



Jimma University College of Natural Sciences Department of
Biology

Ethnobotanical Study of Medicinal Plants and knowledge of Traditional healers in Bedele District, Buno Bedele Zone, Southwest Ethiopia.

By: Wondimagegn Abdisa Kumsa

Advisor: Dereje Denu (PhD)

Co-advisor: Desalegn Raga (MSc)

A Thesis Submitted to Department of Biology College of Natural Sciences, Jimma University, in Partial Fulfilment of the Requirement for the Degree of master in General Biology

August, 2019

Jimma Ethiopia

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Approved by

Signature

Date

Professor Kitesa

(examiner)

Acknowledgement

I would like to express my special and deepest thanks to my advisor Dr. Dereje Denu and co-advisor Desalegn Raga for their consistence invaluable advice, comments encourage and follow up right from the starting to completion of this work. I would like to thank Jimma University for financial support.

I am grateful to the local people in Bedele district for their hospitality and kinds of response to my inquires. My special thanks to Ato Muzeyne Gudata who scarifies his time and energy to help in data collection. Last but not list my heartfelt thanks go to all who participated in moral support for successful accomplishment of my study.

Contents

Acknowledgement.....	I
Table content.....	II
List of figure.....	IV
List of table.....	V
Acronyms and Abbreviation.....	VI
Abstract.....	VII
1 Introduction.....	1
1.1 Background of the study	1
1.2. Statement of the problem	2
1.3. Objective of the study.....	3
1.3.1. General objective	3
1.3.2. Specific objectives	3
1.4 Significant of the study.....	3
1.5 Limitation of the study	3
2. Literature review.....	4
2.1 Development of Ethno botany.....	4
2.2 Traditional Medicinal plant.....	4
2.3 Indigenous knowledge	5
2.4 Supply of medicinal plant	5
2.5 Medicinal plants in ethno veterinary.....	6
2.6 Traditional medicinal plants in public health care system	8
2.2 Application of Traditional Medicine in Different Part of the Worlds.....	9
2.2.1 Use of Medicinal Plants in Developed Nations.....	9
2.2.2. Uses of Traditional Medicinal Plants in Africa.....	9
2.2.3 Overview of Medicinal plants in Ethiopia	10
2.2.4 Utilization status of traditional medicines in Ethiopia.....	10
2.3 Ethno-Medicine Research in Ethiopia	11
2.4 Role of Medicinal Plants in New Drug Developments	12
2.5 Threats and conservation of traditional medicinal plants in Ethiopia.....	13

2.5.1 Threats to Medicinal plants	13
2 .5.2 Conservation of medicinal plants	13
3. Methodology	15
3.1. Description of the study area.....	15
3.2. Climate	16
3.3 Study Population	17
3.4 Sample size and sapling technique.....	17
3.5 Method of data collection.....	17
3.6 Ethnobotanical da collection	18
3.7 plant specimen identification.....	18
3.8 Data analysis	19
3.9 Preference ranking	19
3.10 Paired comparison.....	19
4. Result	19
4.1 Demographic features of respondent.....	20
4.2. Diversity of medicinal plant resource in the study area	20
4.3 growth habit parts use of medicinal plant	21
4.4 Application of medicinal plant.....	23
4.5 Route of administration and dosage	26
4.6 Habitat of medicinal plant	27
4.7 Treatment of medicinal plant	27
4.8 Method and preparation of traditional medicine	28
4.9 Threats to medicinal plants in the study area	28
4.10 Conservation of medicinal plants.....	29
4.2.1 Preference ranking of medicinal plant Species	30
4.2.2 Paired comparison of medicinal plants used to treat teeth ache.....	31
5. Discussion	32
5.1 Medicinal plant in the study area	32
6. Conclusion.....	35
7. Recommendation	36
8 Reference	37
9 Appendix	49

List of Figure

Figure 1: Map of the study area showing Ethiopia, Oromia, Buno Bedele Zone and the study district...	15
Figure 2: Mean maximum and mean minimum temperature of Bedele district	16
Figure 3: Average monthly rain fall (in mm) of Bedele district from 2009-216	17
Figure 4: Medicinal plant sample collection from the study area	18
Figure 5: Application of medicinal plants	23
Figure 6: Habitat of medicinal plant in study area.....	27
Figure 7: Disease treatment of medicinal plants in study area.....	27
Figure 8: Method of preparation of remedy from medicinal plants.....	28
Figure 9: Status of medicinal plants in the study area	28

List of table

Table 1: Demography of the respondents of this study.....	20
Table 2: Families of medicinal plant species, number of genera and species in the study area	21
Table 3: Growth form and parts use medicinal plants	22
Table 4: Human disease and number of plant species used to treat in the study area.....	24
Table 5: List of animal disease in study area	25
Table 6: Route of administration and dosage.....	26
Table 7: Threats to medicinal plants of Bedele District.....	28
Table 8: The response of traditional healers on the conservation activities of traditional medicinal plant	29
Table 9: Suggestion of traditional healers about conservation of medicinal plants	29
Table 10: Preference ranking of medicinal plant species used to treatment of wound	30
Table 11: Paired comparison of plant species to treat teeth ache	31

Acronyms and Abbreviations

WHO- World Health Organization

HIV/AIDS- Human Immunodeficiency viruses, Acquired immunodeficiency syndrome

UNEP- United nation Environmental program

UNESCO -United Nations Educational, Scientific and Cultural Organization

NDA- New -Drug application

SNNPR- Southern, Nation Nationalities and Peoples Region

NGO- Non-Government Organization

BDAO- Bedele District Agricultural office

BDCO- Bedele District communication office

EMABb- Ethiopia metrology agent Bedele branch

Asl- above sea level

Ca- culture

Abstract

Plants have been shown very effective medicinal value for some ailments of human and domestic animals. Those medicinal plants and knowledge of their use provide a vital contribution to human and livestock health cure throughout the country. The major reason why medicinal plants demanded in Ethiopia are due to culturally linked traditions, the trust the communities have in the medicinal value of traditional medicine and relatively low cost in using. The purpose of the study was to assess the ethnobotanical use of medicinal plant in Bedele district, BunoBedele Zone. The area lies between 8° 27'N 36° 21'E and 8°45'N 36° 35'E of longitude and latitude with an altitude range of 2,012-2,162 asl. The study includes three Gandas (Qollo-Siri, Secho and Bitamute) which were purposively selected depending on the presence of traditional healers. From each Ganda 10 traditional healers were purposively making and the total traditional healers were thirty. The study involves traditional herbalist, local leader and selected assistant. The study was conducted from September to August 2017 and data and plant specimen collection was from April to June 2017. Various techniques were used to collect and analyse data, semi structure interview, focus and group discussion preference ranking and paired comparison was employed. Voucher specimens were brought to Jimma university herbarium and identified. Total of 60 medicinal plant species belonging to 39 families and 52 genera were identified as medicinal plants from the study area. The most commonly used plant families were Fabaceae, Lamiaceae, Solonaceae, Asteraceae, Rutaceae and Euphorbiaceae. Trees and shrubs have 74.6% of medicinal plants. Leaf was most widely parts use 46% followed by root 36.6% and application in fresh and dried forms. 29 human and 16 livestock diseases were recorded and treated by reported plant species. In the study area methods of preparation were pounding, crushing, chewing, boiling and squeezing respectively. Routes of administration oral, nasal and dermal, dosage determination were counting the life and seed, figure length for bark, root and stem. The majority medicinal plants (70%) were collected from wild. The leaves were widely used parts (45%) of medicinal plants. The major threat to medicinal plants in the study area were agricultural expansion and burning of forest. So, proper conservation measures are needed to practice sustainable use of plants.

Key word: Bedele district, indigenous knowledge, medicinal plant, traditional healer

1. Introduction

1.1 Background of the study

Ethnobotany studies the relationship between human being and plants. For a long time plants have played important role for human life. The dependency of human up on plants was primarily started by domestication and date back 10,000 years (Martin, 1995). From plants human can obtain food, medicine, fodder, fuel construction material, and others Thus indigenous knowledge on plants appeared when human started and learn how to use plants (Posey, 1999). Over centuries indigenous people develop their own local specific knowledge on plant use (cotton, 1996). Nowadays, peoples are using traditional medicine obtained from plants for treatment of human ailments (Bayatop, 1999).

Plants contribute to the development of modern medicine in various ways. They can be used either as major components or supplementary starting material for the manufacturing of modern drugs for treatment of various diseases. The progress in synthetic chemistry and biotechnology has not decreased the importance of medicinal plants. In some cases it has even increased the importance due to the danger of side effects of synthetic products (OECD, 1992). It was also reported that in the early 1970s, plant derived drugs account from 30% of total production in the industrialized countries. In Africa due to the availability of medicinal plant materials the percentage of plant derived drugs produced could be higher than 33% (UNESCO, 1989). As compared to modern medicine, traditional medicine is an immediate existing source of health care for people where they live. The wider and systematic application of traditional plants in the official health care delivery system undoubtedly helps to ameliorate scarcity of some drugs. Traditional medicine is cheaper than modern medicine, also potential source of new drugs and a source of starting products for the synthesis of known drugs. There is also possibility that some revolutionary new drugs for treating incurable disease as cancer may be discovered in medicinal plants (Sofowara, 1987).

About 80% of populations of many developing countries still use traditional medicinal plants for their health care. These people are precluded from the luxury of access to modern therapy, mainly for economic reason (FAO, 1997). Traditional medicine is more accessible by most population in the third world. This is mainly because of the shortage of Hospitals and health care

center. Ethiopia is characterized by a wide range of economical, edaphic and climatic condition that account for the wide diversity of its biological resources, both in terms of floral and faunal. The plant genetic resources of the country exhibit an enormous diversity in medicinal plants. Because of this it is said that almost all plants of Ethiopia are used medicinally.

Ethiopia is known for having many medicinal plants due to variation in its topography and ethnic diversity. However, many of these plants have not been investigated scientifically, although they have been used in traditional system by traditional health practitioners for a long time. Therefore in the mentioned Bedele district, scientific investigation and medicinal plants used for treating various human and livestock ailment are lacking. Consequently this study aim to fill the gap of the problem.

1.2. Statement of the problem

Peoples of Bedele district use traditional medicine derived from plants. Due to lack of sufficient health service, lack of infra-structure as well as low house hold income which does not allow to get modern medicine for themselves and their Livestock. As far as we know there has not been any ethnobotanical study on these medicinal plants and associated knowledge in Bedele district. Therefore, this study was designed to assess and document medicinal plants and associated indigenous knowledge of the district.

Research question

- What are the medicinal plants used to treat human and livestock ailments in Bedele district?
- Which parts of medicinal plant are used to treat various human and livestock ailments?
- What are indigenous knowledge used in preparation and dosage determination of traditional medicine?
- What are the conservation measures of medicinal plants?

1.3. Objective of the study

1.3.1. General objective

The general objective of this study was to assess traditional use of medicinal plants and associated indigenous knowledge in Bedele district.

1.3.2. Specific objectives

1. To assess medicinal plants used to treat humans and livestock ailment in Bedele district
2. To identify parts of medicinal plants used to prepare traditional medicine.
3. Document method of preparation and administration of traditional medicine.
4. To assess ethnobotanical knowledge of traditional healer
5. To record the conservation measure used by people of study area

1.4 Significance of the study

The study was document types of medicinal plants used for the treatment of human and livestock ailments, parts used and ways of preparation in Bedele district. This could be used as spring board for those who want to conduct further study on medicinal plants of the district. In addition to this, the study was also show the conservation status of medicinal plants.so that traditional healers were apply sustainable way of collection of medicinal plants.

1.5. Limitation of the study

The study was limited to some selected ‘Gandas’ of the district due to lack of accessibility, shortage of time (work load) and due to financial problem. The study had focus on the traditional use of medicinal plants in Buno Bedele Zone, Bedele district Qollo -siri, Secho and Bitamute Ganda

2. Literature review

2.1 Development of Ethno botany

As it is known, starting from the ancient period human being uses plants for different purposes. Such as source of food, home construction, fire wood, furniture and medicinal value are possible to mention as an example (Possy, 1999). Regarding plants as a source of traditional medicine, not only in the Ancient, but also in this time, man is using plants for preparation of traditional medicine to treat human and livestock ailments. No evidence and documentation tell exactly ethnobotany become part of modern science. But since thought back when man started to conscious interaction to plants and animal. According to Cotton (1996); Martin-(1 995), ethno botany work started with Christopher Colombos 1492 at the time when brought plant product to Europe. The focus of ethnobotany is on how plants are used, managed and perceived in human societies and includes plants used for food, medicine, cosmetics, dyeing, clothing and social life.

Ethnobotanical investigation documents the knowledge on cultural interaction of people with plants and how local people have traditionally used plants for various purposes incorporated plants in to their cultural and religious (Balick and Cox, 1996).

The use of plants as a source of traditional medicine for human treatment is still very important (Baytop, 1999). Different writers (Balick and Cotton, 1996); and others put their own idea and interpretation on ethno botany. However, the term and definition of ethnobotany refers to the use and interaction of humans with plants.

2.2 Traditional Medicinal plant

Medicinal plants are the useful plants for primary health care and remedy for disease and injury. Plants are traditionally used for food, medicine and others. The world health organization (WHO,2001), explain that traditional medicine as the total combination of knowledge, and in diagnosing, preventing, eliminating physical or mental disease which may rely exclusively on past experience and observation handed down from generation to generation specially by verbal. Thus experience still help peoples living rural and not have an access of modern medicine around the world. In the future the roles of health care system not diminish because of culturally accepted, if the situation of modern medicine UN able to meet. Also by encouraging of

traditional practitioner very help full for health care provision of most developing Countries. Traditional medicine is more accessible to most of population in the third world and many drugs used in modern medicine can be produced from medicinal plant available in developing countries (Sofowara, 1987).

Medicinal plants are sometimes the only possible available treatment or treating illness, generally together with spiritual practice, in the form of a traditional cure (De-Feo1992; Hammond et al., 1998). Few ethno medical surveys carried out in different counties resulted in completion of many plants that are used in treating various diseases (Ruffo, 1991).

2.3 Indigenous knowledge

The practice of knowledge built by humans through generation is indigenous knowledge which adapted to social, economic and environmental setup (Quanash, 1998). Thus, knowledge differs in community members. By developing the knowledge of preparing medicine from plant passed to in the Family and local people is the accumulation of indigenous knowledge maintained by rule, standards and mental set .The cultural and indigenous knowledge of medicinal plants in Ethiopia is unevenly distributed among each community members. Peoples in different geographical location with different religious, linguistic and cultural backgrounds have their own specific knowledge.

According to Thomas, (1995); and Martin, (1995); knowledge belief and practice generally as Indigenous knowledge changed within times. Eventually, knowledge about environment also related to show the knowledge of people interacts with nature and plants. In Ethiopian culture the knowledge of traditional medicine transfer from generation to generation largely in word of mouth (Jansen, 1981). It has been the base for agriculture, food preparation and conservation health care, education and wide range of other activities that situation society and its environment in many parts of the world for many centuries.

2.4 Supply of medicinal plant

Different vegetation type that are found in the various agro ecological zone of Ethiopia accommodate various type of medicinal plants ,they are distributed across divers habitat where as it shown wood land, mountain vegetating including grass land and forest contain more

medicinal plants, with high concentration in the wood land more medicinal plant species (Edwards,2001). The herbalist use plants from natural vegetation, home garden, the wild and around home habitat.

Ethiopia is believed to home for many thousands .of species of higher plants and so as known the richest plant diversity in Africa and the world. Ethno veterinary medicine involves use of medicinal plants, surgical techniques and livestock management practice to prevent and treat animal diseases (ITDG and IIRR, 1996). According to some estimates as many of plants used 75% to 90% of the world people relay on herbal medicines for their primary health care. The use of herbal medicine over many countries only relative by small number of plant species have been studied for possible medicinal application (WHO, 1998).Medicinal value is one of the different purposes of plants for human beings.UNEP (1995); indicate from 6500 species of Ethiopian higher plants 12% are endemic. Since 500 years Egyptian, Greek and Rome used plant materials from Ethiopia as a commodity. This witness shows Ethiopia have richest biodiversity.

2.5 Medicinal plants in ethno veterinary

In most developing countries, particularly in Sub-Saharan Africa, disease remains one the Principal causes of poor livestock performance leading to an ever-increasing gap between Supply and demand for livestock and products. The ever-declining provision of animal health services has resulted in the reappearance of a number of epizootic diseases reducing the economic efficiency of livestock production in Africa (TafeseMesfin and Mekonen Lemma, 2001).

Ethno veterinary medicine which refers to traditional animal health care knowledge and Practices comprising of traditional surgical and manipulative techniques, traditional immunization, magi co-religious practices and beliefs, management practices and the use of herbal remedies to prevent and treat a range of disease problems encountered by livestock holders (Tafesse Mesfin and Mekonnen Lemma, 2001).

Ethnoveterinary medicine provides traditional medicines, which are locally available and usually cheaper than standard treatments. Livestock holders can prepare and use home-made remedies with minimum expense. So far, many livestock holders in rural areas are relatively

few veterinarians and shortages of other facilities, traditional medicinal plants are the only choice to treat many ailments (McCorkle, 1995).

In Ethiopia as in other developing countries, livestock production plays an important role in the lively hood and economy of majority of the population. Crop production is almost entirely dependent on traction power provided by animals. Livestock offers in many harsh Environments the only way of survival and constitutes a driving force for food security and Sustainable development in developing countries like Ethiopia. Although gain from Livestock production is directly related with safeguarding animal health convention, veterinary medical system is among the smallest in Ethiopia. Techniques such as those to treat the more wide spread ailments are common knowledge among livestock holders (ITD and IIRR, 1996). On the contrary, others are known only to a few indigenous professional healers who have over the year learned the practice. Stock raisers, both farmers and herders have developed their own ways of keeping their animal health and productivity (McCorkle and Mathias, 1996).

They treat and prevent livestock diseases using sometimes age old homemade remedies, surgical and manipulative techniques. Taken together, these indigenous local animal health care beliefs and health care practices constitute an ethno veterinary medicine. Like other kind of local technical knowledge, ethno veterinary medicinal practice and skills are built up on over time empirical observation, mainly through trial and error and sometimes through deliberate or even desperate experimentation and innovation (McCorkle and Mathias, 1996).

Ethno veterinary medicine can be useful when ever and where ever stock raisers have no other animal health care options, whether in rural or peri-urban areas. In spite of its paramount importance as livestock health care system, the various traditional veterinary practices remained undocumented in Africa and Ethiopia (Dawit Abebe and Ahadu, 1993). Thus, creation of awareness on ethno veterinary medicine emphasizing on useful plants used for treatment of livestock has paramount importance to livestock management. In addition, proper documentation and understanding of farmers' knowledge, attitude and practices about the occurrence, cause, treatment, prevention and control of various ailments is important in designing and implementing successful livestock production (Tafese Mesfine and Mekonen Lemma, 2001).

2.6 Traditional medicinal plants in public health care system

Plants have been used as a source of traditional medicine in Ethiopia from the time Immemorial to combat different ailments and human sufferings (Asfaw.Z Debela *et al.*, 1999). Due to its long period of practice and existence, traditional medicine has become an integral Part of the culture of Ethiopian people (MirgissaKeba, 1998).

According to Dawit Abebe (2001), there is a large magnitude of use and interest in medicinal plants in Ethiopia due to acceptability, accessibility and biomedical benefits. In this country, the long history of use of medicinal plants is reflected in various medico- religious manuscripts Produced on parchments and believed to have originated several centuries ago (Fissile Kibebew, 2001). Medical textbooks written in Geez or even Arabic in Ethiopia between the mid of 17th and 18th century imply that plants have been used as a source of traditional medicine in Ethiopian health care system. Even today, it is common for people living in rural and urban areas to treat some common ailments using plants available around them (example *Hagenia abyssinica* to expel tapeworm, *Ruta chalepensis* for various health problem) (Abbink, 1995). The continued dependency on herbal medicine along with the side of modern medicine is largely conditioned by economic and cultural factors (Aketch, 1992).

The problem of ensuring equitable distribution of modern health care has become more serious, as the gap between supply and demand has continued to widen. Hence, in present day Africa including Ethiopia, the majority of people lack access to health care and where available the quality is largely below standard (Abbiw, 1996). This is for most indigenous peoples and the local communities' reliance on plant resources accounts for anything up to 95% of their survival requirements. Therefore, herbal remedies are the world's therapeutic means to act against diseases for a large proportion of people both rural and urban centers in developing countries like Ethiopia (Abbiw, 1996)

2.2 Application of Traditional Medicine in Different Part of the Worlds

2.2.1 Use of Medicinal Plants in Developed Nations

In fact, majority of the developing countries rely on medicinal plants for the primary healthcare. This is not only because of poverty, shortage of allopathic doctors, and less access of hospitals but due to the fact it is more culturally accepted (WHO, 2002; Hamilton *et al.*, 2003). While showing how far these traditional medicines goes in line with our physiological needs, Hippocrates who mainly remembered as a father of medicine said that herbal remedies contain synergistic and side effects neutralizing combinations (Gilani and Rahman, 2005).

The interest of medicinal plant is not only for developing countries but also it is true for developed worlds. For example, India, Korea, Japan, China, and Malaysia are frequently cited countries in using traditional medicine (WHO, 2002). According to the same report, countries like Australia, Europe and North America increasingly used complementary and alternative medicine particularly for treating and managing chronic disease.

2.2.2. Uses of Traditional Medicinal Plants in Africa

As elsewhere in other continents, Africans have been supposed to use traditional medicine to safe guard against disease since time immemorial (Lewu and Afolayan, 2009; Izugbara and Duru, 2008). According to WHO (2002), about 80% of the populations in Africa primarily rely on traditional medicine. As a matter of testimonial there has been found documentary evidences like that of medicinal plants of East Africa (Kokwaro, 1976), Medicinal plants of North Africa (Boulos, 1983).Hutching and Terblanche (1989) also emphasized the use of herbal remedies for the physical and physiological health care in South Africa.

WHO (2002) reported the degree of some specific African countries towards the use of traditional plants; accordingly,70% of the Benin and Rwandans, 60% of Tanzanians and Uganda peoples are reported to rely on medicinal plants. The same organization in 2003 reported the use of traditional medicine in treating and proactive prevention for some chronic disease. For example, in Ghana, Mali, Nigeria and Zambia, the first line treatment for 60% of children with malaria is the use of herbal medicine, and in South Africa, 70% of people living with HIV/AIDS use traditional medicine (WHO, 2003).

2.2.3 Overview of Medicinal plants in Ethiopia

Ethiopia is believed to be home for about 6,500 species of higher plants with approximately 12% endemism, and hence one of the six plant biodiversity rich countries of Africa (Endashaw, 2007). The genetic diversity contained in the various biotic make up is also high thus making the country a critical diversity hot spot for plants (UNEP, 1995).

Ethiopia has a significant portion of two of the world's 35 biodiversity rich areas hot spot i.e. the eastern Afromontane Biodiversity Hotspot and the Horn of Africa-Biodiversity Hot Spot. These hotspots house a lot of the useful wild biodiversity, particularly that of medicinal plants. The biodiversity richness of Ethiopia was known since 5000 years ago when ancient Egyptians Greeks and Romans used it as a source of unique commodities like Frankincense, Myrrh and other plant products, which are also used for medicine preparation (Thulin, 2004). Most Ethiopian traditional medicinal knowledge is kept in strict secrecy; however, it is dynamic in that the practitioners make every effort to widen their scope by reciprocal exchange of limited information with each other or through reading the traditional pharmacopeia (Dawit, 1986).

2.2.4. Utilization Status of Traditional Medicines in Ethiopia

As known, Ethiopia is a land of mosaic topographies which is responsible to have diverse floras and faunas, a land of multiple ethnic groups (Dawit and Ahadu, 1993). These traditional practices associated with plant base health care systems are in use since time immemorial (Dawit , 1986) and was supposed to be the only system available for health care before the introduction of allopathic medicine to get cured from disease arising from worms, fungi, virus and protozoa (Dawit ,2001). According to this scholar 80% of the populations in Ethiopia use medicinal plants as the primarily health care system. Similar report by WHO (2002) stated that 80%of the Ethiopian populations using medicinal plants for their primary health care. This percentage is greater than other developing counties like Benin (70%), Rwanda (70%), Tanzania (60%), and Uganda (60%). This implies that the uses of traditional medicine in Ethiopia for primary health care are becoming accepted and popular as compare to other African countries.

2.3 Ethno-Medicine Research in Ethiopia

The contribution of medicinal plant species to modern health system and the poor society who live mainly in the rural area is very high, lack of detailed descriptions of the medicinal plants has made it difficult for the researchers to decide the identity of these plants universally with the only reference being the local names of the plants and there is very little attention in modern research and development and the effort made to upgrade is not satisfactory. One of the reasons is that the traditional medicinal plant species are not well described (Mesfin and Sebsibe, 1992).

According to Sebsibe and Dagne (2001), when research is conducted on the medicinal plant species, it must target on the fact that the providers of the indigenous knowledge should get a fair share on the benefits of the development of medicines. According to Tesfaye, (2007), detailed information on medicinal plants of Ethiopia could only be obtained when studies are under taken in various parts of the country where little or no botanical and ethno botanical studies have been conducted. Scientific research on medicinal plants provides additional evidence to the present knowledge of medicinal plants which has been handed down from generation to generation (WHO, 1998). As it has already been stated by Cunningham (1993), it is better to involve traditionally medical practitioners in pharmaceutical companies. The modern health professionals and some of the consumers ask for scientific based evidence. This encourages for better and more research work. According to Kannon (2004), research on medicinal plants should direct for quality control and the research should examine active herbal constitute for efficacy and toxicity of the herbs.

To preserve indigenous knowledge of traditional medicinal plant in particular, an ethno botanical survey of lesser-studied socio-cultural groups is very crucial. However, in Ethiopia research and documentation on medicinal plants have been started only very recently (Mesfin and Sebsibe, 1992). Limited number of these papers dealt with specific socio-cultural groups in specific areas. When compared to the country's varied flora and the socio-cultural diversity, these studies are incomplete as medicinal plant healing systems differed from culture to culture. Due to this, attention should be given to the field of ethno medicine of the country with all necessary endeavours to have a full picture of the country's medicinal plants potentials.

2.4 Role of Medicinal Plants in New Drug Developments

Medicinal plants are important element of indigenous medicinal systems worldwide. Traditional medicine is able to contribute significantly to the common goal of health for all by its capacity to maintain health and treat diseases (WHO, 2000). In addition, an increasing reliance on the use of medicinal plants in the industrialized societies has been traced to the extraction and development of several drugs and chemotherapeutics from these plants as well as from traditionally used rural herbal remedies (UNESCO, 1994). Furthermore, chemical structures derived from plants can be used as models for synthetic compounds (WHO, 2000). Most of plant derived drugs were originally discovered through the study of traditional cures and folk knowledge of indigenous people (Balick and Cox, 1996).

Analysis of the number and sources of anticancer and anti-infective agents, reported from 1984 to 1995 indicates that over 60% of the approved drugs and pre-DNA (New Drug Application) candidates (for the period 1989-1995), excluding biological aspects developed in this disease are of natural origin. A recent review reported that at least 119 compounds derived from 90 species could be considered as important drugs currently in use in one or more countries, with 77% of this being derived used in traditional medicine. Further evidence of the importance of natural products is provided by the fact that closes to half of the best-selling (selling (Maundu *et al.*, 2006).

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

2.5 Threats and conservation of traditional medicinal plants in Ethiopia

2.5.1 Threats to Medicinal plants

Many of the threats to medicinal plant species are similar to those causing endangerment to plant diversity generally. The most serious proximate threats generally are habitat loss, habitat degradation and over-harvesting (Hamilton, 1997; Maundu *et al.*, 2006). Medicinal plants can have other uses besides as sources of medicines, and the threats from over-harvesting may be due to effects of collection for purposes other than medicinal. The majority of species of plants in traditional or herbal medical treatments are harvested in the wild rather than cultivated. As a result, many plant species have become extinct and some are endangered. It is therefore necessary that systematic cultivation of medicinal plants be introduced in order to protect threatened species.

As population grows, demand for traditional medicines will increase, and pressure on medicinal plant resources will become greater than ever (Hamilton, 2003). Like other developing countries, the loss of valuable medicinal plants in Ethiopia due to population pressure, loss of habitat, agricultural expansion and deforestation is widely reported by different workers in Ethiopia Zemedu, (2001). Thus, documentation of medicinal use of plants is becoming increasingly urgent because of the rapid loss of the natural habitat for some of these plants due to anthropogenic activities.

2.5.2 Conservation of medicinal plants

Laterally the term Conservation is defined as the sustainable use of biological resources. The concept of sustainability is now seen as the guiding principle for economic and social development, particularly with reference to biological resources. According to Zemedu, (2001), medicinal plants are considered to be at conservation risk due to over use and destructive harvesting (roots and barks collection).

Dawit and Ahadu (1993) found that many medicinal preparations use roots, stem and bark by effectively killing the plant in harvest. Plant parts used to prepare remedies are different; however, root is the most widely used part. Such wide utilization of root part for human and livestock ailments with no replacement has severe effect on the future availability of the plant.

Recent work of (Haile, 2005) confirms the fact that of the total plant parts to prepare remedies root is widely used with 64 species (35.5%) followed by leaf 47 species (25.97%) which hence affects sustainable utilization. This implies that the major factor for the loss of medicinal plants in Ethiopia.

In a broad sense, conservation is achieved using *in-situ* and *ex-situ* means. In-situ conservation is conservation of species in their natural habitat. Some traditional medicinal plants have to be conserved in-situ due to difficulty for domestication and management (Zemedede, 2001). Moreover, some plants fail to produce the desired amount and quantity of the active principles under cultivation out of their natural habitats. Medicinal plants can also be conserved by ensuring and encouraging their growth in special places, as they have been traditionally (Zemedede, 2001), this can be possible in places of worship (churches, mosques, so on), road sides, and garden.

Medicinal plants also can be conserved using appropriate conservational methods in gene banks and botanical gardens. This type of conservation of medicinal plants can also be possible in home gardens, as the home garden is strategic and ideal farming system for the conservation, production and enhancement of medicinal plants (Zemedede Asfaw, 2001).

3. Methodology

3.1. Description of the study area

Bedele is one of the districts in Buno Bedele Zone, Oromia Regional state southwest of Ethiopia. It is about 492 km from Addis Ababa/Finfine/ the capital city of Ethiopia. Bedele is surrounded by Gechi district in the south, Dega district in the West , Chora district in the south west, on the north by BenshingulGumuz region, and on the Northeast by the Didesa River which separates the area from the Eastern Wollega Zone. Geographically, the area coordinated between 8⁰ 27'N 36⁰ 21'E and 8⁰45'N 36⁰ 35'E of longitude and latitude with an altitude range of 2, 012-2,162 asl. In terms of land use of the district, 32177 ha (41.75%) was cultivated land, 1440 ha (1.9%) grazing land, 5264 ha (6.9%) reserved for cultivation and related purposes and 1037ha (1.45%) of wet lands (BDAO, 2009). The Study area encompass 12- 36 Km from the center of the town.

Location of Bedele district in BunoBedele Zones

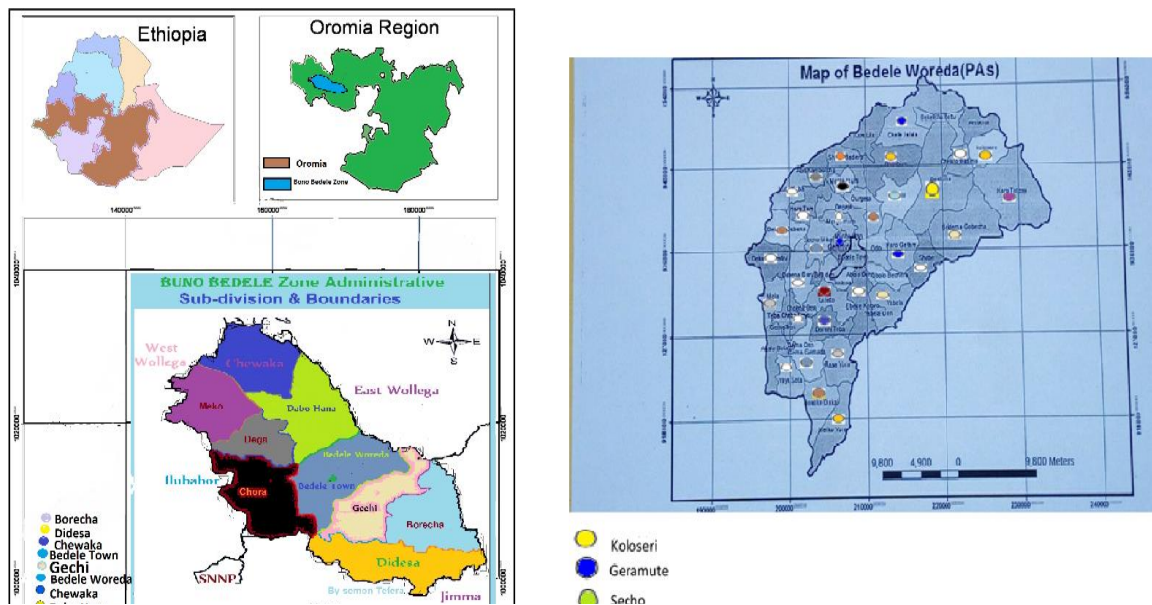


Figure 1 Map of the study area showing Ethiopia, Oromia Regina state Buno Bedele Zone and the study district (Bedele)

The study was carried out from September to August 2017 According to district agricultural office (2017), total forest coverage of the district was 12,240 ha (16%). The human population of the district was 138,164 of which 52.49% were male and 47.54% were female. The major ethnic group in the district were Oromo (ca 97.8%), Amhara (2%), others (0.2%) (BDCO, 2017). Mixed agriculture (crops and livestock rearing) were the means of livelihood in the district.

3.2. Climate

The mean monthly maximum temperature of Bedele district is 24⁰c.while the minimum temperature ranges from 14-15⁰C (Figure 2).

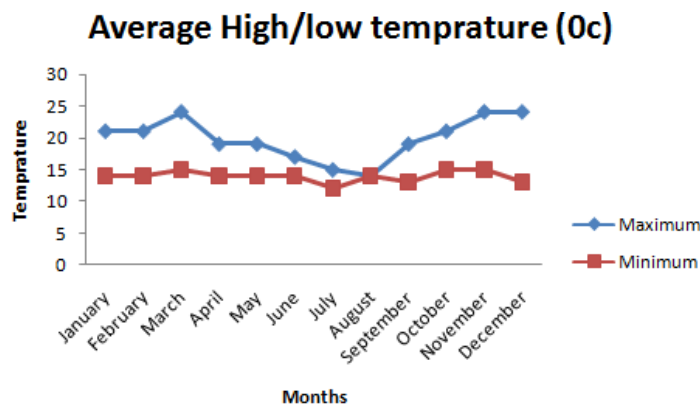


Figure 2: Mean maximum and minimum Range of the year temperature of Bedele district (Source: FMABb, 2017)

The mean annual rainfall recorded for Bedele district was between 450-1850mm (EMABb, 2017), and humidity is high (near or over 91 %) a year round (Figure3).The district is characterized by four months dry period and eight month of rainy season.

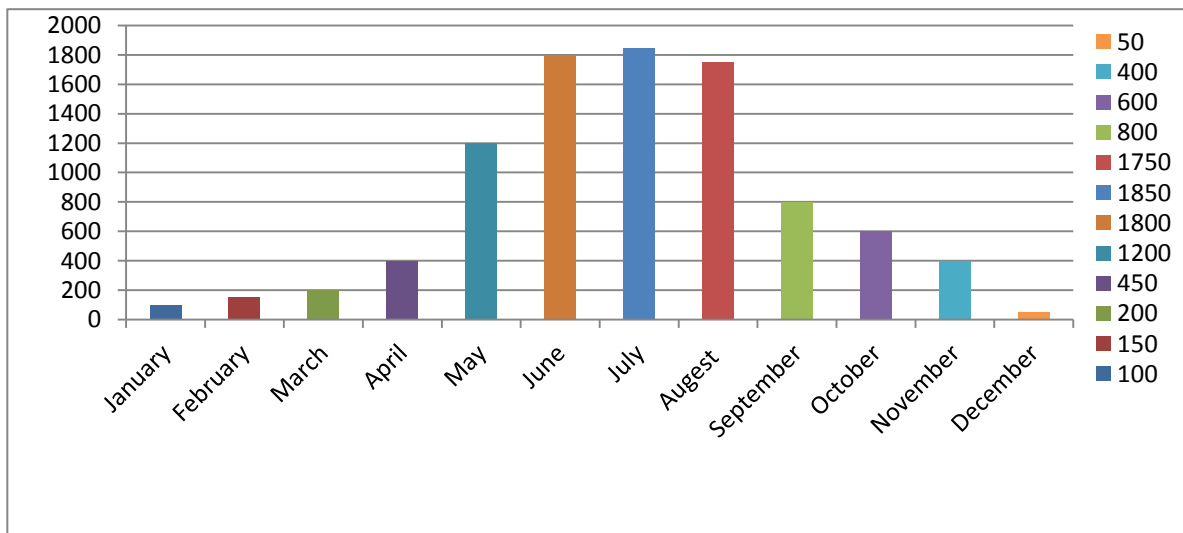


Figure 3: Average monthly rain fall (in mm) of Bedele district Source: EMABb (2017)

3.3 Study Population

Bedele has 41 *Ganda* (the smallest administrative unit) and population of the area is more than 138,164. In each *Ganda*, the distribution of traditional healers in terms of number and sex was different. However, from the data taken from local leaders and known person of each *Ganda*, there were 26 males and 10 female traditional healers. The purpose of these people in the study was to provide information about traditional medicinal plants, knowledge practice of herbal medicine and current status of medicinal plant.

To obtain reliable data for any investigation focusing on the study design is an important point. Thus a cross sectional study was conducted to assess ethnobotanical study of medicinal plants in Bedele district, BunoBedele zone, southwest.

3.4 Sample size and sapling technique

Three *Ganda* (Qolo-sirri, Bitamute and Secho) were purposively selected based on the presence of traditional healers. Ten traditional healers were selected from each *Ganda* and hence the total population was thirty

3.5 Method of data collection

Data was collected from April to June 2017 following the method given by Hedberg (1993) and Cotton (1996). Accordingly, semi structured interview and focused group discussion with informants were employed. Interview and discussion were conducted based on questionnaire (Appendix 2) prepared before and focus group discussion conducted with 8-12 informants needed to understand, management, conservation and status and practice of knowledge transferred. The questionnaire translated to local language (afanoromo). The interview was held directly by investigator and selected trained assistant.

3.6 Ethnobotanical data collection

Ethno botanical data collection between April to Jun 2017 on six field trips made to the site based on methods given by Martin (1995). The data were collected by using semi-structured interview, observation, focus group discussion guided field walks with informants to obtain indigenous knowledge of traditional healers.

3.7 Plant specimen identification

Each medicinal plant specimen was collected, numbered, pressed dried and taken to Jimma University for identification. The identification was done using key of flora of Ethiopian and Eritrean by experimental method, comparison authentic specimen illustration and taxonomic key with the expert of Jimma university herbarium. Voucher specimens with scientific name, vernacular name, families and collection numbers for all medicinal plants and plants recorded from the study area.

Data collection with traditional healer



Figure 4: Medicinal plant sample collection from the study area(.foto by kumilacchw Denekew)

3.8 Data analysis

The information were obtained through interview from traditional healers and arranged according to their similarities so as to make easy the data analysis activity. Finally the data were analysed using excel spread sheet and result was presented in table and graph. Preference ranking and paired comparison were also analysed.

3.9 Preference ranking

Preference ranking was conducted following Martin (1995) for six most important medicinal plants used in treating wound (Table 11), as traditional healers treat it usually, 9 local healers were selected to identify the best preferred medicinal plant species for treatment of wound. Each informant provided with six medicinal plants informed to treat and asked to assign the highest value (4), for plant species most preferred against this ailment and the lower value (1) for the least preferred plant and in accordance of their order for the remaining ones. The value was summarized and ranks given to each plant species.

3.10 Paired comparison

The method can be used for evaluating the degree of preference or levels of importance of certain selected plants (Nemarundwe and Richards, 2002). Paired comparisons to indicate the effectiveness of 5 medicinal plant species used to treat teeth ache were employed as described by Martin (1995). In such a way that seven key informants were purposively selected and allowed to show their responses independently for pairs of five traditional medicinal plants that are used for teeth ache. A list of the pairs of selected items with all possible combinations was made and sequence of the pair and the order within each pair was randomized before every pair is presented to selected informants and their responses were recorded, total value summarized and ranked . The most effective plant is stated by highest value 4 while the least important is stated by least value

4. Result

4.1 Demographic features of respondent

Of the total number of respondents, 66.7% were male and 33% female. The majority of the informants (66.6%) were above 50 years of age. Regarding to educational status 26.7% of them could not read and write; 40% were grade 1-4 and 33.3% were grade 5-12.

Table 1: Demography of the respondents of this study

Item	Alternative	Number	Percentage
Sex	Male	20	66.67
	Female	10	33.3
Age	25-40	6	20
	41-50	4	13
	51-60	11	36.6
	>60	9	30
Educational status	Uneducated	8	26.7
	1-4	12	40
	5-8	10	33.3
	Higher education	—	—
Religion	Protestant	6	20
	Orthodox	8	26.7
	Muslim	16	53.3
Marital status	Single	—	—
	Married	30	100
	Divorce	—	—

4.2. Diversity of medicinal plant resource in the study area

Overall, 60 medicinal plant species were recorded and identified from the study area. From those medicinal plants 7(11.6%) belong to Fabaceae followed by Lamiaceae with 6 (10%) of medicinal plants. Solanaceae and Asteraceae were composed of 3 (5%) species each, Verbenaceae, Rununculaceae, Euphorbaceae, Rutaceae are the families with 2(3.3%) medicinal plant species each while the remaining 29 families have only one species (1.6%) each (Table 2).

Table 2: Families of medicinal plant species, number of genera and species in the study area

Families	No of Genera	% of genera	No of Species	% of species
Fabaceae	4	7.7	7	11.6
Lamiaceae	4	7.7	6	10
Rutaceae	2	3.85	2	3.3
Solanaceae	2	3.85	3	5
. Euphorbiaceae	2	3.85	2	3.3
Asteraceae	4	3.85	3	5
Rubiaceae	2	3.85	2	3.3
Verbenaceae	2	3.85	2	3.3
Apocynaceae	1	1.9	1	1.67
Myrsinaceae	1	1.9	1	1.67
Amaranthaceae	2	3.85	1	1.67
Crassulaceae	1	1.9	1	1.67
Bigoniaceae	1	1.9	1	1.67
Myrtaceae	1	1.9	1	1.67
Phytolacaceae	1	1.9	1	1.67
Aloaceae	1	1.9	1	1.67
Ranunculaceae	1	1.9	2	3.3
Acanthaceae	1	1.9	1	1.67
Loranthaceae	1	1.9	1	1.67
Boraginaceae	1	1.9	1	1.67
Polygonaceae	1	1.9	1	1.6
Convolvulaceae	1	1.9	1	1.67
Sapindaceae	1	1.9	1	1.67
Melianthaceae	1	1.9	1	1.67
Moringaceae	1	1.9	1	1.67
Rosaceae	1	1.9	1	1.67
Caricaceae	1	1.9	1	1.67
Simarubiaceae	1	1.9	1	1.67
Hyacinathaceae	1	1.9	1	1.67
Cucurbitaceae	1	1.9	1	1.67
Davalliaceae	1	1.9	1	1.67
Pittosporaceae	1	1.9	1	1.67
Moraceae	1	1.9	1	1.67
Amaryllidaceae	1	1.9	1	1.67
Cryophyllaceae	1	1.9	1	1.67
Comberetaceae	1	1.9	1	1.67
asclepiadaceae	1	1.9	1	1.67
Verbenaceae	2	3.85	1	1.67

4.3 Growth Habit and parts use of medicinal plants in study area

Table 3: Growth form and parts use of medicinal plants in study area

Habit	Parts use						Total	%
	Leaf	Root	Bulb	Stem	Seed	shoot		
Tree	9	4	-	2	3	2	20	36.3
Shrub	12	3		2	3	3	23	38.3
Herbs	5	3	1	2	1	1	13	21.67
Climber	2	-		-	-	-	3	5
Epiphyte	-	-	-	1	-	-	1	1.6
Tot	28	11	1	7	7	6	60	
%	46.7	36.67	1.67	11.67	11.67	10		100

As indicated in Table 3, shrubs are the plant growth form with relatively highest number of medicinal plants composition (38.3%) followed by trees (36.3%) while the least was contributed by Epiphytes (1.67%).

Different parts of plants are used for remedy preparation by the local community in Bedele district. Almost all plant parts are used for preparing remedy for treatment of different human's and livestock ailments in the study area. Leaf was the most widely used parts of a plant accounting for 46% of the source of traditional medicine followed by root (36.67%), while the least was contributed by the Bulb (1.67%) (Table 3). Out of total number of collected species of plants 43% were used for more than one disease treatment and 57% were used for a single disease treatment (Appendix 1).

4.4. Application of medicine plants

The traditional healers in the study area employ several ways for preparation of remedies from medicinal plants. Most of the traditional medicines are served in fresh form while the dried form accounts for 25% (Figure 4). About 30% is prepared both in fresh and dried form.

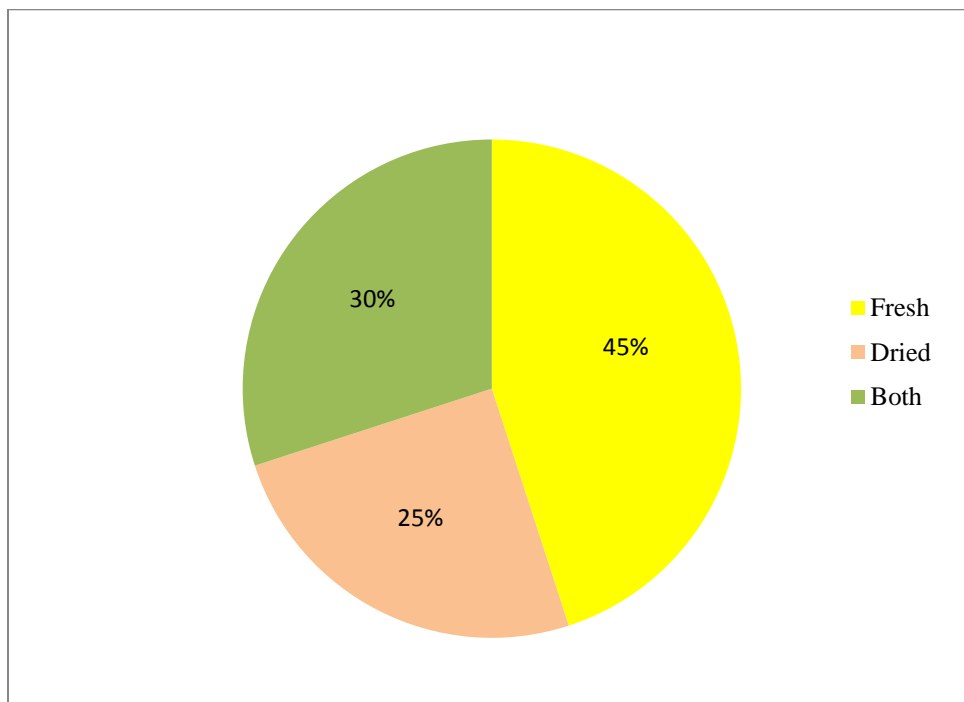


Figure 5: Application of medicinal plants in the study area

In this study, 29 different human ailments were recorded as a local health problem and are treated by the reported medicinal plant species. A species could treat a single or a number of ailments (Appendix1). From these medicinal plant species, 6(10%) are used to treat wound, 5(8.3%) species used for the treatment of teeth ache, 4(6.67%) to treat Diarrhoea and abdominal cramp, and snake bite, Head ache, evil spirit, malaria and worms each are treated with 3(5%) species, fibril illness, Rheumatism, skin rash, Scabies, sinus and Rabies are treated by 2 (3.3%) of medicinal plants each and (1.7%) recorded to treat the remaining of 12 different human disease (Table 4).

Table 4: Human disease and number of plant species used to treat the disease in the study area

Type of disease	No of species	Percentage
Wound	6	10
Teeth ache	5	8.3
Diarrhoea	4	6.67
Abdominal cramp	4	6.67
Snake bite	3	5
Head ache	3	5
Evil sprite	3	5
Malaria	3	5
Gonorrhoea	2	3.3
worms	3	5
Haemorrhoid	2	3.3
Rheumatism	2	3.3
Skin rash	2	3.3
Scabies	2	3.3
Sinus	2	3.3
Impotence	1	1.67
Termination of placenta	1	1.67
Fibril illness	1	1.67
Menstruation problem	1	1.67
Snail poison	1	1.67
Epilepsy	1	1.67
Asthma	1	1.67
Diabetes	1	1.67
Swelling body	1	1.67
Gastritis	1	1.67
Hepatitis	1	1.67
Kidney infection	1	1.67
Rabies	1	1.67
Elephantiasis	1	1.6

Peoples of the study area use few number of plant species to treat their livestock when compared to human diseases. However, most of the informants revealed they treat their livestock by indigenous medicine, and rarely look for modern medication in the area. Total of 16 livestock ailment identified that treated by 20 plant family and 26 species of plants in the study, the known disease affecting livestock health were Diarrhoea treated by 5(8.3%) species, Fasciola 4(6.6%), rabies 3(5%), Anthrax. Bleeding diarrhoea and blotting 2(3.3%) each species the reaming were

treated by one (1.7%) species each. Endalew Amenu (2007) reported 34 livestock ailment treated by 60 plant species.

Table 5: List of animal disease in study area

Disease	No of Plant species	%
Diarrhoea	5	8.3
Fasciola	4	6.67
Rabies	3	5
Bleeding diarrhoea	2	3.3
Snake bite	2	3.3
Blotting	2	3.3
Anthrax	2	3.3
Eco- parasite	2	3.3
Coccidian	1	1.7
Trypanosomes	1	1.7
Blackleg	1	1.7
leech	1	1.7
Retained faeces	1	1.7
Internal parasite	1	1.7
Actinomycosis	1	1.7
pasturolosis	1	1,7

4.5 Route of administration and dosage

The route of administration of traditional medicine in the study area includes nasal, oral, and dermal. Oral administration was the dominant route of administration of traditional medicine (50%) followed by dermal means (23.3%), while the least route of administration was nasal (Table 6).

Traditional healers use to determine dosage and frequency by various measurements like counting the leaf and seed, using finger length for bark, root and stem, pinch for pounding. Concerning frequency of dosage, 63% of the traditional medicines are administered until it cures the ailments and 37% are given only once to treat both human and livestock ailments.

Table 6: Route of administration an

Routeof administration	Frequency		Total	Percentage
	once	More than once		
Oral	11	19	30	50
Nasal	2	-	2	3.3
Dermal	4	10	14	23.3
optical	-	-	-	-
Both Oral&Nasal	2	1	3	5
Both oral &Dermal	3	8	11	18
Total	22	38	60	-
%	37	63	-	100

4.6 Habitat of medicinal plant

Medicinal plants for the preparation of traditional remedies are distributed in different habitats in the study area. Most of the medicinal plants (70%) were collected from the wild, while the least was collected from rocky area (Figure 6)

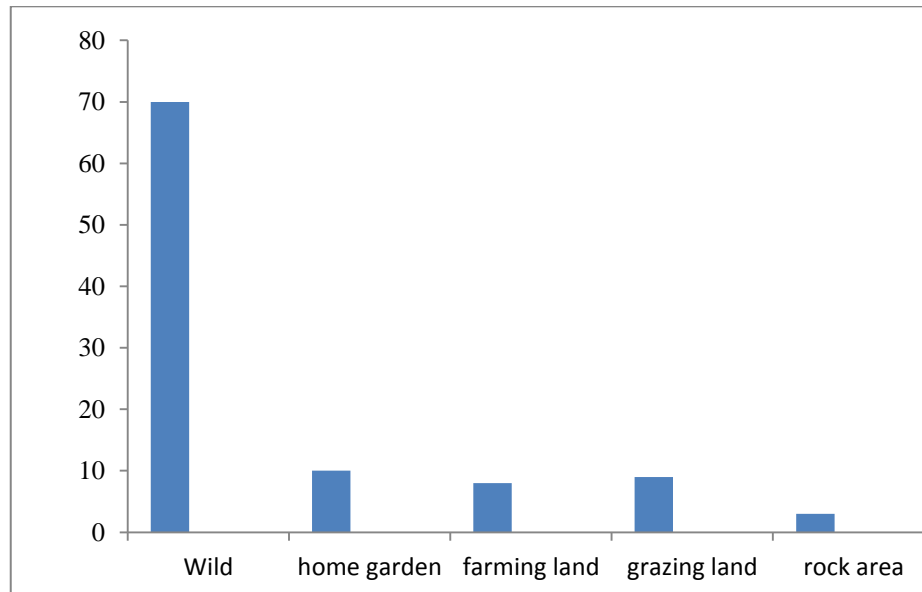


Figure 6: Habitat of medicinal plant

4.7 Medicinal plant for treatment

From 60 species of medicinal plants collected in the study area, about 62% are used to treat human ailments, while 13% are used to treat livestock ailments and 25% are common (Figure 7).

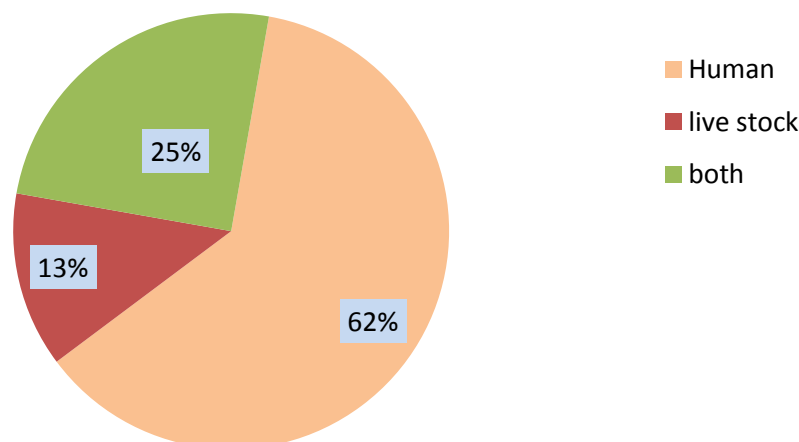


Figure 7: medicinal plants for treating in study area

4.8 Method and preparation of traditional medicine

Traditional healers in the study area employ varieties of methods in order to prepare remedy from medicinal plants based on the type of treatment and the actual site of ailment, knowledge through experience. According to the healer in the study area pounding accounts for 47%, squeezing 6%, crushing 25%, chewing 12% and boiling 10% (Figure 8)

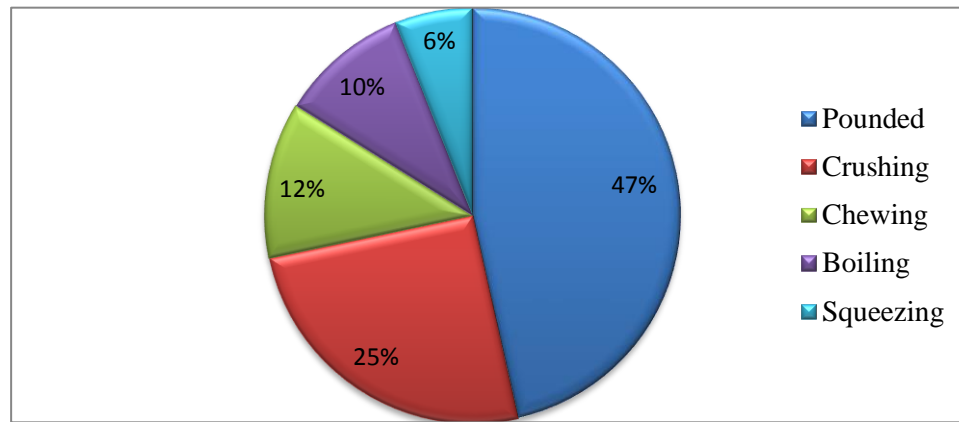


Figure 8: Method of preparation of remedy form medicinal plants

4.9 Threats to medicinal plants in the study area

About 72% of the traditional healers believe that the medicinal plants are decreasing, 18% reported no change in the status of medicinal plants in the study area, while 10% believe increasing than ever before.

The information gathered on the threats of medicinal plants from the local healers of the study area showed that expansion of agriculture accounting for 43% was the major problem affecting medicinal plants while 17% of the threat was caused by burning of forest and the rest (39.7%) of medicinal plant were declined by the combination of three factors (Table6).

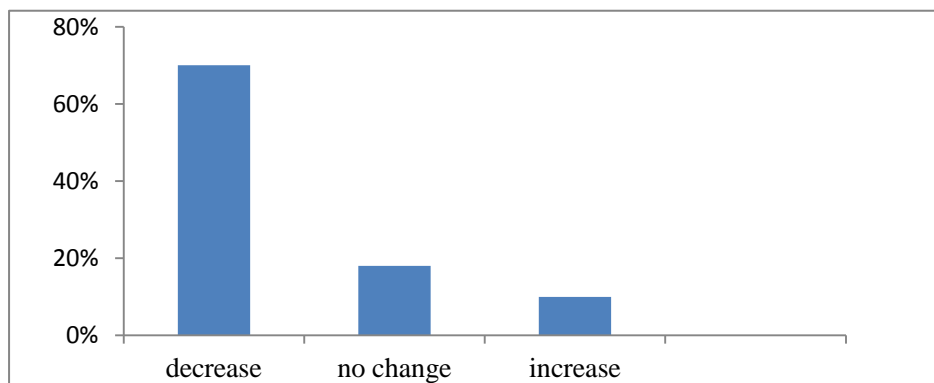


Figure 9: Status of medicinal plants in the s

Table 7: Threats to medicinal plants of Bedele District

No	Threatening factors	No res.	%
1	Agricultural expansion (A)	13	43
2	Burning of forest (B)	5	17
3	Over using for other purposes(c)	7	23
4	Both A+B	2	6.7
5	Both A+C	3	10

4.10 Conservation of medicinal plants

Of the thirty local healers, majority of them (53.3%) do not have experience on conservation of medicinal plants while the remaining 46.6% of the healers have conducted some conservation activities like planting the medicinal plants in their own gardens and taking care when they collect medicinal plants from the wild (Table 8).

Of the total respondents, 43% suggested that medicinal plants should be conserved and managed through cultivation out of original habitat around home garden. The other methods, such as cultivation in the original habitat and using wisely account for 56% (Table 9).

Table 8: The response of traditional healers on the conservation activities of traditional medicinal plant

Response	No of respondents	%
Yes	14	46.6
No	16	53.3
Total	30	100

Table 9: Suggestion of traditional healers about conservation of medicinal plants

No	Conservation method	No of respondent supported the method	%
1	in the original habitat	7	23
2	Cultivation out of original habitat in around home garden	13	43
3	Teaching the society to save guard in the natural habitat	0	-
4	Using wisely	10	33
5	Other idea	-	
	Total	30	100

4.2.1 Preference ranking of medicinal plant Species

Preference ranking of medicinal plant species used to treat specific disease. There were different plant species that prescribed for treating the same health problem in the study area. The informants show preference of one over the other. The preference ranking of six traditional medicinal plants identified to treat wound was conducted after selecting nine informants (Table 9). *Erythrina abyssinica* was the most effective plant species to treat wound which ranked 1st and others like *Guizotia scabra*, *Croton macrostachyus*, *Pittosporum viridiflorum* and *Bersama abyssinica* ranked 2nd, 3rd, 4th and 5th in curing wound while *Millettia ferruginea* was the last preference by the local healers to cure wound.

Table 10: Preference ranking of medicinal plant species used to treatment of wound

Medicinal plant	Respondents (1-9)									Total	Rank
	R1	R2	R3	R4	R5	R6	R7	R8	R9		
<i>Erythrina abyssinica</i>	4	4	3	3	0	2	3	3	2	24	1 st
<i>Croton macrostachyus</i>	3	3	3	1	4	2	2	1	2	21	3 rd
<i>Pittosporum viridiflorum</i>	2	1	2	3	3	0	2	4	0	17	4 th
<i>Millettia ferruginea</i>	2	1	0	0	2	4	0	0	3	12	6 th
<i>Guizotia scabra</i>	2	3	2	4	1	2	2	2	4	22	2 nd
<i>Bersama abyssinica</i>	3	2	3	0	3	1	1	1	1	15	5 th

4.2.2 Paired comparison of medicinal plants used to treat teeth ache

Pair comparison of five popular plant species were identified and the efficacy to treat teeth ache reported by seven key informants. Accordingly *Citrus limon*, *Clematis hirsuta* and *Premna schimperi* are ranked 1-3rd respectively and *Bersama abyssinica* and *Asparagus africanus* less preferred to compare the other three species (Table10).

Table 11: Paired comparison of plant species to treat teeth ache

Plant species	Respondents (1-7)							Total	Rank
	R1	R2	R3	R4	R5	R6	R7		
<i>Citrus limon</i>	3	4	4	2	3	4	2	22	1 st
<i>Clematis hirsuta</i>	4	0	2	2	3	2	1	15	2 nd
<i>Premna schimperi</i>	2	2	4	2	1	1	2	14	3 rd
<i>Bersama abyssinica</i>	2	3	0	1	2	1	0	9	5 th
<i>Asparagus africanus</i>	2	3	2	2	0	2	1	12	4 th

5. Discussion

5.1 Medicinal plant in the study area

The available and significant role of medicinal plant is primary health care delivery in Ethiopia were 70% of human and 90% of livestock. as varies literature show traditional health care culturally deep rooted with oral and written pharmacopeia The major reason why medicinal plant are demanded in Ethiopia are due to culturally linked traditions, the trust of community have in medicinal value of traditional medicine and low cost, getting health services are the main reasons for preferring traditional medicine than modern ones (Kanon, 2004).

In the finding the experience and participation of male informants exceed female practitioners by number this indicat culturally male perform their activates out of home and have specific interaction with plants. Similar result was recorded by (Brhane *et al.*, 2014).

Overall, 60 medicinal plant species belonging to 39 families and 52genera were collected and identified from the study area. Fabaceae 7species Lamiaceae 6species Astraceae and Solonaceae 3 species each, Euphorbiaceae, Rutaceae, Vebenaceae, Rubiaceae, Runununucleae reported by 2 species each and the rest 31 were represented by one species each (Appendix1). Most of these studied medicinal plants have medicinal value for human being and some used for both human and livestock disease treatment. Large number of plant species used for traditional medicine in the study area belongs to family fabaceae. This finding agrees with Awas (2007), Yinger and Yehwhala (2007), and Amenu (2007). Fabaceae were represented by high number of medicinal plant species contributing for remedies preparation.

Medicinal plants utilized by people of Bedele district were mostly obtained from wild and few being found under cultivation. This is similar with study conducted by Ermias Lulekal *et al.* (2008) in Ethiopia.

Trees and shrubs together have contributed about 74.6% of the medicinal plants in the study area. The reason behind the high number of medicinal plants in the woody species is associated by the ability of tree and shrubs to withstand long dry season. Comparing with other work reported by Kebede Tarfesa *et al.*, (2017);(Bayafers Tamene, 2001; Debela Hunde, 2001; and

Ermias Luka, 2005) herbs were followed by shrubs in which the dominant growth form of species to treat humans and livestock ailment. The result shows difference.

High per cent of herbal medicine prepared from medicinal plants without any ingredient and some of assembled medicinal plant needed mixed with other substances to be medicine.

Analysis of data on plants parts used indicate that leaf is the major part widely used by local healers in preparation of remedy which account for 46.7% root 36.67% and seed and shoot 11%. This is similar with other similar studies conducted in Ethiopia (Dawit Abebe, 1991; Bayafers Tamene, 2000; Mirutse Giday, 1999), Endalew Amenu (2007); Etana Tolasa (2007); Haile Yineger and Delenasaw Yewhalaw (2007). Similar to Dawit Abebe (1993), Bayafers Tamene (2000) and Kebu Balemie *et al.*, (2004) 45.5% of herbal medicine was administrated orally in the study area.

People of the study area use various local units of measurement and the duration of administration the dosage to estimate the amount of medicine. Recovery from the disease, disappearance of the symptoms of the diseases e.g. measure by using teacup count the leaf and seed, finger length for (root & stem) pinch for pounding The amounts of remedy and prescription rates were generally dependent on the degree and duration of the ailment prescription was also reported by Haile *et al.*, (2008). The lacks of standardized measuring units for traditional medicine were described by other research results (Ermias *et al.*, 2008).

The result of the study showed the highest proportion of medicinal plant was used in treating wound and teeth ache respectively. Eg *Erythrina abyssinica*, *Croton macrostachyus*, *Pittosorum viridiflorum*, *Millattia ferruginea*, *Guizotia scabra* *Bersama abyssinica* were used in treating wounds while *citrus limon*, *clematis hirsuta*, *Premna schimperi*, *Bersama abyssinica* and *Asparagus africanas*.

Most of the respondents (72%) agreed that the medicinal plants have been decreased from the wild due to various reasons such as agricultural expansion, burning of forest and over using for other purposes. Local healers also rely on fresh material that could aggravate the decline of medicinal plants with rare occurrence. Similar studies have been reported by Debela Hunde (2001) and Kebu Balemie *et al.*, (2004). According to these writers climatic condition and manmade activities have contributed to the declining of medicinal plants. .

The ethnobotanical finding and some other past studies do not contradict with each other. Therefore, it is better for the local people to use herbal medicine along with modern medicine. The reason is due to high medicinal value and low cost of herbal medicine. In addition according to this finding, these medicine plants are endangered due to various reasons. According to the informants transfer and acquisition of indigenous knowledge to generation were declined with the effect of loss medicinal plant, modernization, lack of Youngers practice, elders kept as secret except a few family members, also no written documentation

Same natural factors and anthropogenic factors resulted in loss of plant genetic diversity and the loss of medicinal plants associates with the missing advantages gained from medicinal plants and indigenous knowledge associated with plants (Sofowara, 1982). The problem observed in the study area during collection and search for some medicinal plants like *Albiza schimpeiana*, *prumus africana*, *Croton macrostachyus* used for fire wood and other purpose. The effect of deforestation on medicinal plants was reported by Mirutse (1999) a sustainable harvest which put medicinal plants under threat, even though it is not severe as the other factors.

Most medicinal plants were more available in the wild areas (appendix 1) and have not been cultivated by traditional practitioners in the home gardens. Future efforts need to give attention to conserve them around human habituations. Flati *et al.*, (2009) reported some of the medicinal plants were cultivated in the home gardens for benefits of other than medicine preparation. Hence the medicinal plants are more exposed to extinction. Unless conserved, medicinal plants may be highly eroded in the study area. Hence, the sustainable utilization of medicinal plant species should practice through awareness raising and conscious protection in situ and ex situ conservation. Endalew (2007) stated that giving educational training for the people can help the management of traditional medicine easily.

6. Conclusion

Bedele district has large potential of medicinal plant species diversity because of favourable agro climatic condition. In the area medicinal plants are immediate existing source of health care for people where they live.

People of the study area are using plant resource and traditional medicine for their day to day health care due to the low cost and high effective medicinal value. These medicines are not only beneficial for people who do not have access to modern medicine, but also for those highly dependent on conventional medicine.

Generally, 60 species of medicinal plants have been documented from the study area and are used in the treatment of different types of human and livestock health problems and categorized under 52 genera and 39 families.

Most of the medicinal plant species collected from study was from their natural habitat grazing land and home home gardens. Regarding the growth forms of medicinal plants shrubs are widely used followed by tree. Peoples of the study area mostly prepare the remedies from leaves and root. This utilization of plant parts put medicinal plants under pressure.

.Treat to these plants in the district might be from the type of plants and parts used, Harvesting the underground parts, roots, stems or the whole parts of medicinal plants pose more of threat than using fruit and seed and more threatening them using leaf.

To conserve endangered medicinal plant in the area, traditional healers should be organized together as they relied on it, awareness creation of local people, working with agricultural office and none governmental organization and wise use of medicinal plants are the main solution for the decrement of these medicinal plants to be sustainable

7. Recommendation

- ❖ Plants which their roots, stems and the whole part are used for medicinal purpose need special attention to determine their status and priority measure should be taken to conserve and use wisely by healers.
- ❖ Training should be given for traditional healers to use medicinal plants carefully.
- ❖ Major use of medicinal plant use for treatment of disease. This traditional remedies need to be confirm through scientific investigation to identify may be provide for modern drugs
- ❖ The individual knowledge and skill of traditional practitioner encourage and protected
- ❖ recognition given for traditional healers either through certification with popularize their indigenous knowledge and medicinal plant value
- ❖ Training the local people on resource use value management and conservation with sustainable use.
- ❖ Encouraging people to grow medicinal plants in home garden with crop in farm land and round home fence
- ❖ The existing of heavy pressure on medicine plants in the study area due to biotic factors like agricultural expansion, burning of forest and over harvesting/ using for different purpose so urgent measure to be taken to rehabilitate and conserve the remaining medicinal plant
- ❖ Create a conducive environment for traditional medicine practitioners and modern medicine so that they will work together hand in hand complementing each other

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Appendix 1. Medicinal plants used for human and livestock disease, treatment their local name, scientific name, part used, condition in which medicinal plant used, method of preparation, dosage, growth habit, habitat status and disease treatment

	Scientific Name	Family Name	Local Name (afaan oromo)	Part used	Condition in which medicinal	Method of preparation	Dosage	Growth habit	habitat	Status of medicinal plants	Disease Treatment	
											Human	Livestock
16	<i>Carissa spinarum</i>	Apocynaceae	Agamsa	R	D	-Its powdered is mixed with water (concentrate)	Or. Half of tea cup 3 times a day	SH	F	Dec	Impotence (loss of sexual feeling)	
58	<i>Maesa lanceolata</i>	Myrsinaceae	Abbayi	B	D	-pounded and mixed with butter	Ex. Ointment	T	F	Dec.	Elephantiasis	Faciolosis
3	<i>Guizotia scabra</i>	Asteraleae	Adaa	L	F	-squeezed and its drop is prepared	Ex. Introduced on wound till cure	SH	F	Dec.	Wound	
32	<i>Phytolacca dodecandra</i>	phytolaccaceae	Andoodee	L R	F	-squeezed -Juice	Na.2-3 drop is taken Or. 1 glass a day for on week.	SH	F	No ch.	-sinus -Termination of pregnancy -mosquito larva	

17	<i>Albizia schimperiana</i>	Fabaceae	Ambabbe ssa	L	F	-pounded and tied with a piece of cloth and warmed by fire	Ex. rubbing affected part fill it cure	T	F	Dec	Kin tarot (hemorrhoids)	
26	<i>Ajuga sp.</i>	Lamiaceae	Armagusa	A- P	F	-pounded and mixed with nut oil.	Or. Taken one cup a day for three days	H	F	No ch.	Epilepsy.	
56	<i>Datura stramonium</i>	Solanaceae	Asangira	L	F	-Squeezed and its drop is prepared		SH	F	No ch.	Kin tarot Evil eye	
30	<i>Ocimum gratissimum</i>	Lamiaceae	-Ancabbii	L	F	Leaf smashed	Snafed through nose	T	F	Dec	Head ache	
23	<i>Croton macrostachyus</i>	Euphorbiaceae	Bakanisa	B	D	-Is powder is prepared -Powder is prepared and mixed with water -powder is mixed with butter Pounded	-Ex. Apply on it (wound) -Or. one tea cup three times a day for a week -Or. Three spoon per a day during	T	F	Dec.	-Wound -Malaria - Rheumatis m	

						and mixed with water and filtered	pain -Or.one cup per a day for three days				-Gonorrhoea	
19	<i>Kalanchoe sp.</i>	Crassulaceae	Bosoqee	L	F	-crushed	-Or.one tea cup is taken once	H	F	Dec.	Ascaris	
28	<i>Amarantus sp.</i>	Amaranthaceae	-Amasillo (matere)	L	D	Crushed with bean nut	1 spoon a day	H	F	.Dec	Tapeworm	
5	<i>Stereospermum kunthianum</i>	Bignoniaceae	-Botoro	B	F&D	-pounded and mixed with water (conc.)	-Or. Drink 1/2L per a day for a week	T	F	Dec.	-Snake bite	Faciolosis
57	<i>Eucalyptus globulus</i>	Myrtaceae	-Bargamoadii	L	F	Fresh leaf boiling	Ex. Steam bath inhalation	T	H G	Dec.	-Allergic Head ache Commencoid	
7	<i>Erythrina abyssinica</i>	Fabaceae	-Biroo	B	D	-Its powdered is prepared	Ex. introduced on wound	T	H G	Inc.	-Wound	
9	<i>Calpurnia aurea</i>	Fabaceae	-Ceekaa	L	F&D	-crushed properly -its powder mixed with water	-Ex. rubbing the whole part till cure -Or.1/2 tea spon take a week	SH	F	Dec.	-Measles -rabies -	-diarrhoea
	<i>Justicia schimperiana</i>	Acanthaceae	-Dumuga	L	F	-crushed and mixed	-Or.1 glass three times	SH	F	Inc.	- Rheumatis	

						with water and filtered	a day for a week				m.	
27	<i>Ocimum lamiifolium</i>	Lamiaceae	Demakase	L	F	-squeezed and its drop is prepared	-Or. Taking one teacup -Nas. small drop it taken Ex. Rubbing	SH	F	Dec	-Allergic Fibril illness Head ache	
24	<i>Tapinanthus globiferus</i>	Loranthaceae	- DertuBek enisa	ST	F&D	-pounded p mixed with water	Or. 1 glass per day for a week	Ep	.	Dec	Blood pressure	
4	<i>Terminalia schimperiana</i>	comberetaceae	-Dabakaa	B	F&D	-pounded and mixed with water.	Or. 1tea cup is taken during biting	T	F	Dec.	Snake bite	Faciolosis
13	<i>Rumex abyssinica</i>	Polygonaceae	Dhangaggoo I	R	F	-	Ex. Rubbing the affected place with it	SH	F	No ch.	Kuwakucha Ring worm scabise	
8	<i>Achyranthes aspera</i>	Amaranthaceae	-Darguu	R	F	-pounded and filtered	Or. 1/2 tea cup taken during pain	H	F	Dec	Abdominal crump.	
39	<i>Olea europaea sub.sp .Cuspidata</i>	Oleaceae	-Ejersa	L	F	-Decoction -pounded and boiled with honey	- Or. 1 tea cup is a day for 3 days Washing mouth with it	T	F	Dec	-Menstrual problem Teeth ache	
38	<i>Vernonia amygdalina</i>	Asteraceae	-Eebicha	L	F	-Crushed and boiled	- Or. 1 tea cup is	T	F	Dec	Menstrual problem	Milk producti

						in water mixed with honey	taken per a day for 3 days					on
49	<i>Clematis hirsuta</i>	Ranunculaceae	Hiddafiiti	L	F	-Squeezed and its drop is prepared -pounded & mixed with coffee residue	Ex. Taking its drop -Or.1L is taken for 3 days	CL	F	No ch.	Teeth ache	Faciolosis
54	<i>Gardenia volkensii</i>	Rubiaceae	Gambela	B	F&D	-Crushed with white onion	-Or.1 tea cup 3 times a day for a week	T	F	Dec	Gonorrhoea	
33	<i>Trifolium repens</i>	Fabeceae	Suunqoo qalamee	L	D	Squeeze/crushed/hoting in fire	-Dermal applied	H	F	.No ch	-Snail poison -tetanus	
45	<i>Withania somnifera.</i>	Solanaceae	Gizawa	L	F	-Crushed with Tenadam and mixed with water	Or.1 tea cup per day for three days is taken.	H	H G	De.	-Evil eye. -malaria	
42	<i>Dichondra repens</i>	Convolvulaceae	-HidaHant Uta	R	F	-Crushed and mixed with water (conc.)	-Or.1L pare a day for a week	Cl	F	De	-	Faciolosis
14	<i>Verbena officinalis</i>	Vebennaceae	Calasee	S	F	seed	Or.Chewin	H	F	Dec.		

							g fresh seed swallowing					
52				S F	F	-Juice	-Or. chewing during pain -Or. 1 Glass is taken morning & night for 5 days	T	F	Dec.	- Abdominal crump. -Anemia	
52	<i>Dodonaea angustifolia</i>	Sapindaceae	-Itecha	L	F&D	-Pounded and mixed with water and filtered	-Or. 1 glass per a day for three days	SH	R A	Dec	- Ministratio n pain	
31	<i>Gynura Pseudochina</i>	Asteraceae	- Jiniiraasaa	L	F	-Pounded and mixed with water.	-Or.1 glass per a day for three days	SH	H G	Dec.	-Epilepsy Evil eye	
15	<i>Bersama abyssinica</i>	Melanthaceae	-Lolchisaa	L	F	-Crushed and prepared and mixed with butter -squeezed and its drop is prepared	- Ex.putapie ce on teeth -Ointment -Ex. Introducing 2-3 drop	SH	F	No ch.	Teeth ache -Scabies Wound. tumor	dysenter y
60	<i>Citrus limon</i>	Rutaceae	-Lomii	L	F	-Squeezed and its drop is prepared	-Or. ½ tea cup is taken once during	SH	H G	Inc	-Snake bite	Snake bite

							accident					
12	<i>Trichodesma zeylanicum</i>	Boraginaceae	- MataneGuracha	A. P	F	-Pounded and mixed with water and filtered	-Or.1 glass per a day for 3 days is taken	H	FL	De	Menstrual problem	
59	<i>Aspuragus aficanus</i>	Lamiaceae	Mararsiisa	L	F	-Pounded and mixed with water, boiled	-rinsing	SH	F	Dec.	Teeth ache	
51	<i>Lantana trifolia</i>	Veбенaceae	Midhaandurba	L	F&D	-pounded and mixed with butter	Ex. Ointment	SH	F	Dec	Herpeszoster	
11	<i>Moringa stenopetala</i>	Moringaceae	- Moringa(s hiferaw)	L	D&F	Eatasvegetable Boiling &chopped &mix	-Or. 1 tea cup is taken 3x per day	T	H G	inc	Hypertation -Asthem -diabetes	
18	<i>Prunus africana</i>	Rosaceae	-Omii	B	F&D	-Crushed and boiled and them filtered	Or.1 glass per a day for a week	T	F	Dec	Pheмония	
10	<i>Carica papaya</i>	caricaceae	-Papayaa	L S	D	-Powdered -Powdered and mixed with water	Ex. Applied -Or.1/2 tea cup is taken once	T	H G	Inc.	-Wound -Tape worm -Ascaris	
46	<i>Brucea antidysenterica</i>	Simarubiaceae	Komonyo	S&L	D	-Powdered and mixed with butter	-Ex ointment	SH	F	de	Scabies DIarrhoea Eye disease	rabies
56	<i>Cyrtanthum obliquus</i>	Amaryllidaceae	-Kulubbi	R	D	-Powdered	-Or.4 tea	SH	F	de	Abdominal	

			warabesa			and mixed with butter	spoon is taken during pain				crump	
34	<i>Acanthus mollis</i>	Asteraceae	sokoru	L	F	-Pounded and mixed with water and filtered	Or. 1 glass a day for 3 days	sh	F	de	Menstrual problem	
17	<i>Ricinus communis</i>	Euphorbiaceae	-Kobboo	R B	F D	-Pounded and mixed with water -Prepared in coffee form	Or. 1 tea cup is take once -Or. 1 cup a day for 2 week is taken.	SH	H G	Incr.	-Snake bite -Gonorrhoea	Black leg
43	<i>Vernonia aurichli</i>	Asteraceae	-Rejjii	R	F&D	-Pounded and mixed with water (conc.)	Or. 1 spoon a day for a weak is taken	SH	F	Dec.	Hepatitis	diarrhoea
47	<i>Momordica foetida</i>	Cucurbitaceae	-SarooBofa	AP	F	-Crushed and mixed with butter	Ex. ointment	Cl	F	De	Herpeszoster	
1	<i>Sennadiplymbothea</i>	Fabeceae	Senemekii	L	F	-Pounded and mixed with water	-Or.1 glass a day for a week is taken	SH	F	De	Diarrhoea	
53	<i>Plantago palmata</i>		Faca:ee	L	F	-Powder is mixed with water	-or- two glass a day for a week	H	F	De		-diarrhoea -Blotting
2	<i>Davallia denticulata</i>	Davalliaceae	Balaballes	R	F	-crushed	Dermal	H	F	Dec	Skin rash	

			sa				rubbing				Ring worm	
35	<i>Pittosporum viridiflorum</i>	Pittosporaceae	-Soolee	B	D	-Its powder is prepared -Crushed and added to coffee residue	Ex. Applied on wound Or.1/2L day for a week	T	F	Dec	-Wound	-Black leg
20	<i>Penhtas lanceolata</i>	Rubiaceae	-Suruma	L	D	-its powder and sorgam powder mixed and prepared in soup form	-Or.1 glass a day is taken till cure.	SH	F	Dec.	-Fracture Gastritis	- Fracture
40	<i>Acacia abyssinica</i>	Fabaceae	-Sondii	B	F	-pounded and mixed with water (conc.)	-Or.1L a day till cure	T	F	Dec	-	-Babesia
55	<i>Celtis africana</i>	Ulmaceae	Ceyii	S	D	-powdered and mixed with water&salt	Or.1 tea cup a day for 2 week is taken	T	F	De	-	Bleedin g diarrhea
36	<i>Millettia ferruginea</i>	Fabaceae	Sotaloo	S	D	-It powder is prepared	-Ex. Applied to wound -Introduced to river where fishes. Found	T	F	Dec	-Wound -Fishing	
6	<i>Scadoxus multiflorus</i>	Amarylidaceae	Harmal	R	F	-crushed & squeeze	Hot& put on parts of swelling	H	H G	Dec	-Swelling body -Tb	

48	<i>Clausena anisata</i>	Rutaceae	Ulumayii	B	F D	-powdered and mixed with water and filtered -Fresh leaf	-Or.1 glas a day for a week is taken -sweep	SH	F	Dec	Diarrhea	Ectoparasit
41	<i>Premna schimperi</i>	Lamiaceae	-Urgesaa	SH	F	-	-Or. Chewing by affected teeth.	T	F	Dec.	Teeth ache	
22	<i>Erythrina Brucei</i>	Fabaceae	Waleensu	B	D F	-Powdered and mixed with honey -Squeezed and drop is prepared	-Or.2 spoon per a day for a week -2 to 2 drops is added till cure	T	F	No..	-Kidney infection.	-Kerato conjunctivitis.
25	<i>Drymaria cordata</i>	cryophyllaceae	Motibiqilota	R B	D	-Powdered and mixed with water (conc.)	-Or.1 cup a day for 6 day is taken -Or. ½ tea cup is taken fill cure	T	F	Dec.	-Bad smile of mouth -Hepatitis - Abdominal crump	
44	<i>Cetlis africana</i>	Cannabaceae	-xaatesaa	L	F&D	-Pounded and mixed with butter	Ex. Ointment	SH	F	Dec	Herpeszoster	

21	<i>Pycnostachys abyssinica</i>	Lamiaceae	Yeriyo	L	F	-Crushed and mixed with water	Or.1 cup is taken once	SH	F	No ch.	Ascaris.	
50	<i>Crotalaria juncea</i>	fabaceae	Ribuukur uphee	B	F	Stem cut	Stem latex rubbing on skin rash	SH	F	Dec	Skin rash	

Abbreviation: - Part used; L= leaf, ST= stem, S=seed, R= root, B= Bark, SH= shoot and Ap=
Aerial part

- Condition in which medicinal plant used F= Fresh D= Dry.

- Growth Habit: T= Tree, SH=shrub, H=Herbs, Cl= climber

- Habitat: F= Forest, HG= Home Garden. FL= Farm Land, RA= Rock Area &
GL= Grazing Land,

- Status: Inc= Increase, Dec= Decrease & No ch.= No change

- Name: Or= Oromigna

- Administration. Or=Oral, Ex= Nas= Nasal

Appendix-2 list of human disease in the study area

Type of disease	
Wound	Madaa
Teeth ache	Dhibee ilkaanii
Diarrhoea	Garaa kaasaa
Abdominal cramp	Garaa ciniinnaa
Snake bite	Hidduu bofaa
Head ache	Mataa bowuu
Evil sprite	Budaa
Malaria	Bursa
Gonorrhoea	Copxoo
worms	Rammoo garaaa
Haemorrhoid	kintaarotii
Rheumatism	Qurxumaatii
Skin rash	Shifee qaama
Scabies	Citgo
Sinus	Ukaamsaa
Impotence	Rakoo qaama dhiraa
Termination of placenta	Irra bau ulfaa
Fibril illness	Rukutaa/ michii
Menstruation problem	Rakoo laguu
Snail poison	Hadhaa
Epilepsy	gaggabdoo
Asthma	asmii
Diabetes	Dhibee Sakkara
Swelling body	Dullaa
Gastritis	Dhibee garaachaa
Hepatitis	Dhibee simbiraa
Kidney infection	Kalee dhibamuu
Rabies	Dhibee saree
Elephantiasis	qurcii

Appendix-3 list of livestock disease in study area

Disease	
Diarrhoea	Garaa kaasaa
Fasciola	Rammoo hook
Rabies	Dhibee saree
Bleeding diarrhoea	Dhiiga kaasaa
Snake bite	Iddu boff
Blotting	bokoksaa
Anthrax	Abba sangaa
Eco parasite	Cinii/silmi
Coccidian	Mugsiisa lukkuu
Trypanosomes	gandii
Blackleg	Bishoofsistu
leech	Ulaan dhala
Retained faeces	Dhoqe goguu
Internal parasite	Rammoo gara keesa
Actinomycosis	
pasturolosis	Gororsiisa

Appendix-4

1. Interview questions prepared for traditional healers in three kebeles.

I thank you much to contribute your time, knowledge and positive attitude to give me response for interview questions.

Instruction

For the interview question presented below, I will ask you to give response based on your knowledge and skill.

I. Personal information

1. Name _____
2. Sex: M _____ F _____
3. Age _____
4. Marital status married _____ Not married _____ divorced _____
5. Educational back ground: illiterate _____ Reading & writing only _____
Grade 1-4 _____ Grade 5-8 _____ Grade 9-12 _____
6. Work _____
7. Religion _____
8. Ethnicity _____
9. For how many years do you prepare and give traditional medicine?
A. 1-5 _____ B. 6-10 _____ C. 11-15 _____
D. 16-20 _____ E. >20 _____

II. Types of Disease treated by traditional medicine.

1. Human Diseases

- A _____
B _____
C _____
D _____
E _____
F _____
G _____
H _____
I _____
J _____
K _____

2. Livestock Diseases

- A _____
B _____
C _____
D _____
E _____
F _____
G _____
H _____
I _____
J _____
K _____

L _____

L _____

M _____

M _____

N _____

N _____

O _____

O _____

P _____

P _____

Q _____

Q _____

R _____

R _____

III. GENERAL AND DETAIL INFORMATION ABOUT TRADITIONAL MEDICINAL PLANTS

1. MEDICINAL PLANTS USED TO TREAT HUMAN DISEASES.

No	1	2	3	4	5	6	7	8	9	10
	Name of human diseases mentioned under No.1	What is the local name of this medicinal plant?	Which part of the plant is used?	At what condition this medicinal plant is used?	How this traditional medicine is prepared?	What is the dosage and route of administration?	What is the growth habit of this medicinal plant?	What is its habit at?	What is the status of this medicinal plant at this moment?	If your answer for question No. 9 is decrease, what are the causes?

2. MEDICINAL PLANTS USED TO TREAT LIVE STOCK DISEASES

No	1	2	3	4	5	6	7	8	9	10
	Name of live stock diseases mentioned under No 2.	What is the local name of this medicinal plant?	Which part of the plant is used?	At what condition this medicinal plant is used?	How this traditional medicine is prepared?	What is the dosage and route of administration?	What is the growth habit of this medicinal plant?	What is its habitat?	What is the status of this medicinal plant at this moment?	If your answer for question No. 9 is decrease, what are the causes?

IV. CONSERVATION ACTIVITIES

1. Have you ever practiced in activities of conserving medicinal plants?

Yes_____ No_____

2. If yes, how you conserve it?

- a. By planting in the garden
- b. By managing in the wild habitat
- c. Using suavely

3. What do you suggest about conservation of these medicinal plants?

- a. Cultivation in the original habitat.
- b. Cultivation out of original habitat in the selected area with traditional healers and other stake holders.
- c. Teaching the society to save guard in the natural habitat.
- d. Using wisely
- e. Any other idea

4. What do you think the future practice of herbal medicine?

- a. Encouraged
- b. Abolished
- c. Used along with modern medicine.

5. Please give reason for your answer question no.6.
