with food and eat it.	oral	
<i>Nigella sativa</i> L.	Ranunculaceae	Tikur azmud , herb	Rheumatism	Seed, dry: -Crashed the dry seed <i>Nigella sativa</i> mix with human milk and sniffs.	nasal	M G-34
			Nose disease	Seed, dry: -grounded dry seed of <i>Nigella sativa</i> roasted with butter and swallow at the morning and evening.	oral	
			Cough	See, dry:- One spun of <i>Nigella sativa</i> mixed with one cup of milk, boiled,decantand drinks before bed for seven days.	oral	
			Common cold	Seed, dry: -One spun of <i>Nigella sativa</i> mixed with one cup of milk, boiled,decant and drinks before bed for seven days.	oral	
			Amoeba	Seed, dry: -Two cap of dry seed <i>Nigella sativa</i> mixed with two cup of honey, <i>Ruta chalepensis</i> and <i>Chinus molle</i> pounded together then swallow one spun from it at the morning and evening.	oral	
			Dandruff	Seed, dry: -Crashed one cup dry seed of <i>Nigella sativa</i> mixed with butter then creamed it on to infected area.	dermal	
<i>Premna schimperi</i> Engl.	Laminaceae	Checho Shrub	Wound	Leaf, fresh: -Crashed fresh leaf of <i>Nutia congesta</i> put on the wund.	dermal	M G-77
			Thoothache	Root, fresh: -chewing the fresh root of <i>Nutia congesta</i> by infected teeth.	tooth surface	
<i>Sida Schimperium</i> L.	Malvaceae	Rejim Gurjejt Herb	Lifie	Root, fresh: -crashed fresh root of <i>sida cuneifolia</i> mix with earth worm crashed and tied on wund.	dermal	M G-84
<i>Citrus Sinensis</i> (L.) Osb.	Rutaceae	Birtukan shrub	Common Cold	Leaf& seed, fresh: -Decocted the fresh leaf and seed of <i>Citrus sinensis</i> and drink it	oral	M G-27
<i>Billantasia grotanllipic.sech.</i>	Acanthaceae	Dechmerch, Herb	Tumor	Leaf, fresh: -crashed the fresh leaf and creamed on infected area.	dermal	M

			Blemish	Leaf, fresh:- crashed the leaf of <i>Hydnora johnnis</i> with <i>Curcuma domestica</i> then mix lemon juice and creamed it.	dermal	G-01
<i>Clausena anisata</i> Willd.Benth	Rutaceae	Limch Shrub	Stomachache	Root ,fresh:- Pounded fresh root of <i>Clausena anisata</i> , squeezed with water and drinks it	oral	M G-68
<i>Eucalyptus globulus</i> Labill.	Myritaceae	Nech Bahirzaf Tree	Fibril illness	Leaf,fresh:- The leaf of <i>Eucalyptus globulus</i> is chopped and boil with water and fumigated at the bed time, then sleeping.	nasal and oral	M G-
			Bronchitis	Leaf, fresh:- The leaf of <i>Eucalyptus globulus</i> is chopped and boil with water and inhale the vapor.	nasal and oral	
<i>Lagenaria Siceraria</i> (Mol.)Standl.	Cucurbitaceae	Qil Climber	Body Swell	Fruit ,fresh:- The dry fruit of <i>Lagenaria Siceraria</i> heated with fire then puted on the swelling part of body.	dermal	M G-57
			Ear Disease	Whole part fresh:- The whole part of <i>Lagenaria Siceraria</i> heats on fire , pounded,squeezed and drops the solution in to sicked earthen tunk the ear with cotton.	ear	
			Uvulitis	the dry fruit of <i>Lagenaria Siceraria</i> sling above head of the new born baby and mother by saying sikel sikel	dermal	
<i>Croton macrostachyus</i> L.	Euphorbiaceae	Misana Tree	Chirt	The twig or petiole of <i>Croton macrostachyus</i> is cut and the sap is smear on the patient of the body.	dermal	M G-40
<i>Brucea antidysenterica</i> J.F.Mill.	Simaroubaceae	Adegevalo Shrub	Yewofitu	Stem bark,fresh:- the fresh steam bark of <i>Brucea antidysenterica</i> with steam bark of <i>Corton macrostachus</i> pounded ,squeezed and drinks half cup sap before food,at wensday or Friday.	oral	M G-78
			Yehodehimem	Root, fresh:- The fresh root is pounded, squeezed then drinks the jucie.	Oral	
<i>Calotropis procera</i> (Ait)Ait.f.	Asclepin daceae	Tobiya Shrub	Wound	Above ground part fresh:- cut any part of fresh <i>Calotropis procera</i> and creamed the milk or sap the infected area.	dermal	M G-92
			Homorrhoid	Latex ,fresh:- The affected area is covered by latex of young leaf and repeating every 2 days until recover.	dermal	
<i>Plantago</i>		Worte	Wound	Leaf ,fresh:- The leaves of <i>Plantago</i>	dermal	M

<i>lanceolata</i> L.	Plantagin aceae	b Herb		<i>lanceolata</i> are crushed or squeezed and applied it.		G-16
L.	Solanace ae	Mitmit a Herb	Heart Disease	Seed ,fresh:- The fresh seed of <i>Capsicum</i> spp is crashed with <i>Allium sativum</i> and leaf of <i>Clemaatis semensis</i> then roasted by lung of sheep and eat.	oral	M G-69
<i>Ocimum basilicum</i> L.Var.basii um.	Lamiacea e	Zikaki be Herb	Suddensi ckness	Seed ,dry:- The seed of <i>Capsicum</i> spp is crashed with <i>Allium sativum</i> then roasted by lung of sheep and eat	oral	M G-03
<i>Citrus limon</i> Burm.f. Rutaceae		Lomi Shrub	Cough	Leaf ,dry:- the dry leaf of <i>Citrus limon</i> mixed with milk boil and drink.	oral	M G-31
			Stomach ache	Fruit ,fresh:- The fruit juice <i>Citru limons</i> drunk.	oral	
			Kidney Disease	Fruit fesh:- ruit The fresh fruet of <i>Citrus limon</i> is squeezed with water and drinks per day for seven days.	oral	
			Malaria	Fruit fresh:- Squeezed the fruit, pounded the peel one then mix tether and drinks	oral	
<i>Acacia abyssinica</i> Hochst.ex. Benth.	Fabaceae	Girar Tree	Stomacha che	Root ,fresh:- The fresh root of <i>Acacia abyssinica</i> is powdered; mix with Sour milk or “ergo” and drunken one cup before food until recover.	oral	M G-60
			Cough	Glue fresh:- The fresh <i>Acacia abyssinica</i> glue is boiled with a glass of water then adds sugar and drinks it at the morning and evening untile treated.	oral	
<i>Cyperus Atroviridis</i> C.B.Cl.	Cyperace ae	Giramt a, Herb	Mumps	Above ground part, fresh/dry:- The dry or fresh above ground part of it soak in to water then split, spin and tie around neck rigion.	neck	M G-66
<i>Carthamus tinctorius</i> L	Asteracea e	Yabes ha Suf Herb	Heart disease	Seed ,dry:- Decocted the dry seed of <i>Carthamus tinctorius</i> with bulb of <i>Allium sativum</i> then decant water and drink it, Or Crashed the dry seed and boil with	oral	M G-96

				hony then drink it at morning and evening.		
<i>Zehneria scabra</i> (Linn.f.) sond.	Cucurbitaceae	Hergre sa Climber	Fibril illness	Leaf ,fresh;- The leaf of <i>Zehneria scabra</i> is pounded, squeezed and mixed with sugar and drunk ,or The fresh leaf of <i>Zehneria scabra</i> is squeezed and adds the solution in to tea and drinks.	oral And nasal	M G- 08
<i>Sacchurum officinarum</i> L.	Poaceae	Shenk ora ageda Herb	Cough	Stem ,fresh:- Decocted the fresh steam of <i>Sacchurum officinarum</i> then drink it.	oral	M G- 97
<i>Maytenus arbutifolia</i> (A.Rich.)	Celastraceae	Atat Tree	Kidney disease	Root ,fresh:- The fresh root of <i>Maytenus arbutifolia</i> with <i>Croton macrostachyus</i> are crushed, powdered, mixed with water and ountilne sine drunk every morning.	oral	M G- 71
<i>Clutia Abyssinica jaub.and spach.</i>	Euphorbiaceae	Figele feg Shrub	Hepathitis	Root ,fresh:- Crashed roots of <i>Phytolacea dodecandra</i> , <i>Achyranthes aspiera</i> leaf, C Lutia lanceolate leaf, <i>Euphorbia abyssinica</i> sap, then prepare as powder and beakwith red teff powder then eat it.	oral	M G- 45
			Lashit	Leaf ,fresh:- By using the fresh leaf of <i>Clutia lanceolata</i> lapping the every day untile the new hear grow.	dermal	
<i>Ocimum forskolei</i> Benth.	Lamiaceae	Dema kase Shrub	Fibril illness	Leaf ,fresh:- The fresh leaf of <i>Ocimum lamiifolium</i> is squeezed and added in tea or coffee and drink.	oral	M G- 91
<i>Mangifera indica</i> L.	Anacardiaceae	Mango Tree	Diabetes	Leaf ,fresh:- Decocted the fresh leaf of <i>Mangifera indica</i> and drinks it before meal at the morning and evening for tree day	eat	M G- 31
			Heart disease	Leaf ,fresh:- Decocted fresh leaf <i>Mangifera indica</i> and drinks it.	oral	
			Scorpion bite	Seed ,dry:- Crashed the dry seed of <i>Mangifera indica</i> , mix it with <i>Allium sativum</i> and <i>Zingiber abyssinica</i> ,then pounded is and tied in aplace where body is infected.	dermal	

<i>Solanum Incanum</i> L.	Solanaceae	Embua y Herb	Tumer,	Leaf ,fresh:- The fresh leaf of <i>Solanum incanum</i> and <i>Cucumis ficifalius</i> , <i>Calotropis procera</i> and <i>Jasminum floribundum</i> subsp ,floribundun together then the powder creamed to the infected area.	dermal	M G- 89
			Itching,	Seed or root,fresh:- The <i>Solanum marginatum</i> seed and root of <i>Arundo donax</i> crushed and grounded together then mixed by water and drunk it with a cup of tea for seven days.	oral	
			Tuberclo sis	Fruit ,dry:- Pounded and dry the fruit of <i>Solanum Incanum</i> , dry it mix with water and butter then boil it drinks.	oral	
<i>Olea europaea</i> L.subsp cupsidata	Oleaceae	Woiraa Tree	Eye nive	Latex ,fresh:- Grinding the epicotyly of <i>Olea europaea</i> L. subsp cupsidata with <i>Rumex nervosus</i> then squeezed and decanted jucie then applied on infected eye.	dermal	M G- 21
<i>Venonia amygdalina</i> Del.	Astraceae	Girawa Tree	Malaria	Leaf ,fresh:- Crashed one hand full fresh leaf of <i>Venonia amygdalina</i> then squeezed it and mix its jucie with honey and drinks one coffee cup per day for a week.	oral	M G- 80
			Thyphoid	Latex ,fresh:- Pounded one hand full latex of <i>Venonia amygdalina</i> , squeezed it with cup of water, mixed with honey and drinks at morning for a week.	oral	
<i>Ricinus communis</i> L	Euphorbiaceae	Bulka Shrub	Nekersa	Fruit ,fresh:- The dry fruit will be crushed,d and mix with butter after that applies on the affected part.	dermal	M G- 06
			Scabies	Seed,dry:- The dry seed of <i>Ricinus communis</i> is crashedS then massaging the infected body part and tied.	dermal	
<i>Persea americana</i> Mill.	Lauraceae	Avokado, Tree	Kidney Disease	Leaf ,fresh:- The leaves of <i>Persea Americana</i> are boiled and the liquid portion is drunk until recovery.	oral	M G- 05
<i>Juniperus procera</i> Hochst ex. Engl.	Cuppressaceae	Yabehatsid, Tree	Wound	Leaf ,fresh:- fresh leaves of <i>Juniperus procera</i> are sequenzed and applied on to the wound.	dermal	M G- 10 3

<i>Catha edulis</i> (Vahl)Forssk.ex. Endl.	Celastraceae	Chat, Shrub	Astma	Leaf ,fresh:- The fresh leaf of <i>Catha edulis</i> and <i>Coffea arabica</i> mixed together then boiled with honey and drinks.	oral	M G-07
<i>Allium sativum</i> L	Alliaceae	Nech Shinkurt Herb	Common cold,	Bulb ,fresh:- fresh bulb of <i>Allium sativum</i> is boiled and fumigated it.	nasal&oral	M G-29
			Asthma	Bulb, fresh:- The fresh bulb of <i>Allium sativum</i> is boiled and fumigated it.	nasal	
			Kidney diseases	Bulb, fresh:- Crashed the fesh tree up to five bulb of <i>Allium sativum</i> , add in to a glass of water then stay it for 12 hrs and drinks before food at the morning.	oral	
			Cough,	Bulb ,fresh:- Mixed one cup of <i>Allium sativum</i> with two cup of honey, pounded together then swallow one spun per day before food.	oral	
			Hemorroi de	Bulb fresh:- Pounded the same bulb of <i>Allium sativum</i> and creamed on the infected body part and tie it.	dermal	
			Wound	Bulb, fresh:- Pounded the same bulb of <i>Allium sativum</i> and creamed on the infected body part and tie it.	dermal	
			Toothache	Bulb, fresh:- Crashed the fresh bulb of of <i>Allium sativum</i> mixed with salt and holds by sick tooth.	tooth surfaces	
<i>Coffea arabica</i> L.	Rubiaceae	Buna, Shrub	Astma	Leaf ,fresh:- The dry leaf of <i>Coffea arabica</i> boil with honey and drinks	oral	M G-17
			common cold,	Leaf ,fresh:- The fresh leaf of <i>Coffea arabica</i> boil and drinks as tea.	oral	
			Headach	Seed ,dry:- The dry seed roasted crashed boil and mix with lemon water and drinks	oral	
			Diarrhea,	Seed, dry:- The dry seed roasted crashed powdered then mix honey and swallow it	oral	
<i>Thalictrum rhychoarpum</i> . Dill & Rich	Ranunculaceae	Sire-bizu Herb	Stabbing pain,	Stem ,fresh:- The steam of <i>Thilictrum rhyocarpum</i> is tie on the neck part of the body.	dermal	M G-53
			Bellyach	Root fresh:- The fresh root of <i>Thilictrum rhyocarpum</i> is pounded squeezed with	oral	

			e,	water then drinks it by cup.		
			Gerefit	Root, fresh/dry:- The fresh or dry root of <i>Thilictrum rhyocarpum</i> adds in to fire and fumigated the smoke.	nasal&oral	
<i>Artemisia abyssinicus</i> Sch.Bip.ex Engl.	Asteraceae	Chikugn Herb	Evel eye	Root ,fresh:- The fresh root of <i>Artemisia abyssinicus</i> is pounded and sniffed or the fresh root is crashed, squeezed mix jucie with water and drink it.	oral	M G- 51
			Common could	Leaf ,fresh:- The fresh leaf squeezed and sniffed.	nasal	
			Tonsillitis	Leaf ,fresh:- Squeezed the fresh leaf creamed jucie throts and drinks it.	oral	
<i>Rosa abyssinica</i> Lindley.	Rosaceae	Kega Shrub	Ascariasis	Seed ,fresh:- The fresh seed of <i>Rosa abyssinica</i> is eaten.	oral	M G- 48
			Stomachache	Seed, fresh:- The fresh seed of <i>Rosa abyssinica</i> is eaten.	oral	
<i>Hagenia abyssinica</i> (Brace)J.F. Gmel.	Rosaceae	Koso, Tree	Tapwarm	Seed , dry:- The dry seed of <i>Hagenia abyssinica</i> crashed and mixed with milk and drinks one cup per tree days.	oral	M G- 61
<i>Hordeum vulgare</i> L.	Poaceae	Gebs, Herb	Anemia	Seed ,dry:- The dry seed of <i>Hordeum vulgare</i> roasted ,crashed then boiled with water, add honey and drinks it every day.	oral	M G- 86
<i>Urtica Simensis</i> Steudel.	Urticaceae	Sama, Herb	Nose bleed	Leaf, fesh:- The fresh leaf of <i>Urtica Simensis</i> pounded and sniffed through nose.	nasal	M G- 11
			Hemorrhoids	Fresh leaf of <i>Urtica simensia</i> pounded squeezed and creamed the jucie on the infected area.	dermal	
			Rheumatism	Leaf ,dry:- Crashed the dry leaf of <i>Urtica simensis</i> then mixed with honey, butter and tazima honey, then creamed infected area and massaging.	dermal	
<i>Clerodendrum myricoides</i> Hochst.Vat ke.	Lamiaceae	Misrich, Shrub	Wart	Leaf ,fresh:- The fresh leaves of <i>Clerodendrum myricoides</i> are crushed; grounded with seed of <i>Lepidium sativum</i> , then mix with salt and apply on the affected part	dermal	M G- 02
<i>Rubus</i>		Enzori	Stomachache	Leaf,fresh:- The fresh leaf of <i>Rubus</i>	oral	M

<i>steudneri</i> Schweinf.	Rosaceae	a, Shrub	che	<i>steudneri</i> chewing and swallow or Gringing the leaf <i>Rubus steudneri</i> <i>Ocmum forskoli</i> and <i>Zehneria scabra</i> then distillates and drinks the jucie with tea glass		G-46
<i>Osyris quadripartite</i> Benth	Santalaceae	Keret Shrub	Stomach ache	Seed ,fresh/dry:- gringing the seeds with <i>Thymus schimperii</i> leaf and roasted with butter, then distilled and drink it	oral	M G-44
			Wound	Leaf ,fresh:- Gring the fresh leaf <i>Osyris quadripartite</i> , <i>Plantago lanceolata</i> and <i>Dodnaea agunstitolia</i> together and creamed the wound.	demal	
<i>Capparis tomentosa</i> Lam.	Capparidaceae	Gimer o Shrub F	Evil eye	Root ,root:- Gringing the fresh root of <i>Capparis tomentosa</i> with root of <i>Petrolobium stellatum</i> and <i>Croton macrostait chyus</i> , squeezed with pure water decanted and drinks it one cup.	oral	M G-62
			Tooth ache	Root ,fresh:-Pounded the fresh root of <i>Capparis tomentosa</i> and chewing or holds by teeth.	tooth sureface	
			Belly ache	Leaf ,fresh:- The fresh leaf <i>Capparis tomentosa</i> squeezed with water and drinks it.	oral	
<i>Rumex nepalensis</i> L.	Polygonaceae	Gerda n/yew usha milas Herb	Stomach ache	Root ,fresh:- the fresh root of <i>Malva verticillata</i> is ground with the seed of <i>Lepidium sativum</i> then drunk the solution with water.	oral	M G-54
<i>Clematis simensis</i> Fresene.	Ranunculaceae	Azoha reg climber	Tooth ache	Seed ,fresh;- The fresh steam of <i>Clematis simensis</i> chewing and holds during pain	tooth surfaces	M G-102
<i>Justicia schimperiana</i> (Hochst.ex. Nees)T.Anders.	Acanthaceae	Simiza Shrub	Ye wof beshita	Leaf ,fresh:- Fresh leaf of The <i>Justicia schimperiana</i> is boil with water and drinks with tea or, The fresh leaf is boil and fumigated and inhaled the vapour in to mauth and nose.	oral and nasal	M G-18
			Malaria	Leaf ,fresh:- The fresh leaf is crashed ,squeezed then mix with milk and drinks for tree day by a cup.	Oral	

			Rheumatism	Leaf, fresh:- The fresh leaf of <i>Justicia schimperian</i> is chopped, boil with water then immersed the infected body in to it.	Dermatol	
<i>Artemisaia absinthium</i> L.	Asteraceae	Riyan, Herb	Syphilis	Whole part,fresh:- The whole part of it pounded squeezed with water and drinks.	oral	M G-19
			Tonsillitis	Leaf fresh:- The fresh leaf of <i>Artemisaia absinthium</i> is dqueezed and sniffed and drinks one spun from the squeezed solution.	nasal and oral	
<i>Ficus carica</i> L.	Moraceae	Beles, Shrub	Ear wound	Leaf ,fresh:- Crashed and squeezed the fresh leaf of <i>Ficus carica</i> then decant the solution and drops in to ear.	ear	M G-47
			Tumor	leaf , fresh:- Macerated the fresh leaf of <i>Ficus carica</i> and wash the body with it.	dermal	
			Hepatitis,	Leaf and root,fresh;- Crashing the fresh leaf and root of <i>Ficus carica</i> decanted the liqid then mix with honey and drink it with tea glass tree times per day.	oral	
<i>Impatiens rothii</i> Hook.f.	Balsaminaceae	Gurshiti, Herb	Woundfiring	Root ,fresh:- fresh root of <i>Impatiens rothii</i> is pounded and tied on the wound.	dermal	M G-55
<i>Allium cepa</i> L.	Alliaceae	Key shinkurt, Alliaceae Herb	Dandruff	Bulb ,fresh:- The fresh bulb of <i>Allium cepa</i> is boiled, then decant water, make it cold and wash head.	dermal	M G-107
<i>Maesa lanceolata</i> Forssk.	Myrsinaceae	Kilabo Shrub	Tape warm ,	Leaf, fresh:- The fresh leaf of <i>Maesal lanceolata</i> is pounded ,squeezed then jucie mixed with water and drinks.	oral	M G-52
<i>Guizotia abyssinca</i> Cass.	Asteraceae	Noug , Herb	Gastritis	Seed, dry:- the dry seed of <i>Guizotia abyssinca</i> ,heated crashed and powdered, then mixed with water decant the solution and drinks it.	oral	M G-67
			Common cold	Seed, dry:- the dry seed of <i>Guizotia abyssinca</i> ,heated crashed and powdered mixed with water, boil with tenadam and nech shinkurt drinks it.	oral	

<i>Ficus sur</i> Forssk.	Moraceae	Shoal, Tree	Gonorrhoea	Sap, fresh:- The sap of <i>Ficus sur</i> together with that of root <i>Phytolacca dodecandra</i> , <i>Ficus vasta</i> <i>Dodonaea angustifolia</i> , and <i>Rhamnus prinoides</i> will be pounded and taken with tea or local alcoholic drink.	oral	M G- 99
<i>Mimusops kummel</i> A DC	Sapotaceae	Eshe Tree	Diarrhea	Fruit Fresh:- Fresh fruit of <i>Mimusops kummel</i> will be eaten.	oral	M G- 30
<i>Citrus aurantifolia</i> (christem.) Swingle.,	Rutaceae	Birtolomi, Shrub	Common cold	Fruit, fresh:- the fresh fruit of <i>Citrus aurantifolia</i> is squeezed, boiled with water mixed with honey and drinks it.	oral	M G- 28
<i>Vicia faba</i> L.	Fabaceae	Bakela, Herb	Bugnic	Seed, dry:- the dry seed of <i>Vicia faba</i> crashed with thoth and teid on infected area.	dermal	M G- 36

Appendice 6. List of medicinal plants used to treat only livestock ailments in the study area with scientific name, family name, local (Amharic) name, habit(H herb,C climber ,S shrub and T tree) condition of preparation(F -fresh ,D-dry and F/D-fresh or dry), parts used(L-leaf, R-root, SB-stem bark, S-stem, SE-seed,FR- flower) applications and route of administration

Scientific name	Family name	Local name and growth form	Disease treated	Parts used, condition of preparation and method of preparation	Route of administration	Coll. Code
<i>Brassica carinata</i> A.Br.	Brassicaceae	Gomenzer, Herb	bloating	Seed, dry:- Crashed the dry seed of <i>Brassica carinata</i> , make powder then mixed with water and given to drinks for animals.	oral	M G- 56
<i>Ficus sycomorus</i> L.	Moraceae	Banba, Tree	Calf warm	Leaf, fresh:- Crashed the fresh leaf of <i>Ficus sycomorus</i> , mix with milk and given for calf	oral	M G- 81
<i>Pisum sativum</i> L.	Fabaceae	Ater, Herb	Woreshigin	Tseed coat, dry:- the dry seeds coat of <i>Pisum sativum</i> is smoken and fumigate the cuttles .	nasal and oral	M G- 37
<i>Arundo donax</i> L	Poaceae	Shenbeko, herb	shotelay	Root, fresh:- The fresh root of <i>Arundo donax</i> mixed with fresh or dry root of <i>Echinops keberi</i> enwrap with close or lether then tied on neck or horns of livestock.	neck	M G- 10 8

<i>Trachyspermum ammi</i> L.	Apiaceae	Nech azmude, Herb	Antako(hode menefat)	Seed, dry:- Crashed and powdeerd two cups of dry seed of <i>Trachyspermum ammi</i> then mixed with water and given to drink for cuttles.	oral	M G-42
			Labour pains	Seed, dry:- Crashed the dry seed of <i>Trachyspermum ammi</i> mixed with hot water then given to drink	oral	
<i>Helianthus annuus</i> L.	Asteraceae	Koshe shile Herb	Stomachache	Cut the above ground part of <i>Helianthus annuus</i> then strikes the animals body (around stomach).	dermal	M G-12
<i>Allophlus abyssinicus</i> (Hochst)Radlkofer.	Sapindaceae	Embis Tree	Leech	The fresh leaf of <i>Rhus glutinosa</i> is pounded, squeezed then adds a few drops of jucie in to animal nose.	nasal	M G-50
<i>Cymbopogon Citrates</i> (D C.)Stapf.,	Poaceae	Tej sar Climber	Antako	Root, fresh:- the fresh root of <i>Cymbopogon Citrates</i> with the fresh leaf of <i>Ruta chalepensis</i> pounded and squeezed with water and given to livestock to drink.	oral	M G-104
<i>Syzygium guineense</i> (willd.)DC	Myrtaceae	Dokma, Tree	diarrihea	The dry steam bark and root bark of <i>Syzygium guineense</i> is crushed, powdered and mixed with water and honey then given to drinks	oral	M G-72
<i>Euphorbia tirucalli</i> L.	Euphorbiaceae	Kinchib Shrub	Skin disease	The fresh milk like sap creamed the woun.	dermal	M G-106
<i>Musa x paradisiaca</i>	Musaceae	Muz, Shrub	Hode dirket	Flower and leaf,fresh:- the fresh flower and leaf of <i>Masa x paradisc</i> squeezed and given the the solution to drinks.	oral	M G-105
<i>Copparis mycgantha</i> A.Rich.	Acanthaceae	Dandezaf	Kortim(viral or bacterial infection)	Stem bark,fresh:- the fresh stem bark of <i>Copparis mycgantha</i> is Peels and winds around flank.	dermal	M G-

Appendix 7. List of medicinal plants that used to treat both human and livestock ailments in the study area with scientific name, family name, local (Amharic) name, habit(H herb,C climber ,S shrub and T tree) condition of preparation(F -fresh ,D-dry and F/D-fresh or dry), parts used(L- leaf, R-root, SB-stem bark, S-stem, SE-seed,FR- flower) applications and route of administration.

Scientific name	Family name	Local name And growth form	Disease treated and organism to be treat	Parts used , condition of preparation and methods of preparation	Route of adiminations	Col l. Code
<i>Asparagus africanus</i> Lam.	Asparagaceae	Yeset kest, climber	Tigen Liv	Root, fresh: -Cut a pice of fresh root of <i>Asparagus africanus</i> and tied in infected area	dermal	MG-95
			toothache Hu	Root fresh:- the fresh root of <i>Asparagus africanus</i> chwing during hache.	tooth surface	
			Gonorrhia Hu	Root fresh: -root of <i>Asparagus africanus</i> grounded, mix with hony and stay for a week then eat it at morning before food	oral	
<i>Zea mays</i> L.	Poaceae	Bekolo Herb	Diarrhea, liv	Cob dry: -The dry cob of <i>Zea mays</i> is burned then mixed with one litter of water and make it thin then given to cattels to drink twice per day.	oral	MG-10
			Kidney disease, Hu	Fly swatter, fresh: -One hand full fresh fly swatter of <i>Zea mays</i> mixed with two glass of water, boil, cool and decant then mixed with honey and drinks at the morning and evening every day.	oral	
<i>Dodonaea angustifolia</i> L.f.	Sapindaceae	Kitkita Shrub	Cough HU	Leaf dry: -The dry leaf and roots of <i>Dodonaea angustifolia</i> burn and smoke then inhale through mauth	oral	MG-88
			Bone fracture, LIv	Leaf fresh: -the fresh leaf of <i>Dodonaea angustifolia</i> are crushed and tied on fractured bone with frame	dermal	

			Eczema, HU	Leaf,fresh:- The leaf of <i>Dodonaea angustifolia</i> is burn, pounded, powdered and mixed with butter and creamed the affected part.	dermal	
			Malaria, Hu	Seed fresh:- One hand full fresh seed of <i>Dodonaea angustifolia</i> crashed mixed with honey then swallow two spuns from it at the morning for a week.	Oral	
<i>Sida Schimprium</i>	Malvaceae	Achir gurjejit Herb	Buginge, H	Leaf fresh:- chashed the fresh leaf <i>Sida Schimprif</i> tied on wund.	dermal	MG-84
			Acne, H	Leaf fresh:- squeezed the fresh leaf and ceamed in infected place.	dermal	
			Gornit(wound), HU	Leaf, fresh:- squeezed the fresh leaf of creamed the sap on to the infected part.	dermal	
			Eye disease, Liv	Root,fresh:- Pounded the fresh root of <i>Sida Schimpri</i> and tied on the infected eye.	eye	
<i>Cordia africana</i> Lam.	Boraginaceae	Wanza Tree	Homorroid, hu	Stem bark, fresh:- the fresh bark of <i>Cordia africana</i> ,root of <i>Otostegia integtifalia</i> , leaf of <i>Rumex nervosus</i> and <i>Calotropis procera</i> pounded together, then mixed withhoney and applied.	dermal	MG-22
			Eye disease, Liv	Leaf,dry:- The leaves of <i>Cordia africana</i> are burned and the burnt leaves's ash is inserted in to cattle's eye with butter.	eye	
			Wound, Hu	Leaf,dry:- Leaf of <i>Cordia africana</i> burned and its ash mixed with butter then creamed on the affected part.	dermal	
			Stomachache, Hu	Root,fresh:- Grinding the fresh root of <i>Cardia Africana</i> squeezed it distillates its liquid and and drinks a cup	oral	
<i>Psidium guajava</i> L.	Myrtaceae	Zeytun Shrub	Ameobasiss, hu	Fruit, fresh:- The fresh fruit of <i>Psidium guajava</i> is eaten.	oral	MG-26
			Diarearihe Liv	Leaf,fresh:- The half kilogram fresh leaf of <i>Psidium guajava</i> mixed with one litter of water, then boil , cool and given to cattles to drink two up to tree times	oral	

				per day.		
<i>Withania somnifera</i> (L.) Dunal in DC.	Solanaceae	Gizewa Shrub	Evil eye Hu	Root, fresh: -the fresh root of <i>Withania somnifera</i> with leaf of <i>Thallictrum rhynchopetaium</i> and drink.	oral	MG-23
			Heart disease, Hu	Leaf, fresh: -boil the fresh leaf of <i>Withania somnifera</i> with seed <i>Sesamum indicum</i> and drink the it before meal at the morning or Leaf, fresh: --crashed fresh leaf with bunna and papaya dry leaf then mixed with honey and drinks it.	oral	
			Eye disease, Liv and hu	Root, fresh: -Pounded the fesh root of <i>Withania somnifera</i> Soaking in to water, decant then wash the infected eye with the solution	eye	
<i>Grewia ferruginea</i> Hochst.ex. A.Rich.	Tiliaceae	Lenquta Shrub	Cough, Hu	Leaf, dry: -the dry leaf of <i>Grewia ferruginea</i> crashed mixed with honey swallow at morning before food.	oral	MG-64
			Danduraff, Hu	Bark, fresh: -Washed the hair by the bark of <i>Grewia ferruginea</i> with water.	dermal	
			expel placenta, liv	Stembark, fresh: - fresh steam bark of the bark <i>Grewia ferruginea</i> is pilled then pounded, squeezed with water and given to animals to drink.	oral	
<i>Carissa spinarum</i> L.	Apocynaceae	Agam Shrub	Wound, liv and hu	Root, dry: -the dry root of <i>Carissa spinarum</i> is crashed powdered and tied.	dermal	MG-65
			Snake bite, Hu	Fresh leaf of <i>Carissa spinarum</i> will be crushed and chewed and the sap is swallow.	oral	
<i>Cicer arietinum</i> L.	Fabaceae	Shimbra shrub	Parasites, Hu	Seed dry: -The dry seed of <i>Cicer arietinum</i> macerated in water then after aday eat th seeds .	oral	MG-35
			Ascariasis, Hu	Seed, dry: -The seed of <i>Cicer arietinum</i> with root of <i>Kalanchoe pettitiana</i> is boiled, filtered and drunk the solution	oral	
			Almoche Liv	Seed caot dry: - dry seed coat of <i>Cicer arietinum</i> is smoken and fumigate stocks is smoken and fumigate stocks	nasal and oral	

<i>Stephania abyssinica</i> (Dillon & A. Rich)	Menispermaceae	Yayt hereg Climber	Alemoche , Liv	Whole part, fresh: -The fresh whole part of <i>Stephania abyssinica</i> is wind (coiled) around animals neck .	neck	MG - 85
			herpes hu	Leaf, fresh: -the fresh leaf of <i>Stephania abyssinica</i> squeezed and the sap applied on infected part	Dermatol	
			Anterax, Hu	Root, fresh: - the fresh root of <i>Stephania abyssinica</i> pounded , squeezed then juice given to drinks by measuring the first line of small finger in a cup	Oral	
<i>Cucurbita pepo</i> L.	Cucurbitaceae	Duba climber	Head ache, Hu	Seed, fresh: -The freshe seeds of <i>Cucurbita pepo</i> crashes and put on heads and tied,	dermal	MG -58
			Tapwarm, Liv	Seed, dry: -Seeds of <i>Cucurbita pepo</i> are dried roasted and mix with honey then eaten before food (empty stomach) and stay for six hour without eat food for human, given the dried seed for animals with salt in the morning.	oral	
<i>Melia azedarach</i> L.	Meliaceae	Nim Tree	Hypertension Hu	Leaf, fresh: -Grind and squeeze fresh leaf of <i>Azadirachta Indica</i> then drinks the juice	oral	MG -04
			Diabetes, hu	Leaf, fresh: -Crashed and squeezed the fresh leaf <i>Melia azedarach</i> then drink a cup of its juice.	oral	
			Epidemic, Liv	Leaf, fresh: --squeezed the fresh leaf of <i>Melia azedarac</i> , mixed the juice with engera and given to hens to eat.	oral	
<i>Phytolacca dodecandra</i> L. Herit.	Phytolaccaceae	Endod, climber	Anthrax, Hu	Root, fresh: -Grinding the fresh root and epicotyle of <i>Phytolacca dodecandra</i> , squeezed decant the solution is and drink it half spun.	oral	MG -70
			Rabis, Hu and liv	Root, fresh: -Grinding the fresh roots of <i>Phytolacca dodecandra</i> and <i>Croton macrostachyus</i> then decant and drink it by skimmed milk.	oral	
<i>Euphorbia ampliphylla</i> Pax.	Euphorbiaceae	Kukqual , Shrub	Scorpion bite Hu	Leaf, fresh:-The sub fresh leaf <i>Euphorbia ampliphylla</i> is creamed on the area of scorpion bited.	dermal	MG -20
			Kuro (cough) Liv	Smoking the dry stem of <i>Euphorbia ampliphylla</i> and fumigates the cattels or animals.	nasal and oral	

<i>Myrica salicifolia</i> Hochst.ex. A Rich.	Myrsinaceae	Shinet Tree	Epilepsy liv	The dry stem bark of <i>Myrica salicifolia</i> mix with water and given to calf.	oral	MG -49
			Astma hu	Stem bark fresh: -Crash the bark of <i>Myrica salicifolia</i> with the bark of <i>Scheffera abyssinica</i> then boil with honey and drinks it with cup.	oral	
<i>Achyranthes aspera</i> L.	Amaranthaceae	Telenge Herb	Wart Hu	Root and latex,fresh: -The fresh root and latex of <i>Achyranthes aspera</i> is pounded and applied on to infected part of body.	dermal	MG -101
			Heart disease Hu	Leaf,fresh ”-Fist full fresh leaf of <i>Achyranthes aspera</i> pounded, squeezed and drinks one cup os its jucie every morning for a week.	oral	
			Tigen Liv	Leaf fresh: -The fesh leaf and root of <i>Achyranthes aspera</i> burned and powdered then tied on the infected part of body.	dermal	
<i>Calpurnia Aurea</i> (Ait) Benth).	Fabaceae	Zigta Shrub	Calf disease, Liv	Root,fresh: -Grinding the fresh root and given to calf.	oral	MG -74
			Eczema, Hu	Leaf,fresh: -Pounded the fresh leaf of <i>Calpurnia aurea</i> and <i>Plantago lanceolata</i> then mix with butter and creamed the infected part.	dermal	
			Fire burn, Hu	Leaf,fresh: -the fresh leaf of <i>Calpurnia aurea</i> with <i>Plantago lanceolata</i> leaf mix with butter and creamed it in to infected part.	dermal	

			Yewofitu, Hu	Root, fresh: -the fresh leaf or root of <i>Calpurnia aurea</i> is mixed with leaf of <i>Croton macrostachyus</i> and <i>Justica schimperiana</i> , then boiled and fumigated the vapour through nose and mouth for tree or seven days.	oral and nasal	
<i>Otostegia integrifolia</i> Benth.	Lamiaceae	Tingut Shrub	Stomach ache, Hu	Leaf, fresh:- the fresh leaf of <i>Otostegia integrifolia</i> is pounded ,squeezed and drinks one	oral	MG-90
			Telalafi, Liv	Leaf fresh/dry:- The fresh or dry leaf of <i>Otostegia integrifolia</i> and <i>Olea africana</i> add in to fire, smoke and fumigated the cattles	nasal and oral	
<i>Nicotiana tabacum</i> L.	Solanaceae	Timbaho, Herb	Kinkin Hu	Leaf fresh:- the fresh leaf of <i>Nicotiana tabacum</i> with fresh leaf of <i>Datura stramonium</i> crashed squeezed and drops juice to ear	nose	MG-100

Appendice 8. List of medicinal plant species collected in the study area with scientific name, family name, local name, habit and their other uses rather than medicinal value.

No	Scientific name	Family name	Local name	habit	Other uses rather than medicinal value	Coll. code
01	<i>Bersama abyssinica</i> Fresen.	Meliantaceae	Azamir	Shrub	Fire wood, depository for injera, to make mofer	MG-94
02	<i>Asparagus africanus</i> Lam.	Asparagaceae	Yeset-kest	Climber	To make spindle	MG-95
03	<i>Buddleja polystachya</i> Fresen.	Scrophulariaceae	Anfars	Shrub	Fire woof, fence	MG-59
04	<i>Zea mays</i> L.	Gramineae	Bekolo,	Herb	Food, livestock forage	MG-10

05	<i>Coriandrum sativum</i> L.	Apiaceae	kuzbara	Herb	Spice	MG-79
06	<i>Cynodon dactylon</i> L.	Poaceae	Sedo sar,	Climber	Forage for livestock	MG-87
07	<i>Dodnaea agunstifolia</i> L.f.	Sapindaceae	Kitkita,	Shrub	To fumigate tools used to prepare milk products, fire wood	MG-88
08	<i>Rumex nervosus</i> Vahl.	Polygonaceae	Embacho	Shrub	Fire wood,	MG-93
09	<i>Rhamnus prinoides</i> L.Herit.	Rhamnaceae	Gesho	Shrub	To make traditional drink tella,	MG-38
10	<i>Eragrostis tef</i> (Zucc.)	Poaceae	Key tef	Herb	Food	MG-63
11	<i>Ximenia americana</i> L	Olacaceae	Encoy	Tree	Food, fire wood, charcoal, house building material	MG-33
12	<i>Brassica carinata</i> A.Br.	Brassicaceae	Gomenzer	Herb	Spice,	MG-56
13	<i>Moringa stenopetala</i> (E.G.Baker)	Moringaceae	Shiferaw	Tree	Fire wood,	MG-14
14	<i>Datura stramonium</i> L.	Solanaceae	Astenagir	Herb	Ornamental	MG-13
15	<i>Lycopersicon esculentum</i> L.	Solanaceae	Timatim	Herb	Food	MG-25
16	<i>Carica papaya</i> L.	Caricaceae	Papaya	Shrub	Food	MG-15
17	<i>Verbascum sinaiticum</i> Benth.	Scrophulariaceae	Debtera kitel	Herb	Fire wood	MG-76
18	<i>Trigonella foenum graecum</i> L.	Fabaceae	Abish	Herb	Spice	MG-41

19	<i>Ruta chalepensis</i> L.	Rutaceae	Tenadam	Herb	Spice	MG-82
20	<i>Ficus sycomorus</i> L.	Moraceae	Bamba	Tree	Charcoal, fire wood, frange Fence	MG-81
21	<i>Rosa x richardii</i> Rehd.	Rosaceae	Tigereda	Shrub	Ornament	MG-09
22	<i>Capsicum annuum</i> L.	Solanaceae	Karia	Herb	Food	MG-24
23	<i>Combretum</i> <i>collinum</i> Feresen.	Combretaceae	Abalo	Tree	Fire wood, charcoal	MG-24
24	<i>Maesa lanceolata</i> Forssk.	Myrsinaceae	Kilabo	Shrub	Fire wood	MG-52
25	<i>Pisum sativum</i> L.	Fabacea	Ater	Herb	Food, frage for livestocks	MG-37
26	<i>Trachyspermum</i> <i>ammi</i> (L.)Sprague ex Turrill.	Apiaceae	Nech azmude	Herb	Spice	MG-42
27	<i>Shinus molle</i> L.	Anacerdiaceae	Kondo berbere,	Tree	Spice	MG-98
28	<i>Nigella sativa</i> L.	Ranunculaceae	Tikurbaz mude	Herb	Spice	MG-34
29	<i>Premna schimperii</i> Engl.	Laminaceae	Checho	Shrub	Fire wood	MG-77
30	<i>Sida rhombifia</i> L.	Malvaceae	Rejim gurjejit	Herb	To make traditional farmers tool metol	MG-83
31	<i>Sida schimperium</i>	Malvaceae	Achir gurjejit	Herb	Traditional teeth brush	MG-84
32	<i>Cordia africana</i> Lam.	Boraginaceae	Wanza	Tree	Food, fire wood ,furniture	MG-22

33	<i>Citrus sinensis</i> (L.) Osborn	Rutaceae	Birtucan	Shrub	Food	MG-27
34	<i>Psidium guajava</i> L.	Myrtaceae	Zeytuna	Tree	Food	MG-26
35	<i>Withania somnifera</i> (L.)Duna 1	Solanaceae	Gizewa	Shrub	Ornamental	MG-23
36	<i>Grewia ferruginea</i> <i>Hochst.ex.A Rich.</i>	Malvaceae	Lenquta	Shrub	Fire wood, forage	MG-64
37	<i>Hydnora abyssinica</i> A.Braun.	Hydnoraceae	Dech- merch	Herb	Ornamental	MG-01
38	<i>Carissa spinarum</i> L.	Apocynaceae	Agam	Shrub	Fire wood, to drill females ear, food	MG-65
39	<i>Clausena anisata</i> (Willd).Benth	Rutaceae	Limch	Shrub	Used as teeth brushes	MG-65
40	<i>Eucalyptus globulus</i> Labill.	Myrtaceae	Nech bahirzaf,	Tree	Fire wood, charcoal, house building material.	MG- 101
41	<i>Lagenaria siceraria</i> (Mol.)Sta ndl.	Cucurbitaceae	Qil	Climber	Holding water and cereals in farmers home	MG-57
42	<i>Cicer arietinum</i> L.	Fabaceae	Shimbra	Herb	Food, forage	MG-35
43	<i>Croton macrostachyus</i> Del.	Euphorbiaceae	Misana	Tree	Charcoal , fire wood, used to build home	MG-40
44	<i>Brucea antidysenterica</i> J.F.Mill.	Simaroubaceae	Adegeval o	Shrub	Fire wood	MG-78
45	<i>Calotropis</i>	Asclepiadaceae	Tobiya	Shrub	Fence	MG-92

	<i>procera</i> (Ait)Ait.f.	e				
46	<i>Plantago lanceolata</i> L.	Plantaginaceae	Worteb	Herb	Livestock forage	MG-16
47	<i>Capsicum Spp</i> L.	Solanaceae	Mitmita	Herb	Food	MG-69
48	<i>Ocimum basilicum</i> L.Var.	Lamiaceae	Ziqakibe	Herb	Spice	MG-03
49	<i>Citrus limon</i> (L.) Burm.f	Rutaceae	Lomi	Shrub	Food	MG-31
50	<i>Acacia abyssinica</i> Hochst.ex.Benth.	Fabaceae	Girar	Tree	Charcoal , fire wood, forage	MG-60
51	<i>Cyperus atroviridis</i> C.B.Clarke	Cyperaceae	Giramta	Herb	House material, forage	MG-66
52	<i>Stephania abyssinica</i> (Dillon &A.Rich) Walp.	Menispermaceae	Yayit haregh	Climber	Farmers used as skip to incarceration wood	MG-85
53	<i>Cucurbita pepo</i> L.	Cucurbitaceae	Duba	Climber	Food	MG-58
54	<i>Hhelianthus annuus</i> L.	Asteraceae	Kosheshile	Herb	To make chibo	MG-12
55	<i>Carthamus tinctorius</i> L.	Asteraceae	Yabesha Suf	Herb	Food	MG-96
56	<i>Zehneria scabra</i> (Linn.f.) Sond.	Cucurbitaceae	Haregresa	Climber	To made tradional beehives	MG-08
57	<i>Sacchurum officinarum</i> L.	Poaceae	Shenkora ageda,	Herb	Food	MG-97
58	<i>Maytenus arbutifolia</i> (A.Rich.)	Celastraceae	Atat	Tree	Fire wood, to make tradional fance around crop lands,	MG-71

					forage for livestock	
59	<i>Clusia abyssinica</i> Jaub.and spach.	Euphorbiaceae	Figele fej	Herb	Fire wood	MG-45
60	<i>Melia azedarach</i> L.	Meliaceae	Mim	Tree	To make shades around home, cherchs	MG-04
61	<i>Ocimum forskolei</i> Benth.	Lamiaceae	Damakas e	Herb	Fire wood	MG-91
62	<i>Mangifera indica</i> L.	Anacardiaceae	Mango	Herb	Food	MG-32
63	<i>Solanum Incanum</i> L.	Solanaceae	Embuay	Herb	Ornamental	MG-89
64	<i>Phytolacca dodecandra</i> L. Herit.	Phytolacaceae	Endod	Climber	Used as soup traditionally	MG-70
65	<i>Olea europaea</i> <i>L.sub spp</i> <i>cuspidate</i>	Oleaceae	Woirra	Tree	Charcoal, fumigate tools in home, to build homes	MG-21
66	<i>Emelia schimperi</i> Vatke.	Myrsinaceae	Enkoko	Climber	Fire wood, food	MG-43
67	<i>Venonia amygdalina</i> Del.	Astraceae	Girawa	Tree	Fire wood, to fumigate traditional alcoholic drinks tools	MG-80
68	<i>Ricinus communis</i> L	Euphorbiaceae	Kachima	Tree	To soften lethers traditionally	MG-06
69	<i>Persea americana</i> Mill.	Lauraceae	Avocado	Shrub	Food	MG-05
70	<i>Juniperus procera</i> Hochst ex. Endl.	Cupressaceae	Yabeshatid	Tree	Fire wood, furniture, to build homes	MG-04
71	<i>Catha</i>	Celastraceae	Chat	Shrub	Food, recreation	MG-07

	<i>edulis</i> (Vahl)Forssk .ex.Endl.					
72	<i>Euphorbia ampliphylla</i> Pax.	Euphorbiaceae	Qulqual	Tree	To make traditional fance around homes, Fire wood	MG-20
73	<i>Allium sativum</i> L.	Alliaceae	Nech shinkurt,	Herb	Food, spice	MG-29
74	<i>Coffea arabica</i> L.	Rubiaceae	Buna	Shrub	Food	MG-17
75	<i>Thalictrum rhyocarpum</i> Tour n.ex.L.	Ranunculaceae	Sire bizu	Herb	Broom	MG-53
76	<i>Artemisia abyssinicus Sch.Bip.ex Engl.</i>	Asteraceae	Chikugn	Herb	Ornament	MG-51
77	<i>Nicotiana tabacum</i> L.	Solanaceae	Timbaho	Herb	Fence	MG- 100
78	<i>Rosa abyssinica</i> Lindley.	Rosaceae	Kega	Shrub	To fumigate tools in home	MG-48
79	<i>Allophlus abyssinicus</i> (Hochst)Radlkofer	Sapindaceae	Embis	Tree	Charcoal, fire wood	MG-50
80	<i>Hagenia abyssinica</i> (Brace)J.F.Gmel	Rosaceae	Koso	Tree	Fire wood, charcoals	MG-61
81	<i>Myrica salicifolia</i> A.Rich	Myrsinaceae	Shinet	Tree	Fire wood, tooth brush	MG-49
82	<i>Achyranthes aspera</i> L.	Amaranthaceae	Telenge	Herb	To make broom	MG- 102
83	<i>Hordeum vulgare</i>	Poaceae	Gebis	Herb	Food	MG-86

	L.					
84	<i>Calpurnia aurea</i> (Ait.) Benth)	Fabaceae	Zigita	Shrub	Fire wood	MG-74
85	<i>Billantasia</i> <i>gotanelli</i> pic, set .	Acanthaceae	Dande zaf	Tree	Fire wood, fencing	MG-73
86	<i>Urtica simensis</i> Steudel.	Urticaceae	Sama	Herb	Fencing	MG-11
87	<i>Clerodendrum</i> <i>myricoides</i> Hochst. Vatke.	Lamiaceae	Misrich	Shrub	Fire wood	MG-02
88	<i>Rubus steudneri</i> Schweinf.	Rosaceae	Enzoriya	Shrub	Food	MG-46
89	<i>Osyris</i> <i>quadripartita</i> Decn.	Santalaceae	Keret	Shrub	Fire wood,	MG-44
90	<i>Capparis</i> <i>tomentosa</i> Lam.	Capparidaceae	Gimero	Shrub	Fire wood, to make tradional fance around homes	MG-62
91	<i>Rumex nepalensis</i> L.	Polygonaceae	Jardiyani(tult)	H.erb	To make traditional brooms	MG-54
92	<i>Clematis simensis</i> Fresene.	Ranunculaceae	Azo hareg	Climbe r	To make traditional beehive,	MG- 103
93	<i>Otostegia</i> <i>integrifolia</i> Benth.	Lamiacea	Tingut	Shrub	To fumigate infants close	MG-90
94	<i>Justicia</i> <i>schimperiana</i> (Hochst.ex.Nees)T .Anders.	Acanthaceae	Simiza	Shrub	Fire wood	MG-18
95	<i>Artemisaia</i>	Asteraceae	Nech	Herb	Ornamental	MG-19

	<i>absinthium L.</i>		riyan			
96	<i>Ficus Carica L.</i>	Moraceae	Beles	Shrub	Fire wood	MG-47
97	<i>Syzygium guineense</i> (willd.)D C	Myrtaceae	Dokima	Tree	Food, fire wood, charcoal	MG-72
98	<i>Impatiens rothii</i> A.Rich	Balsaminacea	Gurshit	Herb	Females traditional beauty keeper	MG-55
99	<i>Musa xparadisica</i>	Musaceae	Muz	shrub	Food, females face beauty keeper	MG-106
100	<i>Cymbopogon citrates</i> (DC.)Stapf.	Poaceae	Tej sar	herb	Food for cattles, ornament	MG-105
101	<i>Guizotia abyssinica</i> (L.f) Cass.	Asteraceae	Noug	herb	Food	MG-67
102	<i>Ficus sur</i> Forssk.	Moraceae	Shoal	tree	Food, fire wood,	MG-99
103	<i>Mimusops kummel</i> A.DC.	Sapotaceae	Eshe	tree	Food, fire wood	MG-30
104	<i>Citrus aurantifolia</i> (Christem.) Swingle.,	Rutaceae	birtolomi	shrub	Food	MG-28
105	<i>Vicia faba L.</i>	Fabaceae	Bakela	herb	Food	MG-36
106	<i>Euphorbia trirucelli L.</i>	Euphorbiaceae	KInchib	shrub	To make traditional fence	MG-107
107	<i>Allium cepa L.</i>	Alliaceae	Key shinkurt	herb	Food,	MG-108
108	<i>Arundo donax L.</i>	Poaceae	Shenbeko	herb	To make traditional accordion washint,	MG-39

Appendice 9. List of all informants with socio demographic characteristics

* indicates key informants

nu	Name	sex	age	Maternal Status	Education	Religion	Occupation	Kebele
1	Mezgebu kenaw	M	60	Married	Uneducated	orthodox	Farmer	Atsede mariam
2	Almaze awoke	F	35	Single	Uneducated	orthodox	Housewife	Atsede mariam
3	Ayanaw tesema	M	78	Single	4	orthodox	Farmer	Atsede mariam
4	Mekdes abita	F	22	Married	10	orthodox	House wife	gamber
5	Zewuditu desta	F	37	Married	Uneducated	orthodox	Housewife	Gamber
6	Sindu dessie	F	30	Single	Uneducated	orthodox	Merchant	Gamber
7	Meseret dejene	F	60	Married	Read and write	orthodox	Housewife	Gamber
8	Ziyn kasaw	F	27	Single	12	orthodox	Merchant	Gamber
9	Merigeta H/ mariam teferi*	M	37	Married	4 and religious educational	orthodox	Self employ	Ahicha
10	Merigeta Tibebu beza*	M	40	Married	University	Orthodox	Teachers	Shahura kutir -1
11	Alemush chekol	F	55	Divorce	Uneducated	Orthodox	House wife	Aditaya

12	Silesh belie	M	57	Single	Uneducate d	Protestant	Farmer	Aditaya
13	Amare fenta	M	19	Married	Read and write	Orthodox	Joiner	Atsedes/ mariam
14	Felekech tarekegn	F	57	Single	Uneducate d	Orthodox	House wife	Zaviza
15	Gizaw babey	M	30	Married	Uneducate d	Orthodox	Farmer	Zaviza
16	Habtamu bazezewu*	M	29	Married	Uneducate d	Orthodox	Farmer	Zaviza
17	Haile nega	M	73	Married	8	Orthodox	Merchant	Ahicha
18	Melaku baye	M	33	Single	Collage	Orthodox	Techear	Ahicha
19	Molla belay	M	28	Married	Read and write	Orthodox	Farmer	Gamo ber
20	Alachew zemene*	M	56	Married	Uneducate d	Orthodox	Farmer	Ahicha
21	Habtie woreket	M	24	Married	Read and write	Orthodox	Farmer	Aditaya
22	Mengistu derebe	M	65	Divorce	Uneducate d	Orthodox	Farmer	Gamo ber
23	Gashaye tasie	M	30	Single	Read and write	Orthodox	Joiner	Gamo ber
24	Zemene tega*	M	40	Married	Uneducate d	Orthodox	Farmer	Zaviza
25	Tamir adane	M	35	Married	2	Orthodox	Farmer	Shura kutir-1
26	Tegegne takele	M	55	Married	Uneducate d	Orthodox	Farmer	Shahura kutir-1

27	Admasu tegegne	M	52	Divorce	Uneducated	Orthodox	Farmer	Garasge
28	Fekadu alebachew	M	35	Married	7	Orthodox	Farmer	Atuga
29	Anguach abich	F	33	Married	Collage	Orthodox	House wife	Geneteguahinch a
30	Abich berihanu	M	52	Married	Read and write	Orthodox	Farmer	Zaviza
31	Muluken alachew	F	39	Married	Uneducated	Orthodox	House wife	Atuga
32	Hagernesh gebrie	F	47	Divorce	4	Orthodox	House wife	Atuga
33	Workneh marie	M	46	Divorce	4	Orthodox	Farmer	Atuga
34	Habtam malede	F	26	Single	University	Orthodox	Self employed	Zaviza
35	Adisie temesgen	F	29	Married	Uneducated	Orthodox	House wife	Atsede mariam
36	Techilo asmare*	M	41	Married	Read and write	Orthodox	Watch man	Atsede mariam
37	Tsehay abebe	M	32	Single	12	Orthodox	Self employ	Atsede mariam
38	Tsehaynesh kibatu	F	19	Single	11	Orthodox	Farmer	Wondel lef
39	Marie alemu	F	37	Single	Read and write	Orthodox	Farmer	Amchaho
40	Adisu terefe	M	23	Married	Uneducated	Orthodox	Fermer	Amchaho

41	Fekadu desie	M	32	Married	Uneducated	Orthodox	Farmer	Geneteguahincha
42	Brihun akalu	M	45	Single	Read and write	Orthodox	Farmer	Geneteguahincha
43	Abuhay mekuant*	M	70	Single	Uneducated	Orthodox	Farmer	Geneteguahincha
44	Kasahun chanie	M	42	Married	Uneducated	Orthodox	Farmer	Geneteguahincha
45	Abebe asmamaw	M	36	Married	Uneducated	Orthodox	Farmer	Geneteguahincha
46	Amsalu demlew	M	51	Married	Read and write	Orthodox	Farmer	Geneteguahincha
47	Libargew belay	M	24	Married	Read and write	Orthodox	Self employ	Ahicha
48	Yimegushal ayele	f	33	Married	Uneducated	Orthodox	House wife	Garasge
49	Azawunt workneh	f	38	Single	Collage	Orthodox	House wife	Garasge
50	Merigeta beza demeke*	M	53	Married	7 and religious education	Orthodox	Farmer	Shahura kutir_2
51	Yirbebu kaside*	F	32	Single	7	Orthodox	Self employ	Garasge
52	Gedefay	M	55	Married	Read and	Orthodox	Farmer	Aditaya

	debas				write			
53	Atala y muket	M	27	Single	11	Orthodox	Farmer	Wonde lef
54	Asnakew alamrew	M	55	Single	University	Orthodox	Gove't employ	Atsede Mariam
55	Temesgen mequannt	M	42	Married	Collage	Orthodox	Watch man	Shahura kutir-1
56	Mulugeta ayanaw	M	48	Divorce	University	Orthodox	Gove't employ	Shahura kutir- 2
57	Molla ereda	M	66	Divorce	University	Orthodox	Gove't employ	Shahura kutir-2
58	Simegne watalele	M	29	Married	University	Orthodox	Gove't employ	Shahura kutir-2
59	Worku gobeze	M	31	Single	9	Orthodox	Farmer	Garasge
60	Siyum gesese	M	57	Married	University	Orthodox	Gove't employ	Shahura kutir-1
61	Abebech moges	F	24	Single	Collage	Orthodox	Gov't worker	Shahura ktir -2
62	Destaye babilo	F	29	Single	Collage	Orthodox	Self employed	Shahura ktir -2
63	Getaneh melkamu	M	37	Married	University	Orthodox	Gov't worker	Shahura ktir -2
64	Felegush moges	F	67	Married	Read and write	Orthodox	House wife	Atesde mariam
65	Aseye selemon	F	29	Married	Collage	protestant	Gov't employ	Shahura kutir-1
66	Asmira digsie	F	19	Married	Read and write	Orthodox	Merchant	Wonde lef
67	Girmye	M	30	Married	Read aand	Orthodox	Famer	Wode lef

	kenaw				write			
68	Ahmedin Tahir	M	37	Married	Uneducated	Orthodox	Farmer	Wondel
69	Adane zegeye	M	52	Married	Uneducated	Orthodox	Farmer	Aditaya
70	Adem tahir	M	37	Married	Universty	Muslim	Techear	Shahura kutir -1
71	Yezina damtie	F	29	Married	University	Orthodox	Gov:t worker	Shahura kutir-1
72	Fenta tasje	M	37	Single	5	Orthodox	Farmer	Atsede mariam
73	Priest koye dagnew	f	51	Married	4 and religious education	Orthodox	Farmer	Ahicha
74	Zomanesh Fekaie	F	43	Single	9	Orthodox	Merchant	Atsede mariam
75	Tirunat babey	f	51	Married	Read and write	Orthodox	House wife	Atuga
76	Simachew baye	m	41	Single	Uneducated	Orthodox	Farmer	Shahura Kutir_2
77	Misker negash*	m	48	Married	Uneducated	orthodox	Merchant	Gamober
78	Degsew belete	m	27	Married	Uneducated	Orthodox	Farmer	Wondel
79	Yilalu mekuant	f	37	Married	Read and write	Orthodox	House wife	Genete guahincha
80	Bekalu freed	m	29	Single	Read and write	Orthodox	Farmer	Geenete guahincha

81	Muket gesese	m	65	Married	Uneducated	Orthodox	Farmer	Garasge
82	Mizanu moges	m	19	Single	Uneducated	Orthodox	Farmer	Garasge
83	Chekilie baize	m	41	Married	Uneducated	Orthodox	Farmer	Shahura Kutir_2
84	Abaynesh tadege	f	41	Married	Uneducated	Orthodox	House wife	Ahicha
85	Enguday fekadu	f	26	Single	12	Orthodox	Self employ	Amchaho
86	*	m	67	married	4and religious education	Orthodox	Farmer	Shahura kutir-1
87	Belaynesh anmaw	F	56	Single	Uneducated	Orthodox	House wife	Dengel Ber
88	Sewunet kefale	f	19	Single	12	Orthodox	Farmer	Dengel Ber
89	Tiruneh yihene*	m	47	Married	Uneducated	Orthodox	Farmer	Dengel Ber
90	Alemacha fentahun	f	43	Married	Uneducated	Orthodox	House wife	Dengel Ber
91	Abayneh alelign	m	30	Single	Uneducated	Orthodox	Farmer	Dengel Ber
92	Kibret yimenu	m	57	Married	Uneducated	Orthodox	Farmer	Dengel Ber
93	Getu bitwoded*	m	56	Married	Uneducated	Orthodox	Farmer	Dengle Ber
94	Benchalem zelalem	f	29	Married	Read and write	Orthodox	House wife	Dengel Ber
95	Amarech	f	38	Single	9	Orthodox	House wife	Wonde

	atinkut							lef
96	Yeshume muket	f	43	Married	Read and write	Orthodox	House wife	Garasge
97	Maledu girmay	f	59	Married	Uneducated	Orthodox	Merchant	Garasge
98	Tesfahun jember	m	33	Married	Read and write	protestant	Self employ	Aditaya
99	Wudie belay	f	39	Single	12	Orthodox	Merchant	Aditaya
100	Demeka yalew*	F	41	Married	Uneducated	Orthodox	House wife	Aditaya
101	Zewudnesh destaw	F	42	Single	3	Orthodox	Merchant	Dengember
102	Tarekegn demsash	m	18	Married	Uneducated	Orthodox	Farmer	Shahura Kutir_2
103	Dagnew abich*	m	67	Single	Read and write	Orthodox	Farmer	Gamober
104	Tanawork melese	f	47	Married	Uneducated	Orthodox	House wife	Gamober
105	Belachew degnet	m	61	Married	Uneducated	Orthodox	Farmer	Gamober
106	Andargachew belay	m	43	Married	Collage	Orthodox	Techeer	Gamober
107	Yirged abita*	f	44	Single	Uneducated	Orthodox	House wife	Geneteguancha
108	Merigeta sisay*	m	49	Married	4and religious education	Orthodox	Farmer	Shahura kutir-2
109	Asefu workneh	F	26	Married	12	Orthodox	House wife	Wondelef
11	Atinkut	m	39	Married	Uneducated	Orthodox	Farmer	Amchaho

0	lakachew				d			
11 1	Merigeta aemiro mele*	m	34	Married	Read and write	Orthodox	Farmer	Atsede mariam
11 2	Kenubish temesgen	F	37	Divorce	Uneducate d	Orthodox	House wife	Amchaho
11 3	Molla zemene	m	67	Divorce	11	Orthodox	Farmer	Amchaho
11 4	Serkalem anmaw*	f	48	Single	Read and write	protestant	Gov' worker	Amchaho
11 5	Melese tizazu	m	51	Single	Uneducate d	protestant	Farmer	Ahicha
11 6	Tsegaw teshale	m	41	Divorce	Collage	protestant	Farmer	Ahicha
11 7	Wagnew agumas	m	65	Married	Uneducate d	Orthodox	Fermer	Ahicha
11 8	Hibsit degarege	f	20	Single	Collage	Orthodox	Self employed	Zaviza
11 9	Tegenaw minchil	m	25	Single	Collage	Orthodox	Farmer	Zaviza
12 0	Zeneb lakew	f	43	Married	Read and write	Orthodox	Merchant	Ahicha
12 1	Engidaw dessie	m	34	Single	Uneducate d	Orthodox	Farmer	Amchaho
12 2	Mele takele*	m	39	Married	Uneducate d	Orthodox	Farmer	Amchaho
12 3	Maritu getu*	f	37	Married	Uneducate d	Orthodox	Farmer	Aditaya
12 4	Andebet bizuayew*	m	47	Married	9 and religouse	Orthodox	Merchant	garasge

					education			
125	Merigeta ferew kasie*	m	46	Married	12 and religious education	Orthodox	Merchant	Atuga
126	Kasaye girmaw	f	29	Married	Uneducated	Orthodox	House wife	Amchaho
127	Eyayu abate	m	37	Married	Uneducated	Orthodox	Farmer	Atuga
128	Gizat sitotaw	m	37	Single	Read and write	Orthodox	Farmer	Atuga
129	Hawa yasin*	f	43	Married	3	Muslim	Merchant	Wondel
130	Muhiye mehamed	m	47	Married	University	Muslim	Techear	Wondel
131	Yihalem ambaye*	m	49	Married	7 and religious education	Orthodox	Farmer	wondel
132	Ziyin kasaw	f	32	Single	Uneducated	Orthodox	House wife	Atuga
133	mastewal mengist	f	24	Married	Uneducated	Orthodox	House wife	Atuga
134	Delelegn mesresha*	m	47	Married	Read and write	Orthodox	Farmer	Atuga
135	Bosena alelign	f	36	Married	Read and write	Orthodox	House wife	Atuga
136	Ageritu sisay	f	41	Divorce	12	Orthodox	House wife	Zaviza
137	Eseye demelash	f	58	Divorce	Read and write	Orthodox	Self employ	Zaviza

13 8	Temerta bewuket	f	29	Single	12	Orthodox	Self employ	Ahicha
13 9	Azawunt abeje	f	47	Married	Uneducate d	Orthodox	House wife	Shahura kutir-1
14 0	Sitotaw amare	m	33	Married	Uneducate d	Orthodox	Farmer	Dengel ber

Appendice-10

Research Questionnaire

These questionnaires are used for only academic purpose and it is important educational research. Your willingness to respond the questionnaire is very essential for success of the study. I kindly ask informants to fill this interview questionnaires honestly.

Semi-structured interview checklist that will be employed in research area to collect ethnobotanical data.

(A). Personal data

Date.....Informant name.....sex a. male b. female

age.....kebele..... occupation.....

1 Marital status: A. married B. single C. divorce

2 Religion: A. orthodox B. Muslim C. protestant D. others

3 Education status: A. uneducated B. read & write C. 1-8 D.1-12 E. 1-8&religious education
F. 1-12 & religious education G.callage or university

(B). Semi-structure interview checklist for key informants to collect ethnobotanical data.

1 What are human diseases in this area? List same common diseases please

2. What are animal disease in this area? Please list same common animal diseases

3. How do you know someone is which type of disease attack?

A. Simply observing of the body B. By asking the types of symptom of the disease C. If any other specify.

4. How do you know which type of disease is attacks the animal?

5. What are the plants you used as medicine to threat human disease in this area

6. What are the plant species you used as medicine to threat animals diseases in this area

7. What are the plants species used to treat both Human and Animal disease?
8. What is the local name of plant and what is this plant?
A. tree B. shrub C. grass D. Climber E. herb F. others
9. What is other uses of this particular medicinal plant other than medicinal value
10. Where did you get this plant?
A. in the forest B. around river C. road side D. home garden E. agriculture field F. rocky area G. grazing land H. others
11. Did you get this plants simply? A. yes B. No If your answer is no, explain why?
12. What seasons is preferable to get this plant in your area?
A. in the summer (moist condition) B. in dry season C. through out the year
13. What is the treaty of plants now? A. food B. charcoal C. fire wood D. construction E. furniture F. Agriculture expansions G. urbanization
14. What is your local conservation and management method you apply to prevent loss of this plants?
15. Are you volunteer to transfer this indigenous knowledge for the next generation? A. Yes B. No. if your answer is no explained why?
16. Where did you get this traditional medicine practice and indigenous knowledge?
17. Does modern education interfere with the use of traditional medicinal plants and LK
18. What parts of plant are used for remedy preparations? A. leave B. root C. seed, D. stem bark E. flower F. latex G, others
19. Which forms of medicinal plant are you used? A. fresh B. dry C. fresh or dry
20. Which methods of preparation are you used to prepare remedies? A. crashing B. boiling, C. squeezing D. immersing E. cutting I. tied F. others

21. How prepared remedy taken by patient (rout of administration) A. oral B. dermal C. tooth surface D. nasal E. ear F. eye G. others

22. Is there difference in doses or amount ages and sex ? A. Yes B. No, if your answer is no explained why?

23. Are medicinal plants are marketable?