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COLLEGE NATURAL SCIENCES
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**ETHNO-BOTANICAL INVESTIGATION OF MEDICINAL PLANTS USE BY
OROMO PEOPLE IN MIDDLE ALTITUDES AT LIMU KOSA WOREDA, JIMMA
ZONE**

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A THESIS SUBMITTED TO THE DEPARTMENT OF BIOLOGY SCHOOL OF
GRADUATE STUDIES, JIMMA UNIVERSITY IN PARTIAL FULFILLMENT FOR THE
MASTERS OF SCIENCE IN BIOLOGY

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OCTOBER, 2017

JIMMA, ETHIOPIA

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LIST OF ACRONYMS

ETB: Ethiopian birr

IUCN: International Union for Conservation of Nature

LKD: Limu Kosa District

LKDAO: Limu Kosa District administration office

LKDARDO: Limu Kosa District agricultural and development office

LKWHO: Limu Kosa District health office

MP: Medicinal plant

MPs: Medicinal plants

MSc: Master of Science

TMP: Traditional medicinal plant

WHO: World Health Organization

ACKNOWLEDGMENT

First of all I would like to praise almighty God who helps me in all my life from the beginning till now and yes tomorrow.

Next, I am very great full for my advisors to Dr. Kitessa Hundera and Mr. Desalegn Raga for continues follow up, comments and guidance from the proposal development to compilation of this work (thesis writing).

Also I would highly indebted to all traditional healers of the study area for their hospitality and kind response for sharing their accumulative indigenous knowledge and experiences without reservations. In addition, I would like to express my grateful for the study sites **Ganda** leaders who show me great co-operation.

I would like to express my deepest acknowledgment for my wife w/o Kumeshi Begna and my uncle Mr. Dechassa Amente who support me in moral and all possible conditions.

I truly grateful goes to the Limu Kosa administrative office experts and agricultural and rural development experts in providing me with statistical data of the Woreda.

I would like to express great thanks for Oromia Regional state Education Bureau for sponsoring my postgraduate study and Jimma University for financial support as well as JU biology department teachers.

My special thaks also goes to Dr. Dereje Denu for his great supporting in specimen identification.

At last but not least, I would like to thank Mr. Adane Deressa who support me by drawing research site and Mr. Awol A/ Gero Ethiopian meteorology agency Limu Genet station experts who provided me necessary data.

Abstract

*Investigation of ethnobotanical medicinal plants have been done and on the use of medicinal plants to treat human and livestock ailments in middle altitudes by Oromo people in Limu Kosa District, Jimma Zone, Oromia regional state, South West Ethiopia. Data have been collected using semi-structured interview, field observations, various ranking and comparison. Sixty informants (49 males and 11 females) participated from five **Ganda** and eighty-eight medicinal plant species grouped into 79 genera and 43 families. Fabaceae was the plant family which contributes 10 species (23.26%), stood first followed by Lamiaceae 7 species (16.27%). Regarding growth forms of medicinal plants: 62 species (70.45%) from wild where as 26 species (29.54%) from home gardens and herbs claimed 32 species (36.36%), shrubs 31 species (35.23), trees 17 species (19, 32%) and climbers 8 species (9.095%). Most plant materials prepared from fresh form 80%; both dried and fresh 15% and dried 5% and commonly plant parts used was leaves 56.19%, followed by root 17.14%. Frequently used preparation was crushing and squeezing 26.42%, followed by pounding, powdered and mixing 17.28% and the most favored route of administrations was oral (47.74%), followed by painting 16.78%. Threatening factors of medicinal plants was: fire wood and charcoal (9 species, 10.22%), food (13 species 14.77%); expansion of farm land, over gazing and others consists (21 species, 23.86%); and conservation methods was cultivating some medicinal plants in home gardens*

Key words: Ethno botany, Limu Kosa Woreda, Medicinal plants, local people

1. INTRODUCTION

1.1 Back ground of the study

Traditional medicine refers to health practices, approaches knowledge and beliefs incorporating plants, animals and mineral based medicines spiritual therapies, manual techniques and exercise applied singularly or in combination to treat, diagnose, prevent illness or maintain wellbeing (WHO, 2002). The current demand for herbal remedies in both developed and developing countries is increasing. In developed countries this may be partly due to the dissatisfactions with conventional medicine while with developing countries it is due to lack of medical doctors, shortage of pharmaceutical products and their unaffordable prices. In addition, the use of modern drugs to treat AIDS, cancers, chronic complaints such as rheumatism, arthritis and asthma have been realized (Endeshaw Bekele, 2007). Ethno-medicinal plants have been used since an ancient time for human health care and still remain the most widely used medication system in developing and least developed nations like Ethiopia where over 80% of the population is dependent on traditional medicines (Haile Yinger *et al.*, 2008). Traditional remedies are sometimes the only sources of therapeutics for nearly 80% of human population and 90% of livestock in Ethiopia of which 95% are plant origin (Tilahun Teklehymanot, 2009). Medicinal plants and the associated knowledge are being seriously depleted due to deforestation, environmental degradation and acculturation that have been taking place in the country for quite a long time, which could ultimately result in the weakening of primary healthcare services in Ethiopian, most of the people are highly dependent on the plant based traditional medicinal practices (Mirutse Giday, *et al.*, 2009).

Loss of knowledge is also aggravated by the expansion of modern education, making the younger generation under estimate its traditional value. Migration from rural areas to towns and resettlement of people from drought stricken regions to fertile area has also resulted in the deforestation of traditional practice (Phillipsed et al., 1992; Fassil Kibebew and Getachew Addis, 1999). As more and more medicinal plants associated knowledge are lost, the potential for the future for development of modern herbal drugs could also be compromised. So, urgent ethno botanical studies and subsequent conservation measures are, thus needed to salvage the medicinal plants and the associated knowledge from further loss (Mirutse Gidey *et al.*, 2009).

Like other places in Ethiopia, Oromo people of Limu Kosa District have knowledge of medicinal plants practice which they accumulate for generation to treat both human and livestock ailments. The local people use different parts of plants (leaves, roots, bark and other plant materials) to prepare remedies. The elders who accumulate more knowledge about medicinal plants may die without transferring their knowledge to the young generations. Since the knowledge of medicinal plants was transferred verbally from generation to generation basic information regarding the knowledge like; how to prepare the medicine, disease treated, part of plant used, and the important information may be lost. Therefore, the objective of this study is to compile and document the current status of indigenous knowledge and utilization of medicinal plants in Limu Kosa District.

1.2 Statement of the problem

In most developing countries, including Ethiopia, the indigenous knowledge like traditional medicine is transferred secretly from generation to generation verbally. Because of this fact that, valuable information can be lost whenever a traditional medicinal practitioner passes without conveying his traditional medicinal plants knowledge (Eskedar Abebe, 2011). Also there is a gap in documentation and records on medicinal plants as remedies are getting lost because of migration from rural areas, industrialization, expansion of modern education and specialized healers do not convey their knowledge to next generation. Additionally, wild plants and forest are declining from day to day because of human impacts like; exploitation, population growth, deforestation and expansion of agriculture contribute to loss of diversity of plants. This great damage to forest and problems are observed in Limu Kosa District, Jimma zone, and Oromia regional state. There was no study conducted in Limu Kosa District regarding ethnobotanical knowledge and status of medicinal plants. So; it is vital to document and record ethnobotanical knowledge of study area regarding medicinal plants which is basic for conservation and enhancement of the activity for the future. Based on these findings, local people have been aware of the problems associated with medicinal plants and documentation of the investigation enables those who want to conduct research further on ethnobotanical study and development of modern drugs.

Research Questions

The finding of the study will try to answer the following main research questions:

- Which medicinal plants species are important to treat human and livestock ailments by local people?
- Which part of medicinal plants is used to treat ailments?
- What are the major threats of traditional medicinal plants in the research area?

1.3 Objective of the study

1.3.1 General objective of the study

The general objective of this study was to investigate and document ethnobotanical medicinal plants use by Oromo People in middle altitudes at Limu Kosa District, Jimma zone.

1.3.2 Specific objectives

- To identify parts of medicinal plants used to treat human ailments in the study area.
- To examines the conservation and practices use by local people in the District regarding medicinal plants.
- To indicate the availability status of traditional medicinal plants in the study area.

1.4 Significance of the study

Research results from this study will help to generate:

First hand information for concerned governmental and non-governmental organizations in LimuKosa District for conservation and utilization of medicinal plants. In addition, concerned professionals or other bodies might use the investigation as base information on ethno-botany of medicinal plants.

1.5 Delimitation of the study

The scope of the study was delimited to Limu Kosa Dstrict 5 “**Ganda**” with total of the population was 17771 in which the investigation was conducted since investigation is time and resource consuming as well voluntaryness of the traditional healers.

2 LITERATURE REVIEW

2.1 History and development of ethno botany

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. Since ancient times, plants have been vital sources of both preventive and curative traditional medicine preparations for human beings and livestock (Dery *et al.*, 1999 as cited in Eskedar Abebe, 2011). The term Ethno botany was mentioned for the first time orally by John Hershbeneger in 1895 in public lecture (Balic, 1996; cotton 1996; Hamilton *et al.*, 2003 as cited in Eskedar Abebe, 2011). Today Ethno botany has become multi-disciplinary subject in various fields of academic study like Botany, Anthropology, Agriculture, linguistics, Archedogy and economics (Martin ,1995 ; Alexiandes,1996,Balick,1996 as cited in Eskedar Abebe, 2011). Ethno medicinal plants have been used since ancient time for human health care and still remain the most widely used medication system in developing and least developed nations. There may be variations in approach with in system People in different location with different religious, linguistic and cultural back grounds have their own specific knowledge about use of plants. Ethno botany studies are now growing and becoming fast progress in the world. Also Ethno botany comprises all studies that concern the mutual relationship between plants and traditional people. Knowledge of medicinal plants has resulted from trial and error methods, and often based on speculation and superstition (Hamayun *et al.*, 2006 as cited in Meaza Godey *et al.*, 2014). The indigenous knowledge on medicinal plants appears when humans started and learned how to use the traditional knowledge on medicinal plants (Birhane Emiru, *et al.*, 2011). Thus people depend on plants not only for food but also for preparation of remedies(cotton ,1996). The relationship between plants and human being cultures is not only for food ,clothing and shelter but also for religious ceremonies , ornamentation and health care (Khan *et al.*,2007). Ethno botany also serves to save foreign exchange that will aid in conserving over national heritage (Abiot Birhanu *et al.*, 2006)

Indigenous knowledge of medicinal plants in Ethiopia is an even distributed among community members (Zemedede Asfaw, 2001). Other cultures in country have their own written or oral traditions (Amare Getahun, 1976, Abbink, 1995). As estimated 80% to 90 % Ethiopians used herbal medicine as a primary form of health care. According to Zemede Asfawu (2014), herbs

have traditionally been used in the home to treat family sickness; occasionally traditional healers may be consulted.

2.2 Traditional Medicinal Plants in Ethiopia

French, British and Italian travelers and plant collectors who visited Ethiopia between about 1830 and 1930 gave list of plants used medicinally and their conception by local traditional medicine men (Griaule, 1930). Knowledge on medicinal plants is largely oral, however, Ethiopia has an ancient church practice that have documented some of the knowledge about traditional medicine system usually described as medico religious written in Greek manuscripts of the 15th century (Gelahun Abebe, 1989; Dawit Ababe and Ahadu Ayehu, 1993). The ancient written source includes the book of remedy (Metshehafa Fewes) of 17th c which contains wide range of medicinal plants prescription (Fekadu Fullas, 2001). Ethno medicinal plants have been used since ancient time for human health care and still remain the most widely used medication system in developing and least developed nations like Ethiopia where over 80 % of the population is dependent on traditional medicines (Haile Yinger *et al.*, 2008). Ethiopia has rich medicinal plants flora and points out that almost all plants of Ethiopian flora are used some where somehow medicinally (Jonsen, 1981). One thousand identified medicinal plant species are reported in Ethiopia flora; however, many other are not yet identified. Also about 300 of this species are frequently mentioned in many sources (Endeshaw Bekele, 2007). Study in Bale mountain National park revealed that the area, as much as it is a biodiversity great ,also turned out to be a medicinal plant hot spot with 337 identified medicinal species of which 24 are endemic (National Herbarium, 2004; Ermias Lulekal, 2005; Haile Yinger, 2005). According to Tesema Tanto *et al* (2002), about 887 plant species were reported to be utilized in traditional medicine, among these 26 species are endemic and they are becoming increasingly rare and are at the verge of extinction. This as current accounted of medicinal plants of Ethiopia, documented for national biodiversity strategy and action plan. The species comprised of 283 used as human medicine, 47 used as livestock medicine and 76 species used for both human and livestock by community healer, harvester, traders and users.

According to Dawit Ababe (1986), three treatments of Ethiopian traditional medicines that is curative, preventive and prophylactic. Most Ethiopian traditional medicine knowledge is kept in strict secrecy; however in that practitioner make every effort to widen their scope by reciprocal

exchange of limited information with each other through reading the traditional pharmacopeias. Traditional medicine is an integral part of the local culture and is a major public health care system (Dawit Abebe, 1986).

2.3. Traditional Medicinal plants in health care

One third of the global population has no regular access to essential modern medicine in part of Africa, Asia, and Latin America about half of the population faces shortage of minimum health care. In developing world repeatedly point to inadequacies in the care financing between the states which has led to a high situations of limited materials and human resources for health care services (WHO, 2002). In India according government sources, for the 65 percent of the population traditional medicine is the only available source of health care (WHO, 2002). The plant genetic resources of Ethiopia exhibit an enormous diversity as seen in the fact that our country is one of the twelve vavilov centers of origin for domesticated crop and their wild and weedy relatives. Medicinal plants comprise of the important components of the vegetation on record 600 species of medicinal plants constituting a little over 10 percent of Ethiopia's vascular flora. They are distributed all over the country, with greater concentration in the south and south western part of the country. Over 85 percent the rural population plus an increasing number of the poor in urban centers, and animal's husbandry employment of the available plants, as well as products from wild animals and minerals as their primary source of health care in fight against various physical and mental health problems.

Ethiopia has a long history of traditional health care based largely on rich, though unspecialized, pharmacopoeia draw mostly from plants used both by women in the home in self-administration and traditional health care practitioners (Girma Deffar, 1998). Medicinal plants in primary health care accounts about 70 percent of human and 90 percent of livestock population depend on traditional medicine. The major reason why medicinal plants are demanded in Ethiopia are due to cultural linked traditions the trust the communities have in the medicinal values of traditional medicine and relatively low cost in using them (Kitessa Hundera, unpubl). The forest wood lands and cultivated land also provide as much as 75 to 90 percent of Ethiopia's rural population's requirements for traditional medicine especially medicinal plants for primary health care (Girma Deffar, 1998). Traditional medicinal plants has 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 (Eskedar Abebe, 2011).

2.4 Traditional Medicinal Practice

WHO (1978) defines traditional practitioner as a person who is recognized by the community in which he/she lives as a component to provide health care by using plant, animal and mineral substances who serve as a nurse, physician, dentist, pharmacist, mid wife, dispenser, etc.; and those knowledgeable people include bone setters, birth attendants, tooth extract, herbalists and spiritual healers. It is noted that cooperation and negotiation of the modern health professionals and the traditional health practitioners is crucial especially for those people who have no adequate access for modern health facilities (Jansen, 1981). Traditional medical practitioners are valuable health resources in communities where the health facility is under served. They are important and influential member of their communities (Mengistu G/Hiwot, 2010). Traditional medical practitioners mostly implement herbs, spiritual healing, bone-setting and minor surgical procedures in treating disease. Ethiopian traditional medicine is vastly complex and diverse and varies greatly among different ethnic groups. Most traditional medical practices in Ethiopia rely on an explanation of disease that draws on both the “mystical” and “natural” causes of an illness and employ a holistic approach to treatment Mekonnen Bishaw (1991; as cited in Alevtina Gall and Zerihun Shinkute, 2009).

The medicinal plants have various methods of preparation and application for different types of ailments and they have various preparation forms like concoction, decoction, powder, and crushed and homogenized in water. Concoction (60 species, 26.1%) constituted the highest type of preparation form, followed by crushed and homogenized in water (46 species, 20 %) and powder form (37 species, 16.1%). The preparation and application methods vary based on the type of disease treated and the actual site of the ailment.

The medicinal plant preparations were applied through different routes of administration like oral, topical or dermal, and nasal routes. The practitioners commonly diagnose each health problem by an interview and visual inspection of the patient or their attendants are commonly interviewed for symptoms observed and the duration of the health problem. Changes in eye and skin color tongue and throat regions, body temperature and status of sores are all visually inspected by the practitioner and the remedy is prescribed. Internal ailments were commonly treated by making the patient drink herbal preparations; skin infections such as ringworm were

treated by rubbing and painting herbal preparations on an infected skin; sores by chewing and spitting remedial plant part on the sore; headaches and fever by steam bath and vapor inhalation. Similar results were reported elsewhere in Ethiopia by (Kebu Balemie, et al., 2004) and (Bayafers Tamene, 2000). Though special care was taken; some herbal preparations had side effects and resulted in diarrhea and vomiting. When such conditions happened, antidotes like coffee, milk, honey, yogurt, butter and powder of roasted barley were used or ordered by most of the practitioners to reverse the condition. In most cases dosages were determined according to the age, sex and physical appearance of the patient. Some of the medicinal plant preparations were measured in a small cup, a jug while others as handful or spoonful (Ermias Lulekal et al., 2004).

2.5 Threats of Traditional Medicinal Plants in Ethiopia

According to Zemedede Asfaw (2014); in the old days herbs were everywhere around house and in the back yard because people planted them and also they were growing naturally. Now I have to travel for two days to find some herbs. Even in forest areas, some don't exist anymore at all ... Now ever one is looking for herbs, but no one plants and looks after them. According to Endeshaw Bekele (2007), endemic medicinal species restricted to Ethiopia are primary concern to Ethiopia as well as the world need countries for production of medicinal plants for the purpose of drugs production. For example in 1980 alone European Economic Community imported over 80,000 metric tons and unite state 34,000 metric tons of plants for pharmaceutical production at a cost of 180 and 176 million U.S dollars respectively. Some species of Ethiopian medicinal plants have been threatened by over use and over harvesting for making as medicine. A good example is *Taverniera abyssinical*, which is popular traditional medicine for what is known as sudden disease. The species is labeled as critically endangered in the Red List of Endemic Trees and Shrubs of Ethiopia (Vivero et al., 2003). It has also been reported that Ethiopia has 40 species of Aloe where the sap of some species is used for medicinal, food and cosmetic application and is widely used internationally. Of these 20 species endemic and 18 are threatened. Threatened plants by international trade in Kenya through smuggling and this might soon pose and treat to Ethiopia unless control methods and propagation are not timely put in place (IUCN, Red List, 1977). Numerous species of Ethno medicinal plants are threatened in most of developing nations mainly due to over exploitation, overgrazing, habitat loss and alteration, destructive harvesting

techniques, unsustainable trade and deforestation Hamilton A.C, 2004). According to Haile Yinger et al.,(2008), similar information was stated: deforestation(25 species, 23 %), drought (22 species 20.56 %), fire(16 species,15%), over grazing or over browsing (11 species, 10 %) and agricultural expansion (8 species,7 %), fire wood (25 species, 26%), forage (21 species, 22 %),construction (14 species , 14 %) food and fencing (3 species each, 3 %) as well as timber , tooth brush and live fencing (2 species each , 2 %) by the local people.

An estimate of the threat to medicinal plants can be made from the type of plant and part used. Harvesting the root of the tree poses more of threat than collecting the fruit and seeds and this can be more threatening than using the leaves. High proportions of plants are used for their leaves. This indicates that many of the medicinal plants are being used in a sustainable way. Also about quarter of the plants used are harvested for their roots, tubers or bulbs. The species need special attention to determine their status and what measures should or could be taken to have them conserved (Girma Deffar, 1998). Generally a threat includes; ecological degradation, loss of indigenous knowledge, danger on medicinal plant through smuggling and misuse of resources, lack of suitable scheme for equitable sharing of benefits arising from biological resources, loss of cultural asserts, poor market situation, traditional healer may not participate and fully collaborate. Such threat poses a significant threat to the future wellbeing human and animal populations that have for generations, relied on the resources (Endeshaw Bekele, 2007).

2.6 Management of medicinal plants resources

Medicinal plant form part of the natural ecosystems, in which their exploitation and how sustainable have some effect on the biodiversity of these systems leading to change or even loss of some species curative ingredients. So, utilization should always go hand in hand which means to ensure sustainable and conservation of resources. The use of traditional medicine is increasing compared to the past because modern medicine has become very expensive and beyond the reach of most compatriots. The uncontrolled use of plants, particularly, their roots, can easily lead to destruction of some of the already endangered species. So research development, in-situ and ex-situ conservation of most of these plants is rudimentary (Girma Deffar, 1998). Conducting further collection of medicinal plants identified and their ex-situ conservation in cold rooms and filed gene banks is also recommended (Tesfaye Awas and Sebsebe Demissew, 2009).

Requirements of sustainable harvesting of medicinal plants be included in the collaborative or community based natural resources management plan and implement it in partnership with the stake holders and relevant agencies.

To salvage indigenous knowledge from disappearing, the young generation has very crucial role to play. Accordingly, it is highly recommended to include in the school curriculum aspect of traditional medicine and medicinal plants. Traditional medicine is still valid and important and that medicinal plants have been source of several important drugs and are still potential source of more wonder drugs. In addition, students and pupil should be encouraged to ask and learn more from parents and community elders about the indigenous knowledge as well as how it is practiced (Endeshaw Bekele,2007). Also integrating to school curricula or introducing the idea as an extracurricular school activity. The lesson learned in creating awareness about the need for conservation of crop farmer varieties are also important in preserving in-situ both the medicinal plants and associated ethno botanical knowledge among farmers. The experiences and practice of women gatherers, cultivators, natural resource managers and providers of sustenance and health care for their families constitute a substantial indigenous knowledge system that can contribute to the conservation and sustainable use of medicinal plants and biodiversity as a whole Wyk and Woroniuk (1998; Debela Hunde *et al.*, schalk , 2015). Increasing the population and diversity of medicinal plants in home gardens and other area outside forests is a solution for avoiding human disturbance of forests and the supply shortage that usually goes with seasonal variation (Kitessa H.Unpubl). There are few institutions concerned with the medicinal plants and assisted through government budgetary support.A department at IBE concerned with medicinal plant conservation get ETB100,000 perineum. Also recent ongoing support made funded by the World Bank for conservation and sustainable use of medicinal plant project has annual of ETB 5.9 million per year Ministry of Health (1995 ; Endeshaw Bekele, 2007).

2.7 Economic importance of medicinal plants

Flexibility, easy accessibility, broad acceptance in developing countries and increasing popularity in developed countries.Also some of the positive features of traditional medicine, relatively low cost, low levels of technological input, relatively low side effects and their economic importance high (WHO,2002). The reliance of people on ethno medicine has been for

reasons of cost effectiveness, acceptability, biomedical benefits and accessibility. There has been continuous growth of demand for herbal medicines globally (Demel Teketay, 2008).

The proportion of consumers who rely on harvesting medical plants is the highest in the rural area, since collecting from natural plantation is most accessible and cost effective. Medicinal plants play great role in development and advancement of modern studies by serving as a starting point for development of modern drugs (wright, 2005). The medicinal plants are part of the economic commodity for some members of the society which make their livelihood on their collection, trade and medicinal practices by practitioners or healers. It thus has a substantial potential to make contributions to the economic growth and alleviation of poverty in the country (Endeshaw Bekele, 2007). Medical plants obtained from wild habitats are found in different natural eco- systems. These are free access resources to all with appropriate knowledge and who want to use them for the family for practicing traditional medicine or for sales (Endeshaw Bekele, 2007). Traditional medicine knowledge is important to facilitate discovery of new source of drugs and promote sustainable use of natural resources. In addition the knowledge of the factors involved in the selection of treatment options at house hold level is important for the health service planning and to incorporating herbal medicine in a country's health care delivery system (Reta Regassa, 2012).

3 MATERIALS AND METHODS

3.1 Description of the study Area

The study has been conducted in Limu Kosa District, Jimma zone which is found in Oromia regional state. Limu Genet is capital town of the District, which is located at 75 km to South West of Jimma town and 420 km away from Addis. Its location is between latitude 8°03' N and longitude of 36°5'E. The topography of the District is characterized by slopes, hills, undulating plains valley to the side of Gibe River. Its altitude ranges from 1250 to 2720 meter above sea level. Administratively Limu Kosa District is sub-divided into 44 "Ganda" consisting; 4 urban and 40 rura kebeles. Most of the communities are based on production of coffee, farming and livestock products. The agricultural system of the society is traditional way.

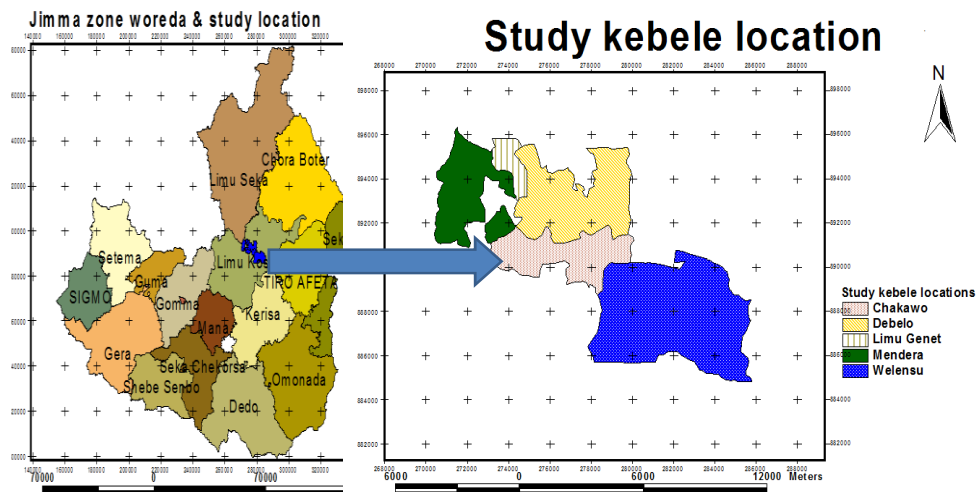


Figure1. Map of Jimma zone, Limu kosa Woreda and study sites.

3.1.1 Climate

According to Limu Kosa agricultural and rural development office (2016), the climate of the study area is traditionally classified into three main agro-ecological zones: high altitude (baddaa), middle altitude (baddadare) and low land gammojjii).

Table1.Traditional zonation of Limu Kosa Woreda

Agro-ecology	% share of total area
High altitude	25%
Middle altitude	65%
Low land	10%
Total	100%

Source: Limu Kosa Woreda agricultural and rural development office (2016)

3.1.2 Temperature and rainfall

The annual average temperature of the study area is estimated between 19.5°C to 33.4°C and also means annual rainfall ranges between 1600 to 2200mm (according Ethiopian meteorology agency Limu Kosa station).

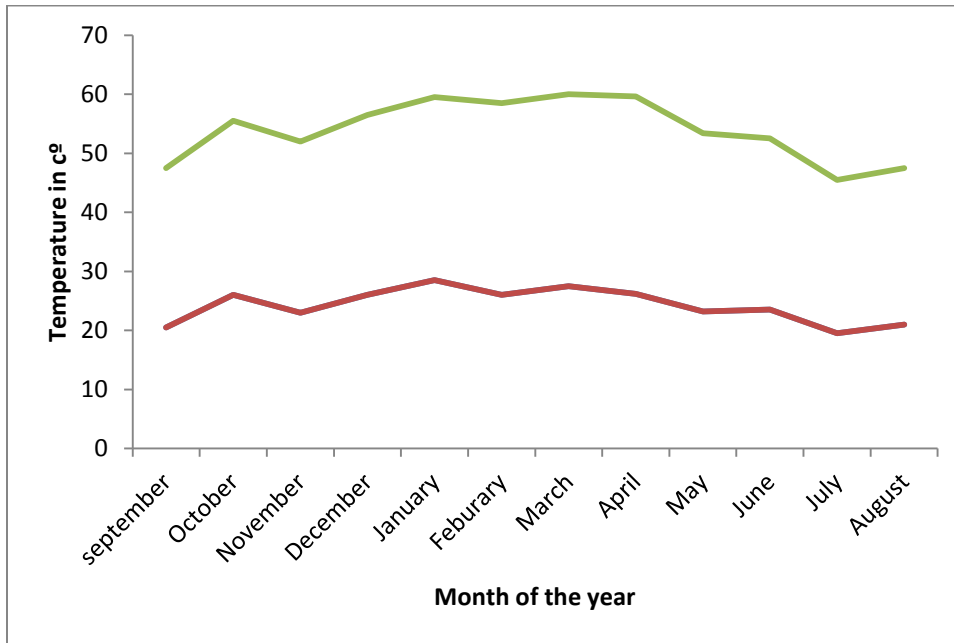


Figure2. Annual temperature of the study area

3.1.3 Population and land cover

Total population of the Woreda according to Limu Kosa District administrative office population census (2016) is reported was 209,262 of which, males 105,626 and female 103,636; and out of these, 18,820 urban (9561 are male's 9259 females) and 190,442 rural dwellers (96,065 males and 94,377 females) and estimated area of the District 146,246 hectares. The woreda is known by coffee production activity (Limu coffee, **bunna Limu**). The majority of local people in the study area belong to Oromo ethnic group and other different ethnic groups like: Amahara, Gurage, Dawuro, kaffa, Yami, and Adiya. Traditional healers of the Oromo people are well known in treating many illnesses with medicine made from plant resources. The woreda forest coverage is 25,768 hectares and of these 1,071 hectare is man-made. The coffee farming coverage accounts about 46,500 hectares and cereal crop farming covers 37,204 hectares. The drainage of woreda consists of 78 small rivers and 6 large rivers.

3.1.4 Soil type

According to Limu Kosa District agricultural and rural development office (2016), the soil type is well drained, deep rich in humus content and characteristically suitable for cereal crops, growth of coffee and different vegetation. The PH of the soil is in the range of 5.5 to 8.5

3.1.5 Vegetation

According to Limu Kosa District agricultural and rural development office (2016), types of vegetation exhibited were complex; the montane moist forest is common. The main types of plants available in large scales are evergreen and broad leaved plants. The vegetation coverage of the woreda is declining from year to year due to expansion of farm land, utilization of logging of the tree and for timber production. However the vegetation coverage of coffee farms; like Gummer, Kosa, Suntu and coffee investment farms are more conserved and in better management.

3. 2 Research Methods

3.2.1 Study design

A cross-sectional study was used to investigate traditional medicinal plants use by people under the study area and used to conduct and assess medicinal plants knowledge and attitude toward medicinal plants.

3.2.2 Selection of study sites

Out of the total "Ganda" in the District, the study has been conducted in the 5 "Ganda" with total residents of 17771 (according Limu Kosa District health office, 2017). The site has been selected based on the availability of the traditional healers and forest. The traditional healers were identified with the assistance of local authorities, elders and knowledgeable persons.

3.2.3 Sample size and sampling techniques

Sixty informants (49 males and 11 females) with the age of 20 to 80 have been selected from study sites regardless of sex, social status and educational background to involve in the study. Also fifteen key informants were selected systematically based on elders and authorities of the "Ganda". Informants from traditional healers have been selected by purposive sampling.

3.2.4 Population and health status of the study area

According to LKDAO (2017), the population of the study was the residents of LKD total population of 209,262 (male 105,626 and 103,636 are female). In Limu Kosa District; 44 local clinics, 8 governmental health centers, 1 governmental hospital and 14 private clinics were reported.

3.2.5 Methods of data collection

The techniques that have been used in ethnobotanical data collection were semi-structured interviews, group discussion and field observation.

3.2.5.1 Semi-Structured Interviews

Semi-structured interviews were employed to assess ethnobotanical data. Accordingly, Check list which consists of 21 questions was prepared in English and translated to Afan Oromo. The respondents were asked by Afan Oromo. The questions have been prepared in relating to;

Personal data of the respondents and

Information on medicinal plants

3.2.5.2 Group Discussion

Group discussion have been conducted at data collection site of selected kebeeles 4 to 6 informants and residents in seeking to understand managements of traditional medicinal plants and use of traditional medicinal system as well as how knowledge transferred from generation to next generations. Group discussion was guide by check list of question that have been prepared by English and translated to Afan Oromo.

3.2.5.3 Field Observation

Field observation was made with informants and interview on relevant data like, local (vernacular) name of plants, parts used, preparation methods, mode of administration, ailments and disease treated, habit of the plants, conservation methods and how knowledge have been transmited. The field observation was performed with assisting of local guides and also interview was collected from respondents.

3.2.6 Plant Specimen Identification

Medicinal plant specimens were collected from wild and cultivated areas. Preliminary identification was done in field. The collected voucher specimens were taken into Jimma University, mini Herbarium of Biology department. The identification was done using taxonomic keys and different volumes of flora of Ethiopia and Eritrean.

3.2.7 Data Analysis

Use full information of medicinal plants such as; part of plants used, their medicinal values, methods of preparation, ailments and disease treated and source of medicinal plants were computed by preference ranking, informant consensus, paired comparison and direct matrix ranking according to Martin (1995), Alexiades (1996), and Cotton (1996).

3.2.7.1 Descriptive statistics methods

Descriptive statistical method (percentage) was employed to analyze and summarize medicinal plants information on usage, practice and conservation methods. The most useful information collected from local communities was analyzed through descriptive statistics according to Martin (1995), Cotton (1996) and Alexiades (1996). Paired comparison, direct matrix ranking and informant consensus were computed. Tables and graphs were used to show data generated.

3.2.7.2 Paired comparison

This method of analysis used to judge level of importance and degree of preferences of selected medicinal plants. According to Martin (1995), the number of pairs was calculated by the formula, $n(n-1)/2$, where n is the number of items. This is by pairing, arranging using number table.

3.2.7.3 Preference ranking

Preference ranking is computed according Martin (1995), for medicinal plants to treat disease. Ten informants were randomly selected to identify the best preferred medicinal plant species for treatment. The selected informants were provided with medicinal plants reported to cure this disease with plants part. The value of each species was summed up and the rank for each species was determined based on the total score.

3.2.7.4 Direct matrix ranking

Direct matrix ranking was conducted following Martin (1995) and Cotton (1996) to conduct several attributes of medicinal plants which were commonly reported by key informants based on information gathered from informants. That is in order to compare multipurpose use of a given plant species based on information gathered from informants, number of multipurpose species were selected out of the total medicinal plants and use diversities of these plants.

3.2.7.5 Informant consensus

In order to confirm the reliability of information during the interview, informants were contacted at least 2-3 times for the same ideas and the validity of the information was proved and recorded. Consequently, if the idea of the informant deviates from the original information, it was rejected since it is considered as unreliable. Only the relevant ones were statistically analyzed. This method was adopted from Alexiades (1996).

4. RESULTS AND DISCUSSION

4.1 Back ground of the informants

4.1.1 Age of informant

In the study area (five **ganda**) a total of 60 informants took part, out these 49 (82%) were males were as 11 (18%) were females. Total informants age ranges from 20 to 80, out of these the age group of 41 to 50 were (25%) and the largest group. However the age between 71 to 80 were only (8.33%) (Table2).

Table2. Age group of informants of study area

Age group	Number of respondents	Percentage
21- 30	7	11.66%
31- 40	13	22%
41- 50	15	25%
51- 60	13	22%
61- 70	7	11.66%
71- 80	5	8.33%
Total	60	100%

4.1.2 Marital status of the respondents

Marital status of respondents indicates that (from personal information), 50 (83%) married, 6 (10%) divorce and 4(7%) were single (Table3).

Table 3.Marital status of informants

Marital status	Sex of informants		Total	Total percentage
	Male	Female		
Married	44	6	50	83%
Divorce	1	5	6	10%
Single	3	1	4	7%
Total	49	11	60	100%

4.1.3 Educational back ground of informants

Regarding educational back ground of informants, those who attended elementary level were 22(37%), followed by uneducated 16(27%) and the others were 22 informants (37%) (Table4).

Table4. Educational back ground of informants

Educational status	Number of Informants	Percentage of informants	Numberof medicinal plants reported	Percentage
Uneducated	16	27 %	105	31%
Reading and writing	8	13 %	30	9 %
Attended elementary level	22	37 %	118	35 %
High school	11	18 %	66	20 %
College	3	5 %	16	5 %
Total	60	100 %	335	100 %

4.1.4 Religion of informants of study area

Among 60 informants of the study area, highest numbers of informants were of Muslims 37 (61.66%), followed by Orthodox 15 (25%) and Protestant 8(13.33%).

4.3 Species richness of medicinal plants in the study area

The result showed that, the number of plant species found were 88 and grouped under 43 families and 79 genera. Source of medicinal plant revealed, 62 species were derived from wild (70.45%) and 26 species (29.54%) were cultivated plants. Wild vegetation were abundant, this indicates conservation in home garden was less. The result revealed that, Fabaceae preceding 10 (23.26%), followed by Lamiaceae 7(16.27%), Asteraceae, Solanaceae, and Euphorubiaceae each accounts 6(13.95%) and other 20 families attributies1 to 2 (46.51%) families (Appendix 1). This implies that medicinal plants were abundant and easily available to local people. Regarding the most cited families, local community have more knowledge than others species. This finding was agreed in line to the finding of (Haile Yinger *et al.*, (2008), on ethno medicinal plant knowledge and practice of the Oromo ethnic group in southwestern.

4.3.1 Growth forms of medicinal plants

The result indicates that, herbs were the abundant species, followed by shrubs (Figure 3).

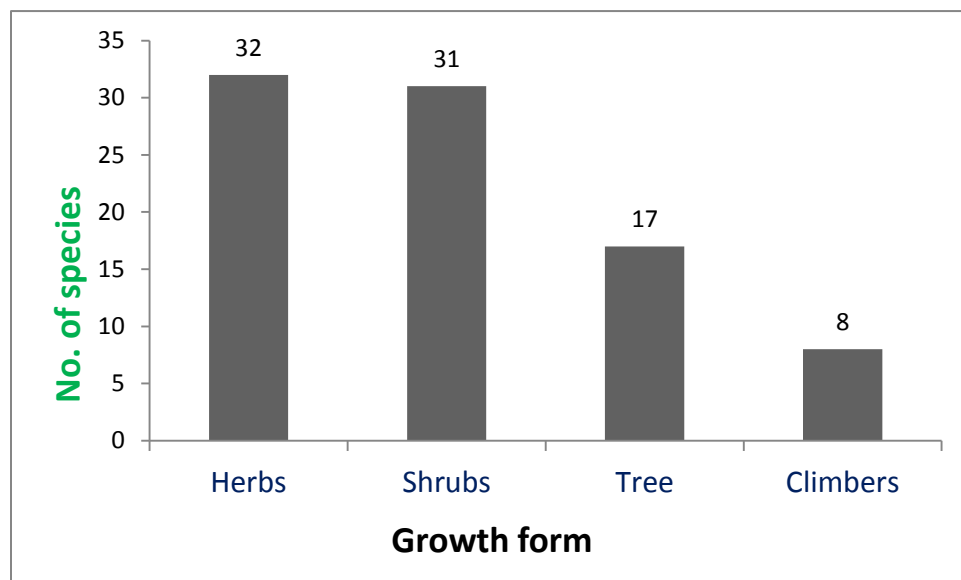


Figure 3. Habits of medicinal plants collected from study area

This study is in agreement with findings of ethnobotanical investigations of (Etana Tolasea , (2007) ; Bahilu Etana , (2010) in which herbs were first ranked and shrubs were followed.

4.4 Species richness of medicinal plants to treat human ailments

From the total collection of medicinal plants in the study area, 86 species were belonging to 77 genera and 42 families were recorded for treating human ailments. The family Fabaceae with 10 species (11.62%), followed by Lamiaceae 7(8.14%), Euphorbiaceae, Solanaceae and Asteraceae each accounts 6(6.97%), and other families (37), contribute 1 to 3 representatives species 35 (40.69%) of the total. This finding was in agreement with ethnobotanical investigation of (Etana Tolasea, (2007); Moa Megersa, (2010) in which family Fabaceae most dominant medicinal plant collected by local healers (Figure 4).

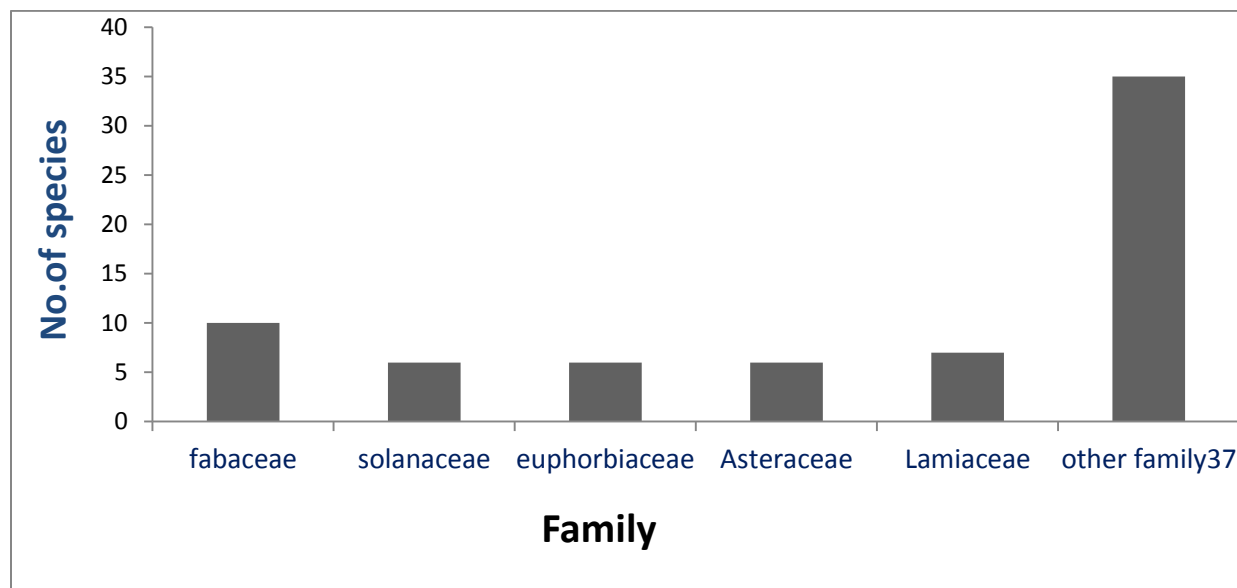


Figure4. Distribution of colleted medicinal plant family to treat human ailments

4.4.1 Source of medicinal plants to treats human ailments

The results indicated that, most of the medicinal plants were collected from wild where as others are from cultivated fields (Figure 5). As the result reveals that, local people most depend on wild plant species as remedies than cultivated once. Medicinal plants farming and conservation in home garden were less encouraged by practitioners' and local communities. The practice may lead for destruction and erosion of medicinal plants which show lack of proper management of plant species in the study area. This documentation was agree in line with some Ethiopian ethno botanical findings, in which more of medicinal plants were collected from wild than home garden(Zemedede Asfaw , (1997) ; Etana Tolasea , (2007) ; Bahilu Etana ,(2010).

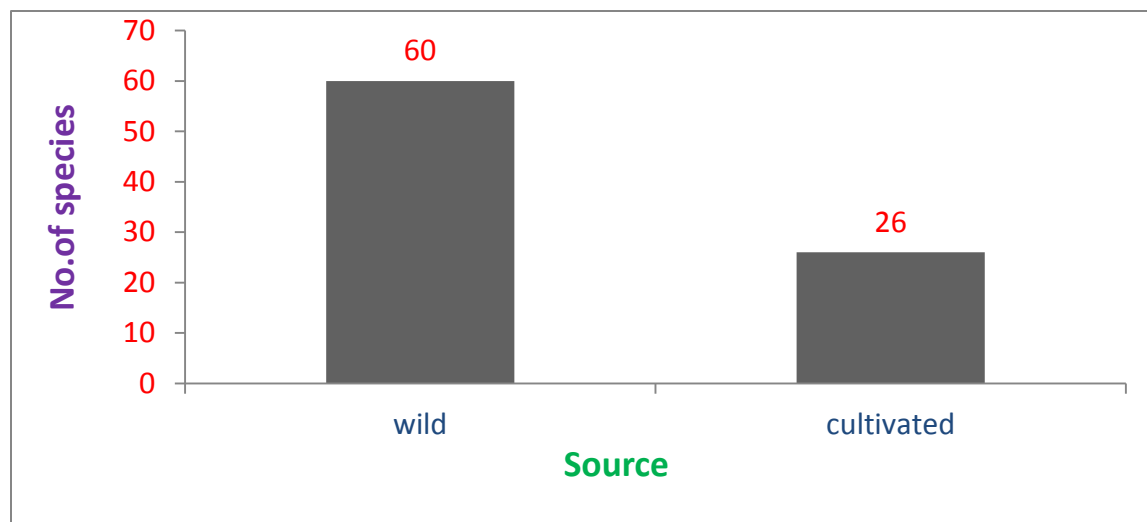


Figure5.Source of medicinal plants to treats human ailments

4.4.2Growth forms of medicinal plants in treating human ailments

Based on growth forms of medicinal plants collected from the study area shows that; herbs were highest species and shrubs followed (Fig.6). Investigation of the study area was in line agree with findings of (Eskedar Abebe, (2011); Bahilu Etana, (2010) ,ethnobotanical study on medicinal plants used by local community in Debark, North Gonder Zone and ethno botanical study of traditional medicinal plants of Goma Wereda, Jima Zone of Oromia Regional State respectively, in which herbs were high ranked in utilization.

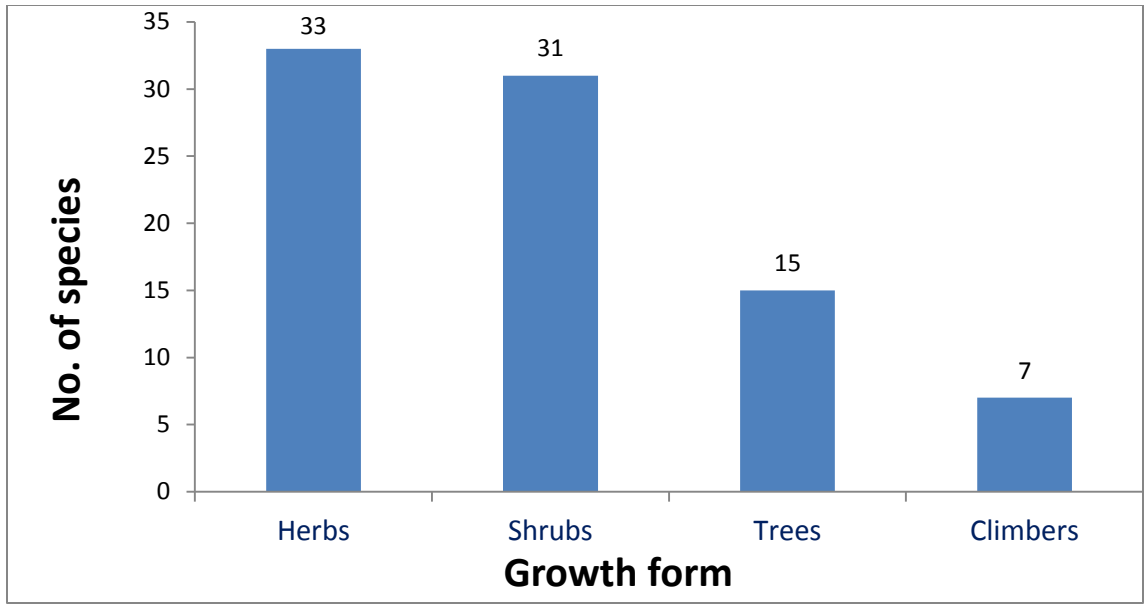


Figure 6. Growth forms of medicinal plants to treat human ailments

4.4. 3 Conditon of preparation of the remedies

The result indicates that, about three forms of preparations (fresh, dried both fresh and dried) were observed. Out of these, majority of medicinal plants materials prepared in their fresh form, followed by dried and both dried and fresh form (Fig.7). This finding was disagreeing with the finding of (Etana Tolasea, (2007) in which dry or fresh part of medicinal plants were largely recommended.

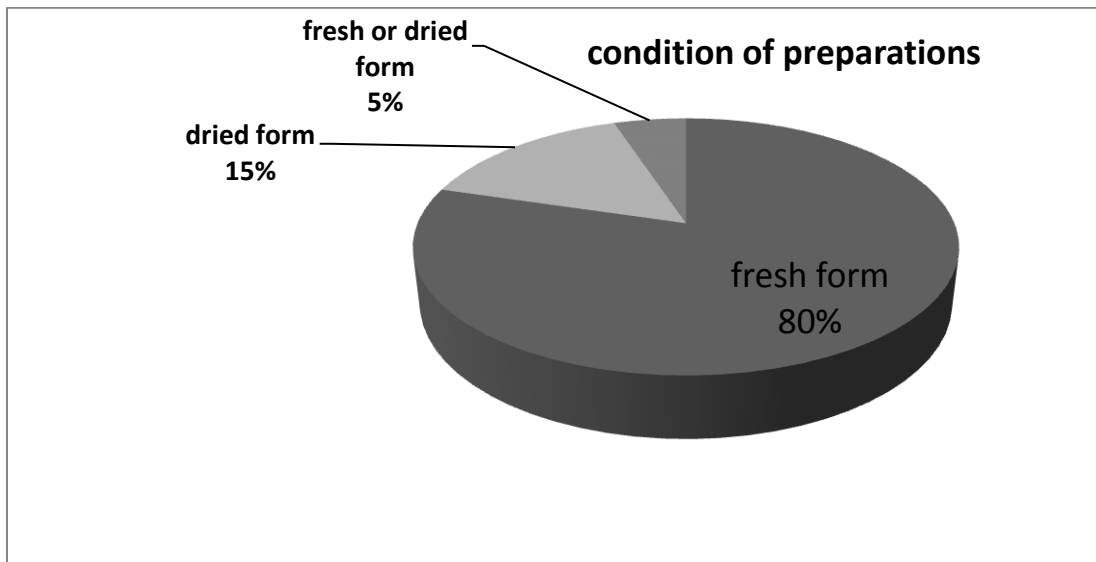


Figure7. Condition of preparations of medicinal plants for human ailments

4.4.4 Part of medicinal plants used in remedies preparations

The result indicated that, local inhabitants were used parts of plants in different ways as herbal medicines. Hence greater number of plant parts used as remedies were leaf, followed by root, seed bark and the others (Table 5). This show that, leaves could easily prepared, most affordable and its high chemical constituent for treatment of ailments. Regarding conservation of plants resource as compared to other part of plant part preparations have its own contribution for existence of species. Despite of leaves; root preparations were favored because of its chemical composition to treat certain ailments. For example, root of *Brucea antidysenterica* to treat rabies as the disease was intolerant killer. Eventhough the root preparation accounts less percent; the practice has been damaging and destructive to the plant species. The finding was agree with the result of (Bahilu Etana, 2010; Moa Megersa, 2010), in which leaves accounted more percent and roots were followed by part of medicinal plant utilized for preparations. There was condition in which different part of the same plant used for different purposes. For example, the leaf of *Carica papaya* cooked and filtered then drunk treat dysentery, seed of *Carica papaya* .; pounded then boiled drunk, to treat typhoid also root of *Carica papaya* ; crushed and mixed with water and used for washing mouth (brushing) treat toothache. There were also conditions in which more than one plants used in treating particular ailment. On the other hand, plant materials of the study area were prepared in single form which accounted for 63.8% where as 36.19% were prepared incombinations (mixture) form.

Table5. Plant part used in preparation of remedies in treatments human ailment

Part of medicinal plants used	Percentage
Leaf	54.28%
Root	17.14%
Seed	6.66%
Bark	5.71%
Bulb	1.9 %
Leaf and stem	4.76%
Bulb, seed and root	2.85%
Stem	1.90%
Fruit	1.90%
Latex (milk)	2.85%
Total 10	100%

4.4.5 Methods of preparation of medicinal plants

As result of the study revealed that, mode of preparations of remedies varired depending on types of disease treated and actual site of ailments. Thus, a total of 16 principal ways of preparations were recorded. Among them, crushing and squeezing were the most commonly used once (Table6).

Table6. Methods of preparations of medicinal plants for human ailments

Category of Preparations	Percentage (%)
Crushed and squeezed	26.42%
Pounded, powdered and mixed	17.28%
Crushed,pounded and mixed	10%
Roasted ,squeezed and mixed	1.42%
Chewed	9.57%
Cooked	7.85%
Powdered and mixed	6.16%
Crushed	1.42 %
Warmed	4.71%
Squeezed	5%
Crushed and mixed	4.28%
Grinded	1.42%
Putted under hot ash	1.42%
Putted on flame less fire	1.42%
Boiled	1.42%
Juice form	0.71%
Total 16	100%

4.4.6 Route of administration of medicinal plants

The result of the study revealed 14 routes of administration has been identified. The most favoured route of administration were drinking , which was followed by painting and bath (Table7).This finding in agreement in line with ethnobotanical investigation by (Eskedar Abebe,

(2011); Mengistu G|Hiwot, (2010) in which oral route of administration were dominant and followed by dermal or paint.

Table7. Categories of route of administration

Route of administration	Percentage (%)
Drinking	47.74%
Painting	16.78%
Bath	8.39%
Put on	6.45%
Spit	3.23%
Eat	3.23%
Warm	3.23%
Chewing	2.58%
Hanging	0.64%
Tying	1.29%
Fumigate	1.29%
Brush	1.29 %
Dropping	1.29%
Insert in	0.64%
Total 14	100%

4.4. 7 Dosage and measurements of medicinal plants

The traditional healers used various ways of prescription. This is based on; ages difference, type of disease treated, severity of medicinal plants, and time of prescription. The observed measurements were small finger, coffee cup; numbers of seeds, leaflets, root length, spoon, droplet, jug and bottle. More over, drinking with coffee, with milk and eating with food for dosage with out measurement were practiced by local healers.

4.4.8 Solvents and additives used in preparations of medicines

The result showed that, water was most frequently used for preparations of medicine where as, milk, butter, honey, salt and food were used as solvent.

4.4.9 Human diseases and plant species used

In the study area 50 different types of ailments were documented. One ailment can be treated with multi species or single plant species. Similarly in which one species can treat a single disease or a number of disease. For example, toothache treated with 14 species of medicinal plants, like toothache; evil eye also treated with nine species of plants. This shows that, alternatives of plant species for particular ailment. According to study area, some informants preferred the 13th month according Ethiopian calendar (**Kammee**) for collection of medicinal plants, also they prepare for the coming year in powdered form. In addition, there were preferred days and time to collect medicines (Friday and Wednesday in the morning). Thus, in line agrees with reported from Gimbi by (Etana Tolasea, (2007). In contrary many traditional healers respond that there was no preferred month, days and time restrictions for collection of medicinal plants rather as it needed. The practitioners keep medicinal plants knowledge secret by making processed form of medicinal plants for users.

4.5 Medicinal plant species used to treat both human and livestock ailments

Medicinal plant species collected to treats both human and livestock ailments were grouped in to 16 families, 20 genera and 20 species. Out of these, four families stood first; Asteraceae, Solanaceae, Fabaceae and Rutaceae comprise each two (40%) and others 12 families represented by one species (60%). Source of medicinal plant indicates that; 16 (80%) from wild and 4 species (20%) were collected from home garden. In respect of growth forms; shrubs were leading 9 species (45%) as trees were 5 species (25%), herbs and climbers consists each 3 species (15%). Accordingly, plants part used in preparations were; leaf is the most widely used 42.85% and which is followed by root 19.04%. Preparations of remedies includes; pounded, mix (40.9%); which was followed by crushed, pounded (31.81%) and the others techniques consists (27.27%) and their route of administration of medicines was drinking 85%, painting 10% and dropping 5%.

4.6 Number of species of medicinal plants used to treat livestock health

Problems

Out of collected medicinal plants in the study area, 22 species, 21 genera and 17 families were used in treatment of livestock health problems. Among these, shrubs were claimed the largest contribution 10 species (45.45%), followed by trees 5 species (22.72%) and the remaining herbs and climbers accounts 4 species (18.18%) and 3 species (13.63%) respectively. Family Fabaceae, Solanaceae, Cucurbitaceae, Asteraceae and Rutaceae each contributes equal species (Table8).

Table8. Number of families of medicinal plants to treat livestock

Family	Number of species	Percentage of species
Fabaceae	2	9.09%
Solanaceae	2	9.09%
Cucurbitaceae	2	9.09%
Asteraceae	2	9.09%
Rutaceae	2	9.09%
Total 17	22	100%

4.6.1 Source and growth form of medicinal plants in treating livestock ailments

The result revealed that, greater number of species was harvested from wild where as less species was collected from home gardens for treating livestock health problem (Fig.8).

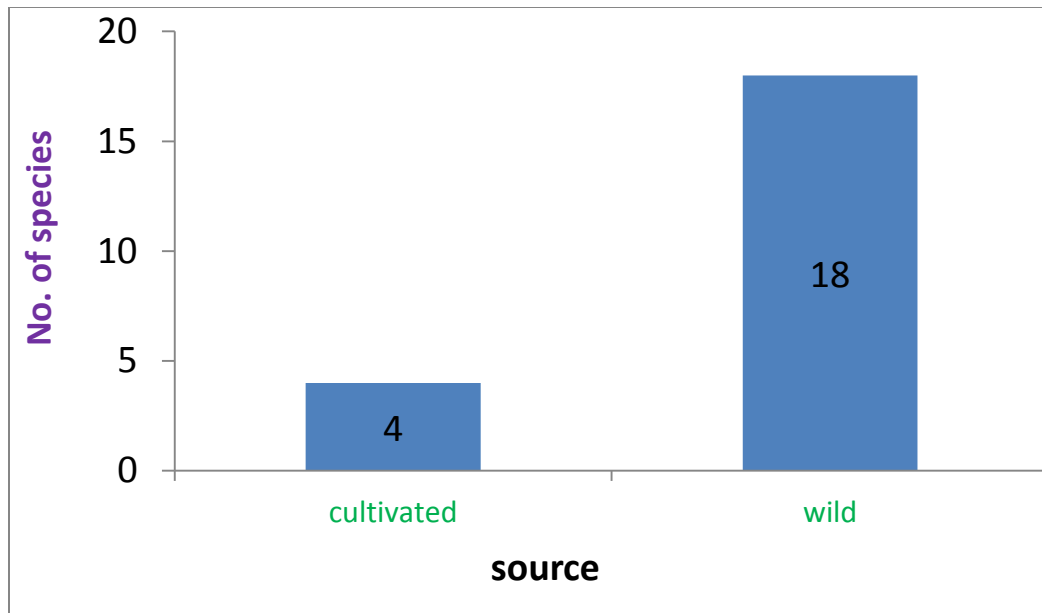


Figure 8. Source medicinal plants for treating livestock ailments

Growth forms of medicinal plants indicate that, shrubs stood first, followed by trees (Figure9).

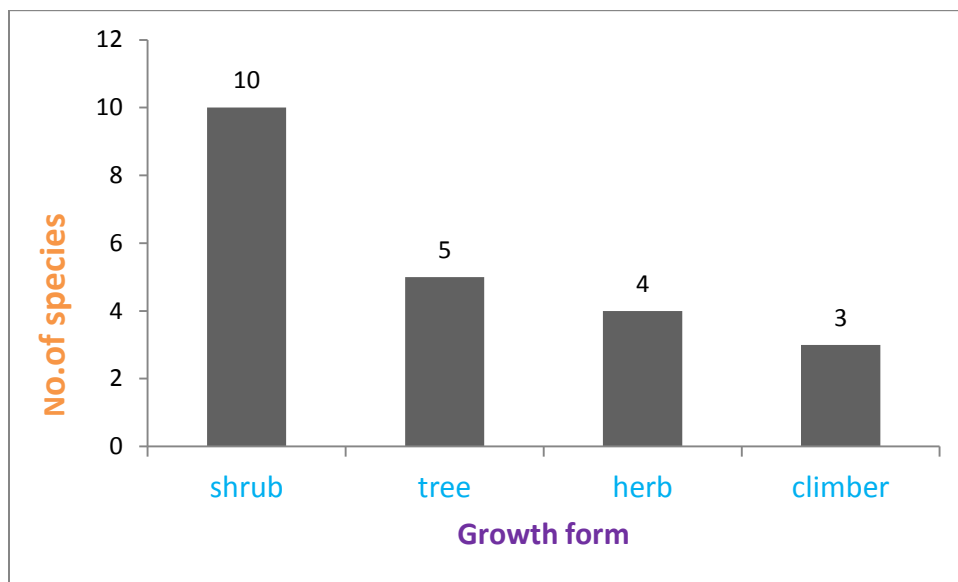


Figure 9. Growth forms of medicinal plants to treat livestock ailments

4.6.2 Conditions of preparation, part used and method of preparations of medicinal plants

Out of the total preparations of remedies in treating livestock ailments; fresh form of medicinal plants materials accounts 91% and 9 % was both dried and fresh (Fig.10).

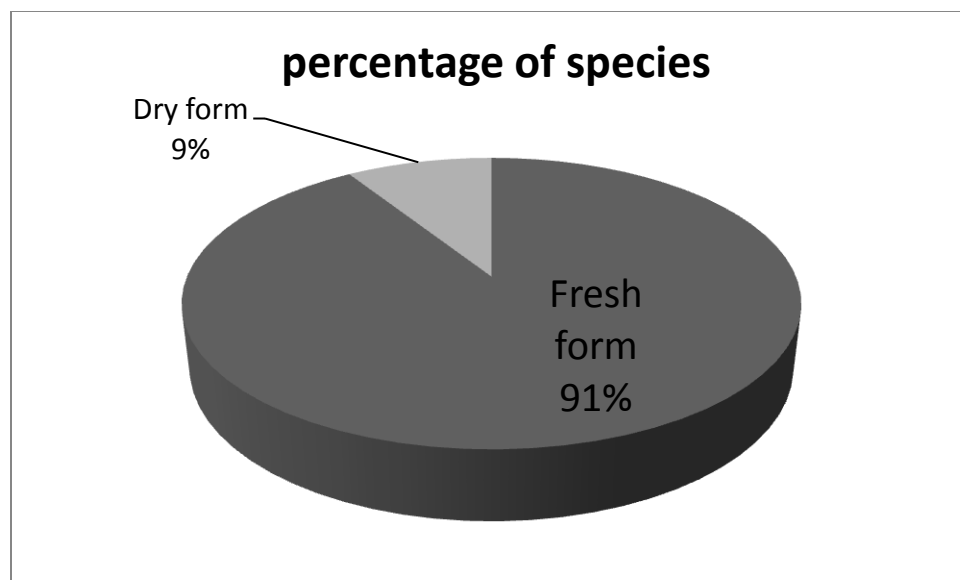


Figure10. Condition of preparations of medicinal plants to treat livestock ailments

The result of study showed that, medicinal plant part used to treat livestock ailments was similar to that of human medicinal plants part utilized. That was in which leaf was largely harvested and root were followed (Table9).

Table9. Plants part used in preparation of livestock medicine

Plant part used	Percentage
Leaf only	52.63%
Root	18.42 %
Fruit	5.26%
Bark	5.26%
Bulb	7.89%
Rhizome	2.63%
Seed	7.89%
Total 7	100%

Table10. Mode of preparations of medicinal plants in treatments of livestock

Method of preparations	Percentage (%)
Pounded, mixed	30.77%
Crushed, pounded and mix	26.92%
Crushed and squeezed	11.53%
Powdered and mixed	11.53%
Squeezed	7.69%
Pounded, powdered andmixed	3.84%
Putting on flat stone	3.84%
Crushed and mixed	3.84%
Total 8	100%

4.6.3 Route of administration of medicinal plants in treatments of livestock

Depending on nature of ailments, communities of the study area applied different route of administrations. Drinking was the most favored route, followed by washing, and the other (Fig.11). There are conditions in which different part of the same plant used for different purposes. There are also cases in which more than one plants used in treating particular ailment. For example, blakleg treated with six medicinal plants (*Brucea antidysenterica*, *Cucumis ficifolius*, *Allium sativum*, *Brassica carinata*, *Lepidum sativum* and *Echinops kebericho*).

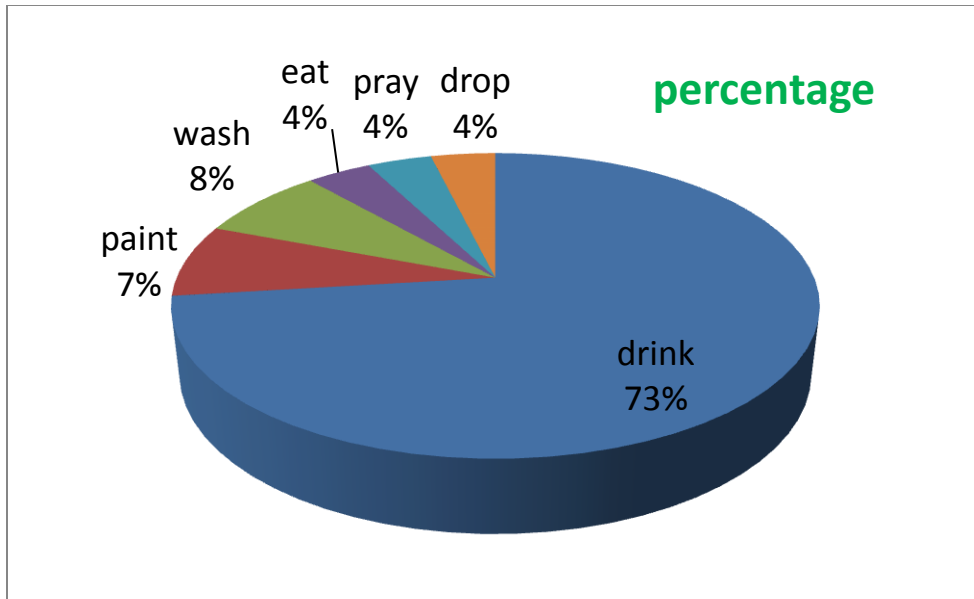


Figure11. Route of administration of medicinal plants to treat livestock ailment

4.7 Medicinal plants used to treat human ailments only, Livestock only, and both human and livestock ailments

Table10. Number of medicinal plants to treat only human, livestock only and both human and livestock ailments

category	Plant species used	Percentage
Medicinal Plant species only used for treating human ailments	66	75%
Medicinal Plant species only used for treating livestock ailments	2	2.27%
Medicinal plants used for in treating both human and livestock ailments	20	22.73%
Total	88	100%

4. 8 Ranking and scoring of some important medicinal plants

4.8. 1 Paired comparison

Paired comparisons were done for most preferred medicinal plants to treat rabies. For this, eight key informants were requested to rank six species of medicinal plants according to effectiveness to treat rabies. Out of the listed medicinal plant species, *Justicia schimperiana* was most ranked species as *Brucea antidysenterica* was least favored by traditional healers (Table12)

Table12. List of medicinal plants and informants paired comparison

Medicinal plant	R ₁ —R ₈								Total	Rank
	R ₁	R ₂	R ₃	R ₄	R ₅	R ₆	R ₇	R ₈		
<i>Pytolacca dedocandra</i>	4	6	6	2	3	4	5	6	36	2 th
<i>Justicia schimperiana</i>	5	6	6	4	5	6	4	6	42	1 th
<i>Euphorbia ampliphylla</i> .	2	4	1	6	4	3	3	3	29	4 th
<i>Brucea antidysenterica</i>	4	6	1	2	5	1	2	2	24	6 th
<i>Cucumis ficifolius</i>	6	5	4	5	3	3	5	4	35	3 th
<i>Pycnostachys abyssinica</i>	1	4	3	6	2	2	4	4	26	5 th

4.8.2 Preference ranking

In the study area preference ranking was carried out on medicinal plants that were effective in treating toothache by ten key informants. According to their perception, traditional healers rated plant species effective to treat toothache, *Datura stramonium* 44, then *Pycnostachys abyssinica* 38 and *Premna schiperi*.32 (Table13).

Table13. Informant's preference ranking

Scientific name	Respondent(R ₁ ---R ₂)										Total	Rank
	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	R-10		
<i>Premna schiperi</i>	4	6	3	4	2	1	2	3	4	5	32	3 rd
<i>Datura stramonium</i> L.	5	6	3	2	6	4	5	6	4	3	44	1 st
<i>Clerodendrum alatum</i>	3	2	5	2	3	3	2	2	1	3	26	6 th
<i>Pycnostachys abyssinica</i>	6	4	3	5	3	3	4	5	3	2	38	2 nd
<i>Clematis simensis</i>	2	4	4	2	1	2	4	2	1	5	27	5 th
<i>Brucea antidysenterica</i>	2	3	4	4	5	2	3	3	2	1	31	4 th

4. 8.3Direct matrix

Based on information gathered from study area, out of the total medicinal plants; direct matrix was performed on seven multipurpose uses of medicinal plant (Table 14). Commonly reported plant was selected by key informants on use and diversity of the species.

Table14. Plant species used in direct matrix

List of plants species	Main use							Total	Rank
	Medicinal	Food	Charcoal	Firewood	Construction	Fence	Furniture		
<i>Cordia africana</i>	3	0	3	3	1	0	3	13	5 th
<i>Croton macrostachyus</i>	5	0	6	6	3	5	0	25	1 st
<i>Combretum collinum</i>	5	0	4	5	5	0	4	23	2 nd
<i>Stereospermum kunthianum</i>	3	0	3	2	3	3	0	14	4 th
<i>Erythrina brucei</i>	6	0	4	3	2	6	0	21	3 rd
<i>Olea europaea</i> <i>L.subsp cuspidate</i>	2	0	0	2	2	2	0	8	7 th
<i>Bersama abyssinica</i>	2	0	1	2	2	2	0	9	6 th

4.8.4 Informant consensus

According to application of medicinal plants in the study area indicates that, *Ocimum lamiifolium* were more cited by 19 informants (31.66%) than others because of preference of the species to treat fibril disease and followed by *Zerhneria scabra*/Linn.f.|Sond 11(18.33%) and *Ocium gratissium* 11 (16.66%) (Table15).

Table15. List of medicinal plants and their informant consensus

Scientific name	Local name	Number of respondents	Percentage	Rank
<i>Ocimum lamiifolium</i>	Damakasee	19	31.66%	1 st
<i>Justiciaschimperiana</i>	Dhmugaa	7	11.66%	6 th
<i>Allium sativum</i>	Qullubbii adii	7	11.66%	6 th
<i>Brucea antidysenterica</i>	Qomanyoo	9	15%	4 th
<i>Calpurina aurea</i>	Ceekaa	9	15%	4 th
<i>Pytolacca dodecandra</i>	Andodee	8	13.3%	5 th
<i>Zerhneria scabra</i>	Hidda midhaan lo'aa	11	18.33%	2 nd
<i>Ocium gratissium</i>	Ancabbii	10	16.66%	3 rd
<i>Rumex nepalensis</i>	Baaruudaa	7	11.66%	6 th
<i>Climatis simennsis</i>	Hidda fiitii	6	10%	7 th
<i>Artemisia abyssinica</i>	Gooddoo gurraacha	6	10%	7 th
<i>Croton macrostachyus.</i>	Makkannisa	7	11.66%	6 th

4.8.5 Fidelity level index (FI)

Fidelity level (FL) values were calculated for some commonly used medicinal plants against some commonly reported ailments (FL% = $lp/lu \times 100$, FL %): *Rumex nepalensis* (against foot

skin rash), *Artemisia abyssinica* (against evil eye), *Ocimum lamiifolium* (against fibril illness), *Ruta chalepensis* against stomacheache and *Justicia schimperiana* (against rabbies) (Table16). In this study, FL was used to determine the relative healing potential of five medicinal plants against human ailments based on the proportion of informants agreement on the use of a given medicinal plant against a given ailment category. High FL was an indicator of efficacy of reported medicinal plant to cure specific ailments. Forexample, *Ocimum lamiifolium* (againstfibril illness) and *Justicia schimperiana* (against rabies).

Table16. Fidelity level index of some medicinal plants in the study area

Medicinal plant	Ailmentstreated	N _p	N _u	FL	FL%
<i>Rumex nepalensis</i>	Foot skin rash	7	9	0.77	77.77%
<i>Ocimum lamiifolium</i>	Fibril	17	19	0.89	89.47%
<i>Justicia schimperiana</i>	Rabbies	8	9	0.88	88.88%
<i>Artemisia abyssinica</i>	Evil eye	6	8	0.75	75 %
<i>Ruta chalepensis</i>	Stomache ache	8	11	0.72	72.72%

4.9 Threats to medicinal plants knowledge in the study area

Plant resources have an immense role in human livelihood for numerous aspects. The threating factors could be natural factors (habitat degradation, drouht) and human factors. The main threating factors of study area reported was: firewood and charcoal (9 species, 10.22%); furniture (2 species, 2.27%); construction (3 species, 3.40%); live fence (4 species 4.54%); food (13 species 14.77%); timber production (2 species 2.27%); expansion of farm land, overgazing and others consists (21 species, 23.86%). As the result revealed that, greater number of medicinal plants availability and species richness was damaged by human activity. According to documented; 45 (75%) of the informants responds that, the demand of medicinal plants in the future will decreases, 5 informants (8.33%) will remains the same and 10 informants (16.66%) responds that, it will unkown. Regarding conservation of medicinal plants; 24 respondets (40%) were conserve very rare species of medicinal plants in their home garden while 36 respondets (60%) have no any conservation action. Because of human action medicinal plants of the study

area was highly threatened. Out of these, *Cordia africana*, *Cucumis ficifolius*, *Aleo pubescens*, *Olea europaeae L.subsp cuspidate*, *Pentas lenceolata*, *Verbascum sinuatum* and *Ximenia americana*.

4.10 Management of medicinal plants in the study area

Plants resource as whole and medicinal plants in specific would use for many reasons by local people. So, management of these resources should always go hand in hand to ensure sustainability of the resources. According to study area, some medicinal plants were harvested for many purpupose. Fore example, plants which were selected in direct matrix ranking: *Croton macrostachyus* and *Combretum collinum* were utilized for medicinal, charchol, construction, fire wood and furniture. To ensure the availblity of resources, some measures that have to be implements are: establishing in-situ and exsitu preserving method, increasing diversity species of medicinal plants in homegardens, giving special attention for those threatened species and creating awareness among the traditional healers and community.

4.11 Medicinal plants knowledge transfer

The result of study area shows that, source of knowledge on medicinal plant resource was from close relatives and parents (Table17). All of of traditional healers (60) confirm that, make their knowledge secure and intentional during collections (harvesting) of remedies. Regarding acquisition of knowledge, as observed during field visits and interview that, young generation lack of positive attitude and interest to learn from elders, under estimation of the knowledge and lack of documentation was problems obsereved.

Table17. Medicinal plants knowledge transfer

Source of traditional knowledge	Number of respondents	Percentage
Relatives	25	42%
Mother, brother and sister	21	35
Father	10	17
Others	4	6
Total	60	100%

4.12 Conclusion and recommendation

4.12.1 Conclusion

Limu Kosa is one of the Oromia regional states which are rich in abundance of medicinal plants as well as knowledge of medicinal plants practice. So that, local people of Oromo ethnic society were well known in treating some common human ailments like; (liver problems, rabies, swelling of the whole body, evil eye, foot skin rash , worm poison, spider urine and livestock ailments (breast swelling and blotting) can be treated by local people. The results of the study revealed that, eighty-eight (88) medicinal plants were reported; of which eight-six (86) were noted to treat 50 human ailments as twenty-two (22) species were to treat 12 live stock ailments, while twenty (20) species were treats both human and livestock ailments. Family fabaceae was which contributes 10 species (23.26%), followed by Lamiaceae 7 species (16.27%). Regarding growth form of medicinal plants; 32 herbs, as 31 species were shrubs and the majority of medicinal plants 62 species (70.45%) were collected from wild resources and 79.6 % of the remedies were prepared from fresh materials. Leaves were part of medicinal plant largely utilized for remedies and most favored route of administration was drinking. Lack of standardized measurements and dosage was problems documented on usage of the medicinal plants.

4.13.2 Recommendations

Based on results of investigation, the following recommendations were forwarded

- Encouraging local people in order to grow medicinal plants in their home gardens.
- Concerned governmental bodies have to design conservation measures of medicinal plants into school curricula to enhance young generation awareness.
- Governmental bodies like health office, educational office, agricultural and conservation of resources have to create awareness in the community.
- Up-grading traditional ways of practice of medicinal plants to modern way through further investigation and confirming local practices through scientific investigations.
- Encouraging young generations to ask and learn more from parents, elders and community.

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Appendices

Appendix1. Medicinal plant collected from study area with different families

Family	Number of genera	No.of plant species	Percentage
Acanthaceae	1	1	1.14%
Alliaceae	1	1	1.14%
Aloaceae	1	1	1.14%
Amaranthaceae	1	1	1.14%
Anacardiaceae	1	1	1.14%
Apiaceae	1	1	1.14%
Apocynaceae	1	1	1.14%
Asparagaceae	1	1	1.14%
Asteraceae	2	6	6.81 %
Bignoniaceae	1	1	1.14%
Boraginaceae	2	2	2.27%
Brassicaceae	1	2	2.2%
Caricaceae	1	1	1.14%
Combretaceae	1	1	1.14%
Commelinaceae	2	2	2.27%
Crassulaceae	1	1	1.14%
Cucurbitaceae	1	3	3.4%
Drcaenaceae	1	1	1.14%
Euphorbiaceae	2	6	6.81 %
Fabaceae	2	10	11.36 %
Lamiaceae	2	7	7.95 %
Linaceae	1	1	1.14%
Malvaceae	1	2	1.14%
Melanthaceae	1	1	1.14%
Meliaceae	1	1	1.14%
Menispermaceae	1	1	1.14%

Myrsinaceae	1	3	3.4%
Oleaceae	1	2	2.27%
Phytolaccaceae	1	1	1.14%
Plantaginaceae	1	1	1.14%
Poaceae	1	2	2.27%
Polygonaceae	2	2	2.27%
Ranunculaceae	1	1	1.14%
Rhemnaceae	1	1	1.14%
Rubiaceae	1	1	1.14%
Rutaceae	1	2	2.27%
Rosaceae	1	1	1.14%
Scrophulariaceae	1	1	1.14%
Simaroubaceae	1	1	1.14%
Solanaceae	2	6	6.81%
Urticaceae	1	1	1.14%

Appendix 2.Lists of Human diseases in the study area and number of plants species used

No.	Name of ailments in afaan oromoo	Equivalent medicinal terms	Number of plant species treat the diseases
1	Abba seeruu	Chancroid	2
2	Alarjikii	Allergic	1
3	Ameebaa	Dysenteric	2
4	Asmii	Asthma	2
5	Baarillee	Tinea corporis	1
6	Budaa	Evil eye	8
7	Busaa (Bisollaa)	Malaria	1
8	Buutii	Snake sight	3
9	Cinninnaa bofaa	Snake bite	1
10	Cittoo	Scabies	3
11	Cophxoo	Gonorrhea	5
12	Dhullaa	Swelling	4
13	Dhiibaa dhiigaa	Hypertension	6
14	Dhiitoo	Swelling	5
15	Dhiibee garaa	Stomachache	12
16	Dhukkuba golfaa	Typhoid fever	2
17	Dhukkuba ilkaanii	Toothache	12
18	Dhukkuba garaa	Intestinal problem	3
19	Dhodhootoo	Tania versicolaries	3
20	Dhuukkuba kale	Kidney problem	1
21	Dhukkuba gurraa	Ear disease	2
22	Dhukkuba mataa	Headache	2
23	Dhukkuba garrachaa	Gastirities	2
24	Dhukkuba qonqoo	Tonsillitis	4
25	Dhukkuba sammuu	Mental problem	1
26	Dhukkuba saree	Rabies	6
27	Dhullaa	Swelling	4
28	Foroforii	Dandruff	2
29	Funuuna	Nasal bleeding	2

30	Hadhaa	Worm poison	4
31	Hafuura lafaa	Swelling the whole body	1
32	Hollachiisaa	Sudden sickness	2
33	Joonjii	Anemia	1
34	Garaa kaasaa	Diarrhea	7
35	Gubaa ibiddaa	Fire burn	5
36	Madaa	Wound	5
37	Kormammuu	Hemorrhoids	4
38	Michii	Febrile illness	3
39	Qaaman muramu	Skin cut	3
40	Nyaataa qaama keessaa	Rheumatism	7
41	Qolla qusil	Prolonged wound	2
42	Raammoo garaa	Intestinal worm	2
43	Raammoo maagaa	Ascaris	3
44	Sariitii	Spider urine	8
45	Sibijii	Foot skin rash	2
46	Simbira	Leishmaniasis	2
47	Sabata waqqayyoo	Liver problem	4
48	Ulfa baasuu	Abortion	1
49	Xaxarii	Skin head disease	1
50	Xiraa'uu afaanii	Bad mouth smell	2

Appendix3. List of livestock diseases in the study area treated by medicinal plants

No.	Livestock disease	Number of plant species treat the diseases
1	Blotting	2
2	External infection	4
3	Breast swelling	2
4	External parasite	7
5	Rabies prevention	2
6	Intestinal problem	6
7	“Goggogsaa”	2
8	Sudden sickness	4
9	Blackleg	6
10	Sheep cough	1
11	Shoulder wound	1
12	Diarrhea	5

Appendix4. Check list for semi-structured interview question for collecting ethno botanical data.

A. General Information

1. Information on respondents:

Date of interviewee_____ Kebele_____ Name of interviewer_____

2. Name of respondent _____ Gender: M_____F_____ Age_____

Religion: Orthodox_____ Muslim _____ Protestant _____ Other_____

Educational Level _____Marital status _____

How long have lived in the area_____

B. Ethno botanical data

3. List Plants Species used to treat human and animal disease in your area

3.1Plants used to treat human disease:

	Local name of plants	Disease treated	Part of plant used	Habitat	Preparation	Route of administration	of collection
A							
B							
C							
D							
E							

3.2 Plants used treat animal disease

	Local name of plants	Disease treated	Part of plant used	Habitat	preparation	Route of Administration	Collection
A							
B							
C							
D							
E							

4. Are members of community frequently use MPs as modern medicine?

Yes _____ No _____

5. How would the knowledge of MP passed to family member or to generation?

6. Are taboos in collecting and utilization of medicinal plants?

7. Do you think the demand for MP most used by communities will be high or low in the future?

1) Will remain high

3) Will decrease

2) Will remain the same

4) I cannot tell

8. Which Season is preferred for collection of most MPs in your area?

Spring _____ Summer _____ Autumn _____ Winter _____

9. Where do most of your customers come from?

Within town----- Form out of town----- From other province-----

I don't know-----

10. Are more of your Customers: Male _____ Female _____

11. Are your customers: poor _____ literate _____ illiterate _____ Wealth _____

12. What would you use if certain plants are no longer available?

13. Do you think your customers are comfortable coming to a traditional healer?

14. What are threatening factors MPs in your area?

Food _____ Construction _____ charcoal _____ Fence _____ fire wood _____
furniture _____ edible fruit _____ others _____

15. Particularly which medicinal plant is threatened in your area? _____

16. How you will have conserve and manage MPs species in your area? _____

17. What units of Measures do you use for selling the medicinal plants?

Hand full----- Cup----- Others-----

18. Why do you think customers come to your shop instead of visiting clinic?

Wants traditional medicine_____ there is no clinics close to their live _____

Could not be cured at clinic_____ modern medicine may too expensive_____

19. Do your customers ask for medicinal plants by name or do they tell their problem?

20. How long can you keep medicinal plants their shelf life? month____, week _____ year _____

Others _____

21. Is medicinal plants used as remedies are; dry, fresh or both dry fresh?

Appendix 5.Number of medicinal plants collected from Kebele's and their percentage.

Study site(Ganda)	No. of medicinal plants collected	Percentage
Welensuu	24	27.27 %
Gennet 02	14	15.90%
Mendera	22	25%
Cakewo	13	14.77%
Debelo	15	17.04%
Total of 5 Kebeles	88 species	100%

Appendix6.Scientific, family and local name and collection no. of medicinal plants in study area

Scientific name	Family	Local name	Habit	Source	Collection no.
<i>Achyranthes aspera</i> L.	Amaranthaceae	Togee	H	W	LK 079
<i>Agertum conyzoides</i>	Asteraceae	Sudee	H	W	LK 076
<i>Aleo pubescens</i> Reynolds	Aloaceae	Hargiisa	Cl	W	LK040
<i>Alibiza schimperiana</i>	Fabaceae	Ambabbeesa	T	W	LK004
<i>Ajuga intesrifolia</i> Buch.Ham	Lamiaceae	Harma gusaa	H	W	LK041
<i>Allium sativum</i> L.	Alliaceae	Qullubbii	H	C	LK 068
<i>Artemisia abyssinica</i>	Asteraceae	Goddo gurracha	H	C	LK036
<i>Asparagus africanus</i> Lam.	Asparaguaceae	Sartii	Cl	W	LK073
<i>Bersama abyssinica</i> Fresen	Meliantaceae	Lolichiisaa	T	W	LK055
<i>Brucea antidysentrica</i>	Simaroubaceae	Qomanyoo	Sh	W	LK065
<i>Brassica carinata</i> A.Br.	Brassicaceae	Raafuu	H	C	LK070
<i>Calpurnia aurea</i> (A.t.)Benth	Fabaceae	Ceekaa	Sh	W	LK021
<i>Capsium frutescens</i> L.	Solanaceae	Mixximixa	H	C	LK093
<i>Carica papaya</i> L.	Caricaceae	Pappayaa	Sh	C	LK062
<i>Carissa spinarum</i> L.	Apocyanaceae	Agamsa	Sh	W	LK003
<i>Clerodendrum alatum</i> Gurke	Lamiaceae	Harmaguusaa	H	W	LK041
<i>Clerodendrum myricoides</i>	Verbenaceae	Misira	H	C	LK060
<i>Citrus limon</i> L.	Rutaceae	Lomii	Sh	C	LK054
<i>Clematis sensis</i> Fresen	Ranunculaceae	Hidda fitii	Cl	W	LK042
<i>Coffee Arabica</i>	Rubiaceae	Buna	Sh	C	LK015
<i>Combretum collinum</i> Fresen	Combretaceae	Anunnuu	T	W	LK008
<i>Commelina dyferse</i>	Commelinaceae	Laaluncaa	H	W	LK053
<i>Commelina lantifolia</i> Hochst ex A.Rich	Commelinaceae	Sunqqoo(Abiishii	H	C	LK095
<i>Cordia africana</i> Lam	Boraginaceae	Wadessa	T	W	LK083
<i>Croton macrostachyus</i> Del.	Euphorbiceae	Makkannissa	T	W	LK058

<i>Cucumis ficifolius</i> USA.Rich	Cucurbitaceae	Faca'aa	W	Cl	LK030
<i>Cuculyptus globulus</i> Labill	Myrtaceae	Bargamoo adii	T	C	LK014
<i>Cupresses procera</i> L.	Fabaceae	Gatiraa	T	C	LK032
<i>Cyathula polycephala</i> Back	Amaranthaceae	Maxxannee adii	Sh	W	LK057
<i>Datura stramonium</i> L.	Solanaceae	Asaangira	Sh	W	LK010
<i>Dracaena steudneri</i>	Dracaenaceae	Algee	Sh	W	LK012
<i>Cymbopogon citratus</i> L.	Poaceae	Xajji saar	H	C	LK085
<i>Cynodon dactylon</i> (L.) press	Poaceae	Coqorsa	H	W	LK023
<i>Echinops kebericho</i> Mesfin	Asteraceae	Qabarichoo	Sh	W	LK063
<i>Ekebrigia cepensis</i> Sparm	Maliaceae	Somboo	T	W	LK094
<i>Ehretia cymosa</i> Thonn	Boraginaceae	Ulaaga	T	W	LK081
<i>Erythrina bruci</i> Schweinf	Fabaceae	Waleensuu	T	W	LK084
<i>Euphorbia ampliphylla</i>	Eurobiaceae	Adaamii	Sh	W	LK002
<i>Euphorbia tirucalli</i> L.	Euphorbiaceae	Cadaa	Sh	W	LK020
<i>Foeniculum vulgare</i> Mill	Apiaceae	Insilala	H	C	LK049
<i>Guiztia scabra</i>	Asteraceae	Hadaa	H	W	LK039
<i>Hemliments stacinus</i> (Ait) Emeey.ex. Steud	Euphorbiaceae	Hidda oomachiisaa	Cl	W	LK105
<i>Indigofera arrecta</i> Hoch St ex A.Ric	Fabaceae	Ennaa	Sh	W	LK029
<i>Indigofera spicata</i> Forssk	Fabaaceae	Harancii	H	W	LK048
<i>Justicia schimperiana</i> Hochst.ex. Nees	Accanthaceae	Dhummuugaa	Sh	W	LK025
<i>Koteletzkya adoensis</i>	Malvaceae	Qubbulloo	H	W	LK104
<i>Kalanchoe laciniata</i> (L.)Dc	Crassulaceae	Bossoqqee	H	W	LK017
<i>Lageraria siceraria</i> (Melina) Stand	Cucurbitaceae	Buqqe hadhaaa	H	C	LK018
<i>Lepidiu sativium</i> (L.)	Brassicaceae	Shiinfaa	H	C	LK100
<i>Linum usitatissium</i> (L.)	Lineaceae	Talbaa	H	C	LK096
<i>Lippia adonesis</i> Hoch St.exwal P	Verbanaceae	Kusaayee	Sh	W	LK052
<i>Maesa lanceolata</i> Forssk	Myrsinaceae	Abbayyii	T	W	LK001

<i>Nicotiana tobacum</i> L.	Solanaceae	Tambo	H	C	LK078
<i>Ocium gratissium</i> (L.)	Lamiaceae	Ancabbii	Sh	W	LK006
<i>Ocium lamiifolium</i> Hoch St Benth	Lamiaceae	Damakasee	Sh	W	LK024
<i>Olea europaea</i> L.subsp cuspidata	Olaaceae	Ejersa	T	W	LK028
<i>Pcnostachys abyssinica</i> Fresen	Lamiaceae	Yeeriyoo	Sh	W	LK086
<i>Pentas lenceolata</i>	Amaranthaceae	Surma leencaa	H	W	LK077
<i>Phytolacca dodecandra</i> L'Herit	Phytolacaceae	Andoodee	Cl	W	LK007
<i>Platogo lanceolata</i> L.	Plantaginaceae	Qorxobbii	H	W	LK066
<i>Prema schiper</i> Engl.	Lamiaceae	Urggeessaa	Sh	W	LK082
<i>Prunu persica</i> (L.)Batsch walp	Rosaceae	Kookii	T	C	LK092
<i>Psidium guajava</i>	Myrtaceae	Zayituunaa	Sh	C	LK087
<i>Rhamnus prinoides</i> L'Herit	Rhemnaceae	Geeshoo	Sh	C	LK034
<i>Rcinus communis</i> L.	Euphorbiaceae	Qobboo	Sh	W	LK046
<i>Rumex nepalensis</i> Spreng.	Polygonaceae	Baaruda	H	W	LK019
<i>Rumex abyssinicus</i>	Polygonaceae	Moqmoqqoo	Sh	W	LK059
<i>Ruta chalepensis</i> L.	Rutaceae	Cilladdama	Sh	C	LK022
<i>Satureja abyssinica</i> (Benth.)Briq	Lamiaceae	Xoosinyii	Sh	C	LK097
<i>Schinus molle</i> L.	Anacardiaceae	Qundda barbarree	H	C	LK069
<i>Senna septemtrionals</i> (Viv.)Ir win and Barneby	Fabaceae	Sanamakii	Sh	W	LK072
<i>Sida schimperiana</i> Hoch St.ex.A.Rich	Malvaceae	Kotte harree	Cl	C	LK074
<i>Solanium giganteum</i> Jacq	Solanaceae	Hiddii saree	Sh	W	LK047
<i>Solanium incunium</i> L	Solanacea	Hiddii sa'aa	Sh	W	LK046
<i>Stephania abyssinica</i> /Dilin and Rich Ward	Menispermeae	Atara kuruphee	H	W	LK044
<i>Stereospermum kunthianum</i>	Bignoniaceae	Botoroo	T	W	LK016
<i>Trifolium multine</i> rve	Fabaceae	Siddisa kormaa	H	W	LK075
<i>Tragia brevipes</i> paxa	Euphorbiceae	Gurgubbee	T	W	LK088
<i>Urtica simensis</i>	Urticaceae	Doobbii	H	W	LK026

<i>Verbascum sinuatum</i> Benth	Scrophulariaceae	Gurra harree	H	W	LK038
<i>Vernonia amygdalina</i> Del.	Asteraceae	Ebicha	T	W	LK027
<i>Vernonia auriculifera</i>	Asteraceae	Reejjii	Sh	W	LK071
<i>Vigna vexillata</i> L.	Fabaceae	Gurra hantuutaa	H	W	LK037
<i>Vicia faba</i> L.	Fabaceae	Baqqelaa	Sh	C	LK090
<i>Withania somnifera</i> (L.)	Solanaceae	Gizzawwaa	Sh	W	LK035
<i>Ximenia Americana</i> L.	Olacaceae	Hudhaa	T	W	LK091
<i>Zehneria scabra</i> /Linn.f. Sond	Cucuribaceae	Hidda midhaan lo'aa	Cl	W	LK045
<i>Zingiber officiale</i> Roscoe	Zingibraceae	Ginjibila	H	C	LK050

Appendix7. List of Medicinal plants used to treat human disease in the study area: Scientific name, family, local name, habit, source, condition of preparation (dried /D and fresh /F, part used, mode of preparation, route of administration and disease treated.

Key: Habit (Tree-T, Shrub-Sh, Climber-Cl, Herb-H), Condition of preparation; CP (dried - D, fresh -F, Dried/ fresh-D/F)

Scientific name	Family	Local Name	Growth form	Source	CP	Parts used	Mode of preparation	Route of Administration	Disease Treated
<i>Achyranthes aspera</i> L.	Amaranthaceae	Togee	H	W	F	Leaves	Crushed and squeezed	Painting and holding on	Stop bleeding
								Painting mouth and face.	Fibrils illness
<i>Ageratum conyzoides</i>	Asteraceae	Suddee	H	W	F	Leaves	Crushed and squeezed	Drop by drop	Ear disease & Stop bleeding
<i>Ajuga intesrifolia</i> Buch.Ham	Lamiaceae	Harmagusaa	H	W	F	Leave	Leaves roasted squeezed and mixed with water, butter and honey is added.	Drunk for 5days in empty stomach	Diarrhea
							Cooking leaves, adding butter and then decanted	Drinking	Stomachache & leg problem
							Leaves crushed and squeezed add on coffee or milk	Drinking one cup in morning	Rheumatism
<i>Allium sativum</i> L.	Alliaceae	Qullubii	H	C	D	B	Bulb of <i>A. sativum</i> together with root of <i>Crissa spinrum</i> L. pounded and powdered at 13 th month of Ethiopia(kammee)	Covered with piece of cloth and hanging on neck.	Evil eye
						Bulb	Bulb crushed together with <i>Lepidium sativum</i> L. and <i>Capsicum frutescens</i> L. and honey is added	Eating for three days before breakfast	Typhoid

							Bulb of <i>A. sativum</i> together with root of <i>Rumex abyssinica</i> crushed, pounded and powdered, mix with water and boiled	Drinking solution	Hypertension
							Bulb is grinded	Always painting affected part	Foot skin rash (sibijji)
<i>Aloe pubescens</i> Reynodds	Aloceae	Hargisa	H	C	F	Leaves	Latex is taken	drinking	Kidney problems, gastritis and hypertension
								Painting	Fire burn
<i>Artemisia abyssinica</i>	Asteraceae	Goddogurracha	H	C	F	Leaves	Crushed and squeezed	Drinking for three days, liquid is measured in finger line,	stomachache
								-Child mix with milk half cup Adult-one cup	Evil eye
								Drinking	
<i>Asparagus africana</i> Lam.	Asparaguceae	Sartii	Cl	W	F D	Root	Crushed and pounded	Painting for three days and drinking half cup for a day.	Spider poison
								Drinking for three days	Mental problem

							<i>A. africana</i> Lam. together with <i>Cyathula polcephla</i> Back. leaves pounded and squeezed	Painting and drinking a few.	Spider poison
<i>Bersama abyssinica</i> Fresen	Meliantaceae	Lolichisaa	T	W	F	Leaves	Leaves of <i>B. abyssinica</i> Fresen, <i>Zehneria scabra</i> [Linn.f] Sond, <i>Calpurina aurea</i> (Ait), <i>Benth</i> , <i>Phtolacca dodecandra</i> L'Herit and <i>Jestica schimperiana</i> (Hochst.ex.Nees) are together crushed, pounded, mixed with water and decanted.	Drinking	Gonorrhea
<i>Brassica carinata</i> A.Br.	Brassicaceae	Raafuu	Sh	C	D	seed	Roasted, grinded, mixed with water and adding few salt.	Eating with injera for three days	Anemia
<i>Brucea antidysenterica</i>	Simarobaceae	Qomanyoo	Sh	W	F	Root	The root is together with <i>Jesticia schimperiana</i> (Hoch St.ex.Nees) root pounded, powdered and mixed with milk	Drinking half cup for a day in empty stomach	Rabies
							The root is cooked together with <i>Pycnostachys abyssinical</i> Fresen. leaves	Washing the mouth	Toothache
					F D	Seed	Pounded, powdered and mixed with fresh extracted butter.	Tied on head for three days	Tania versicoloris
<i>Calpurnia aurea</i> (Ait)Benth	Fabaceae	Ceekaa	Sh	W	F	Root	Root of <i>Calpurina aurea</i> (A.t.) <i>Benth</i> estimated to be equal to small finger crushed and chewed	Taking liquid orally	Sudden sickness

						Leaves	Leaves crushed and mixed with fresh extracted butter	Painting sore	Tania versicolorie s
<i>Carica papaya</i> L.	Caricaceae	Pappayaa	Sh	C	F		Cooking the leaf and filtering its water	Drunk 1 to 2 tea cup	Dysenteric
						Leaves	Juveniles of <i>C.papaya</i> , <i>Croton macrostachyus Del.</i> and <i>Ajuga interifolia Butch.Ham</i> is crushed, squeezed together and mixed with water	Drinking half tea glass for three days	Malaria
							Cooked, sugar is added and decanted	Drink in empty stomach	Malaria
							Leaves roasted ,crushed and pounded	Hold on	Wound
					D	Seed	The seed is pounded and boiled	Drinking one cup in empty stomach	Typhoid and Ascaries
F	Root	Crushed and mixed with water	Washing mouth	Toothache					
<i>Carissa spinarum</i> L.	Apocynaceae	Agamsa	Sh	W	F	Bark	<i>C.spinarum</i> L. bark together with <i>Ximonia Americana</i> L. bark, pounded, squeezed, and mixed with water and butter is added	Drinking a cup of solution for a week before break fast	Asthma
							Root bark is pounded powdered and mixed with water	Drinking one-third cup for two days in empty stomach	Evil eye
<i>Clerodendrum alatum</i> Gurke	Lamiaceae	Harmaguusa	Cl	W	F	Stem	Crushed and chewed	Putting on	Toothache

<i>Citrus limon</i> L.	Rutaceae	Lomii	Sh	C	F	Fruit	Making juice	Drinking	Nausea, Common Cold, Diarrhea
<i>Clematis simensis</i> Fresen	Ranunculaceae	Hiddafitii	Cl	W	F	Leaves	Leaves crushing and squeezing	Sniffing	Leishmaniasis
							Leaves crushing and squeezing	Sniffing	Toothache
						Leaves	Nine leaves were collected, crushed and pounded, then rolled by <i>Crotalaria macrostachya</i> Del. leaves and buried under hot ash for a while, then taken out from and make hole, smell its smoke.	Sniffing steam for 3days	-Swelling gland at back of neck -Bad mouth smell -Headache
						Leaves crushed		Tied on	Swelling
<i>Combretum collinum</i> Fresen	Combretaceae	Anunnu	T	W	F	Bark	Expelling from stem	Brushing	Toothache
<i>Commelina dyferse</i>	Commelinaceae	Laaluncaa	H	W	F	Leaves and stem	Crushed and squeezed	Paining for two days Tied on	Tania corpus and Worm poison

<i>Cordia africana</i> Lam	Boraginaceae	Waddessa	T	W	F	Bark	Crushing bark together with leaves of <i>Vigna vexillata</i> L.A.Rich, <i>Croton macrostachyus</i> Del. and <i>Clematis simensis</i> Fresen	Tied on	Fire burn
<i>Croton macrostachyus</i> Del.	Euphorbiaceae	Makannissa	T	W	F	Late x	Squeezing the sap in cup	Dropping in ear	Infected ear Disease
						Leaves	Juveniles of <i>C. macrostachyus</i> Del. and <i>Vernonia auriculifera</i> crushed and squeezed together, and mix with water	After hair is removed washing head 3-5 days	Dandruff
							Putting on flame less fire	Fumigating, covering the whole body	Malaria
							Leaves <i>Croton macrostachyus</i> Del. together with leaves of <i>Vernonia auriculifera</i> crushed and rolled by any leaves, buried under hot ash for a while taken out.	Warming affected part and tied on for one night	Worm poison
						Leaves dried powdered and mixed with honey	Painting	Scabies	
<i>Cucumis ficifolius</i> USA.Rich	Cucurbitaceae	Faca'aa	Cl	W	F	Root	Pounded and mixed water	Drinking in small cup first day, then after two days for the second time	Rabies
<i>Cyathula polycarpa</i>	Amaranthaceae	Maxxanee	H	W	F	Leaves	Leaves of <i>Cyathula polycarpa</i> Back and	Tied on	Spider poison

Back							<i>Clerodendron myricoides</i> chewed together	Spitting	Hadhaa
<i>Cynodon dactylon</i> (L.)press	Poceae	Coqorsa	H	W	F	Leaves and Stem	Leaves of <i>C. dactylon</i> (L.) press pounded together with <i>Stereospermum kunthianum</i> bark	Painting affected part	Snake sight
							Chewing	Spitting and swallowing	Tonsillitis
								swallowing	Intestinal worm
<i>Cymbopogon citratus</i> L.	Poceae	Xajisara	H	C	F	Leaves	Leaves of <i>Artemisia abyssinica</i> , <i>Withania somnifera</i> (L), and <i>Ruta Chalapensis</i> L are crushed together and squeezed	Drinking Child: one-third of cup Adult: a cup	Stomachache
						Leaf and stem	<i>Cymbopogon citratus</i> L. Leaf and stem pounded and boiled	Washing with and painting	Fibril illness
<i>Datura stramonium</i> L.	Solanaceae	Asaangira	H	W	D	Seed	Pounded and powdered, mixed with fresh butter	Painting head	Tania versicolari es
							Seed is Placed over fire	fumigating	Toothache
							Seed is grinded and rolled by clean piece of clothe	Biting on	
					F	Leaves	Crushed and squeezed	Three days washing the whole body and one day drinking one-third of a cup	Swelling of the whole body

<i>Echinops kebericho Mesfin</i>	Asteraceae	Qarabichoo	Sh	W	D	Rhizome	Rhizome(root) placed on flame less fire	Fumigating	Evil spirit
									Sudden sickness
<i>Erythrina bruci Schweinf</i>	Fabaceae	Waleensuu	T	W	F	Leaves	Juveniles of <i>Ehretia cymosa</i> Thonn together With leaves of <i>Brucea antidysentrica</i> crushed and pounded	Drinking one-third of cup	Stomach problems
						Bark	Chewing bark	-Adult swallowing fluid -Child spitting	Tonsillitis
							Internal bark	Holding on	Toothache
<i>Eucalyptus globulus Labill</i>	Myrtaceae	Bargamoadii	T	W	F	Leaves	Cooked	Fumigating	Influenza and Common cold
<i>Euphorbia tirucalli L.</i>	Euphorbiaceae	Cadaa	Sh	W	F	Stem	Latex is collected and mixed with <i>Eragrostis tef</i> powder then baking bread	Eating in empty stomach	Rabies
							Milk is collected	Painting head skin	Tania versicolari es
							Latex is collected on leaves of <i>Maesa lanceolata</i> Forssk and buried under hot ash.	Painting and warming with	Foot skin rash (sibijjii)
<i>Foeniculum vulgare Mill</i>	Apiaceae	Insilla	H	C	F	Leaves	Crushed and squeezed	Drinking half cup for two days	Evil eye

<i>Helinus mystacinus</i> (Ait) E.mey.ex.S teud.	Euphorbiaceae	Homa chiisa a	Cl	W	F	Leaves	Crushed, squeezed and stayed for short time on sunlight	Rubbing on affected part	Spider poison
							Crushed, and squeezed	Painting genital organ	Chancroid
<i>Guiztia scabra</i>	Asteraceae	Hada a	H	W	F	Leaves	Crushed and squeezed	Drink and paint	Spider poison
<i>Indigofera arrecta</i> Hoch St ex A.Ric	Fabaceae	Enna a	Sh	W	F	Root	Root of <i>Indigofera arrecta</i> Hoch <i>St.ex.A.Rich</i> , <i>Cucumis ficifoli</i> <i>USA.Rich</i> , <i>Echinops kebericho</i> Mesfin, <i>Clerodendrum alatum</i> Gurke, <i>Carissa spinarum</i> L. and bulb of <i>Allium sativum</i> pounded together and mix with few water	Drinking	Evil eye
<i>Indigofera spicat</i> Ha Forss	Fabaceae	Haran cii	H	W	D	Leaves	Pounded powder and mixed with <i>Vicia faba</i> L. then making soup.	Drinking for three nights	Removes sharp materials stayed in the body
<i>Justicia schimperiana</i> (Hochst.ex.Nees)	Accanthaceae	Dhu muga a	Sh	W	F	Leaves	Leaves of <i>Justicia schimperiana</i> (Hochst.ex.Nees) along with <i>Datura stramonium</i> L. leaves pounded and squeezed	Drop by drop	Ear disease

							Leaves of <i>Jesticia schimperiana</i> (Hochst .ex.Nees), <i>Zehneria scabra</i> (Linn.F)Sond and root of <i>Rumex nepalensis</i> Spreng.,together pounded and rolled by leaves of <i>Maesa lanceolata</i> Forssk	Warming with for three days	Hemorrhoid
							Leaves of <i>Jesticia Schimperiana</i> (Hochst .ex.Nees) <i>Brucea antidysentrica</i> , <i>Clausena anisata</i> (Wild.)Benth and <i>Croton macrostachyus</i> Del.cooked together	Bathing for three days	Rheumatic and internal sickness'
<i>Kalanchoe laciniata</i> (L.)Dc	Crassulaceae	Bosso qgee	H	W	F	Root	Crushing ,grinding and mix water	Drinking	Intestinal parasite
						Leaves	Leaves of <i>Kalanchoe laciniata</i> (L.)Dc is rolled by leaves of <i>Maesa lanceolata</i> Forssk and put in hot ash	Warming and holding on	Hemorrhoid
							Leaves of <i>Kalanchoe laciniata</i> (L.)Dc is heated in front of fire	Warming abdomen and drunk fluid of it one fourth of a cup	Ascaries
								Holding on	Swelling

							Chewing	Child-spitting fluid Adult-swallowing fluid	Tonsillitis
						Root	Crushed and squeezed	Sniffing for a day	
<i>Kosteletzky a adoensis</i>	Malvaceae	Qubbullo	Cl	W	F	leaves	<i>Kosteletzky a adoensis</i> along with <i>Asparagus africanus Lam.</i> crushed and squeezed	Drinking half cup	Dysentery
<i>Lageraria siceraria</i> (Melina) Stand	Cucurbitaceae	Buqqehadhaaa	H	C	F	Leaves	Crushing and squeezing	Painting	Dandruff
<i>Lepidium sativium</i> (L.)	Brassicaceae	Shiinfaa	H	C	D	Seed	Raw <i>Lepidium sativium</i> (L.) ten in number and Seven seed of <i>Commelina latifolia Hochst ex Rich</i>	Swallowing	Dysentery
<i>Linum usitatissimum</i> (L.)	Lineaceae	Talbaa	H	C	D	Seed	Cooking	Drinking the solution	Gastritis
<i>Maesa lanceolata</i> Forssk	Myrsinaceae	Abbayii	T	W	F	Leaves	Leaves <i>Maesa lanceolata Forssk</i> along with <i>Solanum incunum L.</i> leaves crushed and squeezed	Drinking, Child: one-third of cup Adult: two-third	Diarrhea
<i>Ocimum gratissimum</i> (L.)	Lamiaceae	Anca bbi	Sh	W	F	Leaves	Leaves of <i>Ocimum gratissimum (L.)</i> , <i>Ocimum lamiifolium Hoch St Benth</i> , <i>Croton macrostachyu Del.</i> together crushed, squeezed and mixed little water	Sniffing and drinking few	Rheumatic

<i>Ocimum lamiifolium</i> Hochst .ex Benth	Lamiaceae	Damakasee	Sh	W	F	Leaves	Leaves of <i>Ocimum lamiifolium</i> Hoch St Benth, <i>Jesticia schimperiana</i> (Hochst. ex.Nees), <i>Zehneria scabra</i> /Linn.f]/ <i>Sond Croton macrostachyus</i> Del. were cooked together	Bathing for three days	Rheumatic
<i>Olea europaea</i> L ssp <i>cuspidata</i>	Olaceae	Esjersa	T	W	F	stem	Oil	painting	Wound
<i>Pentastemon lanceolatus</i>	Amaranthaceae	Surma leencaa	H	W	F	Leaves	Dried,,powder mixing with soup	Drinking	Repair broken bone
<i>Phytolacca dodecandra</i> L'Herit	Phytolaccaceae	Andodee	Cl	W	F	Root	Crushed, pounded and mixed with very a few water	Drinking one-fourth of cup in empty stomach	Rabies
						Root of <i>Phytolacca dodecandra</i> L'Herit, <i>Zehneria scabra</i> /Linn.f] along with <i>Clematis simensis</i> Fresen leaves crushed and pounded	Drinking: Child-one-third of cup Adult-one cup		
						Leaves	Crushed, squeezed and mixed with water	Bathing(was hing) body	Scabies
						Fruit	Pounded and mixed with vasilien	Painting the affected part	Worm poison
Crushing,powdering and mixing with vasilien	painting	Allergic							
<i>Platoglossa lanceolata</i> L.	Plantaginaceae	Qorxobbii	H	W	F	Leaves	Crushed and squeezed	Painting and putting on	Stop bleeding

<i>Premina schimperi</i> Engl	Lamaceae	Urgeessa	Sh	W	F	Leaves	Seven juveniles of <i>Premina schimperi</i> Engl. along leaves of , <i>Ocimum gratissimum</i> L.and <i>Ocimum lamiifolium</i> Hochst.Benth crushed, squeezed and mixed with water and salt added	Biting on	Toothache
							Leaves of <i>Premina schimperi</i> Engl crashed	Putting on	Toothache
<i>Prunu persica</i> (L.)Batsch walp	Rosaceae	Kookii	T	C	F	Leaves	Five juveniles of <i>Prunu persica</i> (L.)Batsch walp cooked and sugar is added	Drinking: Child- half cup Adult-one cup	Ascariis
<i>Rhamnus prinoides</i> L'Herit	Rhemnaeeae	Geshoo	Sh	C	F	Leaves	Chewing apex of <i>Rhamnus prinoides</i> L'Herit	Swallowing its fluid	Tonsillitis
<i>Ricinus communis</i> L.	Euphorbiaceae	Qobb oo	Sh	W	F	Root	Cutting into small pieces and making with fiber	Hanging on neck	Swelling gland
				W	F	Leaves	The leaves rolled by <i>Croton macrostachyus</i> Del. putted under fire	Warming the affected part	Swelling
<i>Rumex abyssinica</i>	Polygonaceae	Moqmoqqoo	Sh	W	F	Root	Pounded,powdered and mixed with water	Drinking one cup for three days	Hepatitis (Liver problem)

<i>Rumex nepalensis</i> Spreng	Polygonaceae	Baruudaa	H	W	D	Root	Crushed, pounded and powdering	Tied on	Qolakusul
							Heated in front of fire	Painting	Hemorrhoid
					F	Root	Fresh <i>R. nepalensis</i> Spreng root estimated to small finger.	Inserted into vagina for an hour	Abortion
					D	Root	Crushed, grinded and mixed with water then, filtered	Drinking one-third of cup	Stomachache
							Pounded and Powdered	Painting skin	Tinea corporis
							Pounded, powdered and mixed with melted butter	Painting, then washing for three to five days.	Scabies
<i>Ruta chalepensis</i> L	Rutaceae	Ciladama	Sh	C	F	Leaves	Along with leaves of <i>Artemisia abyssinicus</i> crushed, pounded and mixed with little water.	Drinking: Child-half cup Adult- a cup before breakfast for three days	Evil eye
<i>Schinus molle</i> L.	Anacardiaceae	Qundabarbarree	Sh	C	D	Seed	Chewing	Swallowing its liquid	Tonsillitis
<i>Senna septemtrionalis</i> (Viv.) Irwin and Barneby	Fabaceae	Sanamakii	Sh	W	F	Leaves	Crushing and squeezing	Tied on	Hadhaa

<i>Sida schimperiana</i> Hoch St.ex.A.Rich	Malvaceae	Kottharre	Cl	C	D	Fruit	Cooking	Eating before breakfast for five days	Hypertension
<i>Solanum incunium</i> L	Solanaceae	Hiddisa'aa	Sh	W	F	Root	Chewing	Swallowing its liquid	Toothache
							Crushed and chewed	Swallowing only liquids	Stomachache
<i>Stereospermum kunthianum</i>	Bignoniaceae	Botoroo	T	W	F	Bark	<i>Stereospermum kunthianum</i> bark, <i>Carissa spinarum</i> L. root, and <i>Nicotiana tobacum</i> L. leaves were pounded and mixed with water	Washing whole body and Drinking a little	Snake bite
<i>Tragia brevipes</i> paxa	Euphorbiaceae	Gurgubbee	C	W	F	Leaves	Squeezing and decanting	Drinking liquid	Spider poison
<i>Verbascum sinuatum</i> Benth	Scrophulariaceae	Gurraharre	H	W	F	Leaves	Pounding and mix with water decanting	Drinking a cup of solution for three days and tying remaining's on	Tania versicolari es
								Drinking a cup of fluid	Snake site (butii)
<i>Vernonia amygdalina</i> Del.	Asteraceae	Ebicha	T	W	F	Leaves	Juveniles of <i>Vernonia amygdalina</i> Del. crushed and squeezed	Drinking one-third of cup for three days	Swelling whole body(hafu ura lafaa)
<i>Vigna vexillata</i> L.A.Rich	Fabaceae	Gurrahantutaa	H	W	F	Leaves	Leaves crushed and squeezed	Painting and tied	Stop bleeding

<i>Vicia faba</i> L.	Fabaceae	Baqq elaa	Sh	C	D	Seed	<i>Vicia faba</i> L. seed and seed of <i>Lepidium</i> <i>sativum</i> chewed along	Tied on	Swelling
						F	Leaf and stem	Squeezed and rolled by clothe	Tied on
<i>Withiana somniafer</i> (L.)	Solanaceae	Gizaa waa	Sh	W	F	Leaves	Nine Juveniles of <i>Withiana somnifera</i> (L.) crushed, squeezed and mixed with water	Drinking one tea cup for three days and washing whole body for three days	Gout
<i>Ximenia Americana</i> L.	Olacaceae	Hudha a	T	W	D	stem	Soft part is taken, dried ,grinded then one tea spoon powder mixed with two tea cup of water	Drinking mooring and night for three days	Malaria and cough
<i>Pycnostach ys abyssinica</i> Fresen	Lamiaceae	Yeriy oo	Sh	W	F	Leaves	Crushed ,pounded and rolled with piece of clothe	Putting on	Toothache
						Root	Cooked and salt is added	Washing mouth	
<i>Zehneria scabra</i> (Linn.f.)So nd	Cucurbitaceae	Hidda midh aan lo'aa	Cl	W	F	Leaves	Crushed and Squeezed	Painting affected part	Spider poison
<i>Zingiber officiale</i> Roscoe	Zingiberaceae	Ginji bila	H	C	F D	Rhizome	Crushed ,making tea	Drinking	Common cold and influenza
							Chewing	Swallowing a liquid	Stomacha che

Appendix8. List of Medicinal plants used to treat Livestock disease in the study area: Scientific name, family, local name, habit, source, condition of preparation (dried /D and fresh /F, part used, mode of preparation, route of administration and disease treated.

Key: Habit (Tree-T, Shrub-Sh, Climber-Cl, Herb-H), Condition of preparation; CP (dried - D, fresh -F, Dried/ fresh-D/F)

Scientific name	Family	Local Name	Growth form	Source	CP	Parts used	Mode of preparation	Route of Administration	Disease Treated
<i>Allium sativum L.</i>	Alliaceae	Qullubbi	H	C	D F	Bulb	Bulb of <i>A. sativum</i> with seed of <i>Lepidium sativum</i> L; crushed, pounded and mixed with water	Drunk	Blakleg
<i>Asparagus africanus Lam.</i>	Asparagaceae	Sariiti	H	W	F	Root	Root pounded and mixed with water, salt is added	Drunk half jug	“Goggog saa”
								Drunk one bottle	Blotting
							Root is pounded mixed with bread or injera	Eaten	stomachache
<i>Bersama abyssinica Fresen</i>	Meliaceae	Lolchisaa	T	W	F	Leaves	Crushed, pounded and mixed with water	Drunk	“Goggog saa”
<i>Brucea antidysenterica</i>	Simarubaceae	Qomanyoo	Sh	W	F	Leaves	Juvenile of <i>Brucea antidysenterica</i> , <i>Croton macrostachyus</i> Del. and rhizium of <i>Zingiber officinale</i> Roscoe and bulb of <i>Allium sativum</i> along crushed, pounded, mixed with water and decanted	Drunk half jug	Blotting Stomachache shivering

						Root	Root of <i>Brucea antidysenterica</i> , <i>Cucumis ficifolius</i> USA Rich, bulb of <i>Allium sativium</i> , seed of <i>Brassica carinata</i> A.Br., seed of <i>Lepidium sativium</i> and root of <i>Echinops kebericho</i> Mesfin Crushed, powdered and mixed with water	Drunk	Blackleg and Different internal diseases
<i>Calpurnia aurea</i> (Ait) Benth	Fabaceae	Ceeaka	Sh	W	F	Leaves	Pounded and mixed with water	Washing the whole body	Ectoparasite
<i>Citrus limon</i> L.	Rutaceae	Loomii	Sh	C	F	Fruit	<i>Citrus limon</i> fruit, and leaves of <i>Nicotiana tobacum</i> L., <i>Calpurnia aurea</i> (Ait) Benth and <i>Zehneria scabra</i> [Linn.f.] Sond crushed, pounded and mixed with water then decanted	Drunk for two days	Diarrhea
<i>Clausena anisata</i> (Wild.) Benth.	Rutaceae	Ulumayyi	Sh	W	F	Leaves	Crushed, mixed with water, soap and salt	Drunk	Blackleg
<i>Clerodendrum alatu</i> Gurke	Lamiaceae	Marasiisaa	Sh	W	F	Leaves	Pounded and mixed with water	Drunk for three days	Thinness “huqqinaa”
<i>Combretum collinum</i> Fresen	Combretaceae	Anunnuu	T	W	F	Bark	Powdered and mixed with water	Drunk one cup for a day	Breast swelling
							<i>Combretum collinum</i> Fresen bark, <i>Vernonia amygdalina</i> Del. leaves crushed, pounded together and salt is added	Drunk half jug for seven days	Breast swelling

<i>Cucumis ficifolius</i> USA Rich	Cucurbitaceae	Faca'aa	Cl	W	F	Root	Pounded, powdered and mixed with water	Drunk one-third of jug for a day	Blakleg
							Pounded, powdered and mixed with milk	Drunk a cup for two days	Rabies prevention
<i>Echinops keberich</i> Mesfin	Asteraceae	Qarabichoo	Sh	W	D F	Root	<i>Echinops keberich</i> Mesfin root, <i>Allium sativum</i> bulb, and <i>Lepidium sativum</i> seeds together pounded, powdered and mixed with water	Drinking one jug	Blotting and Stomachache
<i>Erythrina brucei</i> Scheinf.	Fabaceae	Waleensuu	T	W	F	Bark	Crushed, pounded and mixed with water	Drunk	Blotting
<i>Euphorbia ampliphylla</i>	Euphorbiaceae	Adaamii	T	W	F	Leaves	Leaves of <i>Euphorbia ampliphylla</i> and <i>Croton macrostachyus</i> Del. seven, seven each collected and put on flat stone	Praying	Wound infection
<i>Justicia schimperiana</i> (Hochst.ex.Nees)	Acanthaceae	Dhumugaa	Sh	W	F	Leaves	Apex is pounded and mixed with little milk	drunk	Rabies prevention
<i>Maesa lanceolata</i> Forssk	Myrsinaceae	Abbayyii	T	W	F	Leaves	Leaves of <i>Maesa lanceolata</i> Forssk together with leaves of <i>Ehretia cymosa</i> Thonn. pounded and mixed water	Washing the body	External parasite
<i>Nicotiana tobacum</i> L.	Solanaceae	Tambooo	H	C	F	Leaves	Pounded, mixed with water and salt is added	Drunk half jug	Diarrhea
<i>Pentas lenceolata</i>	Amaranthaceae	Surmalencaa	H	W	F	root	Pounded, mixed with water and salt added.	drink	Thinnes
<i>Phytolacca dodecandra</i> L'Herit	Phytolaccaceae	Andoddee	Cl	W	F	Leaves	Pounded and mixed water	Drunk a bottle	Rabies

<i>Solanum gigantum</i> Jacq	Sola ncea e	Hiddii saree	Sh	W	F	Fruit	Squeezing fruit	Drop by drop into nose	Sheep cough
<i>Urtica simensis</i> Steudel	Urti cace ae	Doob bii	H	W	F	Leav es	Leaves of <i>Urtica simensis Steudel</i> and <i>Calpurnia aurea</i> (Ait.) Benth pounded together and mixed with water	Drunk	External parasite
<i>Vernonia auriculifera</i>	Aste race ae	Reejji i	Sh	W	F	Leav es	Crushed and squeezed	Panting	Wound
<i>Zehneria scabra</i> Linn.f. Sond	Cuc urbi tace ae	Hidda midaa n lo'aa	C	W	F	Leav es	Leaves crushed and squeezed	Panting	Shoulder wound

Appendix9. List of informants in the study area (key: [*] key informants)

No.	Name	Sex	Age	Educational status	Material status	Kebele	No of MPs
1	Beyene Abebe Alemu *	M	60	Uneducated	Married	Chakewo	9
2	Ejigu Angasse A/Dadi *	M	73	Reading	Married	Chakewo	8
3	Hussen A/Firisa A/Bonso	M	80	Uneducated	Married	Chakewo	2
4	Zeyine Ahmed Abdella	M	37	Reading	Married	Mendara	5
5	Nuremin A/Rago A/wari *	M	62	2	Married	Debelo	12
6	Meskerem Dibaba Muleta *	F	50	Reading	Divorce	Genet 02	9
7	Dabessa Ejigu Tesso	M	80	Reading	Divorce	Debelo	4
8	Binalf Bayabil Qelemi	M	80	5	Married	Genet 02	3
9	Solomon Demisse Alemayehu	M	40	Diploma	Married	Genet 02	5
10	Nuru Hibrahim A/Bilo	M	45	10	Married	Genet 02	4
11	Birhanu Asres Worku *	M	52	Read&write	Married	Welensu	7
12	A/jebel A/Gero A/Qoyas*	M	65	Uneducated	Married	Welensu	13
13	Nuriya A/Gero A/Qoyas *	F	50	Uneducated	Divorce	Welensu	11
14	Abdulkadir A/Mecha A/Gero *	M	40	5	Married	Welensu	13
15	Zulalu Sh/Kemal A/Waji	M	28	8	Single	Welensu	2
16	Mulugeta Alemu Ayita	M	54	1 st degree	Married	Debelo	4
17	Mukitar Mohammed A/Gero	M	47	6	Married	Chakew	2
18	Siraj A/Mech A/Waji *	M	42	12	Married	Welensu	11
19	Tadele Tesfaye Kassa	M	39	12	Married	Mendera	4
20	Ahmed Kasima A/sanbi	M	23	9	Single	Debelo	2
21	Mohammed A/Gero A/Jorga	M	80	Uneducated	Married	Mendera	3
22	Ancalu Belisa Tolessa	M	65	Uneducated	Married	Mendera	2
23	Tibebu Geleta Agidew *	M	77	12	Married	Genet 02	9
24	Tekilu Bifa Bonse	M	49	9	Married	Genet 02	8
25	Aziza Amin She Adem	F	21	9	Single	Welensu	4
26	Sherif A/Gumbul SheMohammed	M	69	Uneducated	Married	Genet 02	2
27	Selemon Mengesha Eshetu	M	38	8	Married	Genet 02	2
28	Amsale Balcha Roro	F	53	3	Married	Genet 02	2
29	Matiwos Ayele Guche	M	50	Diploma	Married	Genet 02	5
30	Mulugeta Adugna Galata	M	22	9	Single	Mendera	2

31	Sebisbe Belay shani	M	21	9	Single	Mendera	2
32	Arebu Mohammed Lemu*	M	60	5	Married	Mendera	7
33	Kume A/Megal A/Tobo	F	48	Uneducated	Divorce	Mendera	2
34	Mebiratu Daksiisa Dendena	M	30	7	Married	Mendera	4
35	Selemon Gebire Beranu	M	50	7	Married	Genet 02	5
36	Awa Abdu A/Beshu	F	60	Uneducated	Divorce	Genet 02	4
37	Tadesse Tekle Temsu	M	61	4	Married	Mendera	3
38	Zenebu A/Gero A/Diga *	F	46	Uneducated	Married	Mendera	12
39	Cala Benti Dugassa	M	39	9	Married	mendera	9
40	Kedir A/Mecha A/Meya*	M	42	7	Married	Welensu	10
41	Jihad A/Milk A/Roge	M	50	2	Married	Debelo	2
42	Ekadu Badeg A/Worku	M	65	2	Married	Debelo	4
43	Siraj A/Mati A/Yenfa	M	60	Uneducated	Married	Debelo	4
44	Rashid Oli A/Baru	M	50	7	Married	Chakewo	8
45	Zamzamu A/Waji A/Milki *	F	61	Uneducated	Divorce	Chakewo	15
46	SheKasim A/Rago A/AMAYA	M	60	Uneducated	Married	Chakewo	2
47	Baharu Kemal A/Oli	M	39	5	Married	Chakewo	3
48	Anuwar Awolu A/Fogi	M	32	7	Married	Chakewo	2
49	Mohammed A/Dima A/Meyu	M	70	Uneducated	Married	Welensu	6
50	Aliy A/Gero A/Koyas *	M	45	9	Married	Welensu	9
51	Gezu Mamo Sime	M	37	9	Married	Welensu	4
52	Abdulkadir A/Mecha A/Shifa	M	40	3	Married	Welensu	5
53	Mehammedzen A/Megal /Waji	M	41	3	Married	Welensu	3
54	She Reshid She Sufiyan A/Waji	M	46	Uneducated	Married	Welensu	4
55	Alemi Tena Roro	F	55	Basic edu.	Married	Debelo	3

56	Muzemil Mohamed Yasin	M	35	7	Married	Debelo	7
57	Keru Mohammed Gemta	M	27	5	Married	Debelo	5
58	Bultu Abdlikadir A/Dura	F	36	2	Married	Debelo	3
59	Fatuma A/Jebel Biya	F	47	Basic	Married	Chakewo	2
60	Hawa Gemta A/Rago	F	52	Basic	Married	Debelo	3