ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

AN ETHNOBOTANICAL STUDY OF MEDICINAL PLANTS IN FARTA WEREDA, SOUTH GONDER ZONE OF AMHARA REGION, ETHIOPIA

BY

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ACRONYMS

CBD	Convention on Biological Diversity
EMA	Ethiopian Mapping Authority
FAO	Food and Agriculture Organization of the United Nations
FWOARD	FartaWereda Office of Agriculture and Rural Development
FWHO	FartaWereda Health Office
GTZ	German Technical Cooperation Agency
IBC	Institute of Biodiversity Conservation
ICF	Informant Consensus Factor
IK	Indigenous Knowledge
ISE	International Society of Ethnobiology
IUCN	International Union for Conservation of Nature
MPs	Medicinal Plants
TIK	Traditional Indigenous Knowledge
TMPs	Traditional Medicinal Plants
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNICEF	United Nations International Children's Emergency Fund
USAID	United States of America for International Development

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ABSTRACT: *An Ethnobotanical study on medicinal plant was carried out in Farta Wereda which is found in South Gonder Zone of the Amhara National Regional State that is about 666 km away from north of Addis Ababa. The objective of the study is to conduct ethnobotanical investigation in the area in order to compile and document medicinally important plants in accordance with their traditional practice. The study has been carried out from October 20, 2009 to May 5, 2010 to get valuable information from 20 randomly selected kebeles of Farta Wereda in Amhara National Regional State. In each sample Kebele five informants who are traditional healers and knowledgeable persons were interviewed and randomly selected that make up a total of 100 informants. The ethonobotanocal data were collected through interviewing local communities including local 'debteras,' religious leaders, students and Kebele administrators. Primary data were collected using guided field walk, group discussion, semi-structured interview and participant observation in the field. The inhabitants of the area have used the medicinal plants not only for medicinal value but also for various purposes and have for a long time been dependent on the surrounding plant resources for their food, shelter, fodders, for their animals, health care and other cultural purposes. In total 146 species belonging to 133 genera and 71 families were recorded. Of these, 136 plant species grouped under 68 families and 123 genera were used to treat human and livestock ailments. Taxa commonly used belong to 4 families such as Asteraceae (9.56 %), Solanaceae (6.62%) and Fabaceae and Lamiaceae (5.15 %, each) in number of species. Herbs formed a major component (*41.9%) *while shrubs, trees and climbers constitute* 32.35 %, 18.38 *% and* 7.35 *% respectively. The study showed that preparation and administration of medicinal plants include several methods. The most frequently used plant parts for the preparations of remedy were leaves 56 (34.78 %), roots 29 (18.01 %) and fruits 17 (10.56%). These medicinal plant parts were processed in various forms and the major ones include crushing 51 (23.29%), powdering* 42 (19.18 %) *and boiling 19 (8.68 %). The most common mode of administration was oral (52.97 %) followed by dermal (30.14 %). The main threats to medicinal plants in the study area were agricultural expansion, firewood, grazing, drought and construction. It is therefore, recommended that the local people have to be encouraged to cultivate medicinal plants in their homegarden.*

Key words: conservation, ethnobotany, Farta, healthcare, IK, medicinal plant

1. INTRODUCTION

1.1. Background and Justification

Ethiopia is a land of great topographical diversity of high rugged mountains, flat topped plateaus, deep gorges, incised river valleys and rolling plains, which are responsible for tropical, sub-tropical and temperate climatic conditions (EMA, 1988; Dawit Abebe and Ahadu Ayehu, 1993; PGRC, 1995; IBC, 2008). The altitudinal variation ranges from 116 m below sea level in the Dalol Depression of Afar Region, to 4,620 m. a.s.l. at Ras Dejen in the Amhara Region. The Great Rift Valley runs from northeast to southwest of the country and separates the western and southeastern highlands. The highlands on each side of the rift valley give way to extensive semi-arid lowlands to the east, south and west of the country (IBC, 2008). This environmental mosaic accentuated the diversity of plants and animal life. The country is a land not only of highly varied landscapes and hence flora and fauna, but of multiplicity of ethnic groups with complex cultural diversity (Dawit Abebe and Ahadu Ayehu, 1993).

Like any other developing and least developed nations, the available modern health care services of the country are not only insufficient but also inaccessible and unaffordable to the majority (Haile Yineger *et al.,* 2008). This problem along with the rapidly increasing human population and cultural resistances towards the use of modern medicines means that the majority of the people in Ethiopia are dependent on traditional medicines of mainly plant origins so as to manage various human ailments (Dawit Abebe, 2001).

It is also indicated that Ethiopia has a long historical use of traditional medicine and has developed ways to combat diseases through it. The ways are also as diverse as the different cultures. Healing in Ethiopian traditional medicine is not only concerned with curing of diseases but also with the protection and promotion of human physical, spiritual, social, mental and material wellbeing (Kebede Deribe *et al.,* 2006).

The use of traditional medicine is still widespread in Ethiopia, and its acceptability, availability and popularity is no doubt since about 90% of the populations use it for health care needs (WHO,

2002). However, according to Mirutse Giday and Gobena Ameni (2003), loss of knowledge has been aggravated by the expansion of modern education, which has made the younger generation under estimate its traditional value. Similar to elsewhere in the country, people living in Farta Wereda have traditional practices which have passed from generation to generation in order to treat both human and livestock ailments. Cotton (1996) figured out that the human tendency to categorize and organize knowledge and experience is universal, and that emic classification system throughout the world shows certain structural similarities.

In spite of the vast role and important of ethnobotanical contributions of medicinal plants in the primary health care, limited works have so far been done in the country so as to document and enhance associated knowledge (Amare Getahun, 1976; Dawit Abebe, 1986; Mesfin Tadesse, 1986; Dawit Abebe and Ahadu Ayehu, 1993; Abbink, 1995; Tesfaye Hawas and Zemede Asfaw, 1999; Zemede Asfaw, 2001; Miruste Giday *et al.,* 2003; Debela Hunde *et al*., 2004; Kebu Balemie *et al.,* 2004; Abiyot Berhanu *et al.,* 2006). This study has therefore been initiated to document the plants used in the traditional medical practices of the People of Farta Wereda together with the associated ethnobotanical and ethnomedicinal knowledge and practices.

1.2. Objectives of the Study

1.2.1. General objective

To study and document traditional medicinal plants, their management and conservation associated with the indigenous plant knowledge of people in the study area.

1.2.2. Specific objectives

- To identify and record traditionally important medicinal plants for the treatment of both human and livestock ailments.
- To document the indigenous knowledge of the people on the use of medicinal plants in the study site.
- To identify plant parts used for medicinal purposes together with their method of preparation and route of administration.

- To see the distribution of medicinal plants in visually identified plant community types and
- To contribute to the conservation of medicinally important plants and draw special attention to the protection of endangered population of plants by assessing the role of traditional practices and indigenous knowledge.

2. LITRATURE REVIEW

2.1. Definition and Scope of Ethnobotany

Ethnobotany was first defined in 1896 by Harshberger (Plotkin 1991; Balick and Cox, 1996) was about "plants used by primitive and aboriginal people". In broad terms, ethnobotany is understood as the study of the relationship and interactions between plants and humans (Farnsworth, 1994; Marin, 1995; Balick and Cox, 1996). It was further explained as the study of how the people of a particular culture and region make the use of indigenous plants, while ethno botanists explore how plants are used for such things as food, shelter, medicine, clothing, hunting and religious ceremonies. It is the science, which studies the relationship between a given society and its environment and in particular the plant world (Aumeeruddy, 1996).

Many earlier ethnobotanical studies, whether of healing techniques or other plant uses, simply produced lists of plants deemed, "useful" by the people of an area. The early ethnobotanists often made little effort to understand how the indigenous people viewed the plants in their own culture (Balick and Cox, 1996). Martin (1995) noted that laboratory analysis of medicinal plants and other useful plants is a costly and time-consuming endeavor. He also pointed out that colleagues who study the chemical components of plants decide which species are apt to yield the most promising results before they proceed with extensive ethnopharmacological investigations. A good place to start with is first to know the relationship between the traditional knowledge and modern science that are tied together across a wide gulf based on empirical verification (Martin, 1995; Balick and Cox, 1996).

Ethnobotany deals with the relationship between primitive human society and their plant environment; more simply it is anthropological approach to botany. Importance is chiefly realized with respect to varied economic uses of plants by the primitive human society (Tiwari and Yadau, 2003).

The identification and documentation of plants of ethno-medicinal importance in many cultures has long been an active area of research and has been connected with various objectives.

However, almost no studies have sought to understand local medicinal floras and IK as method for sustainable development in their corresponding localities (Jain, 2002).

2.2. Importance and Current Trends of Ethnobotany

Ethnobotany helps us in identifying conservation issues such as cases where a rate of harvest exceeds the rates of re-growth. There is an urgent need of conserving the medicinal plants that are over harvested so that in future the coming generations could benefit from these precious plants that are a real gift of nature for the humankind (Qureshi *et al.,* 2009). It is collaborative venture between people in local communities and various scientists and specialists. A tragedy of the modern times is that the precious ethnobotanical knowledge is disappearing very fast. Westernization, breakdown of traditional cultures and even the extinction of whole tribal groups are responsible. A chief goal of such a study is to ensure that local natural history becomes a living tradition in communities, where it has been transmitted orally for many years. The results of this work can later be applied to biodiversity, conservation and community development. (Martin, 1995)

Ethnobotany is a key subject for conservation and sustainable development. Capacity building on Applied Ethnobotany is urgently needed in developing countries because of the intimate links between rural people and local plants. This is not to say that Applied Ethnobotany is not also useful as a taught subject in industrial countries, including to train people able to explore the many, largely hidden, economic dependencies of people in such countries on plants and the implications of consumer culture for conservation (Hamilton *et al.,* 2003).

It has been taken in to account that ethnobotanical studies are useful, for not only documenting, analyzing and disseminating IK of local people but also indicating the interaction between biodiversity and human society, how diversity in nature is used and influenced by human activities (Martin, 1995).

Peoples of all cultures have always depended on plants for their primary needs (food, shelter, warmth, medicines, etc.), and have naturally learned diverse applications of plants (Pharmacotherapy Group, 2009). The investigation of plants and their uses is one of the most

primary human concerns and has been practiced by all cultures for tens, if not hundreds, of thousands of years, though it wasn't called 'Ethnobotany' then , Ethnobotany is taken as the scientific study of plant lore and agricultural customs of a people. Given their extensive range of knowledge of medicinal plants, indigenous people remain the ultimate resource for retrieving this information for the purpose of application, particularly in modern medicine (Pharmacotherapy Group, 2009).

Therefore, ethnobotany is a rapidly growing science, attracting people with widely varying academic background and interests. There is aromatic allure to the life of an explorer and the promise of finding ‘gold’ in the form of plants or animals as potential sources for lifesaving drugs that could become important in the treatment of serious diseases such as AIDS and cancer. Today, ethnobotany has become a hot topic (Pharmacotherapy Group, 2009)

2.3. Indigenous Knowledge

There is a traditional distinction between attitudes to knowledge on the parts of academia and industry. Educators have typically considered knowledge as a public good, and the acquisition and dissemination of knowledge have therefore been encouraged the same open-minded (Hamilton, 2003).

Knowledge has many definitions; however Haverkort *et al,* (1999) explained that the actual knowledge of people is three-fold:

- classical knowledge (derived of the great cultural expressions: Aristotle, Incas, …) ;
- traditional knowledge transmitted orally from generation to generation and indigenous knowledge related to a specific environment;
- external knowledge brought by education, mass-media, churches, …

Indigenous knowledge (IK) is not only at its best when it is matched with contemporary science; this match is also a necessary requirement to incorporate it in policy approaches. When it comes to IK on biodiversity this matching process probably is not that much in need of scientific

validation (the forecasted effects are almost trivial), but raises merely questions on effectiveness and efficiency (Hens, 2006).

By definition, IK is context specific. What works successfully in one location or for one community may not for another. The defeat is to extract from the knowledge that applies in a particular context, the more general aspects that can be applied elsewhere. Experience and case studies show that this is possible, but at the same time, that it necessitates a careful approach (Hens, 2006).

2.4. Transferring and Disappearance of TK

Largely, the largest means of acquiring and transferring traditional knowledge is through non-formal education and local communication networks. However, because of the continued acceleration, indigenous traditional knowledge is confronted with irreversible loss. The numerous language that mostly lack written scripts, ageing of the healers, displacement of communities, etc., further compound this situation (Dawit Abebe, 2001).

Among natives of various countries, knowledge of medicine has been passed by word of mouth from one generation to the next by priests, witchdoctors or medicine men. This is no less true in Ethiopia where written records in this field are almost absent even though the country has had a written language for over two thousand years (Amare Getahun, 1976).

Traditional medicinal knowledge is dynamic and practitioners make every efforts to widen their scope by reciprocal exchange of limited information with each other or through reading either one of the traditional pharmacopeias written in Arabic or Geez that are produced as long ago as one hundred or more years (Dawit Abebe, 1986).

Local experiences which have been gained through generations to solve indigenous problems are disappearing from day to day. A number of factors contributed including: the fact that many traditional remedies remain concealed among traditional healers and are rarely documented; deaths of elders; migration of people due to drought and other social problems, urbanization,

influence of modern veterinary medicine and exotic cultures (Tafesse Mesfine and Mekonnen Lemma, 2001).

Traditional knowledge systems have started to disappear with the passage of time due to insufficiency of written documents and relatively low income in these traditions. However, due to the lesser side effects of medicinal plants with respect to allopathic medicine, medicinal plants regained a wide appreciation (Ahmad *et al.*, 2009).

The knowledge about the identity and to some extent of the use of medicinal plants has been circulating chiefly among practitioners of traditional medicine or the benefactors of such practices. Despite the long recorded history of herbal medicine, it is only very recently that studies in to the efficacy of the crude plant parts and products as well as fine extracts of these have been seriously considered by various investigators in Ethiopia (Mesfin Tadesse, 1986).

IK of medicinal plants in Ethiopia is unevenly distributed among community members. However, all share IK, and only a few hold specialized knowledge. The knowledge and social structure is thus intertwined (Fassil Kibebew, 2001; Zemede Asfaw, 2001). The distribution of this knowledge and services are hierarchically placed. Services are obtained from the family, the neighborhood, the village or beyond (Hareya Fassil, 2005). In the country, the loss of indigenous knowledge is not too far from developed countries. The vast knowledge on traditional uses of plants is not fully documented and most of the knowledge is conveyed from generation to generation by word of mouth (Fassil Kibebew, 2001; Berhanemeskel Weldegerima, 2009).

2.5. Importance of Medicinal Plants

Plants are universally recognized as a vital part of the world's biological diversity and an essential resource for the planet (SCBD, 2009). Many thousands of wild plants have great economic and cultural importance, providing food, medicine, fuel, clothing and shelter for humans around the world. Plants also play a key role in maintaining the Earth's environmental balance and ecosystem stability. They also provide habitats for the world's animal and insect life (SCBD, 2009).

Medicinal plants are significant to both developing and developed countries. Estimates indicate that over 75% of the world's rural people rely on traditional herbal medicine. About half of the world medicinal plant compounds are still obtained or derived from plants (Haman, 1991). Many of the most important drugs of the recent times were first isolated from plants including the curare alkaloids; penicillin and other antibiotics, antihypertensive alkaloids like reserpine,; and both cortisone and contraceptive steroids that are derivatives of diosgenin (Hamann, 1991).

The use of traditional medicine remains widespread in developing countries, including herbal medicines (UNESCO, 1996; WHO, 2002).WHO and UNAIDS have initiated activities towards recognizing and encouraging medicinal plants and the roles of traditional healers in primary health care delivery (UNAIDS, 2002; WHO, 2002). Furthermore, medicinal plants are often the only health care resources available for ample population sectors because of poverty, lack of formal health services and international legal barriers in the access to modern medicines. Medicinal plants, together with food plants, are useful biodiversity resources for the health care needs of the rural poor.

Furthermore, 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, 1998).

Plant resources contain and provide materials for survival, that is, economic, medicinal, forage values, but also possess and preserve cultural heritages, biological information and indigenous knowledge on their utility. Many of the Ethiopia's plants have reported to have medicinal value and generations of people have depended up on them to treat and ward off physical and mental diseases (Belachew Wassihun *et al.*, 2003**).**

In addition to their material and economic value, plants have intrinsic, aesthetic, ethical, scientific and cultural values and invaluable ecosystem benefits where they also act as barometers indicating the use of our environment (Green, 1996). Zemede Asfaw (1997) also noted that the material and economic values of plants: as sources of medicine, food and feed, material culture, fuel, construction and as a source of substance from local markets.

Over centuries, indigenous people have developed their own local specific knowledge on plant resource use, management and conservation and in these cultures; the knowledge resides within individuals, families or villages and socio-cultural groups. Retrieval of such knowledge is possible through the use of ethnobiological methodology (Mander, *et al.*, 2006).

According to the findings of, Mirutse Giday *et al.* (2003), Teferi Gedif and Hahn, H, -J. (2003) and Tilahun Tekelehaimanote *et al.*(2007) medicinal plants are locally used by the Zay people and other people in lake Ziway, in the Ethiopian Rift valley, and in the Butajira District, south of Addis Ababa, and in the Debre-Libanos monastery for the treatment of diverse human and livestock diseases like "mich" (illness mainly characterized by fever, headache and sweating), tapeworm infection, typhoid fever, herpes zoster, external injuries, epistaxis, lemphadenopathy, devil disease, black leg anthrax, "aloye" (disease of cattle characterized by failing off hair, skin lesion, constipation failing to urinate and swelling of the body) and "gergelcha" (equine disease characterized by mucus secretion coming out of the nostrils of the sick animals continuously).

It is also reported that in the two sub-districts of Dibatie and Guangua, local socio-cultural groups of people like the Amhara, Shinasha, and Agew-Awi have been using medicinal plants for the prevention of human ailments such as intestinal worms, miscarriage, gardiasis, trachoma, gastro-intestinal complaints, taeniasis, gland tuberculosis and "mewegeber" (child illness mainly characterized by confused mental state) (Mirutse Giday *et al.*, 2003).

2.6. Traditional Medicinal Plants

2.6.1. Definition of traditional medicine and its history

The World Health Organization defines traditional medicine as "health practices, approaches, knowledge and beliefs incorporating plant, animal and mineral based medicines, spiritual therapies, manual techniques and exercises, applied singularly or in combination to treat, diagnose or prevent illness or maintain wellbeing" (WHO, 2003; WHO, 2006). This definition is incredibly broad and includes a variety of different practices originating in countries all over the world. Commonly used therapeutic techniques for traditional medicine include herbal medicines, acupuncture/acupressure, manual therapies, spiritual therapies and exercises (WHO, 2002).

Traditional medicine is a complex medical system that is based on a community's culture, religion, beliefs, and natural environment. To overcome the challenges of documenting and analyzing these principles and practices, multidisciplinary skills are required from a range of fields, for example, botany, pharmacy, linguistics and anthropology (Virapongse and Picheansoonthon, 2005).

Traditional medicine has a long history. It is the sum total of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health, as well as in the prevention, diagnosis, improvement or treatment of physical and mental illnesses. The terms complementary/ alternative/non c conventional medicine are used interchangeably with traditional medicine in some countries (WHO, 2000).

2.6.2. Traditional medicine in Ethiopia

The introduction of modern medicine to Ethiopia dates back to the 16th century during the regime of Emperor Libne Dingel (1508-1540) (Messeret Shiferaw, 1996). The first government run modern health care was established in 1906 with the opening of Menelik II Hospital in Addis Ababa. Since then the government has taken the formal responsibility of delivering health care to the population and health institutions were established in the different regions of the country. However, the growth and development of modern health care in Ethiopia as a whole has been very stunted and to date, its coverage is less than 50% of the population. The vast majority of the rural populations, therefore, still depend on TM and its practitioners (Messeret Shiferaw, 1996).

International interest in Ethiopia traditional medicine, and health practices, dates back to late med review times, when contacts between Ethiopia and outside world began to become significant (Pankhurst, 2001).

It is reported that 60 to 85% of the population in every country of the developing world has to rely on the traditional medicine (Sofowora, 1982). It is estimated that more than 85% the Ethiopian population does not enjoy the services and benefits of modern medicine (Amare Getahun, 1976; Dawit Abebe, 1986). Therefore, Tigist Wondimu *et al.* (2006) added that over

85% of Ethiopian population relies on traditional medicine for the fight against various diseases. Plants are thus the major sources of medicine used by the majority of the population. The IK on the use of many medicinal plants is however, undocumented and thus an expensive effort will be required to document and utilize this knowledge.

The majority of traditional medicines used in developing countries have not been evaluated for quality, safety, and efficacy to the same standards of those in developed countries. Nevertheless, there are some remarkable claims made for their effectiveness and some traditional medicines that are used to treat burns (Sebsebe Demissew and Ermias Dagne, 2001).

Indeed, there is growing recognition that revitalization and promotion of traditional health practices alongside modern health services is the most promising means for ensuring affordable and sustainable health care for poor communities throughout Africa (Akerele, 1987; Cunningham, 1993).

Many species of Ethiopian medicinal plants have a long history of use as remedies. The traditional medical systems in different parts of the world have some distinctive features. The Chinese traditional herbal medicine, the Indian Aurvedic medicine, the Japanese traditional medical system and the African system are recognized among others (Mander *et al.,* 2006). The Ethiopian traditional medical system is a subcategory of the African traditional medical system, which has its own characteristic features. Ethiopian traditional life is painted with the whole mark of wide spread use of traditional medicinal plants with various levels of sophistication and specialization within the indigenous medical lore (Mander *et al.,* 2006).

2.6.3. Traditional medicinal plants in human and livestock health care system

In Ethiopia, plants have been used as a source of traditional medicine from time immemorial to combat different ailments and human sufferings (Asfaw Debela *et al.,* 1999). Modern Health Care has never been and probably never will provide for the foreseeable structure, adequate and equitable health service anywhere in Africa, due to the financial limitations, related to rapid population growth, political instability and poor economic performance (Anokboggo, 1982). Traditional medicine 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 (Haile Yineger and Delenasaw Yewhalaw, 2007). For poor people, medicinal plants represent locally available, affordable and often the only effective resources for health care.

Traditional medicine is an important health care system in Ethiopia. According to a recent WHO report, 90% of the Ethiopian population use traditional medicine for their primary health care needs. Such a wide use of traditional medicine asserts that the contribution of this indigenous knowledge and resource to the enhancement health care needs of the Ethiopian population cannot be underestimated (Demel Teketay, 2001; Kanno, 2004). Therefore, a large segment of the rural population still will remain without access to modern medicine and will continue to depend on medicinal plants and traditional healthcare practices (Medhin Zewdu, 2002).

It has been stated that health is a fundamental human right. Access to health care, which includes access to essential drugs, is a prerequisite for realizing that right. Essential drugs play a crucial in many aspects of health care (Bekele Tefera, 2004). However, many people throughout the world cannot obtain the drugs they need either, because they are not available or too expensive, or because there are no adequate facilities or trained professionals to prescribe them (Bekele Tefera, 2003).

With the changing perception of traditional medicines, there has been increased recognition and use of medicinal plants for primary health care by rural as well as urban populations (Singhal, 2005).
A sizeable proportion of the population in developing countries continues to depend upon medicinal plants for their primary health care needs. In addition, there is a renewed interest of pharmaceutical companies in medicinal plants as a source of chemical leads (Singhal, 2005).

Although Ethiopia is reach in its livestock population, it is one of the countries in the world with the lowest unit output. The poor health condition of its livestock has partially been responsible for the low productivity. Tsetse born, trypanosomiasis, contagious, bovine pleuropneumonia,

rinderpest and foot-and-mouth disease are among the major health problems of livestock (EARO, 1999 cited in Mirutse Giday and Gobena Ameni, 2003).

It is also stated that the quality of livestock performance has remained poor because of a number of animal diseases and this has a direct effect on the economic development of the country (Haile Yineger *et al.*, 2008). This condition has been aggravated by the inadequate provision of modern medicines, which in turn is caused by lack of sufficient money to import those medicines by the government, and lack of access to the available medicines as a result of the poor infrastructures to the rural poor (Tafesse Mesfine and Mekonen Lemma, 2001).

Modern livestock health care is still at its lowest stage in the country due to lack of adequate clinics, veterinaries, and supply of drugs. Besides, most modern drugs are expensive and as result, not affordable by the majority of Ethiopian farmers and pastoralists. Most of the Ethiopian farmers and pastoralists, therefore, rely on their traditional knowledge, practice, and locally available materials mainly plants in the control of diseases of their domestic animals (Mirutse Giday and Gobena Ameni, 2003).

2.7. Traditional and Modern Medicines and Their Integration

Traditional and modern system of medicine was developed by different philosophies in different cultural background. They looked at health, diseases and causes of diseases in different ways. These differences bring different approaches to health and diseases. These inurns have resulted in attitudes ranging from complete rejection of traditional medicine by traditional medicine practitioners to all a parallel existence with little communication over patient care (Kanno, 2004).

In Ethiopia, knowledge on traditional medicine is rejected by some medical doctors trained in Western medicine, as it is not considered to have scientific bases. However, both old and modern arts of healing should exist together and may be integrated (Kanno, 2004).

It has been stated that the modern medicine sector in Ethiopia, unlike many other countries, has not yet integrated and benefited from the traditional medicinal plant resources. China, India,

Cameron and Ghana, for example, have advanced on the use of traditional medicinal plants in a modern context. The wide utilization of plant-based traditional health care is mainly attributed the fact that it makes use of locally available plant resources (Dawit Abebe and Ahadu Ayehu, 1993; Seyani and Chikuni, 1997).

Integration of traditional medicine with modern medicine may mean incorporation of traditional medicine in to the general health service system (Kanno, 2004). Integration is defined as an increase of health coverage through collaboration, communication, harmonization and partnership building between modern and traditional system of medicine, while ensuring intellectual property right and protection of traditional medicine knowledge. The availability of evidence on safety, efficacy and quality will promote the integration in to health systems of traditional medicine practices and products (Kanno, 2004).

An insight into traditional remedies, often selected for use over the centuries, is not only one of the means to palliate present health problems of countries like Ethiopia, but also is part of the universal effort to unveil sources for new or superior drugs against diseases which remain intractable (Dawit Abebe and Ahadu Ayehu, 1993).

In response to these diseases, Ethiopians have attempted to come up with remedies or practices that restore or enhance good health. Knowledge of the remedies and practices is based either on oral tradition or on information that is codified in the early medico-religious manuscripts. The former is a subject of separate study under preparation by the senior author. Thus, the present volume is entirely based on information drawn from ancient medico-religious manuscripts or traditional pharmacopoeias (Dawit Abebe and Ahadu Ayehu, 1993).

More than 80% of the developing world continues to rely on traditional medicines, predominantly plants, for primary health care (Farnsworth *et al.*, 1985).

2.8. Threatened, Rare and Endangered Plant Species

Threatened species present scientific, economic and moral challenges: Scientific, because their extinction would remove evolutionary links that contribute to an understanding of plant life; economic, because endangered species are or some of their genes might prove useful in the future; and moral, because mankind is to blame for having caused, or contributed to their endangered state (Frank *et al.,* 1995).

A concern for the preservation of threatened plants is more recent than that of the survival of rare and endangered animal species. This is due to partly to lesser awareness, partly to the fact that many animal species have been subjected to selective reduction by humans (Frank *et al.,* 1995).

2.9. Threats to Medicinal Plants

It is widely recognized that more species are threatened with extension now than has ever been before, wither the consideration is on geological or historical time scale. However, all species are not equally threatened (Edwards and Ensermu Kelbessa, 1999).

Various human induced and natural factors threaten the survival of many medicinal plant species. However, the degree of threaten varies from place to place and species to species (Kebu Balemie *et al.,* 2004).

Many plant species are threatened by habitat transformation, over-exploitation, invasive alien species; pollution and climate change, and are now in danger of extinction. The disappearance of such vital and large amounts of biodiversity presents one of the greatest challenges for the world community: to halt the destruction of plant diversity that is essential to meet the present and future needs of humankind (SCBD, 2009). Extinction and declines in plant diversity is due to a range of factors including population growth, high rates of habitat modification and deforestation, over-exploitation, the spread of invasive alien species, pollution and climate change (SCBD, 2009).

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). Medicinal plants can have other uses than as sources of medicines, and the threats from over-harvesting may be due, or partly due, to collection for purposes other than medicinal (Hamilton, 1997).

In Ethiopia, traditional medicine as elsewhere in other developing countries is faced with a problem of sustainability and continuity mainly due to loss of taxa of medicinal plants, loss of habitats of medicinal and other category of plants and cultures (Ensermu Kelbessa *et al*., 1992; Zemede Asfaw, 2001). The diversity of plants in Ethiopia is on the process of erosion due to anthropogenic pressures (Abebe Demisse, 2001). The same document states that habitat destruction and deforestation by commercial timber interests and encroachment by agriculture and other land uses have resulted in the loss of some thousand hectares of forest that harbor useful medicinal plants, annually over the past several decades.

Availability of medicinal plants has been affected by a dramatic decrease in the area of native vegetation due to agricultural expansion, deforestation, fire, overgrazing and drought, and trading charcoal, firewood and urban associated developments (Cunningham, 1996; Kebu Balemie *et al.,* 2004).

Interestingly, it has been further emphasized that the primary causes of the problem are loss of taxa of medicinal plants, loss of habitats of medicinal plants and loss of indigenous knowledge. Some studies also have shown that most of the medicinal plants utilized by Ethiopian people are harvested from wild habitats (Mirutse Giday *et al*., 2003; Tesfaye Awas and Zemede Asfaw, 1999) and hence this aggravates the rate of loss of taxa with related indigenous knowledge and loss of widely occurring medicinal plant species.

2.10. Conservation and Management of Medicinal Plants

Conservation as defined within the World Conservation Strategy is: “the management of the human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations” (IUCN, 1980). At the heart of conservation is sustainable use of resources (including biodiversity). That is, using resources in ways that enable the resources to meet the needs and aspirations of the current user without jeopardizing the resources ability to meet the needs and aspirations of future users (Quansah & Quansah, 1995).

The objective of conservation is to conserve maximum diversity within each species to ensure that its genetic potential will be available in the future. Ideally, all plants should be conserved as evolving populations in their natural ecosystem. However, this is not practically feasible for all species. Plant genetic resources can be conserved in situ or ex situ; the two systems are complementary and are being adopted in to the conservation strategy in Ethiopia (Abebe Demissie, 2001).

It is emphasized that the heart of medicinal plant conservation should be aimed at securing robust management systems in favour of conservation or sustainable production (or both) at the sites where the medicinal plants grow

In order to ensure that representative wild populations of vulnerable medicinal plant species are maintained, core conservation areas or other protected habitats that will allow natural processes to continue undisturbed by human activities should be designated (Cunningham, 1993).

The species has a central place in conservation science. It embodies the array diversity from gene to population and provides a measure for the diversity of communities (Wilson, 1988; cited in Frankel *et al.*, 1995).

In a broad sense, conservation is achieved through 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 (Zemede Asfaw, 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 (Zemede Asfaw, 2001), this can be possible in places of worship (churches, mosques, grave yards, etc), scared grooves, farm margins, river banks, road sides, live fences of gardens and fields. However, another researcher **s**tated **t**hat conservation of diversity in plants can in principle be done in three different ways: Ex-situ conservation in gene banks, ex-situ conservation in botanic gardens or "field gene banks", and in-situ conservation in national parks and resources each of the three methods has its advantages and disadvantages (Hedberg, 1996).

Ex-situ conservation of frozen seeds as practiced in conventional gene banks can hold large amount of samples in a small space, but it requires considerable inputs of labour and energy, it can only store part of the genetic variability in the parent population, and it does not conserve the co-evolutionary environment (Hedberg, 1996). The same author stated that, ex-situ conservation in the field gene banks (botanicgardens) can be applied to plants with recalcitrant seeds but requires large resources of land and labour, and suffers the same limitations as frozen seed storage.

Whatever the case is, a well-organized ex-situ conservation system is indispensable for Ethiopia because of the wealth of rare plant genetic resources and accelerated environmental and biodiversity degradation. Therefore, there is a need to expand ex-situ conservation both in gene banks and botanical gardens (IBC, 2008).

In-situ conservation in national parks and reserves is on the one hand the least expensive method, and maintains both intra population variation and co-evolutionary contacts. It is therefore provides the best possibilities for long-term conservation of genetic resources in wild plants (Hedberg, 1996). On the other hand, it implies restriction in land use for the areas reserved, which has sometimes brought hardships on the human residents

On top of ex situ conservation, and in view of the circumstances prevailing Ethiopia, in situ conservation of provinces and populations or even samples the entire ecosystem may have to be

conserved. In principle, in situ conservation may well be integrated with the existing system of national parks scattered various agro-climatic regions in the country. In addition to limited intra-species diversity, the present national parks incorporate only a few medicinal plants (Abebe Demissie, 2001).

In general, according to the findings of Zemede Asfaw (2001), medicinal plants 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. In line with this, effective conservation of medicinal plants can only be achieved through sustained effort directed in increasing the awareness level off all; particularly the local communities who are more or less exclusively rely on these to woof local community health problems (Dawit Abebe, 2001).

3. MATERIALS AND METHODS

3.1. Description of the Study Area

3.1.1. Geographical Location and Land Use

Farta is one of the 105 Weredas in the Amhara Region of Ethiopia, located in the South Gonder Zone. The town, Debre-Tabor is the center of the Wereda, which is also the capital of the Zone. It is located at about 100 km northeast of Bahir-Dar, the capital of Amhara National Regional State, along the Woreta-Woldya Highway. Other towns in Farta include Gassay and Kimir-Dingay. The Wereda is bordered on the south by Este, on the west by Fogera, on the north by Ebnat, and on the east by Lay Gayint. The distance of the Wereda is about 666 km from Addis Ababa. The Altitudinal ranges of the study Wereda vary from 1970 to the highest mountain peak of Guna at 4135 m. a.s.l. In terms of topography, 45% of the total area is gentle slope, while flat and steep slope lands account for 29% and 26%, respectively. In terms of land use pattern, an estimated 52.98 % of the area is cultivated and planted with annual and perennial crops, while area under grazing and browsing, forests and shrubs, settlements and wastelands account for the remaining percentage. The Wereda lies between the coordinates of $11^{0}40`55``$ and $12^{0}03`01``$N latitudes and $37^{0}50`37``$ and $38^{0}17`34``$E longitudes with an estimated area of 1070.77 km^{2}.

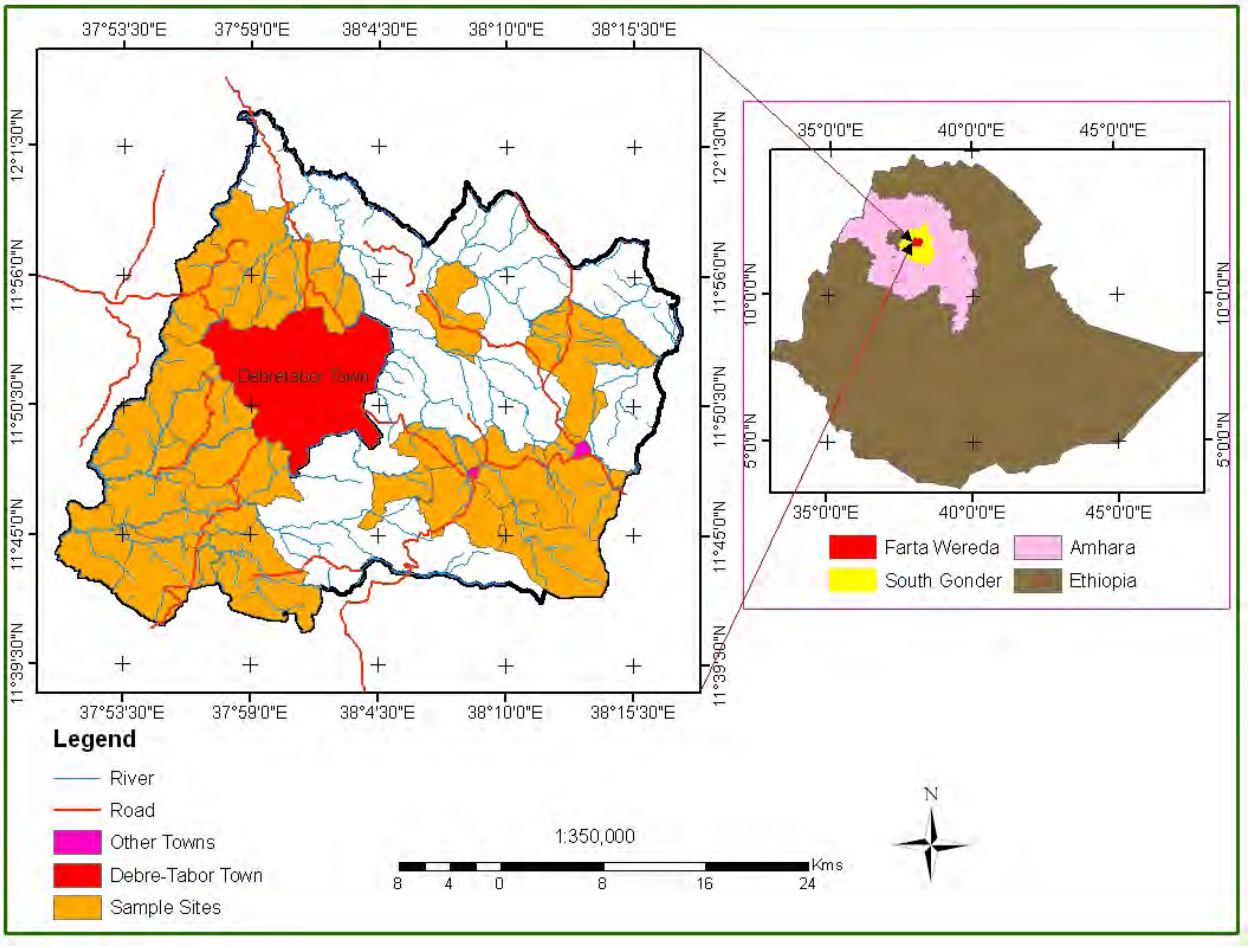

Fig. 1 Map of the Study Site

3.1.2. Climate, Soil and Vegetation Types

Agroecologically, about 44% of the Wereda is classified as Dega while the remaining 56% is considered as Woina Dega (FWOARD, 2009). The average annual minimum, maximum and mean temperatures are 9.54^0C, 22.11^0C and 15.8^0C, respectively. The rainfall pattern is unimodal, stretching from May to September. Annual rainfall ranges between 1097 and 1954 mm with a long term average of 1448 mm.

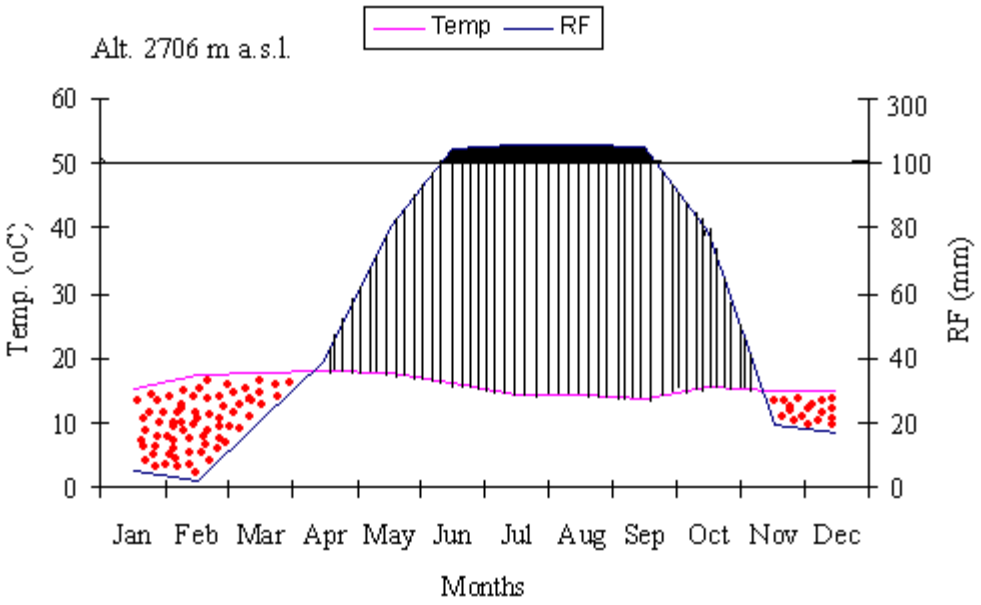

Fig. 2 Climadiagram of the Study Area from **1997-2006 at Debre-Tabor Station (Data Source: National Meteorological Agency)**

In the Gonder-Wello-Gojam-Shewa regions Alfisols, mainly belonging to the suborder Ustalfs, Vertisols and Inceptisols dominate. The shallow soils among them are red to light red-brown on the mountains and hillsides, red-brown to the slopes, brown to dark-brown in the rolling country, nearly black in the lower parts. The red-brown to dark-brown for agriculture, particularly for grain crops, which occur all over the highlands (Demel Teketay, 1999). Anonymous (1997) explained that Cambisols, Regosols, Lithosols and Andosols are the predominant soil types while the rest are found scattered through the Wereda.

According to Sebsebe Demissew and Friis (2009), small or very small patches of undifferentiated Afro-montane forest are preserved in the flora region of Gonder. Most remaining forest patches are dry single-dominant Afro-montane forests. This forest occurs specially on the plateaux in Tigray, Gonder, Wello, and Harerge regions at altitudes between (1600-) 2200 and 3200 (-3300) m with an annual rainfall between 500 and 1500 mm (Friis 1992; cited in Sebsebe Demissew and Friis, 2009). The typical dominant species in the upper storey of these forests is *Juniperus procera* with *Olea europea* subsp. *cupsidata.* Sometimes the juniper

trees can be rather scattered and the forest is characteristic of *Juniperus* woodland with discontinuous evergreen under growth (Sebesebe Demissew and Friis, 2009).

3.1.3. Demography, Socio-economy and Health

Based on the figures published by the Central Statistical Agency of Ethiopia (CSA, 2007) the Wereda has an estimated total population of 232, 337 of whom 118, 599 are males and 113, 738 are females; 6, 780 or 2.92 of its population are urban dwellers, which is less than the Zone average of 8.3% with an estimated area of 1070.77 square kilometers. Farta has an estimated population density of 216.98 people per square kilometer, which is greater than the Zone average of 169.21. The largest ethnic group reported in Farta was the Amhara (99.95%). Amharic is spoken as a first language by 99.96%, and 99.57% of the population practiced Ethiopian Orthodox Christianity.

According to FWOARD (2009), the agricultural households are engaged primarily in crop-livestock mixed farming systems. Barely, wheat, teff, sorghum, maize, field beans, peas, and potatoes are dominant crops while chickpeas and some oil crops are also grown. The production of crop is well integrated with the rearing of livestock in the area with 173, 786 cattle, 132, 312 sheep, 136, 460 poultry, 54, 052 goats and 30,789 pack animals (horses, mules and donkeys) which make up a total of 527, 409 heads of livestock. Oxen are the dominant source of traction power.

The first top ten diseases in the Wereda were tuberculosis, malaria, diarrhea, trachoma, helminthes, skin disease, typhoid, eye diseases, upper respiratory tract infection and blood dysentery (Table 2) whereas, the major livestock ailments reported include pasteurllosis (ovine & bovine), anthrax, internal and external parasites, black leg, salmonellosis, fasciolopsiasis, lumpy skin disease, rabies and coccidiosis (FWOARD, 2009).

Table 1 Land use Category in the Study Area

Land Situation	Area in hectare	Percentage (%)
Arable land	56735.01	52.98
Arable in the Future	-------	-----
Not Arable Land	13813	12.9
Grazing land	11567.98	10.80
Forest Coverage	5910.245	5.52
Bushland	1140.3245	1.06
Aquatic	5154	4.81
House Can	4621	4.32
Others	8134.2105	7.60
Total Area	107076.57	100

Source: Farta Wereda Agricultural and Rural Development (FWOARD, 2009)

Table 2 Ten Top Diseases Seen in the Wereda (2005/6-2007/8).

No.	Types of Disease	2005/6	2006/7	2007/8	Measurement
1	Tuberculosis	7, 559	5, 781	4, 792	In number
2	Malaria	3, 277	14, 379	2,749	>> >>
3	Diarrhea	4, 224	4, 021	1, 957	>> >>
4	Trachoma	---------	--------	1, 607	>> >>
5	Helminthes	---------	4, 933	1, 269	>> >>
6	Skin Disease	2, 002	2, 139	1, 040	>> >>
7	Typhoid	1, 669	694	891	>> >>
8	Eye diseases	5, 586	2, 669	834	>> >>
9	Upper Respiratory Tract Infection	966	1, 131	791	>> >>
10	Blood Dysentery	3, 242	4, 021	779	>> >>

Source: Farta Wereda Health Office (FWHO, 2009)

3.2. A Summary of Information about the Informants in the Study Area

3.2.1. Age group and gender of informants

Informants in the study area can be represented under three age groups the young (20-35), middle age (36-49) and elders (50-91). The highest number is, in the age group between 50 and 91. Information was gathered from 100 (25 females and 75 males) people using semi-structured questionnaire. The number of informants in terms of gender is not proportional. Males are more in number (75), where as females are less (25).

Table 3 Age Group and Gender of Informants

Age group (in yrs)	Number & gender of informants		Total
	Male	Female	
20-35	21	13	34
36-49	26	7	33
50-91	28	5	33
Total	75	25	100

3.2.2. Educational status of respondents

Majority of the informants (62%) were uneducated, but traditionally knowledgeable farmers, whereas 27% and 11% have formal and church education respectivel. The farmers and the young ones are free to tell the information on medicinal plants, whereas those locally called ‘Merigetas’ (highly traditionally skilled persons), ‘Debtera’ and/or ‘Tenquay’ were found to be rather rigid.

Table 4 Educational Status of Respondents

Educational status	Sex		Total
	Male	Female	
Uneducated/illiterate	45	17	62 (62 %)
Modern education	19	8	27 (27%)
Church education	11	---	11 (11%)
Total	75	25	100 (100%)

3.2.3. Marital status of informants in the Study Area

Of the total informants, 84 were married, but 14 and 2 were single and divorced respectively

Table 5 Marital Status of Informants

Marital Status	Sex		Total	Percentage (%)
	M	F		
Married	67	17	84	84
Single	8	6	14	14
Divorced	--	2	2	2
Total	75	25	25	25

3.3. Reconnaissance Survey

Reconnaissance survey was conducted from October 20 to November 1, 2009 in the study site in order to obtain an impression about medicinal plants, on the general physiognomy of vegetation and to identify sampling sites. During the survey, 20 representative sites distributed at different altitudes were selected from the 39 Kebeles.

3.4. Selection of Informants

A total of 100 informants including 25 key informants for the local knowledge on traditional medical plants were selected. As pointed by Martin (1995) the selection of key informants is commonly systematic. In other words, it was based on comments and recommendations from the religious leaders, elders, Kebele administrators**,** students and personal observation of the researcher from the community group. Thus, key informants were identified, later interviewed, and followed for further details. On the other hand, other informants were selected randomly from the community by asking every individual in the house, working fields or wherever they are.

3.5. Data Sources

Ethnobotanical data were obtained from both primary and secondary sources. The primary sources were interview and group discussion in the field of the study area, whereas the secondary data sources are various and relevant literature review**.**

3.6. Ethnobotanical Data Collection

The study has been carried out by interviewing the inhabitants in different villages under various kebeles of Farta Wereda between the months of October 20, 2009 to May 5, 2010. The information, including the various data sets such as local names, ailments and diseases treated, therapeutic effects, parts of plants used, methods of preparation, methods of administration, doses, duration of the treatment were obtained from local people through individual interviews. The selection of respondents from each village was based on the following criteria: that they have been living in the region for many years, use plants as the main medicine or identified as medicinal plant extractors. The information was checked with other areas, neighboring villages, to verify the accuracy. Informants were asked how, when, in which cases, both the harmful and useful effects of the used plants in detailed questions.

Ethnobotanical techniques were employed to collect data on knowledge and management of medicinal plants used by the local people in the study area. The methods used for ethnobotanical data collection were semi-structured interviewed following Martin (1995) and Cotton (1996), field observation and group discussion as described below.

Informant Consensus: During data collection, informants were visited two times in order to confirm and exhaust the reliability of ethnobotanical information. The response of each informant, which is not in harmony with each other, was rejected and the informant replaced by another knowleageble person. This is because such response is considered unreliable. Before the interviews, informants were instructed carefully about the method and encouraged to admit if they did not know the medicinal plant species or its uses.

***Semi-structured*:** A list of questions was prepared that covered in discussion with the informants in a particular order. The interview was guided to cover the key topics on the checklist while leaving room to pursue any relevant subject brought up by the interviewee. All of the interviews were held in Amharic, the language of the local people by the researcher. The place and the time for discussion were set based on the interest of the informants. The status of all the medicinal plants was recorded as abundant, less abundant, rare or very rare as per healer perception during the semi-structured interviews.

***Field Observation*:** Field observations were carried out with local people, guidance, interviewed informants, and students. Habitat, habit, abundance and distribution of plants were recorded in the given area.

***Group Discussion*:** Short, brief and precise group discussions were made with informants regarding the medicinal plants in the study sites. Information on local names of the plants, their medicinal uses, methods of preparation, mode of administration, disease conditions, indigenous knowledge on medicinal plants, and threats to plants, conservation and management of plants, and related data were recorded.

3.7. Ethical Consideration

Involving indigenous peoples and sharing their wisdom would permit the co-existence of knowledge and practices, which could enhance sustainability and include ethical considerations (Emadi, 2005). Gathering the old wisdom among local people in general and old people in particular, would offer an opportunity for paying respect to them. It would also enhance self-esteem among young generation and make them proud of the richness of the knowledge past in their community (Emadi, 2005). It would also allow the management of the knowledge based on their, local indigenous knowledge.

Special ethical considerations were taken based on the cultural view of the local communities in the study area. In view of these considerations, approaching of the informants was very systematic. By telling the fact and convincing each informant following his or her culture strictly. They were also informed that the objective of the research is not for commercial

purposes but for academic reasons. In so doing, the informants in the study site were well informed about the objective of the research before the starting of data collection and/actual works. Finally, most informants accepted the idea and came to reach an agreement.

3.8. Voucher Specimen Collection

Specimens of medicinally useful plants were collected from various habitats at the spot during guided field walk, numbered, pressed, dried, and deep-frozen for identification. Identification of specimens was carried out both in the field and in the National Herbarium (ETH), Addis Ababa University. Then after, nomenclature determination was carried out using Flora of Ethiopia and Eritrea, and other available taxonomic literatures, the voucher specimens were kept at National Herbarium.

3.9. Ethnobotanical Data Analysis

The collected ethnobotanical data were analyzed following survey and analytical tools for ethnobotanical methods, which is recommended by Martin (1995). Appropriate software and descriptive statistics were used. Informant consensus factor, preference ranking, direct matrix ranking and paired comparison were computed to assess the degree of effectiveness of certain medicinal plants against human and livestock ailments.

***The Informant Consensus Factor*:** The Informant Consensus Factor (ICF) was calculated for each category to identify the agreements of the informants on the reported cures for the group of ailments. The ICF is calculated as follows: number of use citations in each category (n_{ur}) minus the number of species used (n_t), divided by the numbers of use citations in each category minus one (Heinerich *et al.,* 1998).

$$ICF = n_{ur} - n_t / n_{ur} - 1$$

***Preference Ranking*:** Preference ranking were included in pre-designed semi-structured interview items. It was conducted following Martin (1995) for five medicinal plants in treating diseases. The key informants were selected to identify the best preferred medicinal plants for the treatment of ailments based on their personal preference or perceived degree of importance in the community. They were informed to assign the highest value (5) for the most preferred plant

species and the lowest value (1) for the least preferred ones. Finally, the values were summed up and the ranks given to each plant.

***Direct Matrix Ranking*:** Direct matrix ranking was conducted following Cotton (1996) on eight multipurpose medicinal plants. Informants were asked to order the items by considering several attributes one at a time. Using numerical scale in which the highest number is equal to the most preferred item whereas, the lowest to the least one. Then the informants were asked to rate their preferences. Direct matrix ranking exercise was conducted for 7 multipurpose medicinal plants to determine the main cause for over harvesting of the respective plants. Frequency of citation as multipurpose species was used as a criterion to select the seven candidate medicinal plant species for the direct matrix ranking exercise.

***Paired Comparison*:** After identifying five most important medicinal plants based on their medicinal values as perceived by the informants, the paired comparison was employed as described by Martin (1995). Paired comparisons on the five most effective plants in treating health problems were conducted using random number table and flipping coins.

3.10. Vegetation Description

Two approaches were used in describing the vegetation of the study area. In the first approach information was gathered from informants following the emic categorization technique i.e. categorization by indigenous people based on their own indigenous knowledge. The second one was described and classified through repeated curious visual observation following the etic classification technique of ethnobotany as described by Martin (1995). In the latter case, morphological characteristics or general appearance of vegetation such as growth and life forms of the dominant or co-dominant plants were focused on.

4. RESULTS

4.1. IK on Landscape Classification

The result of the current study revealed that the inhabitants of the study area traditionally classify the land forms as: Wotageba", "Terrarama", "Medama", "Shelequama" and "Korebta**"** (Table 6)

Table 6 Landscape Classification

Etic category	**Emic category**
Up and down/undulated	Wotageba
Mountainous	Terrarama
Plain	Medama (Saramma)
Valley	Shelequama
Rocky outcrop	Korebta

4.2. Local Vegetation Classification (Emic Categorization)

The indigenous people of the Wereda classify the vegetation as 'kutquato,' 'meda,' 'chaka' and 'den' (Table 7)

Table 7 Emic Categorization of Vegetation

Etic category	**Emic category**
Bushland	Kutquato
Grassland	Meda
Forest	Chaka
Plantation	Tekil Den

4.3. Visual Recognition of Plant Community Types in the Study Area (Etic Categorization)

Based on visual observation, the vegetation of the study area can be classified communities as**:**

A. *Dodonaea angustifolia* and *Carissa spinarum* Type:

This is degraded vegetation derived from the clearing of dry montane forests. The community is the home of small evergreen trees, shrubs and climbers. It is located at the main road of Woreta to Weldya about 10 km from Debre-Tabor. The vegetation is situated in an undulated land. The dominant species are *Dodonaea angustifolia* and *Carissa spinarum.* This community is composed of a number of useful plant species including medicinal plants. The common tree species of this community are *Croton macrostachyus, Schefflera abyssinica, Combretum molle, Cordia africana, Ficus vasta, Apodytes dimidiata, Olinia rochetiana, Teclea nobilis* and many other shrubs such as *Rumex nervosus, Osyris quadripartit*a, *Clutia abyssinica, Euclea racemosa* common. Most of the medicinal plants (75 species) used for treating human and livestock ailments are abundantly found in this community type. Many of the MPs recorded here are`` also found at a spot in other study sites of the Wereda. The community should discharge its responsibility for conservation issues. Therefore, conservation of this vegetation type is inevitable to throw light in to the field of herbal research and to improve socioeconomic development of the people.

Fig. 3 Alem-Saga Forest in Kolay-Dengors Kebele (Photo taken by Nigussie Amsalu, 2010)

B. Afro-alpine Dominated Type:

This is dominated by the fragmented evergreen shrub the *Erica arborea*. The next dominant plants are *Lobelia rhynchopetalum* which is among the giant rosette herbs with stem and a shrub known as *Hypericum revolutum*, *Thymus schimperi* and *Cynoglossum coeruleum* are also common. The plants occupy the highest mountain in the study area, on the average greater than 3000 m. a.s.l. The vegetation is highly degraded. The first three plants are almost on the way to extinct from the study area because of natural and environmental degradation including grazing, agriculture, deforestation and their medicinal and other useful values. The number of species in this vegetation type is relatively low (15 medicinal plants) when compared with others. This is probably the threaten factors which are mentioned above.

C. Community Dominated by *Eucalyptus globulus*

This community type is mostly distributed b/n 2, 600-3, 000 m. a.s.l. and encompasses about 5 kebeles including Farta-Kuskuam, Gassay, Kimir-Dengay, Arga-Didim, Mokish and Sahrna-*Eucalyptus globulus* is the most dominant plantation followed by *Juniperus procera*. Other major trees at a spot include *Dombeya torrid*, *Acacia negrii* and *Arundinaria alpina* are also a plantation herb commonly found in these kebeles. The community includes the following medicinal plants: *Stephania abyssinica, Justicia schimperiana, Haplocarpa schimperi, Erythrina brucei, Carduus shimperi, Leonotis ocimifolia, Kniphofia isoetifolia, Verbena officinalis, Datura stramonium* and others, which contribute about fourty-five medicinal plant species.

Fig. 4 *Arundinaria alpina* (Photo taken by Nigussie Amsalu, 2010)

Fig. 5 Vegetation dominated by *Eucalyptus globulus* (Photo taken by Nigussie Amsalu, 2010)

***D. Euphorbia abyssinica* Type**

Common woody plant species dominated by *Euphorbia abyssinica*. This community type is commonly found in and around few churches of the study area. The common trees include *Apodytes dimidiata, Ekebergia capensis, Albizia schimperiana, Acacia negrii* and shrubs like, *Acanthus sennii*, *Vernonia myriantha* and *Maytenus arbutifolia*, are also common. Fifty medicinal plant species were contributed by this community type.

Fig. 6 *Euphorbia abyssinica* (Photo taken by Nigussie Amsalu, 2010).

Fig. 7 Vegetation dominated by *Euphorbia abyssinica* (Photo taken by Nigussie Amsalu, 2010)

E. *Calpurina aurea* and ***Capparis tomentosa* Type**

This is generally bushland type and distributed in the altitudinal range of 1974 m and 2210 m. a.s.l. and about 40 km away from Debre-Tabor. It is found near the river called 'Gumera', just in between the two adjacent kebeles of Zimha and Mahdere-Mariam. This is characterized by the dominant species *Calpurina aurea.* Other plants are *Capparis tomentosa*, *Bersama abyssinica*, *Brucea antidysenterica*, *Rhus glutinosa* and many others. This community type contributes fifty-five MPs. The second largest community type that needs to be conserved by the local people and the government as well.

Fig. 8 Vegetation Dominated by Bushland Vegetation Type **(**Photo taken by Nigussie Amsalu, 2010**)**

4.4. Traditional Medicinal Plant Use Knowledge Transfer

Most of the traditional knowledge of medicinal plants is passed along the family line from parents (47 %) followed by observation (30 %) to their trustworthy families and other intimate family members (Fig. 9).

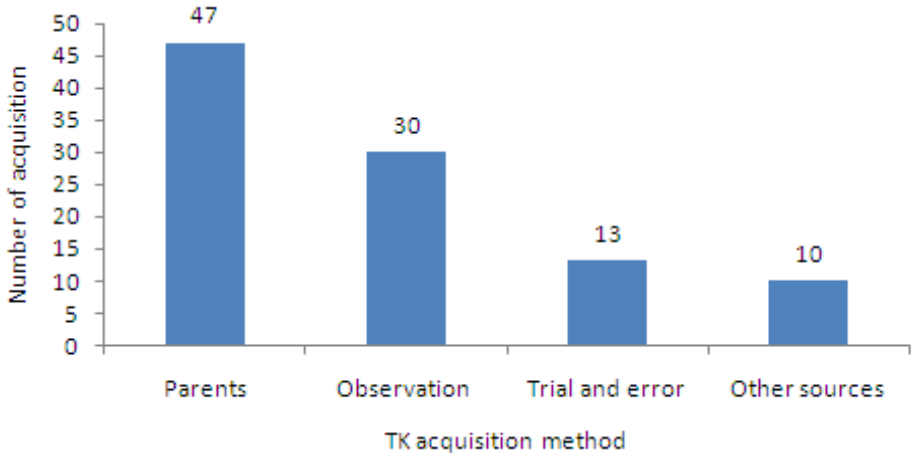

Fig. 9 TK Acquisition Methods in the Study Area

4.5. Medicinal Plants in the Study Area

4.5.1. Ethnomedicinal plants used to treat human and livestock ailments

One-hundred thirty-six medicinal plants belonging to 123 genera and 68 families were recorded. Of the collected medicinal plants, (75 species, 55.15 %) for human ailments and (25 species, 18.38 %) were used against livestock diseases (including cattle, equines, sheep, bees and poultry). Thirty-two (23.53 %) species were used to treat both livestock and human ailments, and very few (four species, 2.94 %) were applied for others (fish, cattle /fish and insect repellents) (Fig. 10).

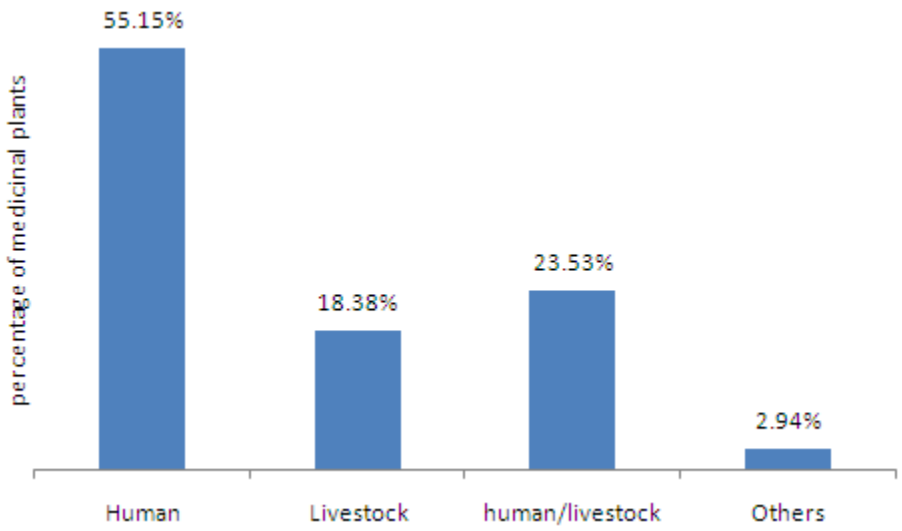

Fig. 10 Medicinal Plants Used to Treat Human and Animal Diseases in the Study Area

4.5.2. Distribution and diversity of medicinal plants in natural habitat and homegarden

A total of 136 species, belonging to 123 genera and 68 families were collected, identified, and documented during the study (Appendix 5). Astereaceae appeared the most dominant family that contains 13 species under 11 genera, followed by Solanaceae having 9 species with 5 genera. Next to Solanaceae, Fabaceae and Lamiaceae were equally dominant (each family contains 7 species that fall under 7 genera). Poaceae contains 6 species under 6 genera, Euphorbiaceae 5 species with 4 genera and following this Cucurbitaceae and Myrtaceae (4 species each). The rest 60 families contain 3, 2 or 1 species each (See Appendix 5). Among the cited traditional medicinal plant species in Farta Wereda, more than half (58.09 %) of the total were found in natural habitat. About 27.94 % of the medicinal plants were found to be homegarden while 13.97 % species were grouped under natural habitat and homegarden (See Table 8).

Table 8 Number and Percentage of Medicinal Plants obtained from Natural habitat and Homegarden

Source	Number of plant species	Percentage of species (%)
Natural habitat	79	58.09
Homegarden	38	27.94
Natural habitat and homegarden	19	13.97

4.5.3. Diversity of habits

Analysis of habits of these medicinal plants (Figure 11) reveals that herbs constitute the largest category with 57 species (41.9%) followed by shrubs with 44 species (32.35 %). Trees and climbers accounted for (25 species, 18.38 %) and (10 species, 7.35 %) respectively (Fig. 11).

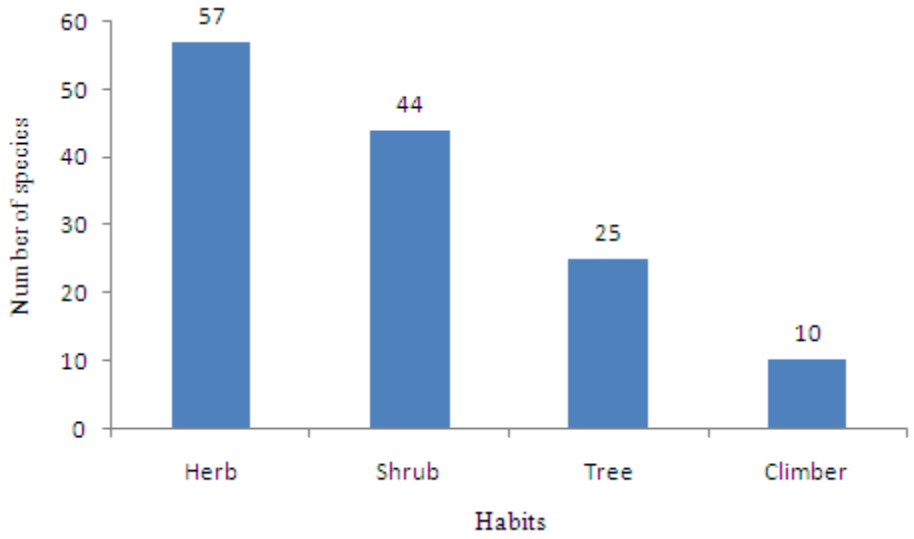

Fig. 11 Habits of Medicinal Plants in the Study Area

4.5.4. Conditions of preparations of traditional medicine in the study area

A large number (72.68%) of medicinal plants were cited to be used in fresh form in remedy preparations. Relatively few medicinal plants (24.74 %) in dried form and the rest very few medicinal plants (2.56 %) were reported to be used as dried and fresh forms (Fig. 12).

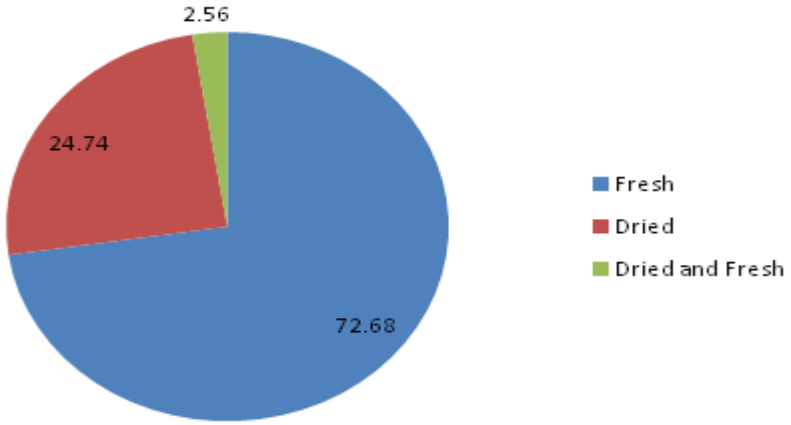

Fig. 12 Preparation Forms of Medicinal Plants

4.5.5. Plant parts used and modes of preparation

The most widely used plant part for the preparations of remedy were leaves, which account for (56 cases, 34.78 %) followed by roots (29, 18.01 %) and fruits (17, 10.56 %) (Table 9). The medicinal plant parts are processed in various forms crushing and harmonizing in water and/or other solvents and additives (51, 23.29%), powdering (42, 19.18 %), boiling (19, 8.68 %) which stood 1st, 2nd and 3rd respectively. Other forms of preparations are also indicated (See Table 10).

Table 9 Plant Part Used in Preparation of Remedies

Plant parts used	Total of plant parts	Total plant parts in percentage (%)
Leaf only	56	34.78
Root only	29	18.01
Fruit only	17	10.56
Stem bark	12	7.45
Seed only	9	5.59
Stem only	8	4.97
Latex only	5	3.11
Whole plant	5	3.11
Resin	3	1.86
Root bark	2	1.24
Tuber	2	1.24
Flower	1	0.62
Shoot (Leaf)	1	0.62
Fiber	1	0.62
Bulb	1	0.62
Fruit bark	1	0.62
Two parts	8	4.97
Total	161	100

Table 10 Types of Preparation of Herbal Medicine

Types of Preparation	Number of Plants	Percentage (%)
Crushing	51	23.29
Powdering	42	19.18
Boiling	19	8.68
Unprocessed	17	7.76
Crushing & squeezing	14	6.39
Chewing & taking the solution	11	5.00
Latex collection	11	5.00
Fluid /Juice	9	4.11
Pounding	9	4.11
Smoking/inhaling	7	3.2
Soaking (infusion)	6	2.74
Decoction	6	2.74
Heating	3	1.37
Chewing & spiting	2	0.91
Others	6	2.74
Total	219	100

4.5.6. Dosage and route of administration

Dosages were estimated using lid spoons, pinches or handfuls (‘woket’) (for powder preparations) cups (‘sini’ or ‘finjal’), ‘tassa’ (can) and glasses (birchiko) (for liquid mixtures to be administered), numbers or in some cases handfuls (for leaf, seed and fruits) and ‘atik’ (for roots, stems or barks).

The most favoured administration routes are oral (116-52.97 %) followed by dermal (66-30.14 %) (Table 11).

Table 11 Routes of Administration of TMP

Mode of administration	Number of medicinal plants	Percentage (%)
Oral	116	52.97
Dermal	66	30.14
Nasal & oral	10	4.57
Nasal	5	2.28
Eye	5	2.28
Dermal & oral	5	2.28
Ear & nasal	1	0.46
Eye & dermal	1	0.46
Dermal & anal	1	0.46
Anal	3	1.37
Ear	3	1.37
Vaginal	3	1.37
Total	219	100

4.5.7. Market survey in the study area

The local market surveys were conducted within the area of research to document the medicinal plants used in health ailments that are sold in local markets. The daily and weekly markets were assessed and these include Debre-Tabor, Gassay, and Kimir-Dingay. However, there are no medicinal plants that are sold in the market legally. During the interview, the respondents explained that most healers prepared and sold TMPs in the home rather than selling in the market. They simply made a big notice that shows different kinds of diseases in front of their home. Some of the noticed medicines were brought to their home from neighboring zones by going long distance. In any case, some medicinal plants were marketed but only for other use-values like for spices, food and fumigation.

4.5.8. Informant consensus (medicinal plant use report)

Based on the informant consensus, 10 top medicinally important plants were selected by 50 and above informants. This showed that, some medicinal plants are more popular than others. For example, *Stephania abyssinica* which stood 1st was cited by 95 %) informants, where as both

Croton macrostachyus and *Allium sativum* were cited by 85 informants for their medicinal values. The last one from the top selected medicinal plans accounts for 50 % of the informant consensus (Table 12).

Table 12 Medicinal Plant Species with High Informant Consensus

Rank	Scientific Name	No. of citation (frequency)	Informant Consensus (%)
1	*Stephania abyssinica*	95	95
2	*Croton macrostachyus*	85	85
3	*Allium sativum*	85	85
4	*Ruta chalepensis*	80	80
5	*Cardus schimperi*	75	75
6	*Justicia schimperiana*	74	74
7	*Datura stramonium* L.	65	65
8	*Phytolacca dodecandra*	63	63
9	*Otostegia tomentosa*	58	58
10	*Euphorbia abyssinica*	50	50

4.5.9. Preference ranking on stomachache

The preference ranking for medicinal plants to treat stomachache revealed that *Lepidium sativum* was the most preferred one followed by *Ruta chalepensis*, *Rumex nepalensis*, *Vernonia amygdalina* and *Verbasicum sinaiticum* (Table 13).

Table 13 Preference Ranking of Medicinal Plants used to treat Stomachache

Medicinal Plants	Respondents (R_1-R_7)							Total	Rank
	R_1	R_2	R_3	R_4	R_5	R_6	R_7		
Vernonia amygdalina	3	4	3	4	5	3	4	26	4
Verbasicum sinaiticum	4	5	2	3	4	3	2	23	5
Rumex nepalensis	5	3	4	4	5	3	4	28	3
Ruta chalepensis	3	5	5	4	4	5	4	30	2
Lepidium sativum	4	5	5	4	4	5	5	31	1

4.5.10. Direct matrix ranking for multiple use medicinal plants

Average score for direct matrix ranking of 8 selected medicinal plants with use diversity

(Use values given from 0 to 5: 5 = Excellent, 4 = Very good, 3 = Good, 2 = Less, 1 = least and 0 = No use**) (**Table 14**)**

Table 14 Direct Matrix Ranking of Medicinal Plants with Different Uses

Main uses	*Croton macrostachyus*	*Cordia africana*	*Ficus sur*	*Eucalyptus globulus*	*Prunus africana*	*Juniperus procera*	*Justicia schimperiana*	*Combretum molle*	**Total**	**Rank**
Medicine	5	3	3	2	4	2	5	3	27	3
Furniture	4	5	3	5	4	5	0	3	29	1
Charcoal	5	4	2	5	3	2	0	1	22	5
Construction	4	3	2	5	2	3	1	2	22	5
Fuelwood	5	4	3	5	4	2	2	3	28	2
Soil conservation	4	4	2	3	4	4	3	3	27	3
Edible fruit	0	4	4	0	0	0	0	0	8	8
Forage	0	4	4	0	3	0	0	0	11	7
Total	27	31	23	25	24	18	11	15		
Rank	2	1	4	3	5	6	8	7		

4.5.11. Paired comparison on plants used to treat wounds

Paired comparison of 5 medicinal plants that were used to treat wounds was made using 8 informants in order to know their ranks. The result indicates that *Euphorbia abyssinica* is much favored in treating wounds followed by *Ranunculus oligocarpus*, *Clematis simensis* and *Justicia schimperiana*. The least preferred one is *Dodonaea angustifolia* (Table 15).

Table 15 Paired Comparison of Medicinal Plants used to Treat Wounds (1= least; 2= good; 3= very good and 4= excellent).

Name of Medicinal plants	List of Respondents (R_1-R_8)								Total	Rank
	R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8		
Dodonaea angustifolia	1	2	1	2	2	1	2	1	12	5
Ranunculus oligocarpus	2	3	3	2	1	3	2	2	18	2
Clematis simensis	2	1	2	3	2	2	1	2	15	3
Justicia schimperiana	1	2	1	1	3	2	1	2	13	4
Euphorbia abyssinica	4	2	3	2	2	2	4	3	22	1

4.5.12. Informant consensus factor

The highest ICF (0.74) value was obtained for diseases related to dermatological problems and the least one (0.46) was associated with organ diseases (Table 16).

Table 16 ICF by ategory of diseases (Key: Ns-number of species, Nuc-Number of use citation)

Diseases	Ns	Nuc	ICF
Diseases related to dermatological problems-scabies, burns, dandruff, ring worm, wound, eczema and leschmaniasis	44	162	0.74
Related to gastrointestinal problems-stomach-ache, gastritis, diarrhea, dysentery, constipation, abdominal helminthes, vomiting, ascariasis and tapeworm	53	155	0.66
Ailments associated with respiratory diseases-cough, common cold and T.B	11	28	0.63
Malaria and hemorrhoids	9	20	0.58
Livestock diseases including leech infestation, ‘kumegna’(emmacilation), ectoparasite, eye infection, ‘kuro’, epidemic, bloating	39	80	0.52
‘Mich’ (sunstrike), evil eye and ‘kurba’(emergency)	17	33	0.50
Organ diseases such as teeth, liver, heart, ear and eye	22	40	0.46

4.5.13. Number of Medicinal Plants reported by the informant

In this ethnobotanical study of Farta Wereda, 20 representative kebeles were sampled and taken information from the informants for TM was recorded. The most vital information gathered on

the MPs can be traditionally categorized under three ecological zones in the study area, namely Woynadega (Medium temperature, 1,500-2, 500 m), Dega (Cool, humid, 2,500-3,000 m) and Wurch (cold highlands, > 3,000 m). Relatively more medicinal plants (60) were reported from Woynadega (high landers). About 46 from Dega and small number (30) from Wurch.

4.5.14. Threats and conservation of medicinal plants in the study area

Most informants perceived that agricultural expansion (24.16 %) was considered to be the main threat to medicinal plants and relatively construction accounts for the least one (16.12 %) (Table17).

Table 17 Ranking of Threats on Medicinal Plants (values 1-5: 1 is the least destructive threat and 5 is the most destructive one)

Major Threats	Respondents (R_1-R_8)								Total	%	Rank
	R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8			
Agricultural expansion	5	4	4	5	5	4	5	4	36	24.16	1
Grazing	4	3	2	4	3	5	4	4	29	19.46	3
Fire wood	4	4	3	5	4	5	5	4	34	22.82	2
Drought	3	3	2	3	3	4	4	4	26	17.45	4
Construction	2	3	5	1	2	3	4	4	24	16.12	5

5. DISCUSSION

5.1. Acquisition, Threat, Transfer and Basic Information of TMP Knowledge in the Study Area

The age of the informants lie between 20 and 91 years. The highest number is, in the age group between 50 and 91. This shows that the elders were more knowledgeable because of the many years accumulated experience.

During this study, it has been found that the main sources of TMK are parents 47 % followed by observation 30 %, trial and error 13 % and other acquaintances and knowledgeable persons 10 % (Fig. 9).

Medicinal plant knowledge, use and transfer of knowledge to the young generation can be affected by religious, beliefs, modernization, acculturation, and environmental change (Cunningham, 1993; Tafesse Mesfine and Mekonnen Lemma, 2001; Mabano and Kakudidi**,** 2006). Ethnomedicinal knowledge diminishes with death of elderly knowledgeable members of the community since only a few young people are willing to acquire the knowledge (Debela Hunde *et al.,* 2004). In a similar fashion, the respondents in the study site also reported that the transmission of TK is disrupted because of modernization and rapid changes in people's life style.

Indigenous people revealed that gathering and processing of many medicinal plants were restricted to traditional medicinal practitioners and their trainees. At family level, it is restricted to the elders (men and women), followed by elder son or daughter or their trustworthy person when the mother or the father is getting old or near to die (Debela Hunde *et al.,* 2004).

The death of elderly custodians of certain traditional knowledge will mean loss of certain practices unless they are passed on to younger generations since folk knowledge among the Farta people like many traditional tribes, is orally transmitted. It is observed that more than in oral or written communication skill transfer of knowledge system is in their beliefs and norms.

However, in the study area, knowledge has been transferred from one generation to the next through the interaction of the communities. Most respondents transfer their knowledge to their family. This means that most of the TK of MPs is passed along the family line. First-born children in the family are the main holder of responsibility in keeping the information and they are successor of their parents as well. Few others share to trustworthy and lovely neighbors and other blood relation persons. Exchange and knowledge sharing are also common among intimate key informants.

A major problem observing during the study was that few of highly traditional skilled and knowledgeable persons are rigid to tell information. Nevertheless, farmers, students and other educated inhabitants are free to secrete out the information. This is because, first, it is a means of income generation and their livelihood depends on the income they get out of it. Second, they believe that the medicinal plant is less effective in treating a certain ailment if everybody knows it. On the other hand, most of the time knowledgeable persons were locally said to be 'Debtera' and or 'Tenquay'. They were also condemned as 'sir mash' (root excavators), and 'kitel betash' (leaf cutter). Because of the above mentioned difficulties, the traditional medicine practitioners had forced to keep their knowledge and practices in secret. In comparison with males, females are sensitive and afraid of the taboo words forwarded by the local people. That is why the number of female informants in the study area was less than males'.

5.2. Medicinal Plants Used to Treat Human and Livestock Ailments

The number of medicinal plants collected in this ethnobotanical study was 136. Out of these, 55.15 % were used to treat human diseases, the other 18.38 % and 21.33 % treat livestock and both human and livestock ailments respectively. Very few plants 2.94 % were used against insect and fish repellents (Fig. 10). Most of the reported medicinal plants are used to treat human ailments. This showed that, the people of the study area are more knowledgeable and give great attention about human ailments as compared to livestock diseases. Similar results were recorded by Seyoum Getaneh (2009) in Debre Libanos Wereda, North Shewa Zone of Oromia Region, Ethiopia.

A few numbers of studies have been conducted in different part of the country. That is, medicinal plants recorded in this study also used as remedies in other few works of other part of the country. For instance, 28 species were mentioned in Mesfin Tadesse (1986), 9 species in Debela Hunde *et al.* (2004), 10 plant species in Abiyot Berhanu (2006), 61 species in Endalew Amenu (2007), 30 plant species in Fisseha Mesfin *et al.,* (2009) and 59 plant species in Seyoum Getaneh (2009).

The data presented in this study indicated that few of the claimed medicinal plants are used as the treatments of many types of ailments. The medicinal plants for example, *Croton macrostachyus* used to treat 6 human, *Euphorbia abyssinica* 6 (1 equine & 5 human) and *Phytolacca dodecandra* 6 (1 cattle & 5 human) ailments (Appendix 3). The study also showed that most of the medicinal plants cure more than two ailments whereas, relatively some used only the treatment of one type of disease **(**See Appendix 3). This agrees with the findings of Mirutse Giday and Gobena Ameni (2003) which had already been recorded in other ethnobotanical study of two Weredas of Southern Tigray, Northern Ethiopia and Kebu Balemie *et al.* (2004) in Fentalle Area, Eastern Shewa, Ethiopia.

Preference ranking indicated that, the most preferred MPs to treat stomachache among 18-selected plant species was *Lepidium sativum* followed by *Ruta chalepensis*, *Rumex nepalensis*, *Vernonia amygdalina* and *Verbasicum sinaiticum* (Table13 and Appendix 6).

Direct matrix of randomly selected 8 medicinal plants with different uses other than medicinal value on a given use criteria revealed that medicinal plants broadly collected for different purposes (Table 14). The paired comparison of five selected medicinal plants out of 15 plant species used to treat a disease called wound based on informant consensus showed that *Euphorbia abyssinica*, *Ranunculus oligocarpus, Clematis simensis, Justicia schimperiana* and *Dodonaea angustifolia* stood 1st, 2nd, 3rd, 4th and 5th respectively (Table 15).

As seen in Table 16, the largest number of the remedies (53) in the study area was used against gastrointestinal problems such as stomachache, gastritis, diarrhea, dysentery, constipation, abdominal helminthes, vomiting, ascariasis and tapeworm. Skin problems such as wounds, cuts,

burns, scabies, dandruff, ringworm, eczema and leschmaniasis were treated by the second largest number of remedies (44). The third largest medicinal plant species (39) were used to treat livestock diseases including leech infestation, 'kuro', 'kumegna' (emmacilation), ectoparasite, epidemic, eye infection and bloating.

On the other hand, the ethnobotanical results showed that the highest ICF (0.74) value was associated with dermatological/skin problems followed by gastrointestinal problems (0.66), associated with respiratory ailments (0.63), malaria and hemorrhoids (0.58), livestock diseases (0.52), and ailments related with "mich' (sunstike) evil eye and 'kurba'(emergency) (0.50). The category of the lowest ICF (0.46) value was associated with organ diseases such as teeth, liver, heart, ear and eye (Table 16). This shows that medicinal plants, which have higher ICF values, are assumed effective in treating a certain ailment. Tilahun Teklehaymanot and Mirutse Giday (2007) also found high proportion of remedy for the treatment of gastrointestinal disorder and parasite ICF (22.8 %) was used by Zegie People in Peninsula, Northwestern Ethiopia.

5.3. Sources and Habits of Medicinal Plants

According to an estimate (Tiwari 2000; cited in Signhal, 2005), 90 per cent of plant material for medicinal purposes is harvested from wild sources (forests). It includes a wide range of non-timber forest products (NTFPs) in the form of roots, seeds, skin, bark, flowers, fruits and leaves. About 70% of the total is still growing in the wild (Cole, 1996**)**.

Most of the medicinal plants utilized by the Ethiopian people are harvested from natural habitats (Tesfaye Hawas and Zemede Asfaw, 1999; Bayafers Tamene, 2000; Mirutse Giday *et al.,* 2003; Endalew Amenu, 2007). It was also noted that medicinal plants are among the diverse category of plants directly used from the natural habitat (Frank *et al*., 1995). However, Zemede Asfaw (1997) reported that medicinal plants make 6% of homegarden plant diversity among the homegarden crops in Ethiopia.

Similarly, most medicinal plants (58.09 %) are harvested from natural habitat in different natural ecosystems of the study area including natural forests, grasslands, wetlands, field margins, churches, hills, river basis and roadsides. In contrast to natural habitats, homegardens contribute

less number of medicinal plants (38.94 %) (Table 8).

The current findings show that the most widely used medicinal plants habit in the study area are herbs followed by shrubs. This may be due to these species exhibit high level of abundance and easy to obtain them. Results of this findings agreed with the findings of indigenous researchers including Abiyot Berhanu (2002), Mirutse Giday *et al.* (2003),Tizazu Gebre (2005), Endalew Amenu (2007), Tilahun Teklehaymanot and Mirutse Giday (2007), Getachew Wolde-Michael (2009) and Seyuom Getaneh (2009).

On the contrary, the findings of Bayafers Tamene (2000), Debela Hunde *et al.* (2004), Mirutse Giday and Gobena Ameni (2003), Ermias Lulekal *et al.* (2008) and Fisseha Mesfin *et al.* (2009) revealed that shrubs are the most commonly used in their respective different study sites of Ethiopia.

5.4. Conditions, Plant Parts Used and Modes of Preparation

The result in the conditions of plant part used indicated that most medicines (72.68 %) are prepared from fresh plants and plant parts; whereas (24.74 %) and very small (2.56 %) were prepared from dried and dried or fresh respectively (Fig. 12). Similar results were reported in the findings of Tizazu Gebre (2005), Tesfaye Seifu *et al.* (2006), Endalew Amenu (2007) and Seyoum Getaneh (2009). In contrast to this, Etana Tolosa (2007) stated that 60 % of the preparations are fresh or dried followed by fresh 36.47 % and dried 14%.

Analysis of the data revealed that, leaves and roots were the most widely used plant parts in preparation of remedies followed by others such as bulb/tuber, flower, stem, latex, seed, smoke, stem/root barks, and fruits (Table 9). Previous reports in Ethiopia have also shown that leaves were the most commonly used and followed by roots to treat various health problems (Bayafers Tamene, 2000; Mirutse Giday *et al.,* (2003); Mirutse Giday and Gobana Ameni, 2003).

Parts of various medicinal plants are used in the traditional medication of different diseases. However, the most widely used plant parts are leaves (34.78 %) and roots (18.01 %) followed

by others such as bulb/tuber, flower, stem, latex, seed, smoke, stem/root barks, and fruits for remedy preparations (Table 9).

During the preparation of traditional medicine from plants, the methods of preparations used by traditional healers were crushing, squeezing, powdering, and mixing with solvents like water and milk in liquid preparations. Most of the preparations of traditional medicinal plants involved the use of solvents and the solvent used is water. Butter and honey are also used in solid preparations. In certain cases, excretes or materials of animal were included in such preparations. Additives like sugar, honey, tea, and coffee were used in most of the remedy preparations to make them testy during taking the medicine. This is to reduce the bitterness of the medicine and initiate the patient to take it.

5.5. Dosage, Lack of Precision, and Route of Administration

The measurements used to determine the dosages are not standardized and depend on the age, physical appearance of the patient, degree of the illness, diagnosis and experience of individual herbalists/or knowledgeable person. Children are given less than adults, such as, one fourth of a coffee cup whereas; an adult is given up to one glass depending on the type of illness and treatment Amare Getahun (1976), Sofowora (1982) and Dawit Abebe (1986) were also reporting that lack of precision and standardization drawback for the recognition of the traditional healthcare system.

However, in the study area, constant measurement units are routinely used to measure the plant part, usually the root parts and the amount of water used to prepare the plant treatment. The most widely cited example includes the ‘atiq’, which is the length of the upper phalange (the tip part of forefinger).

The amounts of remedy and prescription rates were generally dependent on the degree and duration of the ailment. Therefore, this study revealed that while there may be scope for fine-tuning the methods, traditional treatments are not entirely devoid of all measurement and standards. For example, almost all informants demonstrated awareness of the toxicity of some plants and

specific plant parts when administered in large doses. In some cases, the healers will give antidotes such as milk coffee and 'tella' (local alcohol) if the doses are beyond the patients' capacity (See Appendix 4).

The informants in the study area reported that some MPs including *Hagenia abyssinica, Ricinus communis, Prunus africana, Phytolacca dodecandra, Verbasicum siniaticum, Euphorbia abyssinica, Euphorbia schimperiana* and *Croton macrostachyus* are poison to man if not handled with proper care. Though these medicinal plants do have side effects, they are effective in treating different ailments. This emphases how much the local people aware the use and side effects of MPs. However, the medicinal properties of many plants have been scientifically proven in recent years. For example, *Hagenia abyssinica* and *Glinus lotoides* for the treatment of tapeworm, and *Phytolacca dodecandra* as a molluscicide in the control of schistosomiasis are plants from Ethiopia which have been proven as effective and safe (Russo, 2000).

The medicinal plant preparations were applied through different routes of administration. The common administration routes are oral 116 (52.97 %) followed by dermal 66 (30.14 %). Other roots of applications are nasal, ear, vaginal, anal, nasal & oral, and dermal & anal (Table 11). Similar results were observed by Dawit Abebe and Ahadu Ayehu (1993) who reported that the leading route of application used in northern Ethiopia is oral which accounted for 42 %. Those taken through nasal are either smoked or boiled in water and the patient inhales the smoke or the steam being covered with cloth. However, in the case of livestock, few droplets of liquid preparations are dropped in to their nostril and then most are administered through their mouth.

5.6. Ten Top Medicinal Uses of Plants in the Study Area

All medicinal plants (10 species) that had high informants' consensus of 50% and above (Table 12) are described below.

1. ***Stephania abyssinica*** **(Menispermaceae), Shimtirtira/etse-eyesus (Amh.)**

Medicinal Uses: All parts of the plant are used in traditional medicine to treat various stomach disorders and syphilis (Sebsebe Demissew, 2000). The root powder is used for treatment of

gonorrhea (Bayafers Tamene, 2000), the species is used to treat diarrhea (Dawit Abebe *et al.*, 2003). Its medicinal application in the study site includes for the treatment of ascariasis, wart, vomiting and to upgrade intelligence (mental activity) as well (Appendix 4).

2. *Croton macrostachyus* (Euphorbiaceae), Misana (Amh.)

Medicinal Uses: Locally this plant is used to treat ringworm, heart disease jaundice, elephantiasis, gonorrhea, abdominal problem, 'kurba' and tuberculos**is** (Appendix 4). In other part of the country, it is employed for the treatment of leprosy, gonorrhea and boils (Dawit Abebe *et al.,* (2003); fruit and root are used for the treatment of venereal diseases; stem bark with *Hagenia abysinica* used as purgative and vermifuge; young shoots and leaves for jaundice (Amare Getahun, 1976).

Elsewhere, the country it is used as firewood, charcoal, timber, poles, tool handles, medicine (sap, leaves, roots, bark), fodder (young leaves), bee forage, mulch, soil conservation (Azene Bekela-Tessema, 2007). Similarly, the local people of Farta use this plant for construction, firewood, soil conservation and making house furniture.

3. *Allium sativum* (Alliaceae), Nech Shinkurt (Amh.)

Medicinal Uses: It is used to treat cough, malaria, stomach trouble, and 'lashegn' (Appendix4), for the treatment malaria and pneumonia (Abiyot Berhanu, 2006), malaria and stomach problem (Endalew Amenu, 2007), bloating and body itching (Etana Tolassa, 2007) and as a source of medicine for evil eye, spam, intestinal parasite and gastritis Tizazu Gebre (2005).

Other uses: It is also used for preparations of variety of food types, more particularly in making dried foods for storage (Tewolde Brehan Gebre Egziaber and Edwards, 1997). In the study area it is also used for the preparation of different foods (soup, 'wat' (stew), and bread).

4. *Ruta chalepensis* (Lamiaceae), **Tena-adam (Amh)**

Medicinal Uses: The use of the plant as an antitussive agent has been recorded Dewitt Abebe *et al.* (2003), the root is employed against stomach-ache, cough and influenza Endalew Amenu (2007), the leaf juice is swallowed for spam and evil eye (Tizazu Gebre (2005) and in the study area the root is also used for the treatment of stomach-ach and 'kumegna'.

5. *Cardus schimperi* (Asteraceae), Koshashilie or yeahiya koshashilie (Amh.)

Medicinal uses: In the the local people of Farta**,** the root is largely employed for the treatment of sun strike ('mich').

6. *Justicia schimperiana* (Acanthaceae), Smitha (Amh.)

Medicinal Uses: The species is employed for the treatment of wound Mesfin Tadesse (1986), different part of the plant used as against rabies, blackleg, internal parasite and gonorrhea Endalew Amenu (2007), the leaf used to treat hepatitis and rabies Etana Tolassa (2007) and the whole plant is served as against retained placenta Tesfaye Seifu *et al.* (2006) . People of the study area use the leaf against hemorrhoids, 'kurba', vomiting, open sore and 'mekersa'. Leaf shoot is also used for the treatment of coccicoids (Appendix 4).

Other Uses: The indigenous people use for fire wood, fences, ornamental

7. *Datura stramonium* (Solanaceae), Astenagir (Amh.)

Medicinal uses: In the study area, it is used to treat dandruff, ringworm, toothache and bloating**.** Elsewhere, in Ethiopia leaves used against headache and wound (Fichtl and Admasu Adi, 1994), the fruit is used to treat malaria, scabies and dandruff (Endalew Amenu, 2007) and roots against toothache (Abbink, 1995). Elsewhere in Africa, leaves are used against coughing (Iwu, 1993).

8. *Phytolacca dodecandra* (Phytolaccaceae), Endod (Amh.)

Medicinal Uses: It is employed as a remedy for abdominal problem, rabies, **'**kurba', 'siray' leech infestation, malaria, burns and cuts (Appendix 4). Elsewhere in Ethiopia, applied for the treatment of trachoma, syphilis and tinea versicolor (Dawit Abebe *et al.,* 2003). It also used also as a vermifuge and a molluscicide for the control of the snails that is the vectors of bilharzias (Ryding, 2006).

Other Uses: Widely used as soap especially for making cotton white (Ryding, 2006). In the study area it is also used for soil conservation, fences, clothe washing and firewood.

9. *Otostegia integrifolia* (Lamiaceae), Tunjut (Amh.)

Medicinal Uses: In the study area, it is used against abdominal pain, 'kurba', 'dengetegna' and common cold (Appendix 4).

Other Uses: firewood and home uses such as scenting cloth. It is also used for fumigation of huts against diseases and of vessels for brewing beer (Ryding, 2006).

10. *Euphorbia abyssinica* (Euphorbiaceae), Kulkual (Amh.)

Medicinal uses: In the study area, it is used for the treatment of "kuro", itching, ascariasis, wound, hemorrhoids and jaundice.

Other uses: It is used as firewood and timber (roofing, matches, boxes, local tables and wooden saddles) (Azene Bekele-Tessema, 2007).

5.7. Endemic, Rare and Common Medicinal Plants in the Study Area

Asteraceae, Fabaceae and Lamiaceae which have got 98%, 67%, 30 % families respectively are considered to be the 1st, 2nd and 5th endemic rich families in the flora of Ethiopia and Eritrea. However, Solanceae the second largest family, which contains 9 species in the study area accounted the least as compared to the above three families (Vivero *et al.,* 2006).

Some of the medicinal plants recorded as endemic from Ethiopia to the study area are**:** *Acacia negrii, Acanthus sennii, Brassica carinata, Eragrostis tef, Erythrina brucei,impatiens tinctora subsp.abyssinica, Inula confertiflora, Kalanchoe petitiana, Laggera tomentosa, Lippia adoensis, Lobelia rhynchopetalum, Millettia ferruginea, Otostegia tomentosa, Plectocephalus variance, Solenecio gigas, Solanum marginatum, Thymus schimperi* and *Urtica simensis* which accounted 13.24 % (18 species) of the total collected medicinal plants. Out of these, *Acanthus sennii, Inula confertiflora, Laggera tomentosa* and *Lobelia rhynchopetalum are nearly threatened* where as, three plants such as *Acacia negrii, Otostegia tomentosa* and *Thymus scimperi* are velnearable under the Red List of Endemic Flowering Plants of Ethiopia and Eritrea (Ensermu Kelbessa, personal communication;Vivero *et al.,* 2006). See also Appendix 2.

The status of all the medicinal plants was recorded as common and rare or endangered as per healer perception during the semi-structured interviews, group discussion, field observation and personal observation as well. The rarest medicinal plants in the study area are as follow: *Aloe macrocarpa, Artemisia afra, Acmella caulirhiza, Arisaema schimperianum, Crinum abyssinicum, Cucumis ficifolius, Ficus carica, Ficus vasta, Hagenia abyssinica, Impatiens*

tinctoria, Kalanchoe petitianum, *Millettia ferruginea, Myrtus communis*, *Prunus africanus*, *Salix mucronata (S. subserrata)* and few others (See Appendix 3). The lack of effort to sustain resources may result in their depression from natural habitats. Therefore, there must be a great need to create awareness among the indigenous communities about rare or endangered medicinal plants.

5.8. Threats, Management and Conservation of Medicinal Plants in the Study Area

Biodiversity loss in Ethiopia is usually caused by deforestation, expansion of investment activities, overgrazing, expansion of agricultural activities, poverty and lack of appropriate policies that encourage conservation and management of biodiversity (Medhin Zewdu, 2002). It is reported that several medicinal plants have already disappeared from their common habitat and some of them are at risk of extinction. People or traditional healers are forced to travel a long distance to obtain some medicinal plants (Tafesse Mesfine and Mekonnen Lemma, 2001).

As in other parts of Ethiopia, plant resources are vital for the livelihood of the Amhara people of Farta Wereda. However, the resources are eroded from time to time because of the increment of population. Associated with this, the demand of agriculture is high and therefore clearance of vegetation/forests is high. There is evidence of remnant plants at the spot in the farmlands of representative Kebeles in the Wereda where the data were collected. This indicated that agricultural expansion was the main cause of the devastation of plants in the study area. Priority ranking factors (Table 17) also indicated that agricultural expansion contributed the major factor (36 %) to the threat of medicinal plants followed by fuel; grazing, drought and construction as other destructive factors, which account for 24.16 %, 22.82 %, 19.46 %, 17.45 % and 16.12 % of the total scores respectively. In general, in the context of major threats posed to natural habitats and the survival of particular species by agricultural expansion, deforestation and others over-exploitation of traditional medicines is occurring.

In Farta district, patchy remnants of old-aged Afromontane forests that contain many medicinal plants can be found mainly around the Ethiopian Orthodox Tewahido Churches. Hence, some one sees a patch of indigenous old-aged trees in the study area; he/she can be sure of that there is an Orthodox Church in the middle. Patches of forests are visible from a great distance, usually

built on small hills just above the surrounding villages. The local people call these churches with the surrounding trees as ‘debr’ or ‘gedam’.

No one tries to cut a single tree because of the culture of the people. If anyone cuts the tree of church, he or she is considered to be out of the norm, break rule of the church regarding their religion, and hence, out casted by the local people. In addition, there is also a cultural belief called ‘Gizit’ that is strictly forbidden to harvest plants in and around the church areas. As a result, church compounds are the safe places for plants in general and medicinal plants in particular for conservation purposes. In other words, church compounds are serving as in-situ conservation.

In the study area, natural forests such as Alem-Saga, Mer, Gumera, Debre-Sina and few other are also serving as conservation for many medicinal plants. These natural forests are being protected by the local people in collaboration with the government.

On the other hand, the healers bring and plant the most threatened medicinal plants in their homegardens. Zemede Asfaw (2001) in his findings reported that, the home garden is a strategic and ideal farming system for conservation, production and enhancement of medicinal plants and valuable indigenous knowledge. He also added that the cultivated medicinal plants are traditionally conserved on farm through community networks.

Likewise, medicinal plants which have additional uses in the area, such as ornamental, fuel, forage, spice, food and soil conservation were planted on home gardens and farmlands. Plants for example, *Allium sativum, Coriandrum sativum, Foeniculum vulgare, Lepidium sativum, Myrtus communis, Ocimum gratissimum, Ruta chalepensis, Schinus molle* and few others were commonly planted. This implies that endangered species are the focus of ex-situ conservation. Therefore, it must be noted that sustainable medicinal plant management and conservation is not an option but imperative for rural health and community well-being especially primary health.

6. CONCLUSION AND RECOMMENDATIONS

In the present study, 136 plant species of medicinal importance were recorded and documented. Most of these herbal medicines were harvested from natural stands followed by homegarden. They are also found growing sporadically in natural forests, hills, mountains, churches, homegardens, river and roadsides. They are the predominant sources of traditional medicine for traditional healers. Herbs and shrubs were found to be the most dominant growth forms in the preparation of traditional remedies followed by shrubs, trees and climbers.

Like many other Ethiopians, people of Farta have traditional practices which they accumulated for generations to treat both human and livestock ailments. They use different parts of plants to prepare remedies (root, leaves, stem, bark, and other plants structure). The traditional medicine practitioners have developed their own unique methods of diagnosis and treatment that are specific to their particular cultures. They also knew very well about the preparations, root of administrations and dosage about the traditional medicinal plants.

The result of the study showed that, traditional medicine is recognized and accepted by the community for its role in the maintenance of health and the treatment of diseases. This is due to lack of adequate communication, remoteness of the village and unavailability of modern health care facilities. Hence, the use of traditional medicine is attributed to its accessibility and affordability for the broad masses of rural people.

People in the study area use medicinal plants not only for healthcare, financial income, cultural identity and livelihood security but also as food, firewood, charcoal, construction and furniture. However, due to various reasons, many of medicinal plants were reported to be getting threatened and lost. These demand an urgent attention to conserve such vital resources to optimize their use in the primary healthcare system. It was also reported that the elders, who know more about medicinal plants, might die without sharing their traditional knowledge to the young generation. Therefore, documentation is important in order to transfer the knowledge to the next generation since it can be base for the invention of modern drugs.

It can be conclude that, the documentation of this traditional knowledge is inevitable to throw light in to the field of herbal research and to improve socio-economic development of the people. Moreover, all efforts should be made to conserve these medicinal plants in a proper way for the health benefits of this community. This work is based on the IK on medicinal plants and methods of treatment against common ailments prevail among the people of Amhara in Farta Wereda.

Based on the results and the conclusions given above the following recommendations are forwarded**:**

- Medicinal properties of plant species should be properly known.
- Traditional herbalists should be acquainted with and abide by the ethics and fundamental principles of medicines.
- The IK and skill of traditional medicine practitioners have to be encouraged and protected
- Marketing potential and market trends should be properly understood and implemented, in other words efforts should be made to facilitate conditions where by traditional medicines could be supplied to the market maintain their traditional values.
- To give more support to the above findings, further scientific investigations are needed for the isolation of active principles and pharmacological evaluation of different medicinal plant species reported in this study.
- All efforts should be made to conserve these medicinal plants in a proper way for the health benefit of this community.
- There should be mass responsibilities for the issues of medicinal plants and indigenous knowledge to conserve and build up their value.
- Encourage by creating awareness in order to conserve threatened and endangered plant species in natural habitats and home-gardens.
- Medicinal plant management and conservation must be integrated in other sectors such as in health to foster better use of plant materials and education to build up awareness of the need for protection. Government must also support local medicines and provide incentives to farmers for cultivation of medicinal plants to ensure conservation issues.

7. REFERENCES

Abbink, J. (1995). Medicinal and Ritual Plants of the Ethiopian South West An account of Recent Research. *Indigenous Knowledge and Development Monitor* **3(2):** 6-8.

Abebe Demisse (2001). Biodiversity conservation of medicinal plants: Problem and prospects. **In:** C*onservation and Sustainable Use of Medicinal Plants in Ethiopia*, pp. 198-203, (Medhin Zewdu and Abebe Demissie eds). Proceeding of the National Workshop on Biodiversity Conservation and Sustainable Use of Medicinal Plants in Ethiopia, 28 April-01 May 1998, IBCR, Addis Ababa.

Abiyot Berhanu (2002). Use and Conservation of Human Traditional Medicinal Plants in Jabitehaan Wereda, West Gojam. M.Sc. Thesis (Unpublished), Addis Ababa University.

Abiyot Berhanu, Zemede Asfaw and Ensermu Kelbessa (2006). An Ethnobotany of plants used as insecticides, repellents and anti-malarial agents in Jabitehnon District, West Gojjam. *SINET: Ethiop. J. Sci*., **29(1):** 87-92.

Ahmad, S. S., Mahmud, F., Dogar, H. -UL -Z., Khan, I. Z., Ahmed, K., Sher, M., Mustafa, I. and Valeem, E. E. (2009). Prioritization of Medicinal Plants of Margala Hills National Park, Islamabad on the Basis of Available Information. *Pakistan Journal of Botany,* **41(5):** 2105-2114.

Akerele, O. (1987). The best of both worlds: bringing traditional medicine up to date. *Soc. Sci. Med*., 24, 177 - 181.

Amare Getahun (1976). Some Common Medicinal and Poisonous Plants Used in Ethiopian Folk Medicine. Addis Ababa University, pp. 63.

Anonymous (1997). Intermediate evaluation of the GTZ-IFSP supported development activities in South Gonder presented by technical team. South Gonder Adm. Zone, Debre-Tabor, pp. 9.

Anokboggo, W. (1982). The role of African traditional medicine in healthcare delivery along *modern medicine. **In:** Plant Used in Africa Traditional Medicine as Practiced* in Ethiopia and Uganda. Botany 2000. East and Central Africa. *NPRECA Monograph Series,* **2:** 25-35, (Edwards, S. and Zemede Asfaw eds). NAPRECA, Addis Ababa University, Addis Ababa.

Asfaw Debela, Dawit Abebe and and Kelbessa Urga (1999). An overview of traditional medicine in Ethiopia: perspective and development effects. **In:** *Ethiopian Pharmaceutical Association.* Silver Jubilee Anniversary, pp. 25-61, (Tamrat Ejigu ed). Addis Ababa, Ethiopia.

Aumeerudy, Y. (1996). Ethnobotany, Linkages with Conservation and Development. **In:** "*Ethnobotany and its application to conservation*", proceedings of first training workshop on NARC, Islamabad, pp. 152-157.

Azene Bekele-Tesemma (2007). *Useful trees of Ethiopia: identification, propagation and management in 17 agroecological zones.* (Tengnäs, B., Ensermu Kelbesa, Sebsibe Demissew and Maundu, P. (eds). Nairobi: RELMA in ICRAF Project, pp. 552.

Balick, M. J. and Cox, P. A. R. (1996). Plants People and Culture: The Science of Ethnobotany. Scientific American Library, New York, USA, pp. 219.

Bayafers Tamene (2000). A Floristic Analysis and Ethno botanical Study of the Semi-Wet land of Cheffa Area, South Wello, Ethiopia. M. Sc. Thesis, Addis Ababa University.

Bekele Tefera (2004). WHO's Traditional Medicine Strategy. Essential Drugs and Medicines Policy, WHO Country Office, Addis Ababa, Ethiopia. **In:** *Traditional Medicine in Ethiopia*, pp. 10-16, (Kelbessa Urge; Ayele Assefa; and Merga Guta, eds). Proceedings of a National Workshop Held in Addis Ababa, Ethiopia, on June 30-2 July 2003. Ethiopian Health and Nutrition Research Institute, Addis Abba, Ethiopia.

Belachew Wassihun, Zemede Asfaw and Sebsebe Demissew (2003). Ethnobotanical Study of Useful Plants in DANIIO GADE (homegarden) in Southern Ethiopia. *Ethiop. J. Biol. Sci*., **2:**119-141.

Berhanemeskel Weldegerima (2009). Review on the importance of documenting ethnopharmacological information on medicinal plants. *Afr. J. Pharm. Pharmacol*., **3(9):** 400-403. http://www.academicjournals.org/ajpp. Accessed on December 20, 2009.

Cole, N. H. (1996). Diversity of medicinal plants in West Africa habitats. In; the biodiversity of African plants , pp. 704-768, (vander Mesen, G., vander Burget, X. M. and Rooy, J. M. eds). Proceedings 14th AETFAT Congress 22-27 August 1994. Wageningen, Netherlands.

Cotton, C. M. (1996). *Ethnobotany: Principles and Applications*. John Wiley and Sons Ltd. Chichister, England, pp. 347.

CSA (2007). Ethiopian Population Pyramid: Central Statistical Agency, Addis Ababa.

Cunningham, A. B. (1993). '*African medicinal plants: Setting priority at the interface* between *conservation and primary health care'*, People and Plants Institution Working Paper 1, UNESCO, Nairobi, http://www.rbgkew.org.uk/pepole /wp/wp1/index.htm. Accessed on January 16, 2010.

Cunningham, A. B. (1996). People, park and plant use recommendation for multiple uses zones and development alternatives around Bwindi. Impenetrable National Park Uganda. **In:** *People and Plant Working Paper*, 4: 18-23. UNESCO, Paris.

Dawit Abebe (2001). The role of medicinal plants in health care coverage of Ethiopia**.** The possible benefits of integration**. In:** *Conservation and Sustainable Use of Medicinal Plants in Ethiopia,* pp. 6-21, (Medhin Zewdu and Abebe Demissie eds). Proceedings of the National Workshop on Biodiversity Conservation and Sustainable Use of Medicinal Plants in Ethiopia, 28 April-01 May 1998, IBCR, Addis Ababa.

Dawit Abebe and Ahadu Ayehu (1993). *Medicinal Plants and Eenigmatic Health Practices of Northern Ethiopia*. Addis Ababa, B.S.P.E. pp. 511.

Dawit Abebe, Asfaw *Debella and Kelbessa Urga* (2003). *Medicinal Plants and Other Useful Plants of Ethiopia*. Ethiopian Health and Nutrition Research Institute, Addis Ababa, Ethiopia, Nairobi, Kenya.

Debela Hunde, Zemede Asfaw and Ensermu Kelbessa (2004). Use and Management of Ethnoveternary Medicinal Plants by Indigenous People in Boosat, Welenchiti area. *Ethiop. J. Biol. Sci*., **3 (2):** 113-132.

Demel Teketay (1999). Past and present activities, achievements and constraints in forest genetic resources conservation in Ethiopia. **In:** *Forest Genetic Resources Conservation on: Principles, Strategies and Actions.* Proceedings the National Forest Genetic Resources Conservation Strategies Development Workshop June 21-22, 1999, pp. 40-72, (Edwards, S. Abebe Demissie, Taye Bekele and Haase, G. eds). IBCR, Addis Ababa, Ethiopia.

Demel Teketay (2001) Deforestation, Wood Famine, and Environmental Degradation in Ethiopia's Highland Ecosystems: Urgent Need for Action Northeast African Studies (ISSN 0740-9133), *New Series*, **8(1):** 53-76. Kusami, Ghana.

Edwards, S. (2001). The Ecology and Conservation Status of Medicinal Plants in Ethiopia: What Do We Know? **In:** C*onservation and Sustainable Use of Medicinal Plants in Ethiopia,* pp. 46-55, (Medhin Zewdu and Abebe Demissie eds). Proceeding of the National

Workshop on Biodiversity Conservation and Sustainable Use of Medicinal Plants in Ethiopia, 28 April-01 May1998. IBCR, Addis Ababa.

Edwards, S. and Ensermu Kelbessa (1999). Indicators to determine the level of treat to tree species. **In:** *Forest Genetic Resources Conservation: Principles, Strategies and Actions.* (Edwards, S; Abebe Demissie; Taye Bekele and Haase, G. eds). Proceedings of the National Forest Genetic Resources Conservation Strategy Development Workshop June 21-22, 1999, Institution of Biodiversity Conservation and Research (IBCR). German Technical Cooperation (GTZ). Addis Ababa, Ethiopia.

EMA (1988**)**. *National Atlas of Ethiopia*: Ethiopian Mapping Authority (EMA). Addis Ababa.

Endalew Amenu (2007). Use and management of Medicinal plants by Indigenous People of Ejaji Area (Chelya Wereda) West Shoa, Ethiopia: An Ethnobotanical Approach, M.Sc. Thesis (unpublished), Addis Abeba University.

Ensermu Kelbessa, Sebsebe Demisssew, Zerihun Woldu and Edwards, S. (1992). Some Threatened Endemic Plants of Ethiopia. **In:** *The status of some plant resources in parts of Tropical Africa, Botany 2000.* (Zemede Asfaw and Edwards. S., eds). NAPRECA, Monograph No. **2:** 35 - 55. Addis Ababa.

Ermias Lulekal, Ensermu Kelbessa, Tamrat Bekele and Haile Yineger (2008). An ethnobotanical study of medicinal plants in Mana Angetu District, southeastern Ethiopia. *Journal of Ethnobiology and Ethnomedicine.* http://www.ethnobiomed.com/content/4/1/10. Accessed on March 20, 2010.

Etana Tolassa (2007). Use and Conservation of Traditional Medicinal Plants by Indigenous People in Gambi Wereda, Ethiopia, M. Sc. Thesis (unpublished), Addis Ababa.

Etkin, N. L. (1998). Indigenous pattern of conserving biodiversity: pharmacologic Implication. *Journal of Ethnopharmacology*, **63:** 233-245.

Farnsworth, N. R. (1985). Plants and Modern Medicine where Science and Folklore Meets. World Health Forum **6(1):** 76-80.

Fatnsworth (1994). Ethnopharmacology and drug development. **In:** *Ethnobiology and search for new drugs*, pp.42-59, (Wiley Chichester, Cibia Foundation eds). Chicago, USA.

FWHO (2009). Farta Wereda Health Office, Debra-Tabor.

FWOARD (2009). Farta Wereda Office of Agriculture and Rural Development, Debre-Tabor

Fassil Kibebew (2001). The status and availability of oral and written knowledge on traditional health care in Ethiopia. **In***: Coservation and Sustainable Use of Medicinal plants in Ethiopia (*Medhin Zewdu and Abebe Demissie eds). Proceeding of the National workshop on Biodiversity Conservation and Sustainable use of medicinal plants in Ethiopia, 28 April- 01 May 1998, pp. 107-119. IBCR, Addis Ababa.

Fichtl, R. and Admasu Adi (1994). *Honey bee flora of Ethiopia*. Margraf Verlag, Wikersheim, Germany, pp. 510.

Fisseha Mesfin, Sebsebe Demissew and Tilahun Teklehaymanot (2009). An ethnobotanical study of medicinal plants in Wonago Wereda, SNNPR, Ethiopia. *Journal of ethnobiology and Ethnomedicine* **5:** 28. http//www.ethnobiomed.com/content/5/1/28. Accessed on April 26, 2010.

Frankel, O. H., Anthony, H. D. B. and Burdon, J. J. (1995). *The Conservation of Plant Biodiversity*. Cambridge University Press, Cambridge, pp. 299.

Getachew Wolde-Michael (2009). Ethnobotanical Study on Medicinal Plants used by Local Communities in Wolmera Wereda, West Shewa Zone of Oromia Region, Ethiopia. M. Sc. Thesis (unpublished).

Green, B. H. (1996). Countryside conservation. Landscape Ecology, Planning and Management. 3rd ed. E and F. N. Spon, an Imprint of Chapman and Hall, London.

Haile Yineger and Delenasaw Yewhalaw (2007)**.**Traditional medicinal plant knowledge and use by local healers in Sekoru District, Jimma Zone, Southwestern Ethiopia. *Journal of Ethnobiology and Ethnomedicine*, **3:** 24.

Haile Yineger, Ensermu Kelbessa, Tamrat Bekele and Ermias Lulekal (2008). Floristic Composition of and Structure of the Dry Afromontane Forest at Bale Mountains National Park, Ethiopia. *Ethiop. J. Sc*i., **31(2):** 103-120.

Hamann, O. (1991). The joint IUCN-WWF plants conservation programme and its interest in medicinal plants. **In:** *The Conservation of Medicinal Plants,* pp.13-22, (Akerele, O; Heywood, W. Synge, H. eds). Cambridge University Press, Cambridge.

Hamilton, A. C. (1997). Threats to plants: an analysis of centers of plant diversity. **In:** *Conservation in to the 21 first century*. vol. proc. 4th International Botanic gardens Conservation Congress (Tuochell, D. H. and Dixon, K. W. eds). Kings Park and Botanic garden, Perth, Australia.

Hamilton, A. C. (2003). *Medicinal Plants and Conservation: Issues and Approaches.* International Plants Conservation Unit, WWF- UK, pp. 43.

Hareya Fasil (2005). Beyond Plants, Professionals and Parchments: The role of home-based medicinal plant use and traditional health knowledge in primary health care in Ethiopia. *Ethnobotany Research & Applications*, **3:** 037-049.

Haverkort, B., Hiemstra, W. and van't Hooft, K. (1999). 'In search of the right compass towards experimentation within farmers world views', *Compass Newsletter*, **1:** 4-6.

Hedberg, O. (1996). Monographs, databases and biodiversity conservation. **In:** The Biodiversity *of African Plants. Proceedings of XIVth AETFAT Congress* 22-27 August 1994, pp. 3-9, (vander Masen, L. J. G; vander Burget, X. M. and vander Mendenbach De Roony, J. M. eds). Wageningen, the Netherlands.

Heinrich, M., Ankli, A., Frei, B., Weimann, C. and Sticher, O. (1998). Medicinal plants in Mexico: Healer's Consensus and Cultural Importance. *Social Science and Medicine*, **47:** 1863-1875.

Hens, L. (2006). Indigenous Knowledge and Biodiversity Conservation and Management in Ghana. *J. Hum. Ecol.*, **20(1):** 21-30.

IBC (2004). *Institute of Biodiversity Conservation*: *The State of Ethiopia's Farm Animal Genetic Resources***:** Country Report. A Contribution to the First Report on the State of the World's Animal Genetic Resources. IBC, Addis Ababa, Ethiopia, pp. 74.

IBC (2008). *Institute of Biodiversity Conservation.* Ethiopia**:** Second Country Report on the State of PGRFA to FAO, Addis Ababa, Ethiopia, pp. 45.

IUCN (1980). *International Union for Conservation of Nature World Conservation Strategy*. IUCN/WWF/UNEP. Gland, Switzerland.

Iwu, M.M (1993). *Handbook of African Traditional Medicinal plants. B*oca Raton. Ann Arbor. London. *CRC Press, Inc.* Pp. 43.

Jain, S. K. (2002). *Bibliography of Indian Ethno-botany*. Publ., Jodhpur, India, pp. 144.

Jansen, P.C. M. (1981). *Spices, Condiments* and *Medicinal Plants in Ethiopia*. *Their Taxonomy* and *Agricultural Significance*. College of Agriculture. Addis Ababa University, Ethiopia and the Agricultural University, Wageningen, the Netherlands, Entre for Agricultural Publishing and Documentation, Wageningen.

Kanno, B. (2004). Integration of traditional medicine with modern medicine. **In:** *Traditional Medicine in Ethiopia*, pp. 32-35, (Kelbessa Urga; Ayele Assefa and Mulugeta Guta eds). Proceedings of a national workshop held in Addis Ababa, Ethiopia on June 30-2 July,2003. Ethiopian Health and Nutrition Research Institute, Addis Ababa**.**

Kebede Deribe Kassaye, Alemayehu Amberbir, Binyam Getachew, Yunis Mussema (2006). A historical overview of traditional medicine practices and policy in Ethiopia. *Ethiop. J. Health Dev*., **20(2):**128-134.

Kebu Balemie, Ensermu Kelbessa and Zemede Asfaw (2004). Indigenous Medicinal Plant Utilization, Management and Threats in Fentalle Area, Eastern Shewa, Ethiopia. *Ethiop. J. Sci*., **3(1):** 37-58.

Mabano, O. W. G. and Kakudidi, Z. K. E (2006). Medicinal plant uses in Nyabushoti Country, Abarara District, Western Uganda. In: *Taxonomy* and *Ecology of African Plants, their Conservation and Sustainable Use. Proceedings of the 17th AETFAT Congress*, Addis Ababaa, Ethiopia, pp. 505-518, (Ghazanfar, A. S. and Beentie, J. H. eds). Royal Botanic Gardens, Kew.

Mander, M., Bezabih Emana, Zemede Asfaw and Busa Badassa (2006). Marketing of medicinal Plants in Ethiopia: A survey of the trade in medicinal plants. A research report prepared for Sustainable Use of medicinal Plants Project, Institute of Biodiversity Conservation, Addis Ababa, pp. 221.

Martin, G.J. (1995). *Ethnobotany:* A method Manual. *A 'People and Plants' Conservation Manual*. Champman and Hall, London, pp. 268.

Medhin Zewdu (2002). *Sustainable Development*. Report of Assessment of Activities and issues Relevant to the Review Process of the Earth Submitted to Heinerich Boell Foundation. Institute of Biodiversity Conservation and Research (IBCR), Addis Ababa, Ethiopia, pp. 29.

Mesfin Tadesse (1986). Some Medicinal Plants of Central Shewa and South Western Ethiopia. *SINET: Ethiop. J. Sci*., **9:** 143-167.

Messeret Shiferaw (1996). The role of health professionals in the development of traditional medicine in Ethiopia**. In:** *Proceedings of the Workshop on Development and Utilization of Herbal Remedies in Ethiopia*, pp. 15-18, (Dawit Abebe ed). Ethiopian Health and Nutrition Research Institute, Addis Ababa.

Mirutse Giday and Gobena Ameni (2003). An Ethnobotanical Survey on Plants of Veterinary Importance in Two Weredas of Southern Tigray, Northern Ethiopia. *SINET: Ethiop. J. Sci.*, **26(2):** 123-136.

Mirutse Giday, Tilahun Tekelehaimanot, Abebe Anmut and Yalemtsehay Mekonnen (2003). Medicinal plants of the Shinasha, Agew-Awi, and Amhara people in northwest Ethiopia. *Journal of Ethnopharmacology*, **110:** 516-525.

Mirutse Giday, Zemede Asfaw, Elmquist, T. and Zerihun Woldu (2003). An ethnobotanical study of medicinal plants used by the Zay people in Ethiopia. *Journal of Ethnopharmacology*, **85:** 43-52.

Pankhurst, R. (2001). The Status and Availability of Written and Oral Knowledge on Traditional health Care in Ethiopia. **In:** *Conservation* and *Sustainable Use of Medicinal Plants in* Ethiopia, pp. 92-106, (Medhin Zewdu and Abebe Demissie eds). Proceedings of the National Workshop on Biodiversity conservation and Sustainable Use of Medicinal Plants in Ethiopia, IBCR, Addis Ababa, Ethiopia.

PGRC (1995). *Plant Genetic Resources Center*. Ethiopia: Country Report to the FAO International Technical Conference on Plant Genetic Resources, Addis Ababa, Ethiopia, pp. 51.

Pharmacotherapy Group (2009). Current Trends in Ethnobotany. *Tropical Journal of Pharmaceutical Research,* **8 (4):** 295-296. http://www.tjpr.org. Accessed on November 15, 2009.

Ploktin, M. J. (1991). Tradtional Knowledge of Medicinal Plants-The Search for New Jungle Medicines**. In:** *The Conservation of Medicinal Plants*, pp. 53-64, (Akerele, O., Heywood, V. and Synge, H. eds). Proceedings of an International Consultation. Cambridge: Cambridge University Press.

Quansah, N. and Quansah, P. (1995). Saving biodiversity of extinction: The need to understand and practice the principle of conservation. *Hanitriniala*, **7:**19-20.

Qureshi, A. R; Ghufran, A. M; Gilani, A. S; Yousaf, Z; Abbas, G. and Batool, A. (2009). Indigenous medicinal plants Used by Local Women in Southern Himalayan Regions of Pakistan. *Pak. J. Bot.*, **41(1):** 19-25.

Ryding, O. (2006). Lamiaceae. **In:** *Flora of Ethiopia* and *Eritrea Volume, 5, Gentiaceae to cyclocheilaceae,* 516-604, (Hedberg, I., Ensermu Kelbessa, Edwards, S., Sebsebe Demissew and Persson, E. eds). Addis Ababa and Upsalla.

Russo, L. (2000) *Ethiopia - Non-Wood Forest Products and Forest Services*. FAO Forestry.

Sebsebe Demissew (2000). Menispermaceae. **In:** *Flora of Ethiopia* and *Eritrea Volume 2, Part one, Magnoliaceae to Flacourtiaceae,* pp. 42-53, (Edwards, S Mesfin Tadesse, Sebsebe Demissew and Hedberg, I. eds). Addis Ababa, Ethiopia; Uppsala, Sweden.

Sebsebe Demissew (2006). The Ethiopian Flora Project. **In:** *Taxonomy and Ecology of African Plants, their Conservation* and *Sustainable Use. Proceedings of the 17th AETFAT Congress*, Addis Ababaa, Ethiopia, pp. 21-25, (Ghazanfar, A. S. and Beentie, J. H. eds). Royal Botanic Gardens, Kew.

Sebsebe Demissew and Ermias Dagne, (2001). Basic and Applied Rearch on Medicinal Plants of Ethiopia. **In:** C*onservation* and *Sustainable Use of Medicinal Plants in Ethiopia*, pp. 29-33, (Medhin Zewdu and Abebe Demissie eds). Proceeding of the National Workshop on Biodiversity Conservation and Sustainable Use of medicinal plants in Ethiopia, 28 April-01 May1998, IBCR, Addis Ababa.

Sebsebe Demissew and Friis, I. (2009). Natural Vegetation of the Flora area. **In:** *Flora of Ethiopia and Eritrea* volume 8 pp. 27-32. (Hedeberg, I., Friis Ib. and Person, *E*. (eds). Addis Ababa, Uppsala.

SCBD (2009). Secretariat of the Convention on Biological Diversity. *The Convention on Biological Diversity Plant Conservation Report : A Review of Progress in Implementing the Global Strategy of Plant Conservation (GSPC*), Secretariat of the Convention on Biological Diversity, Montreal, QC H2Y 1N9, Canada, pp. 48.

Seyani, J. H. and Chikun, A. C. (1997). Botanic gardens of Malawi and their role in the conservation sustainable utilization of indigenous medicinal and agricultural plants. **In:** *Conservation* and *Utilization of Indigenous Medicinal Plants* and *Wild* Relatives *of Food* and *Crops*, pp. 35-40. UNESCO, Nairobi, Kenya.

Seyoum Getaneh (2009). Ethobotanical study of Medicinal Plants in Debre-Libanos Wereda, North Shewa Zone of Oromia Region, Ethiopia M.Sc. Thesis, Addis Abeba University, pp. 94.

Singhal, R. (2005). Medicinal Plants and Primary Health Care: The Role of Gender. SAGE,

London. *Journal of Health Management,* **7(2):** 277-293.

Sofowora, A. (1982). *Medicinal Plants and Traditional Medicine in Africa*. John Wiley and Sons, Ltd. New York, pp. 256.

Taffesse Mesfine and Mekonnen Lemma (2001). The role of traditional veterinary herbal medicine and its and its constraints in animal healthcare system in Ethiopia. **In:** *Conservation and Sustainable Use of Medicinal Plants in Ethiopia,* pp. 22-28, (Medhin Zewdu and Abebe Demissie, eds). Proceedings of the National Workshop on Biodiversity Conservation and Sustainable Use of Medicinal Plants in Ethiopia, 28 April-01 May 1998, IBCR, Addis Ababa.

Teferi Gedif and Hahn, H, -J. (2003). The Use of Medicinal Plants in Self-care in Rural Central Ethiopia. *Journal of Ethnopharmacology*, **87:** 155-161.

Teshale Sori, Merga Bekana, Girma Adugna and Ensermu Kelbessa (2004). Medicinal Plants in the Ethnoveterinary Practices of Borana Pastoralists, Southern Ethiopia**.** *Intern. J. Appl. Re. Vet. Med.* **2(3):** 220-225.

Tesfaye Seifu, Kaleab Asres and Tsige Gebre-Mariam (2006). Ethnobotanical and Ethnopharmaceutical Studies on Medicinal Plants of Chifra District, Afar Region, North Eastern Ethiopia. *Ethiop. Pharm. J.,* **24:** 41-58.

Tesfaye Awas and Zemede Asfaw (1999). An Ethnobotanical Study of the 'Bertha' People of the Benshangul Gumuz Region in Western Ethiopia. Program and Abstracts of the National Workshop. "Have We Valued Our Biodiversity?"

Tewolde Brehan Gebre Egziaber and Edwards, S. (1997). *Alliaceae*. **In:** *Flora of Ethiopia and Eritrea, Volume 6*: pp. 146-156, (Edwards, S., Sebsebe Demissew and Hedberg, I. (eds).The National Herbarium, Addis Ababa, Asmara and Uppsala.

Tigist Wondimu, Zemede Asfaw and Ensermu Kelbessa (2006). Eththnobotanical study of food plants around 'Dheeraa' Town Arsi, Ethiopia. *SINET: Ethiop. J. Sci*.,

Tilahun Teklehymanot, Mirutse Giday (2007). Ethnobotanical Study of Medicinal plants used by People in Zegie Peninsula, Northwestern Ethiopia. *Journal of Ethnobiology* and *Ethnomedicine,* **3(1):**12-17.

Tilahun Teklehymanot, Mirutse Giday, Girmay Medihin and Yalem Tsehay Mekonnen (2007). Knowledge and Use of Medicinal Plants by People around Debrelibanos Monastery in Ethiopia. *Journal of Ethnopharmacology and Ethnomedicine,* **111:** 271-283.

Tiwari, K. D. and Yadau, A. (2003). Ethnobotanical Investigation of Some Medicinal Plants Availed by Gond Tribe of Naoradehi Wild Life Sanctuary, Madhya Pradesh. *Anthropologist*, **5(3):** 201-202.

UNESCO (1996). *Culture* and *Health*, Orientation Texts –World Decade for Cultural Development 1988 – 1997, Document CLT/DEC/PRO – 1996, Paris, France, pp. 129.

UNESCO (1998). FIT/504-RAF-48 Terminal Report: *Promotion of Ethnobotany* and *the Sustainable Use of Plant Resources in Africa*, Paris, 1998, pp. 60.

UNAIDS (2002). *Ancient remedies, new disease: Involving traditional healers in increasing access to AIDS care* and *prevention In East Africa.* UNAIDS – Best Practice Collection, Geneva, Switzerland (http://www.unaids.org). Accessed on January 10, 2010.

Virapongse, A. and Picheansoonthon, C. (2005). Researching Traditional Medicine: A Review and Evaluation of Objectives and Methodologies. *The Journal of the Royal Institute of Thailand*. **30(4):** 958-968.

Vivero, J. L., Ensermu Kelbessa and Sebsebe Demessew (2006). Progress on the Red List of Ethiopia and Eritrea Conservation and Biogeography of Endemic of Taxa. **In:** *Taxonomy and ecology of African plants, their conservation and sustainable use*, pp. 761-778, (Ghazanfar, S. A. and Beentje, H. J. eds). Royal Botanic Gardens, Kew.

WHO (2000). World Health Organization General Guidelines for Methodologies on Research and Evaluation of Traditional Medicine, Geneva.

WHO (2002). Traditional Medicines Strategy *2002-2005*. World Health Organization, Geneva: http://www.who.int/medicines/organization/trm/orgtrmmain.shtml. Accessed on November 15, 2009.

WHO (2003). African Traditional Medicine: *Our Culture, Our Future. African Health Monitor,* Volume 4(1) A magazine of WHO Regional Office for Africa.

WHO (2006). Traditional medicine promotion WHO's efforts, World Health Organization *Avenue Appia 20 1211 Geneva 27, Switzerland*: *http://www.who.int* TECH MONITOR Nov-Dec 2006). Accessed on December 10, 2009.

Zemede Asfaw (1997). A survey of Indigenous Food Crops, their Preparations and Homegardens in Ethiopia. United Nations Institute for Natural Resources in Africa. Series No. B6, ICIPE, Science Press, Nairobi.

Zemede Asfaw (2001). The role of home gardens in production and conservation of medicinal plants. **In:** *Conservation* and *Sustainable Use of Medicinal Plants in* Ethiopia. Proceedings of the National Workshop on Biodiversity conservation and Sustainable Use of Medicinal Plants in Ethiopia, pp. 76-91, (Medhin Zewdu and Abebe Demissie eds). IBCR, Addis Ababa, Ethiopia.

Appendix 1 List of Informants in the Study Area (Key to abbreviations: No-no education/illiterate, 1, 2, 3… education level (grade), and church-church/traditional education).

No.	Name	Sex	Age	Marital status	Education Status	Residence kebele	Occupation
1	Afar Molla	M	41	Married	No	Arga-Didim	Farming
2	Gorebet Endashaw	F	28	Married	No	Arga Didim	Housewife
3	Alebachew Fekadu	M	30	Single	5	Arga Didim	Farming
4	Dessalegn Moges	M	35	Married	12 +1	Arga Didim	Teaching
5	Kassa Adbaru	M	50	Married	No	Arga Didim	Farming
6	Getu Seyoum**	M	60	Married	No	Aringo	Farming
7	Tamyalew Alene	M	30	Married	No	Aringo	Farming
8	Alene Birru**	M	92	Married	No	Aringo	Farming
9	Kindu Mequaninnit	M	50	Married	No	Aringo	Farming
10	Baye Tezera**	M	40	Married	No	Aringo	Farming
11	Melashu Teshome	M	42	Married	6	Atta	Farming
12	Mergeta Lisanework	M	41	Married	Church	Atta	Merigeta
13	Adane Biyargie	M	38	Married	No	Atta	Farming
14	Fikadie Habtie	M	28	Married	6	Atta	Farming
15	Getie Tirtie	M	38	Married	No	Atta	Farming
16	Temsgen Kibret	M	24	Single	9	Awzet-Azawur	Student
17	Misa Desalegn	M	25	Married	7	Awzet-Azawur	Student
18	Gebeya Tsega	F	37	Married	No	Awzet-Azawur	House wife
19	Misganaw Bezabih**	M	60	Married	No	Awzet-Azawur	Farming
20	Zenebe Bayabil	M	36	Married	No	Awzet-Azawur	Farming
21	Kassaw Tadesse	M	53	Married	No	Ayvaniva	Farming
22	Tazeb Abebaw**	F	25	Single	11	Ayvaniva	Student
23	Baylie Wondiye	M	63	Married	No	Ayvaniva	Farming
24	Kelebe Workineh	M	28	Single	No	Ayvaniva	Farming
25	Enyew Yigzaw	M	40	Married	No	Ayvaniva	Farming
26	Demissie Walelign	M	80	Married	No	Farta-Kusquam	Farming
27	Fentanesh Abebaw	F	34	Married	No	Fart-Kusquam	Farming
28	Dessie Yigizaw	M	45	Married	No	Farta-Kusquam	Farming
29	Mantegbosh Chekole	F	20	Single	10	Farta-Kusquam	Student
30	Amare Worku**	M	40	Married	Church	Farta-Kusquam	Priest
31	Melkie Ager	M	36	Married	5	Gassay	Farming
32	Aregash Ewnetie**	F	55	Divorced	No	Gassay	Farming

No.	Name	Sex	Age	Marital status	Education Status	Residence kebele	Occupation
33	Awoke Tadesse	M	25	Single	10	Gassay	Student
34	Tibebu Yimer**	M	55	Married	Church	Gassay	Merigeta
35	Asnakech Mekonnen	F	57	Married	No	Gassay	Housewife
36	Wondale Abebe	M	42	Married	No	Gena-Mechawocha	Farming
37	Molla Golemta**	M	68	Married	Church	Gena-Mechawocha	Farming
38	Yiheyis Abebaw	M	42	Married	Church	Gena-Mechawocha	Mergeta
39	Worku Fenta	M	50	Married	No	Gena-Mechawocha	Farming
40	Tsegaye Abebe	M	40	Married	No	Gena-Mechawocha	Farming
41	Anley Alemu	M	82	Married	No	Girbi	Farming
42	Mihret Tiruneh	M	35	Single	8	Girbi	Student
43	Demek Andargie	F	27	Married	No	Girbi	Housewife
44	Wondmu Getachew	M	40	Married	No	Girbi	Farming
45	Nibret Alemayehu**	F	31	Married	4	Girbi	Housewife
46	Bikis Mekonnen	M	60	Married	No	Kimir-Dingay	Farming
47	Bayeh Zelalem**	M	54	Married	Church	Kimir-Dingay	Merigeta
48	Merigeta **	M	45	Church	Church	Kimir-Dingay	Merigeta
49	Yemata Kebede	F	40	Married	No	Kimir-Dingay	Housewife
50	Asnakech Demissie	F	44	Married	No	Kimir-Dingay	Housewife
51	Guadie Alemu	M	33	Married	4	Kolay-Dengors	Farming
52	Wassie Adal Chekole	M	86	Married	No	Kolay-Dengors	Farming
53	Alefu Areaya	M	30	Married	5	Kolay-Dengors	Farming
54	Destaw Endale	M	30	Married	No	Kolay-Dengors	Farming
55	Molla Aragaw	M	40	Married	No	Kolay-Dengors	Farming
56	Baye Mesfin	M	77	Married	No	Mahidere- Mariam	Farming
57	Belete Tsegaye	M	34	Married	No	Mahidere -Mariam	Farming
58	Chalachew Amogne	M	28	Married	6	Mahidere-Mariam	Farming
59	Destaw Alem	M	24	Single	5	Mahidere-Mariam	Student
60	Agegnew Abera	F	30	Married	No	Mahidere-Mariam	Housewife
61	Gedefaw Bishaw	M	22	Single	8	Megendi	Student
62	Berie Honne	F	20	Single	6	Megendi	Student
63	Addis Fekadie	F	26	Married	No	Megendi	Housewife
64	Walle Asfaw	M	82	Married	No	Megendi	Farming
65	Mengistu Aragie	M	23	Single	9	Megendi	Students
66	Tsehay Mazengiya**	M	40	Married	6	Meskel-Tsiyon	Farming
67	Chanyalew Alemu	M	35	Married	5	Meskel-Tsiyon	Farming

No.	Name	Sex	Age	Marital status	Education Status	Residence kebele	Occupation
68	Masresha Asaye**	M	52	Married	Church	Meskel-Tsiyon	Priest
69	Abebu Kassie**	F	38	Married	No	Meskel-Tsiyon	Housewife
70	Dessie Zerihun	M	43	Married	No	Meskel-Tsiyon	Farming
71	Desalegn Gebrie	M	65	Married	No	Mokish	Farming
72	Fentanesh Alemu	F	25	Single	12+1	Mokish	Students
73	Asres Desalegn	F	25	Single	10	Mokish	Student
74	Wondie yalew	M	70	Married	No	Mokish	Farming
75	Dagnaw Ejigu**	M	62	Married	Church	Mokish	Merigeta
76	Misganew Getnet	M	40	Married	No	Qualha	Farming
77	Melash Kassa	M	37	Married	No	Qualha	Farming
78	Agegne Meshesha	M	36	Married	No	Qualha	Farming
79	Belete Mebrie	M	40	Married	No	Qualha	Farming
80	Anchinalu Wondale	F	45	Married	No	Qualha	Housewife
81	Tadela Ejigu	F	28	Married	4	Sahirna-Kisnat	Housewife
82	Endawok Kassie**	F	55	Divorced	No	Sahirna-Kisnat	Farming
83	Asmare Abebe **	M	35	Married	7	Sahirna-Kisnat	Farming
84	Lakew Agegne**	M	72	Married	No	Sahirna-Kisnat	Farming
85	Fitfitie Tamene	F	50	Married	No	Sahirna-Kisnat	Housewife
86	Azmeraw Kassie	M	37	Married	No	KentonanaTerraroch	Farming
87	Yirdaw Alemayehu	M	35	Married	No	Terraroch	Farming
88	Dasash Geremew **	F	30	Single	8	Terraroch	Farming
89	Belaynesh Alemu	F	38	Married	No	Terraroch	Housewife
90	Admas Belay **	M	52	Married	Church	Terraroch	Priest
91	Fikadie Semaw**	M	45	Married	Church	Werkien	Merigeta
92	Kassaw Biadgu	M	40	Married	No	Werkien	Farming
93	Workie Birhan	F	45	Married	No	Werkien	Housewife
94	Engidaw Tarekegn**	M	50	Married	No	Werkien	Farming
95	Abeje Bogale**	M	55	Married	No	Werkien	Farming
96	Berrie Ayele	M	48	Married	4	Zimha	Farming
97	Melese Fentie	M	50	Married	4	Zimha	Farming
98	Mihret Nigeru	M	35	Married	No	Zimha	Farming
99	Chekole Abate	M	58	Married	No	Zimha	Farming
100	Amsal Asmaru**	F	50	Married	No	Zimha	Housewife

--Key informants

"Merigeta"--refers to highly traditionally skilled man (in church education)

Appendix 2 List of Medicinal Plants in the Study Area including botanical names, family, local names, Hb-habit (T-tree, S-shrub, H-herb, Cl-climber) and Coll. No-collection number, which were collected from 20 representative kebeles of the study site.

Scientific Name	Family	Local Name	Hb	Coll. No.
Acacia negrii Pic. Serm.	Fabaceae	Girar	T	NA 116
Acanthus sennii Chiov.	Acanthaceae	Koshashila	S	NA 111
Achyranthes aspera Lam.	Amaranthaceae	Telenj	H	NA 76
Acmella caulirhiza Del.	Asteraceae	Gutcha abeba	H	NA 127
Agave americana L.	Agavaceae	Chiret	S	NA 46
Allium sativum L.	Alliaceae	Nech shinkurt	H	NA 7
Aloe macrocarpa Tod.	Aloaceae	Ret/eret	H	NA 120
Arisaema schimperianum Schott.	Araceae	Amoch	H	NA 131
Artemisia afra Jack. ex Willd.	Asteraceae	Chikugn	H	NA 27
Asparagus africanus Lam.	Asparagaceae	Yesiet kest	S	NA 73
Bersama abyssinica Fresen.	Melianthaceae	Azamir	S	NA 28
Brassica carinata A. Br.	Brassicaceae	*Gomen*	*H*	NA 70
Brucea antidysenterica Swiss Chard.	Simarobaceae	Waginos/Abalo	S	NA 21
Buddleja polystachya Fresen.	Loganiaceae	Anfar	S	NA 126
*Calpurnia aurea (*Ait.) Benth.	Fabaceae	Zikita	S	NA 16
Capparis tomentosa Lam.	Capparidaceae	Gimero	S	NA 15
Capsicum annuum L.	Solanaceae	Karia/keto	H	NA 22
Carduus schimperi Sch. Bip. ex A. Rich.	Asteraceae	Yeahiya koshashilie	H	NA 4
Carissa spinarum L.	Apocynaceae	Agam	S	NA 12
Cassiporea malosana (Baker). Alaston.	Rhizophoraceae	Tikur enchet	T	NA 59
Catha edulis (Vahl) Forssk. ex Endl.	Celastraceae	Chat	S	NA 23
Clausena anisata Willd. Hook.f. ex Benth.	Rutaceae	Limich	S	NA 102
Clematis simensis Fresen.	Ranunclaceae	Azo areg	Cl	NA 41
Clerodendrum myricoides (Hochst.) Vatke	Lamiaceae	Misrich	S	NA 132
Clutia lanceolata Forssk subsp. lanceolata	Euphorbiaceae	Fiyelefej	S	NA 83
Coffea arabica L.	Rubiaceae	Bunna	S	NA 90
Combretum molle R. Br. ex G. Don.	Combretaceae	Abalo	T	NA 65
Cordia africana Lam.	Boraginaceae	Wanza	T	NA 122
Coriandrum sativum L.	Apiaceae	Dinbilal	H	NA 45
Corrigiola capensis subsp. *africana* (Turrill) Chaudrhi	Molluginaceae	Yebeg lat	H	NA 105

Scientific Name	Family	Local Name	Hb	Coll. No.
Crinum abyssinicum (Hochst ex A. Rich) I. Nordal	Amaryllidaceae	Yejib shinkurt	H	NA 115
Croton macrostachyus Del.	Ephorbiaceae	Misana	T	NA 17
Cucumis ficifolius A. Rich.	Cucurbitaceae	Yemidir enbuay	Cl	NA 66
Cynoglossum coeruleum (Hochst. ex A.Rich.) DC in DC subsp. *coeruleum*	Boraginaceae	Chegogit	H	NA 9
Datura stramonium L.	Solanaceae	Astenagir	H	NA 3
Dipsacus pinnatifidus Steud. ex A. Rich.	Dipsacaceae	Keleh zaf	H	NA 64
Discopodium penninervum Hochst.	Solanaceae	Almit	T	NA 107
Dodonaea angustifolia L.f.	Sapindaceae	Kitkita	S	NA 86
Dovyalis abyssinica (A. Rich.) Warb.	Flacourtiaceae	Koshim	S	NA 110
Dregea abyssinica (Hochst.) K. Schum.	Asclepiadaceae	Moider hareg	Cl	NA134
Eleusine coracana (L.) Gaertn.	Poaceae	Dagussa	H	NA 129
Embelia schimperi Vatke	Myrsinaceae	Enkoko	S	NA 42
Eragrostis tef L.	Poaceae	Tef	H	NA 39
Erica arborea L.	Ericaceae	Asta	S	NA 94
Erythrina brucei Schweinf.	Fabaceae	Korch	T	NA 133
Eucalyptus globulus Labill.	Myrtaceae	Nechbahirzaf	T	NA 40
Euclea racemosa Murr. subsp. schimperi. (A. DC.) White.	Ebenaceae	Dedeho	S	NA 95
Euphorbia abyssinica Gmel	Euphorbiaceae	Kulkual	T	NA 5
Euphorbia schimperiana Scheele	Euphorbiaceae	Antirfa	H	NA 92
Ficus carica L.	Moraceae	Beles	S	NA 58
Ficus sur Forssk.	Moraceae	Shola	T	NA 106
Ficus vasta Forssk.	Moraceae	Warka	T	NA 84
Foeniculum vulgare Miller	Apiaceae	Ensilal	H	NA 49
Girardinia bullosa (Steud.) Wedd.	Urticaceae	Sama	H	NA53
Gnidia glauca Fresen.	Thymelaceae	Awura	S	NA 79
Grewia ferruginea Hochst. ex A. Rich.	Tiliaceae	Lenquata	S	NA 130
Guizotia abyssinica (L.f.) Cass.	Asteraceae	Nug	H	NA 19
Guizotia schimperi Sch. Bip.ex Walp.	Asteraceae	Mech	H	NA 47
Hagenia abyssinica (Bruce) J. F. Gmel.	Rosaceae	Koso	T	NA 74
Haplocarpa schimperi (Sch. Bip.) Beauv.	Asteraceae	Getin	H	NA 100
Hordeum vulgare L.	Poaceae	Tikur gebis	H	NA 114
Hypericum revolutum Vahl	Hypericaceae	Amja	S	NA 51
Hypoestes triflora (Forssk.) Roem & Schult.	Acanthaceae	----------	H	NA 128
Impatiens tinctoria A. Rich.	Balsaminaceae	Ensosla	H	NA 88

Scientific Name	Family	Local Name	Hb	Coll. No.
Inula confertiflora A. Rich.	Asteraceae	Woynagift	S	NA 50
Juniperus procera Hochst ex. Engl.	Cuppressaceae	Tid	T	NA 62
Jusminum grandiflorum L.	Oleaceae	Tenbelel	Cl	NA 97
Justicia schimperiana (Hochst. ex Nees) T. Anders.	Acanthaceae	Smitha	S	NA 8
Kalanchoe petitiana A. Rich.	Crassulaceae	Endahula	H	NA 43
Lagenaria siceraria (Mollina) Standl.	Cucurbitaceae	Qil	Cl	NA 72
*Laggera tomentosa (*Sch.Bip. ex A. Rich.) Oliv. & Hiern	Asteraceae	Keskeso/Shetie	H	NA 30
Leonotis ocimifolia (Burm. f.) A. Iwarsson.	Lamiaceae	Ferszeng	H	NA 89
Lepidium sativum L.	Brassicaceae	Feto	H	NA 71
Linum usitatissimum L	Lineaceae	Telba	H	NA 25
Lippia adoensis Hochst ex. Walp.	Lamiaceae	Kessie	H	NA 31
Lobelia rhynchopetalum (Hochst.) Hemsl.	Lobeliaceae	Jebera	H	NA 93
Lolium temulentum L.	Poaceae	Enkirdad	H	NA 24
Lupinus albus L.	Fabaceae	Gibto	H	NA 2
Lycopersicon esculentum Mill.	Solanaceae	Timatim	H	NA 121
Maesa lanceolata Forssk.	Myrsinaceae	Kurabeba	S	NA 11
Malva verticillata L.	Malvaceae	Tult	H	NA 78
Maytenus arbutifolia (A. Rich.) Wilcz.	Celastraceae	Atat	S	NA 108
Millettia ferruginea (Hochst.) Bak.	Fabaceae	Birbira	T	NA 60
Melia azedarach L.	Meliaceae	Nim	T	NA 119
Momordica foetida Schumach & Thonn.	Cucurbitaceae	Kur aba/Nech hareg	Cl	NA 32
Myrtus communis L.	Myrtaceae	Ades	S	NA 96
Nicotiana tabacum L.	Solanaceae	Tinbaho	S	NA 36
Ocimum gratissimum L.	Lamiaceae	Damakessie	H	NA 98
Myrica salicifolia A. Rich.	Myricaceae	Shinet	T	NA 136
Olea europaea L. subsp. *cuspidata (*Wall. ex G. Don) Cif.	Oleaceae	Woira	T	NA 67
Orobanche minor Smith.	Orobanchaceae	Jibo/Yejib dula	H	NA 135
Osyris quadripartita Decn.	Santalaceae	Keret	S	NA 57
Otostegia tomentosa A. Rich.	Lamiaceae	Tunjut	S	NA 55
*Passiflora molisssima (*Kunth) Baily	Passifloraceae	----------	Cl	NA 124
Periploca linearifolia Quant. Dill. & Rich.	Asclepiadaceae	Moider	Cl	NA 81
Phagnalon schweinfurthii Sch. Bip. ex Schweinf.	Astraceae	Nibwoded	H	NA 63
Phytolacca dodecandra L'Herit.	Phytolaccaceae	Mehan endod	S	NA 38

Scientific Name	**Family**	**Local Name**	**Hb**	**Coll. No.**
Plantago lanceolata L.	Plantaginaceae	Wonberet/Esat adrik	H	NA 54
Plectocephalus variance (A. Rich) C. Jeffrey. ex Cufod.	Astraceae	Engochye	H	NA 80
Plumbago zeylanica L.	Plumbaceae	Amera	H	NA 37
Premna schimperi Engl.	Lamiaceae	Chocho	T	NA 14
Prunus africana (Hook. f.) Kalkam.	Rosaceae	Homma	T	NA 109
Prunus persica (L.) Batsch	Rosaceae	Kok	T	NA 99
Psidium guajava L	Myrtaceae	Zeytun	S	NA 18
Punica granatum L.	Punicaceae	Roman	S	NA 123
Ranunculus oligocarpus Hochst. ex A. Rich.	Ranunculaceae	Tinkusht	H	NA 52
Rhamnus prinordes L'Herit	Rhamnaceae	Gesho	S	NA 29
Ricinus communis L.	Euphorbiaceae	Chakima/Gulo	**S**	NA 101
Rumex abyssinicus Jacq.	Polygonaceae	Mekmoko	H	NA 10
Rumex nepalensis Spreng.	Polygonaceae	Yebere milas	H	NA 35
Rumex nervosus Vahl	Polygonaceae	Enbuacho	S	NA 68
Ruta chalepensis L.	Rutaceae	Tenadam	H	NA 44
Saccharum officinarum L.	Poaceae	Shenkora	H	NA 69
Salix mucronata Thunb. (S. *subserrata* Willd.)	Salicaceae	Haya	T	NA 103
Schefflera abyssinica (Hochst. ex A. Rich.) Harms.	Araliaceae	Getem	T	NA 13
Schinus molle L.	Anacardiaceae	Kundoberbere	T	NA 75
Sida schimperiana Hochst.ex A. Rich.	Malavaceae	Chifrig	S	NA 20
Solanecio gigas Vatke.	Astraceae	Libagba	S	NA 34
Solanum adoense Hochst ex A. Rich.	Solanaceae	Zirch enbuay	S	NA 6
Solanum incanum L.	Solanaceae	Enbuay	S	NA 85
Solanum marginatum L.f.	Solanaceae	Geber enbuay	S	NA 48
Solanum tuberosum L.	Solanaceae	Dinch	H	NA 112
Sorghum bicolor (L.) Moench.	Poaceae	Zengada	H	NA 82
Stephania abyssinica (Dill & Rich). Walp.	Menispermaceae	Shimitiritira	Cl	NA 1
Syzygium guineense (Willd.) DC.	Myrtaceae	Dokima	T	NA 87
Teclea nobilis Del.	Rutaceae	Sihil	S	NA 56
Tephrosia vogelii Hook. F.	Fabaceae	---------	T	NA 125
Thalictrum rhynchocarpum Dill. & A. Rich.	Ranunculaceae	Sire bizu	H	NA 61
Thymus schimperi Ronniger	Lamiaceae	Tosign	H	NA 91
Urtica simensis Steudel	Urticaceae	sama	H	NA 104
Verbasicum siniaticum Benth.	Sclrophulariaceae	Kutitina	S	NA 26

Scientific Name	Family	Local Name	Hb	Coll. No.
Verbena officinalis L.	Verbenaceae	Atuch	H	NA 117
Vernonia amygdalina Del.	Astraceae	Girawa	S	NA 118
Vernonia myriantha Hook.f.	Astraceae	Kotkoto	S	NA 33
Vicia fava L.	Fabaceae	Bakela	H	NA 113
Zehneria scabra (Linn. f.) Sondll.	Cucutbitaceae	Hareg resa	Cl	NA 77
Ekebergia capensis Sparrm.	Meliaceae	Lol	T	**NA 137**
Olinia rochetiana A. Juss.	Oliniaceae	Tifie	T	**NA 138**
Myrsine africana L.	Myrsinaceae	Kechem	S	**NA 139**
Nuxia congesta R.Br. ex Fresen.	Loganiaceae	Atquar	S	**NA 140**
Arundinaria alpia K. Schum	Poaceae	Kerkeha	H	**NA 141**
Albizia gummifera (I.F.Gmel.) C.A.Sm.	Fabaceae	Sessa	T	**NA 142**
Dombeya torrid subsp. (Torrid T.F.Gmel) Radlk	Sterculiaceae	Wulkifa	T	**NA 143**
Rosa abyssinica Lindley	Rosaceae	Kega	S	**NA 144**
Apodytes dimidiate E. Mey.ex. Arn.	Icacinaceae	Donga	T	**NA 145**
Rhus glutinosa A. Rich. subsp. *glutinosa* A. Rich.	Anacardiaceae	Embis	T	**NA 146**

- **Collection number starting from NA 137 to NA 146 was not collected for medicinal purposes but for plant community type.**

Appendix 3 Geographical Location, Altitude, Abundance (common, rare, very rare) and Habitat of Each Medicinal Plant Species in the Study Area. (Key: Hs-habitat of species, Nh-natural habitat, H-homegarden, Nh/H-natural habitat & homegarden). Abundence of each species is based on perception of healers & personal observation.

N.B: The geographical location indicates the specific area where each species collected.

Botanical name of species	**Geographical location**	**Altitude**	**Abundance of species**	**Hs**
Acacia negrii Pic. Serm.	13^0 09`43 N, $039^0$ 15`59 E	2,773 m	Common	Nh/H
Acanthus sennii Chiov.	11^0 3'.72 N, 037^0 45`68 E	2, 506 m	Common	Nh
Achyranthes aspera Lam.	11^0 47`78 N, $038^0$ 08`37 E	2, 804 m	Common	Nh
Acmella caulirhiza Del.	11^0 45`98 N, $037^0$ 45`68 E	2, 006 m	Very rare	Nh
Agave americana L.	11^0 50`19 N, $037^0$ 57`28 E	2, 340 m	Common	Nh/H
Allium sativum L.	$11^0$47`57 N, $038^0$ 08`40 E	2, 805 m	Common	H
Aloe macrocarpa Tod.	11^0 56`84 N, $037^0$ 59`34 E	2, 135 m	Very rare	Nh
Arisaema schimperianum Schott.	13^0 09`25 N, $039^0$ 16`19 E	2, 783 m	Common	Nh
Artemisia afra Jacq. ex Willd.	11^0 47`43 N, $038^0$ 09`28 E	2, 858 m	Very rare	Nh
Asparagus africanus Lam.	11^0 55`75 N, $037^0$ 57`05 E	2, 650 m	Rare	Nh
Bersama abyssinica Fresen.	11^0 43`65 N, $037^0$ 52`91 E	2, 117 m	Common	Nh
Brassica carinata A. Br.	11^0 51`79 N, $037^0$ 59`79 E	2, 629 m	Common	H
Brucea antidysenterica Swiss Chard.	11^0 52`31 N, $037^0$ 58`11E	2, 656 m	Common	Nh
Buddleja polystachya Fresen.	11^0 55`35 N, $037^0$ 56`47 E	2, 218 m	Rare	Nh/H
*Calpurnia aurea (*Ait.) Benth.	11^0 55`02 N, $037^0$ 57`01 E	2, 318 m	Common	Nh/H
Capparis tomentosa Lame.	11^0 55`35 N, $037^0$ 56`47 E	2, 231 m	Common	Nh/H
Capsicum annuum L.	11^0 52`56 N, $037^0$ 56`20 E	2, 450 m	Very rare	H
Cardus shimperi Sch. Bip. ex A. Rich.	11^0 51`79 N, $037^0$ 59`79 E	2, 629 m	Common	Nh
Carissa spinarum L.	11^0 55`02 N, $037^0$ 57`01 E	2, 318 m	Common	Nh
Cassiporea malosana (Baker). Alaston.	11^0 52`35 N, $037^0$ 57`17 E	2, 500 m	Very rare	Nh
Catha edulis (Vahl) Forssk. ex Endl.	11^0 52`57 N, $037^0$ 56`31 E	2, 483 m	Very rare	H
Clausena anisata Willd. Hook.f. ex Benth.	11^0 55`33 N, $037^0$ 56`47 E	2, 225 m	Common	Nh
Clematis simensis Fresen.	11^0 52`35 N, $037^0$ 57`17 E	2, 500 m	Common	Nh
Clerodendrum myricoides (Hochst.) Vatke	11^0 55`02 N, $037^0$ 57`01 E	2, 318 m	Common	Nh
Clutia lanceolata	11^0 50`50 N, $038^0$ 00`22 E	2, 829 m	Rare	Nh
Coffea arabica L.	11^0 45`60 N, $037^0$ 54`46 E	1, 970 m	Very rare	H

Botanical name of species	Geographical location	Altitude	Abundance of species	Hs
Combretum molle R. Br. ex G. Don.	11^0 56`84 N, $037^0$ 09`34 E	2, 135 m	Common	Nh
Cordia africana Lam.	11^0 55`75 N, $037^0$ 57`05 E	2, 650 m	Rare	Nh/H
Coriandrum sativum L.	11^0 52`60 N, $037^0$ 56`79 E	2, 512 m	Rare	H
Corrigiola capensis subsp. *africana* Auth	110 54`82 N, 0370 57‘ 02 E	2,346 m	Common	Nh
Crinum abyssinicum Hochst ex A. Rich. J. Nordal	11^0 51`06 N, $038^0$ 14`51 E	2, 393 m	Very rare	Nh
Croton macrostachyus Del.	11^0 55`64 N, $037^0$ 57`05 E	2, 328 m	Common	Nh/H
Cucumis ficifolius A. Rich.	11^0 56`84 N, $037^0$ 59`34 E	2,135 m	Very rare	Nh
Cynoglossum coeruleum (Hochst. A. Rich.) DC	11^0 47`74 N, $038^0$ 06`28 E	2, 819 m	Common	Nh
Datura stramonium L.	11^0 47`74 N, $038^0$ 06`28 E	2, 819 m	Common	Nh/H
Dipsacus pinnati fdus Steaud. Ex A. Rich.	13^0 08`64 N, $039^0$ 16`12 E	2, 831 m	Rare	Nh
Discopodium penninervum Hochst.	11^0 48`89 N, $038^0$ 14`01 E	2, 992 m	Common	Nh/H
Dodonaea angustifolia L.f.	11^0 55`64 N, $037^0$ 56`95 E	2, 309 m	Common	Nh
Dovyalis abyssinica (A. Rich.) Warb.	11^0 56`84 N, $037^0$ 59`34 E	2, 315 m	Common	Nh
Dregea abyssinica (Hochst.) K. Schum.	11^0 48`34 N, $037^0$ 56`29 E	2, 109 m	Rare	Nh
Eleusine coracana (L.) Gaertn.	11^0 45`97 N, $037^0$ 55`83 E	2, 310 m	Common	H
Embelia schimperi Vatke	11^0 51`16 N, $037^0$ 59`21 E	2, 600 m	Common	Nh
Eragrostis tef L.	11^0 45`97 N, $037^0$ 55`83 E	2, 310 m	Common	H
Erica arborea L.	11^0 46`89 N, $038^0$ 13`42 E	3, 387 m	Rare	Nh
Erythrina brucei Schweinf.	$11^0$50`74 N, $037^0$58`48 E	2, 491 m	Rare	Nh/H
Eucalyptus globules Labill.	11^0 47`79 N, $038^0$ 08`31 E	2, 805 m	Common	H
Euclea racemosa (DC) Dandy	11^0 44`51 N, $037^0$ 53`89 E	2, 024 m	Common	Nh
Euphorbia abyssinica Gmel	11^0 3’.72 N, 037^0 45`68 E	2, 506 m	Common	Nh
Euphorbia schimperiana Scheele	11^0 47`03 N, $038^0$ 13`50 E	3, 209 m	Rare	Nh
Ficus carica L.	11^0 50`19 N, $037^0$ 25`28 E	2, 411 m	Very rare	Nh
Ficus sur Forssk.	11^0 45`97 N, 0370 55`83 E	2, 310 m	Rare	Nh
Ficus vasta Forssk.	11^0 44`51 N, $037^0$ 53`89 E	2, 024 m	Very rare	Nh
Foeniculum vulgare Miller.	11^0 45`97 N, $037^0$ 55`83 E	2, 310 m	Common	H
Gnidia glauca Fersen	11^0 50`74 N, $037^0$ 58`48 E	2, 328 m	common	Nh
Grewia ferruginea Hochst. ex A. Rich.	11^0 44`51 N, $037^0$ 53`89 E	2, 024 m	Common	Nh

Botanical name of species	Geographical location	Altitude	Abundance of species	Hs
Guizotia abyssinica (L.f.) Cass.	11^0 52`60 N, $037^0$ 56`79 E	2, 512 m	Common	H
Guizotia schimperi Sch. Bip.ex Walp.	11^0 52`60N, 037 52`60 E	2, 647 m	Common	Nh
Hagenia abyssinica (Bruce) J. F. Gmenh.	11^0 47`64 N, $038^0$ 08`48 E	2, 700 m	Very rare	H
Haplocarpa schimperi (Sch. Bip.) Beauv.	11^0 51`77 N, $037^0$ 59`72 E	2, 637 m	Common	Nh
Hordum vulgare L	11^0 47`65 N, 038 13`56 E	3, 209 m	Common	H
Hypericum revolutum	11^0 50`51 N, 038^0 00.21 E	2, 822 m	Rare	Nh
Hypoestes triflora (Forssk.) Roem & Schult.	11^0 50`74 N, $037^0$ 58`48 E	2, 419 m	Common	Nh
Impatiens hochstetteri Warb	11^0 51`77 N, $037^0$ 59`72 E	2, 637 m	Very rare	H
Inula confertiflora A. Rich.	11^0 54`80 N, $037^0$ 56`59 E	2, 361 m	Rare	Nh
Juniperus procera Hochst ex. Engl.	11^0 47`64 N, $038^0$ 08`48 E	2, 700 m	Common	H
Jusminum grandiflorum L.	11^0 51`06 N, $038^0$ 14`51 E	2, 393 m	Very rare	Nh
Justicia schimperiana (Hochst. ex Nees) T. Anders	$11^0$52`35N, $037^0$ 57`17 E	2, 500 m	Common	H
Kalanchoe petitiana A. Rich.	11^0 54`82 N, $037^0$ 57`02 E	2,346 m	Very rare	Nh
Lagenaria siceraria (Mollina) Standl.	11^0 50`28 N, $037^0$ 50`73 E	2, 360 m	Rare	H
Laggera tomentosa Sch. Bip. ex A. Rich.	11^0 52`35 N, $037^0$ 56`70 E	2, 500 m	Common	Nh
Leonotis ocimifolia (Burm F.) A. Iwarsson.	11^0 47`18 N, $038^0$ 05`83 E	2, 839 m	Rare	Nh
Lepidium sativum L.	11^0 47`64 N, $037^0$ 56`79 E	2, 512 m	Rare	H
Linum usitatissimum L	11^0 51`49 N, 038^0, 0085 E	2, 651 m	Common	H
Lippia adoensis Hochst ex. Walp.	11^0 47'64 N, 038^0 08'48 E	2, 700 m	Rare	Nh
Lobelia rhynchopetalum (Hochst) Hemsl.	$13^0$39`63 N, $040^0$ 61`46 E	3, 850 m	Rare	Nh
Lolium temellentum L.	11^0 47`21 N, $038^0$ 05`96 E	2, 800 m	Common	H
Lupinus albus L.	11^0 47`18 N, $038^0$ 05`83 E	2, 839 m	Common	H
Lycopersicon esculentum Mill	11^0 52`58 N, $037^0$ 56`71 E	2, 490 m	Rare	H
Maesa lanceolata Forssk.	11^0 52`30 N, $037^0$ 59`48 E	2, 590 m	Common	Nh
Malva verticillata L.	11^0 47`11 N, $038^0$ 09`49 E	2, 839 m	Common	Nh
Maytenus arbutifolia (A. Rich) Wilcz.	$11^0$52`35N, $037^0$ 57`17 E	2, 500 m	Common	Nh

Botanical name of species	Geographical location	Altitude	Abundance of species	Hs
Melia azedarach L.	11^0 52`30 N, $037^0$ 59`48 E	2, 590 m	Very rare	H
Millettia ferruginea (Hochst.) Bak.	11^0 50`23 N, $037^0$ 56`81 E	2, 427 m	Very rare	Nh/H
Momordica foetida Schumach & Thonn.	11^0 47`76 N, $038^0$ 09`03 E	2, 804 m	Common	Nh/H
Myrica salicifolia A. Rich.	11^0 51`06 N, $038^0$ 14`51 E	2, 393 m	Common	Nh
Myrtus communis L.	11^0 51`30 N, $038^0$ 14`56 E	2, 320 m	Very rare	H
Nicotiana tabacum L.	11^0 47`26 N, $037^0$ 58`90 E	2, 185 m	Very rare	H
Ocimum gratissimum L	11^0 50`50 N, $038^0$ 00`21 E	2, 836 m.	Very rare	H
Olea europaea L. subsp. *cuspidata (*Wall. ex G. Don) Cif.	11^0 43`87 N, $037^0$ 52`58 E	2, 110 m	Rare	Nh/H
Orobanche minor Smith.	11^0 52`58 N, 037^0 56'71 E	2, 490 m	Common	Nh
Osyris quadripartite Decn.	11^0 43`87 N, $037^0$ 52`58 E	2, 110 m	Common	Nh
Otostegia tomentosa A. Rich.	11^0 45`98 N, $037^0$ 45`71 E	2, 082 m	Rare	Nh/H
Passiflora molisssima (Kunth) Baily	13^0 01`43 N, $039^0$ 19`53 E	2, 690 m	Very rare	H
Periploca linearifolia Quant. Dill. & Rich.	11^0 48`35 N, $038^0$ 07`24 E	2, 806 m	Rare	Nh
Phagnalon schweinfurthii Sch. Bip. exSchweinf.	13^0 37`81 N, $04^0$ 63`28 E	2, 831 m	Rare	Nh
Phytolacca dodecandra L'Herit.	11^0 51`45 N, $038^0$ 01`22 E	2, 660 m	Common	Nh/H
Plantago lanceolata L.	11^0 43`87 N, $037^0$ 52`58 E	2, 110 m	Common	Nh
Plectocephalus variance (A. Rich) C. Jeffrey. ex Cufod.	11^0 50`40 N, 038^0 0019 E	2, 830 m	Rare	Nh
Plumbago zeylanica L.	11^0 43`87 N, $037^0$ 52`58 E	2, 110 m	Rare	Nh
Premna schimperi Engl.	11^0 51`06 N $038^0$ 14`51 E	2, 394 m	Common	Nh
Prunus africanus (Hook. f.) Kalkam	11^0 50`20 N, $037^0$ 56`54 E	2, 525 m	Very rare	Nh
Prunus persica (L. Batsch)?	11^0 52`56 N, $037^0$ 56`31 E	2, 481 m	Rare	H
Psidium guajava L	11^0 52`56 N, $037^0$ 56`31 E	2, 481 m	Rare	H
Punica granatum L.	13^0 01`43 N, $039^0$ 19`53 E	2, 690 m	Rare	H
Ranunculus oligocarpus Hochst. ex A. Rich.	11^0 51`73 N, $038^0$ 00`16 E	2, 667 m	Rare	Nh/H
Rhamnus prinordes L'Herit	11^0 47`76 N, $038^0$ 09`03 E	2, 804 m	Common	H
Rhus glutinosa A. rich.	11^0 50'.28 N, 037^0 50`57 E	2, 360 m	Common	Nh
Ricinus communis L.	11^0 51`91 N, $037^0$ 59`72 E	2, 618 m	Common	Nh/H
Rumex abyssinicus Jacq.	13^0 63`27 N, $040^0$ 31`46 E	2, 735 m	Common	Nh

Botanical name of species	**Geographical location**	**Altitude**	**Abundance of species**	**Hs**
Rumex nepalensis Spreng.	11^0 47`64 N, $038^0$ 08`48 E	2, 700 m	Common	Nh
Rumex nervosus Vahl	11^0 55`75 N, $037^0$ 57`05 E	2, 329 m	Common	Nh
Ruta chalepensis L.	11^0 47`26 N, $037^0$ 58`51 E	2, 000 m	Common	H
Saccharin officinarum L.	11^0 30`72 N, $037^0$ 50`53 E	2, 442 m	Very rare	H
Salix subserrata Willd.	11^0 51`31 N, $038^0$ 14`56 E	2, 325 m	Very rare	Nh
Schefflera abyssinica (Hochst. ex A.Rich.) Harms	11^0 55`55 N, $037^0$ 57`09 E	2, 328 m	Rare	Nh
Schinus molle L.	11^0 47`64 N, $038^0$ 08`48 E	2, 700 m	Rare	H
Sida schimperiana Hochst.ex A.Rich.	11^0 52`59 N, $037^0$ 56`78 E	2, 513 m	Common	Nh
Solanecio gigas Vatke.	11^0 47`03 N, $038^0$ 13`50 E	3, 301 m	Common	H
*Solanum adoense (*Hochst) ex A. Rich.	11^0 47`76 N, $038^0$ 08`34 E	2, 780 m	Common	Nh
Solanum incanum L.	11^0 43`87 N, $037^0$ 52`58 E	2, 120 m	Common	Nh
Solanum marginatum L.f.	11^0 51`06 N, $038^0$ 14`51 E	2, 659 m	Common	Nh
Solanum tuberosum L.	11^0 50`20 N, $037^0$ 56`54 E	2, 522 m	Rare	H
Sorghum bicolor (L.) Moench.	11^0 48`34 N, $037^0$ 56`29 E	2, 109 m	Common	H
Stephania abyssinica (Dill and Rich). Walp.	11^0 48`35 N, $038^0$ 07`24 E	2, 806 m	Common	Nh
Syzygium guineense (Willd.) DC.	11^0 43'.60 N, 037^0 52`44 E	2, 117 m	Very rare	Nh
Teclea nobilis Del.	11^0 50`20 N, $037^0$ 56`54 E	2, 522 m	Rare	Nh
Tephrosia vogelii Hook. F.	11^0 52`59 N, $037^0$ 56`78 E	2, 513 m	Very rare	H
Thalictrum rhynchocarpum Dill. & A. Rich.	13^0 77`10 $039^0$ 17`83 E	2, 687 m	Rare	Nh
Thymus schimperi Ronniger	11^0 47`65 N, $038^0$ 13`56 E	3,150 m	Common	Nh
Urtica simensis Steudel	13^0 63`27 N, $040^0$ 31`46 E	2, 735 m	Common	Nh
Verbasicum siniaticum Benth.	11^0 52`05 N, $038^0$ 00`34 E	2, 617 m	Rare	Nh
Verbena officinalis L.	13^0 0047 N, 039^0 19`53 E	2, 694 m	Very rare	Nh
Vernonia amygdalina Del.	13^0 09`04 N, $039^0$ 18`15 E	2, 693 m	Common	Nh/H
Vernonia myriantha Hook.f.	13^0 90`15 N, $039^0$ 15`57 E	2, 792 m	Common	Nh
Vicia fava L.	11^0 47`15 N, $038^0$ 13`32 E	2, 768 m	Common	H
Zehneria scabra (Linn. f.) Sondll.	11^0 48`65N, $038^0$ 08`63 E	2, 764 m	Common	Nh/H

Appendix 4 List of Medicinal Plants for Treating Human and Livestock Ailments along with species, family, local name, habit (Hb), plant parts used (Pp), conditions of plant used (Cp), methods of preparation , Root of application (Ra) and dosage. Key to other abbreviations: T-tree, S-shrub, H-herb, Cl-climber, L-leaf, R-root, Lax-latex, Fl-flower, St-stem, F-fruit, Sb-stem bark, Rb-root bark, Bu-bulb, Fi-fiber, Re-resin, Uf-used for, Chi-chicken, Hu-human, Cal-calf, Eq-eqiuns, Ca-cattle, Co-cow, Ter-termite, In-insect, Li-livestock, Fi-fish, Dm-dermal, E-external, An-anal, Va-vaginal, O-oral, D-dry, F-fresh, D/F-dry or fresh

Scientific Name	**Family**	**Local Name**	**Hb**	**Pp**	**Uf**	**Ailment type Ailment Type**	**Ra**	**Cp**	**Preparation, Application and Dosage**
Acacia abyssinica	Fabaceae	Girar	T	R Sb	Hu	Diarrhea Scabies	O Dm	D D	The dried root is powdered & mixed with water and one cup is drunk. The bark is roasted, powdered and mixed with fresh butter and creamed the affected part.
Acanthus sennii	Acanthaceae	Koshashila	S	R	Hu	'Kurba' (emergency)	O	F	The root is crushed, mixed with water, decanted & drunk.
Achyranthes aspera	Amaranthaceae	Telenj	H	L	Hu	"Lifie" (wound) Excessive menstrual	Dm O	F F	Crushed & tied at the finger tip with a piece of cloth. Crushed, mixed with water, decanted and drunk about ½ litter to stop menstrual flow, bleeding.
Acmella caulirhiza	Asteraceae	Gutcha abeba	H	Fl	Hu	Tooth-ache	O	F	Chewing and applying directly on the affected teeth (Decoction of fresh flower) without sapping it for about 5 to 10 minutes.
Agave americana	Agavaceae	Cattle	S	Lax	Ca	Wound	Dm	F	Applied the latex /milky sap on the affected part

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Allium sativum	Alliaceae	Nech shinkurt	H	Bu	Hu	Cough	O	F	The bulb & fruit of *Capsicum annum* boiled with butter and drunk continuously.
						Malaria	O	F	The fresh bulb is crushed and mixed with butter, pepper powder ('dikus') and baked with bread ('Injera'), and then eaten the fresh mixture.
						Stomach-ache	O	F	The bulb mixed with *C*apsicum *annuum and Ginger officinalis* & soaked with water for 5 days called 'elbet' & then eaten with bread continuously
						'Lashign' (tinea nigra)	Dm	F	Creamed the head with bulb's fluid.
Aloe macrocarpa	Aloaceae	Ret/eret	H	Lax	Hu	Impotency	Dm	F	The latex is mixed with butter and stained the whole part of penis and heated it with fire for continuous days.
Arisaema schimperianum	Araceae	Amoch	H	St	Ca	Bloating	O	F	The stem is inserted through the mouth for 2-3 minutes and the acid will be released to the stomach to vomit.
Artemisia afra	Asteraceae	Chikugn	H	Le	Hu	Common cold	Na	F	Inhaling the fresh leaves through nostril.
						Evil eye	Dm	F	Crushed and tied within a piece of cloth around neck.
Asparagus africanus	Asparagaceae	Yesiet- kest	H	St	Hu/ Ca	Bone fracture	Dm	F	The damaged part is tied with the stem and occasionally changed until it gets relieve**.**
				L/R		Bloating	Na	F	Its leaves & the root of *Verbasicum sinaiticum* are mixed with water, crushed, decanted and dropped in to left nostril.
					Hu	Pain, bleeding	Dm	F	Its leaves & the leaves of *Rumex nervosus* crushed filtered and applied on the cut part to reduce the pain & to stop bleeding after circumcision.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Bersama abyssinica	Melianthaceae	Azamir	S	L/St	Hu	Ascariasis	O	D	Dry powder is mixed with water and then drunk.
Brassica carinata	Brassicaceae	Gomen	H	F	Hu	Stomach trouble	O	F	The seed is pounded & mixed with water, then drunk about ½ liter.
					Ca	bloating	O	F	More than 1 litter is given orally.
Brucea antidysenterica	Simarobaceae	Waginos	S	F	Hu	Eczema	Dm	F/D	The roasted powder is mixed with butter & salt and put over the wound.
						Evil eye	Na	D	The dry root is smoked & inhaled.
Buddleja polystachya	Loganiaceae	Anfar	S	L	Li	Eye infection	Eye	F	Crushed, squeezed & dropped in to eye.
Calpurina aurea	Fabaceae	Zikita	S	F	Hu	Diarrhea	O	D	One dried & powdered pod of fruits mixed with honey and taken before breakfast until you get relieve.
				L	Chi	Ecto-parasite	Dm	F	The fresh leaves crushed and mixed with water and then washed their body for 2 days.
					Hu	Eczema, Scabies	Dm	F	The fresh leaves roasted, powdered & mixed with fresh butter, and then creamed the affected part.
Capparis tomentosa	Capparidaceae	Gimero	S	R	Hu	Evil eye	Dm	F/D	Tying with a piece of cloth around the neck or put in pocket.
						Asthma	O	F	Decoction of the leaves is used for the treatment of asthma.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Capsicum annuum	Solanaceae	Karia/keto	H	F	Hu	Abdominal bloat	O	D	Powder of red pepper ("Dikus") mixed with water and drunk.
						loss of appetite	O	F	Eating the fresh fruit with bread.
					In	Insect repellent	E	D	Smoking the dried paper in the home against ant.
Carduus shimperi	Asteraceae		H	R	Hu	'Mich'	Dm	F	The root is crushed and soaked for few minutes and then washed the entire body.
Carissa spinarum	Apocynaceae	Agam	S	St	Ca	Eye infection	Eye	D	The charcoal powder is mixed with fresh butter & water, and then stained the affected part of eye.
				R	Hu	Evil eye	Na	D	Fumigating the smoke of dry root.
Cassiporea malosana	Rhizophoriaceae	Tikur enchet	T	Sb	Ca	Cough, leech	O	F	The bark is crushed, soaked in water & left for overnight, and then given to drink.
Catha edulis	Celastraceae	Chat	S	L	Hu	Unspecified disease	O	F	The fresh leaves are mixed with honey & soaked in water for 7 days. This is locally called "Awuza". One glass per day will be drunk for 3 consecutive days.
Clausena anisata	Rutaceae	Limich	S	R	Ca	'Kumegna' (emmacilation)	O	F	The root of the plant is mixed with the roots of *Aspargus africanus*, *Carissa spinarum* and *Verbasicum sinaiticum* are crushed, soaked with water in fresh 'Qil' for overnight, decanted & then drunk.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Clematis simensis	Ranunclaceae	Azoareg	Cl	L	Hu	Any sore, leshmaniasis	Dm	F	Very small droplets are mixed with honey & rubbed on the skin. Squeezed and dropped in to the swelling and tying up.
Clerodendrum myricoides	Lamiaceae	Misrich	S	Rb	Cal Hu	Constipation Vomiting	O O	F F	Crushed & pounded and then given orally. Five leaves mixed with water and crushed, squeezed, and then about a quarter of litter is drunk.
Clutia lanceolata subsp. lanceolata	Euphorbiaceae	Fiyele fej	S	L	Hu Ca	'Shotelay', heart disease Ecto-parasite	O Dm	D F	A cup of powder is mixed with honey and given orally at 4.5 months of the gestation period continuously for 3 days. Its leaf & the leaves of *Calpurina aurea* are crushed and mixed with cattle's' urine and then washed their skin
Coffea arabica	Rubiaceae	Bunna	S	F	Hu	Sore, cuts	Dm	D	Its waste is used to dry the open sore. Or the roasted ponder is applied on cuts.
Combretum molle	Combretaceae	Abalo	T	Sb	Hu	Jaundice	O	F	Boiled, decanted & then drunk. After having drunk, roasted barely, "Tella" (local drink) and green paper are taken as antidotes.
Cordia africana	Boraginaceae	Wanza	T	Sb	Hu	Jaundice Malaria	O O	D F	Powdered and mixed with water, and is given one glass. Washed and boiled, and two glasses are drunk before or after meal.
Coriandrum sativum	Apiaceae	Dinbilal	H	Se	Hu	Cough	O	D	The seed together with butter and small quantity of water are boiled and drunk.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Corrigiola capensis subsp. *africana*	Molluginaceae	Yebeg lat	H	L	Ca	Bloating	O	F/D	The fine powder is mixed with one litter of water and drunk.
Crinum abyssinicum	Amaryllidaceae	Yejib shinkurt	H	Wp	Ca	Bloating	O	F	Crushed and given it to the cattle.
Croton macrostachyus	Ephorbiaceae	Misana	T	Lax	Hu	Ringworm	Dm	F	Milk latex is applied on the affected part.
				Sb		Heart disease	O	D	One spoonful of the fine powder of the dried bark is mixed with half litter of milk and drunk.
				L		Jaundice, elephantiasis, gonorrhea, abdominal problem, & 'kurba' (emergency)	O	D	About one spoonful of the bark powder is mixed with few root powder of *Cucumis ficifolius* & red paper. Water is added and then one cup of mixture is drunk.
						Tuberculosis	O	F/D	Leaves of shoots are boiled with water and decanted the toxic water, & allowed to dry. The dry fine powder is mixed with powder of spices & water. Then about two syringes are given per day for one month.
Cucumis ficifolius	Cucurbitaceae	Yemidir enbuay	Cl	R	Ca	Diarrhea/retained birth	O	F	Crushed, mixed with water, and then about one litter is drunk.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Cynoglossum coeruleum	Boraginaceae	Chegogit	H	L	Hu	'Mich'(sunstrike)	Dm/O	D	About one cup of liquid is squeezed and washed the entire body except heart. Then drunk quarter of a cup.
						Itching	Dm	F	Decoction of fresh leaves applied on the skin.
Datura stramonium	Solanaceae	Astenagir	H	L	Hu	Dandruff, ringworm	Dm	F	Crushed with leaf of *M. communis* & rubbed the powder over the head after having cut the hair.
						Tooth-ache	O	F	Crushed & mixed with butter and put on the hot plates, and then inhaling the steam to the mouth.
					Ca	Bloating	O	F	Crushed & mixed with water and then given.
Dipsacus pinnatifidus	Dipsacaceae	Keleh zaf	H	R	Ca	'Gumletalebet '(eye disease)	Eye	F	The root is crushed and sprayed on the eye of cattle.
Discopodium penninervum	Solanaceae	Almit	T	Leaf	Hu	Wound	Dm	F	Crushed, soaked and applied on the affected part of the skin.
						Dandruf	Dm	F	Crushed and washed the hair.
						"Shererit'	Dm	F	Crushed and mixed with water and washed the entire body for three days continuously.
Dodonaea angustifolia	Sapindaceae	Kitkita	S	L	Hu	Wounds, Eczema	Dm	F	Crushed & applied on wounds /or roasted, powdered, mixed with butter and applied.
Dovyalis abyssinica	Flacourtiaceae	Koshim	S	F	Hu	Abdominal Helminthes, Parasites	O	F	About 12 fruits consumed daily for 10 consecutive days without water or using its juice.
Dregea abyssinica	(Hochst.) K. Schum.	Moider hareg	Cl	R	Li	Rabies	O	F	Crushed, squeezed & mixed with milk, and then given to drink it.
Elucine coracana	Poaceae	Dagussa	H	Se	Hu	Malaria	O	D	Soaked & fermented for seven days and then drunk like local alcohol ("tella") continuously.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Embelia schimperi	Myrsinaceae	Enkoko	S	F	Hu	Constipation, tapeworm	O	F/D	Crushed, dried, powdered and one cup of powder is mixed with a cup of water, and then drunk.
						Hemorrhoids	An	F	Heating and rubbing on the wound by pressing it.
Eragrostis tef	Poaceae	Tef	H	Se	Ca	Bloating	O	D	One 'tasa' (can) is mixed with milk (wogemit) and is given. Inhibit them not to drink water until 6:00 hr.
						Bone fracture	O	D	Boiled and given to cattle to make them fat & relive from fracturing.
Erica arborea	Ericaceae	Asta	S	L	Hu	Wound	Dm	D	The powder of dried leaves is mixed with butter & rubbed on the affected part to dry the wound.
Erythrina brucei	Fabaceae	Korch	T	L	Ca	Eye disease	Eye	F	Crushed and mixed with water and then dropped in to the eye (few droplets).
Eucalyptus globulus	Myrtaceae	Nech bahirzaf	T	L	Hu	'Mich' (sun strike), common cold	Na/ O		Boil fresh leaves with water and inhale the water vapour repeatedly.
Euclea racemosa	Ebenaceae	Dedeho	S	Sb	Hu	Tooth-ache	O	F	Biting the stem b/n teeth for sometimes.
				L		Tapeworm	O	F	Crushed & mixed with water, decanted & then drunk.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Euphorbia abyssinica	Ephorbiacea	Kulkual	T	L	Eq	'Kuro'	Na	D	Inhaling the smoke of dried leaves
				Sb	Hu	Itching/scabies	Dm	D	Dried, roasted & mixed with butter, & then applied on the skin.
				Lax		Ascariasis	O	F	Seven droplets are added in to fresh and heated "Injera" and eaten at early morning without having food for the last over night.
						Wound	Dm	F	Latex is applied on affected part.
						Hemorrhoids	An	F	Boiled and spread over the anus.
						Jaundice	O	F	Small amount of droplets are drunk.
Euphorbia schimperiana	Euphorbiaceae	Antirfa	H	Wp	Hu	Wound	Dm	D	Dried, powdered & applied on the wound and covered with clean cotton for an interval of three days until you get relieve.
				lax		Circumcision	Dm	F	2-3 droplets applied on the tip of the penis skin.
Ficus carica	Moraceae	Beles	S	Wp	Ca	Tail sore/wound	Dm	F	Milk latex of the plant applied on the tail's sore/or wound formed after operation
				L	Hu	Jaundice, 'kurba' (emergency)	O	F	The leaf shoot crushed, mixed with water decanted & drunk. The antidote is milk.
Ficus sur	Moraceae	Shola	T	F	Hu	Heart disease, cough	O	F	Boiled & eaten continuously.
						Itching	Dm	F	The fluid of ripen fruit is mixed with butter and creamed over the body.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Ficus vasta.	Moraceae	Warka	T	L Sb	Ca Hu	Loss of weight Eczema	O Dm	F F	Crushed, boiled & given for skinned cattle. The infusion of the bark is applied on the affected part.
Foeniculum vulgare	Apiaceae	Ensilal	H	F L	Hu Ca	Dysentery, stomach-ache, 'Kurba' Bloating	O O	D F	The powder is mixed with milk ('ergo') & is drunk. Crushed & mixed with water, & then given.
Girardinia bullosa	Urticaceae	Matta	H	R	Hu	Burns	Dm	F	The fresh root crushed & applied on the affected part.
Gnidia glauca	Thymelaceae	Awura	S	Sb	Ca	Epidemic Calf rejection	Dm Va	F F	Tying their horn in the form of rope around their horn. Inserting the bark in the form of rope through the vagina into the uterus & then pulling back after a while.
Grewia ferruginea	Tiliaceae	Lenquata	S	Sb	Ca/ Hu	'Adef' (menstruation)	O	F	Crushed & soaked with water & then drunk.
Guizotia abyssinica	Asteraceae	Nug	H	Se	Hu Ca	Gastritis, Throat sore Leech	O O	D D	Roasted, powdered, salted & mixed with one glass of water (1/2 litter) and drunk per day until you get relieve. More than one litter (powder mixed with water) for three days continuously.
Guizotia schimperi	Asteraceae	Mech	H	R	Hu	"Megagna", stomach-ache	O	F	Crushed & mixed with water, then decanted and drunk about a quarter of cup is given or chewing & taking the root sap.
Hagenia abyssinica	Rosaceae	Koso	T	F	Hu	Stomach-ache	O	F	Crushed, squeezed & about half cup is mixed with two cups of 'tella' and is drunk.
Haplocarpa schimperi	Asteraceae	Getin	H	R	Ca	'Lebitir' (Physical damage)	Na, Ear, O	F	The root is crushed & mixed with water, and first, few droplets are given through their left nose & ear and then their mouth (one can).

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Hordeum vulgare	Poaceae	Tikur gebis Nech gebis	H	Se	Hu	Diarrhea Gastritis	O O	D D	The seeds are soaked in water and made to germinate, dry, roast and powder. Then the powder is boiled in water and drunk until it gets relieve. The roasted barely is eaten before meal.
Hypericum revolutum	Hypericaceae	Amja	S	L	Hu	"Megagna", Stomach-ache	O	F	Chewing & taking the solution/juice.
Hypoestes triflora	Acanthaceae	----------	H	L	Hu/ Ca	Ecto-parasite, tick	Dm	F	roasted, powdered & mixed with fresh butter and creamed the body for consecutive days.
Impatiens tinctoria	Balsaminaceae	Ensosla	H	R	Hu	Scabies, 'kurtimat'	Dm	F	The fresh root is crushed & boiled with water, cooled dawn and then stained the affected part.
Inula confertiflora	Rubiaceae	Woynagift	S	L	Li Hu	Eye infection, sore Tooth-ache	Eye/ Dm O	F F	Crushed & mixed with water, and then sprayed on the affected part for seven days continuously. 2or 3 leaves are chewing & biting b/n teeth without touching the tongue for some time.
Juniperus procera	Cuppressacea	Tid	T	Res	Hu	Ringworm	Dm	F	Applied directly on the affected part.
Jusminum grandifolum	Oleaceae	Tenbelel	Cl	L	Hu	Tapeworm	O	D	One spoonful fine powder is mixed with water and then drunk per day until you get relieve.
Justicia schimperiana	Acanthaceae	Smitha	S	L	Chi Hu	Coccicoids Hemorrhoids	O An	F D	The leaf (shoot) is crushed, mixed with water and decanted, & 'injera' (bread) is soaked with the solution, and then eaten. One-third of a spoonful fine powder is directly applied to anus.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Justicia schimperiana	Acanthaceae	Smitha	S	L	Hu	'Kurba'	O	F	Crushed, mixed with water, squeezed & decanted, & then ¾ of a cup is drunk.
						Vomiting	Na	F	Inhaling the fresh leaves against vomiting.
						Open sore, 'mekersa'	Dm	D	Its flower together with the leaf of *Phytolacca dodecandracrushed*, crushed, dried, powdered & applied.
Kalanchoe petitiana	Crassulaceae	Endahula	H	R/L	Hu	Colic, boil, sore	Dm	F	The fresh root is directly applied on the affected part of the skin for 3 days continuously or putting the leaf directly on the affected part after scratching and pressing with hot plate for some time.
Lagenaria siceraria	Cucurbitaceae	Qil	Cl	L	Hu	Ear lesion	Ear	F	Squeezed & 2or 3 droplets are dropped in to the ear.
Laggera tomentosa	Asteraceae	Keskeso/Sh-etie	H	L	Hu	Gonorrhea	Va	F	Crushed & boiled and then applied the steam to the vagina and cleaned with cotton after steaming for continuous days.
						Tooth-ache	O	F	Chewing and spiting for 10 minutes.
Leonotis ocimifolia	Lamiaceae	Fers zeng	H	Wp	Hu	Intestinal - worms	O	F	Crushed, squeezed & drunk.
				Wp/ St	Ca	Bloating	O	F	Crushed, & mixed with water and given or crushed & inserted the stem to the mouth for some time.
Lepidium sativum	Brassicaceae	Feto	H	F/L	Hu	Tapeworm, Stomach-ache	Dm	D	The powder of dried fruits or leaves is mixed with water and honey and drunk ½ litters for 3 days gap until u get.
						Bloating	O	F	Chewing the flower and sucking the sap or solution.
							O	F	Chewing the flower and sucking the sap or solution.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Linum usitatissimum	Lineaceae	Telba	H	Se	Hu	Eye's dirt	Eye	D	2 to 3 seeds will be added and slept for overnight to discharge dirt from eyes.
					Hu/ Ca	Gastritis	O	D	Boiled the seeds and cooled dawn, and then drunk.
						Delivery-difficult	O	D	Raw or boiled seeds will be given to promote delivery.
Lippia adoensis	Lamiaceae	Kessie	H	L	Hu	Common cold, Cough	O	F	Decoction of a leaf is mixed with water and a cup of mixture is drunk.
Lobelia rhynchopetalum	Lobeliaceae	Jibera	H	R	Hu	Scabies/itching	Dm	D	Dried, powdered, mixed with butter and washed the body for two consecutive days and then taking shower on the 3rd day.
				R / S	Eq	"Kuro"	O/Na	D	Inhaling the dried smoke.
				R	Hu	Evil eye	Dm	D	The dried root tied with piece of cloth around the neck or put in to the pocket.
Lolium temulentum	Poaceae	Enkirdad	H	Se	Ca	Sore	Dm	D	The powder is rubbed on the cattle's **sore** (the sore having after operation due to bloating) until it gets relieve.
Lupinus albus	Fabaceae	Gibto	H	Se/F	Hu	Hypertension	Dm	F	Soaked with water for 5 days, decanted the water & eaten.
						Gardiasis	O	F	Eight cups of fresh fruits are crushed & mixed with and soaked with water for 4 days then drunk to relieve from

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Lycopersicon esculentum	Solanaceae	Timatim	H	L	Hu	Stomach-compliments	O	F	Decoction of fresh leaves is taken.
Maesa lanceolata	Myrsinaceae	Kotkoto	S	Wp	Ca	Leech	O	F	The whole plant is given.
					Fis	Poison	Dm	F	The powder of dry fruit is spread over the sea so as to fish.
Malva verticillata	Malvaceae	Tult	H	R	Ca	'Kumegna'	O	F	Crushed, mixed with milk & given.
						Loss of weight	O	F	Crushed& salted and given to skinned cattle
Maytenus arbutifolia	Celastraceae	Atat	S	Rb	Hu	Pain	O	D	Dried, powdered and mixed with water and then drunk about one cup.
					Ca	Eye disease	Eye	F	Crushed and dropped in to the eye.
Melia azedarach	Meliaceae	Nim	T	L	Hu	Dandruff	Dm	F	Crushed & washed the hair for consecutive days.
					Ca	External - parasite	Dm	F	Crushed & immersed in water and then washed their body.
					Chi	Coccicoids	O	F	One handful leaves is crushed, squeezed & mixed with pieces of bread, and then given.
Millettia ferruginea	Fabaceae	Birbira	T	L	Ca	External - parasite	D	F	The fresh leaves applied on the skin of the cattle.
				F	Fis	Fish poison	E	D	Dried fruit is pounded and then applied on water to make (catch) fish.
Momordica foetida	Cucurbitaceae	Kura harg	Cl	L	Hu	Swelling	Dm	F	Heated the leaf and rubbed on the affected part.
Myrica salicifolia	Myricaceae	Shinet	T	Sb	Li	Eye infection	Eye	D	Few powder of dried bark is sprayed on eye.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Myrtus communis	Myrtacae	Ades	S	L	Hu	Stomach-ache Scabies Leschmaniasis	O Dm Dm	F D D	Chewing & taking the sap. Dry powder is mixed with butter & applied on the affected part. Powdered & mixed with butter, and then applied.
Nicotiana tabacum	Solanaceae	Tinbaho	S	L	Ca	Leech	O	F	Squeezed & is given to drink.
Ocimum gratissimum	Lamiaceae	Dama kessie	H	L	Hu	Fever, head-ache	O O/Na	F F F	Handful of leaves are crushed with small amount of water, filtered and then given for 5 days continuously. Boiling and inhaling through mouth & nose. Leaves crushed with small amount of water and filtered, and then washed the body.
Olea europaea subsp. *cuspidata*	Oleaceae	Woira	T	St	Hu Res	Tooth-ache Sore	O D	F F	The heated stem is cached b/n teeth for some time. Resin is applied on open sore to dry it.
Orobanche minor	Orobanchaceae	Yejib dula/jibo	H	Wp	Eq	Unspecified disease	Ear/ Na	F	Crushed and mixed with water and dropped in to left ear and nostril.
Osyris quadripartita	Santalaceae	Keret	S	St	Hu	Stomach-ach	O	F	Chewing the stem & swallow the solution.
Otostegia tomentosa	Lamiaceae	Tunjut	S	L	Hu	Abdominal-pain,'Dengetegn a', 'Kurba' Common cold	O O/N	F D	The fresh leaves chewed and taken the solution. Inhaling the smoke of dried leaves.
Passiflora molisssima	Passifloraceae	----------	Cl	F	Hu	Sleeping problem	O	F	One glass of droplets (juice) of fruit is drunk to bring deep sleep.

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Periploca linearifolia	Asclepiadaceae	Moider hareg	Cl	L	Hu, Ca	Wound/hemorrhage	Dm/ An	D	The powder of dry leaf is mixed with butter and stained the affected part or the powder is mixed with the powder of *Ruta chalepensis* & butter, and then stained.
Phagnalon schweinfurthii	Asteraceae	Nibwoded	H	Wp	Be	Dormancy	E	D	The dried powder is mixed with wax and smoked in the hive to make the bees active and strong.
Phytolacca dodecandra	Phytolaccaceae	Mehan endod	S	R/L	Hu	Sorcery, abdominal problem	O	F/D	Chewing & taking the sap solution (fluid) or its root & the root of *Croton macrostachyus* crushed, dried, powdered, mixed with water & then one cup is drunk per day for 3 days.
						Rabies, **'**Kurba'	O	F	About the size of 'atki' is dug out, crushed & mixed with water, filtered & then one cup is drunk. The antidote are coffee and water (boiled and cooled).
					Ca	Leech	Na	F	Handful of leaves are crushed with small amount of water, decanted & given through nostril.
					Hu	Malaria	O	F	Handful of leaves is crushed, mixed with water and about two glasses are drunk for one day. The antidote is 'tella' and coffee.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Plantago lanceolata	Plantaginaceae	Wonberet/Esat adrik	H	L Fi	Hu	'Fire burn Cuts	Dm Dm	F	Crushed & squeezed, then the droplets applied on the affected part. Put the fibers on the affected part.
Plectocephalus varians	Asteraceae	Engochye	H	R	Ca	'Kumegna,' 'Kofa'	O	F	Pounded and mixed with water & then drunk.
Plumbago zeylanica	Plumbaceae	Amera	H	R	Hu Ca	Snake bite Epidemic	O/ Na	F	Washing, chewing and taking the solution. Dried, crushed, & smoked.
Premna schimperi	Lamiaceae	Checho	T	L	Ca	Eye infection Neck-infection	Eye Dm	F F	Squeezed & dropped in to the eyes for 2 to3 days. Crushed & with droplets of water, and then rubbed on their neck.
Prunus africana	Rosaceae	Homma	T	L	Ca	Eye infection Leech	Eye E	D F	Dried, powdered and aired in to their eye. Pounded with the fresh leaves of *R. chapelensis* added in to water to kill the leeches.
Prunus persica	Rosaceae	Kok	T	L	Cal	Constipation	O	F	Crushed and mixed with water and given orally for continous days until it gets relieve.
Psidium guajava	Myrtaceae	Zeytun	S	F	Hu	Dysentery	O	F	The fruit is employed as remedy against amoebic dysentery.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Punica granatum	Punicaceae	Roman		Fb	Hu	Diarrhea	O	F	The flesh fruit bark ('litach') is eaten continuously against heavy diarrhea.
Ranunculus oligocarpus	Ranunculaceae	Tinkushit	H	L	Hu	Sore, eczema, leschmaniasis	Dm	F	One 'woket' (handful) leaf is crushed and applied on the affected part until it gets relieve (washing is recommended before application).
						Tapeworm, amoebiasis	O	D	The fruit is boiled & one cup is drunk before or after food for continuous days.
Rhamnus prinoides	Rhamnaceae	Gesho	S	L	Hu	Tonsillitis	O	F	Crushed & squeezed shoots or tip part from 12 d/f plants of the same species and added few droplets to raise the epiglottis.
					Ca	Leech	O/Na	F	Crushed, dried **a**nd soaked with the leaves of a *Solanum tuberosum* at least for 2 days & then given small droplets through left nostril & then much more through their mouth.
Ricinus communis	Euphorbiaceae	Chakima/G-ulo	**S**	F	Cal	Constipation	O	F	Half of a fruit is crushed, pounded, mixed with water & drunk orally.
Rumex abyssinicus	Polygonaceae	Mekmoko	H	F	Hu	Hyper tension	O	F	The fruit part crushed with *T. schimperiana* decanted & mixed with local drink ("Areki")
Rumex nepalensis	Polygonaceae	Yebere milas	H	R	Ca	Delay of placenta	Va	F	Wash & insert the root in vagina
					Hu	Stomach-ache	O	F	Chewing & sucking the sap.
Rumex nervosus	Polygonaceae	Enbuacho	S	R	Hu	Itching	Dm	D	Roasted fine powder is mixed with butter and stained the entire body for 3 days, then wash your body.

Scientific Name	**Family**	**Local Name**	**Hb**	**Pp**	**Uf**	**Ailment Type**	**Ra**	**Cp**	**Preparation, Application and Dosage**
Ruta chalepensis L.	Rutaceae	Tenadam	H	L	Hu	Stomach-ache	O	F	Mixed with sugar & powder of *Vicia fava,* then boiled and drunk (or chewing and taking the sap).
					Ca	'Kumegna' (emmacilation)	O	F	Its leaf together with root of *Cucumis ficifolius* (one 'atik') crushed mixed with water & drunk.
Saccharum officinarum	Poaceae	Shenkora ageda	H	St	Hu	Stomach-ache, caught	O	F	Crushed, boiled & drunk or crushed & mixed with *Allium sativum* L. boiled & drunk or simply chewing and taking the sap for consecutive days.
Salix mucronata (*S. subserrata***)**	Salicaceae	Haya	T	L	Hu	Ascariasis, bloated belly	O	D	½ cup of leaf powder is mixed with 4 cups of water & drunk for 3 days daily.
					Co	Infertility	O	D	One feast of leaves dried, pounded & mixed with water, decanted and about ½ litters is drunk.
Schefflera abyssinica	Araliaceae	Getem	T	Rb	Hu	'Mich', Gonorrea	O	D	About the size of 'atiq" is taken, dried, powdered & mixed with honey and then eaten.
						Swelling, wart			Or dried, powdered & mixed with butter, and then creamed the affected part.
Schinus molle	Anacardiaceae	Kundobe-rbere	T	L	Eq	"Abrik'	O	F	Crushed and soaked with water for certain time and drunk
Sida schimperiana	Malavaceae	Chifrig	S	Fl/ Wp	Hu	Leshmaniasis	Dm	F/D	Chewing the sap and spitting the solution/or the powder of the plant on the affected part.
				St		'Liffe'	Dm	F	Taking about the size of toothpick and tying around the tip part of finger.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Solanum adoense	Solanaceae	Zirch enbuay	S	F	Hu	Itching	Dm	F	Fluid of ripen fruit applied on the affected part of the skin.
						"Kinkin" (ear parasite)	Ear	F	The fruit latex is mixed with water & 2-3 droplets are dropped in to the hole of ear.
Solanum incanum	Solanaceae	Enbuay	S	R	Hu	Stomach ache	O	F	Chewing & sucking the sap.
Solanum marginatum	Solanaceae	Geber enbuay	S	F	Li	"Tifina"	Na/ O	F	The fluid of ripen fruit mixed with milk & then given through nostril (few droplets) & mouth for 3 days continuously.
				R	Hu	Stomach -ache	O	F	Chewing & taking the sap/the solution.
Solanum tuberosum	Solanaceae	Dinch	H	Tu	Hu	Indigestion problem	O	F	Splitting the raw tuber in to pieces and eating before meal to make digestion easier.
						Eye's dirt	Eye	F	Putting & binding thin slice of raw tuber with a piece of clean cloth for overnight to discharge the sparks that were entered into the eye during welding.
Solenecio gigas	Asteraceae	Libagba	S	L	Ca	Epidemic	Dm	F	Crushed & mixed with water and then washed the cattle's body or rubbed with the fresh leaves over the skin.
					Hu	Jaundice	O	F	Half cup of droplets from the leaf is mixed with one cup of milk and drunk for three days continuously.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Sorghum bicolor	Poaceae	Zengada	H	St	Ca	Bloating	O	D	The roasted stem is powdered and mixed with water, and then one can (about 1 litter) is drunk.
				Se	Hu	'Mich'	Dm	D	Boiled the seed with water, cooled down and washed the body with the decanted water.
Stephania abyssinica	Menispermaceae	Shimitiritira/ Etseyesus	Cl	R	Hu	Ascariasis	O	F	Crushed, powdered, & mixed with water and then drunk about one cup.
						Wart	Dm	F	The fluid of ripen fruit is applied on the affected part of the skin after scratching it.
						Vomiting	O	F	The root is washed, crushed, mixed with water, decanted & drunk about 1 cup.
						Intelligence ('letimirt')	O	D	One spoonful dry powder of root is mixed with honey and swallowed to increase mental activity.
Syzygium guineense	Myrtaceae	Dokima	T	L	Hu	Abdominal parasite, kalazar			Two-third of cup of its leaves is mixed with one-third of *P. africanus*, crushed, powdered and mixed with 1itter of water and drunk continuously for 3 days.
Teclea nobilis	Rutaceae	Sihil	S	Sb	Hu	Gastritis	O	F	Chewing and taking the sap of the internal part of stem bark.
Tephrosia vogelii	Fabaceae	----------	T	L	Ter	Poison	E	F	Crushed & soaked with water for 12:00 hrs and then applied.
Thalictrum rhynchocarpum	Ranunculaceae	Sire bizu	H	R	Ca	"Kumegna"	O	F	Fresh roots crushed & soaked with water for over-night and then about one litter is given.
				L		Epidemic	O	F	Crushed, powdered & mixed with H_2O, decanted & a quarter of the cup is drunk.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Thymus schimperi	Lamiaceae	Tosign	H	L	Hu	Gastritis, Hypertension	O	D	Dried, powdered, & mixed with the seed powder of *H. vulgare* and eaten in the form of "besso."
						Cough	O	D	Boiled with water & sugar, and drunk in the form of tea every morning.
Urtica simensis	Urticaceae	sama	H	R	Ca	"Nidifit"	O	F	Crushed and mixed with the excrete of dogs, water and then decanted and given to horses about 1 litter.
				L		Burns	Dm	F	Crushed, roasted, & powdered put on the affected part.
						Gastritis, heart disease	O	F	Eat in the form of stew ('wot') against gastritis & heart disease.
Verbasicum sinaiticum	Scrophulariaceae	Kutitina	H	R	Hu	"Gormit' / 'yekolakusil'	Dm	D	Dried, roasted, powdered and mixed with fresh butter and stained the wound until it gets relieve.
						Stomach-ache	O	F	Crushed the fresh root about the size of 1/3 of 'atik' & mixed with water, decanted and drunk.
Verbena officinalis	Verbenaceae	Atuch	H	F	Hu	Ear' pus	Ear	F	Crushed, mixed with water and decanted, and then few droplets will be dropped in to the ear.
Vernonia amygdalina	Asteraceae	Girawa	S	L	Hu	Vomiting, stomach-ache	Dm	F	One feast of leaves cut from seven different parts, crushed with small amount of water, filtered, and then drunk.

Scientific Name	Family	Local Name	Hb	Pp	Uf	Ailment Type	Ra	Cp	Preparation, Application and Dosage
Vernonia myriantha	Asteraceae	Kotkoto	S	L	Hu	Ulcer, sore	E	D	A spoonful of powder is placed on the wound continuously until it gets relieve.
Vicia fava	Fabaceae	Bakela	H	Se	Hu	Boil, leshmaniasis Heart disease	Dm O	F D	Chewed & spitted on the wound after scratching. Soaked seeds in water and made them to grow, dry, powder with other spices, salt and eat with bread ('injera').
Zehneria scabra	Cucutbitaceae	Haregresa	C	L	Hu	'Mich' (sunstrike)	O/Na	F	Crushed, mixed with water and decanted, then drunk one cup /or boiled and inhaled the stem.

N.B: See the Amharic (local) names with their medical terminologies on Appendix 6

Appendix 5 Number of Medicinal Plant Species in Each Family

Number	Family	Number of genera	Number of plant species	Percentage of plant species (%)
1	Acanthaceae	3	3	2.21
2	Agavaceae	1	1	0.74
3	Alliaceae	1	1	0.74
4	Aloaceae	1	1	0.74
5	Amaranthaceae	1	1	0.74
6	Amaryllidaceae	1	1	0.74
7	Anacardiaceae	1	1	0.74
8	Apiaceae	2	2	1.47
9	Apocynaceae	1	1	0.74
10	Araceae	1	1	0.74
11	Araliaceae	1	1	0.74
12	Asclepiadaceae	2	2	1.47
13	Asparagaceae	1	1	0.74
14	Asteraceae	11	**13**	9.56
15	Balsaminaceae	1	1	0.74
16	Boraginaceae	2	2	1.47
17	Brassicaceae	2	2	1.47
18	Capparidaceae	1	1	0.74
19	Celastraceae	2	2	1.47
20	Combretaceae	1	1	0.74
21	Crassulaceae	1	1	0.74
22	Cucurbitaceae	4	4	2.94
23	Cuppressaceae	1	1	0.74
24	Dipsacaceae	1	1	0.74
25	Ebenaceae	1	1	0.74
26	Ericaceae	1	1	0.74
27	Euphorbiaceae	4	5	2.94
28	Fabaceae	7	**7**	5.15
29	Flacourtiaceae	1	1	0.74
30	Hypericaceae	1	1	0.74
31	Lamiaceae	7	**7**	5.15
32	Lineaceae	1	1	0.74
33	Lobeliaceae	1	1	0.74

Number	Family	Number of genera	Number of plant species	Percentage of plant species (%)
34	Loganiaceae	1	1	0.74
35	Malavaceae	2	2	1.47
36	Meliaceae	1	1	0.74
37	Melianthaceae	1	1	0.74
38	Menispermaceae	1	1	0.74
39	Molluginaceae	1	1	0.74
40	Moraceae	1	3	2.21
41	Myricaceae	1	1	0.74
42	Myrsinaceae	2	2	1.47
43	Myrtacae	3	4	2.94
44	Oleaceae	2	2	1.47
45	Orobanchaceae	1	1	0.74
46	Passifloraceae	1	1	0.74
47	Phytolaccaceae	1	1	0.74
48	Plantaginaceae	1	1	0.74
49	Plumbaceae	1	1	0.74
50	Poaceae	6	**6**	4.41
51	Polygonaceae	1	3	2.21
52	Punicaceae	1	1	0.74
53	Ranunclaceae	3	3	2.21
54	Rhamnaceae	1	1	0.74
55	Rhizophoraceae	1	1	0.74
56	Rosaceae	2	3	2.21
57	Rubiaceae	1	1	0.74
58	Rutaceae	3	3	2.21
59	Salicaceae	1	1	0.74
60	Santalaceae	1	1	0.74
61	Sapindaceae	1	1	0.74
62	Sclrophularaceae	1	1	0.74
63	Simarobaceae	1	1	0.74
64	Solanaceae	5	**9**	6.62
65	Thymelaceae	1	1	0.74
66	Tiliaceae	1	1	0.74
67	Urticaceae	2	2	1.47
68	Verbenaceae	1	1	0.74
Total	68	123	136	100

Appendix 6 List of Human and Livestock Diseases in the Study Area (Key: NMP-Number of medicinal plants)

			Human		Livestock	
No.	**Disease treated**	**Local Name (Amharic)**	**NMP**	**%**	**NMP**	**%**
1	Wound /sore	Kusil/ lifie/shererit/Gormit	16	8.33	3	5.08
2	Wart	Kintarot	2	1.04	-	-
3	Vomiting	Mastawok/masmeles	4	2.08	-	-
4	Unspecified gastrointestinal disorder	Dingetegna	2	1.04	-	-
5	Unspecified disease	Beshita(yekebit)	-	-	1	1.69
6	Ulcer	Yecheguara	1	0.52	-	-
7	Tumor	Mekersa	1	0.52	-	-
8	Tuberculosis/lung disease	Yesanba beshita	1	0.52	-	-
9	Toothache	Yetirs kurtimat	6	3.13	-	-
10	Tonsillitis	Entil	1	0.52	-	-
11	Tinea nigra	Lashign/lash	1	0.52	-	1.69
12	Tapeworm	Kosso	6	3.13	-	-
13	Swelling	Ebitet	1	0.52	-	-
14	Sun strike	Mich	6	3.13	-	-
15	Stomach-ache	Yehod kurtet	18	9.38	-	-
16	Snake poison	Yebab merz	1	0.52	-	-
17	Sleeping problem	Yenkilf chigir	1	0.52	-	-
18	Ringworm	Chirt	3	1.56	-	-
19	Rh^- Disease	Shotelay	1	0.52	-	-
20	Retained placenta	Yengdelj sizegey	1	0.52	1	1.69
21	Related with dysentery & constipation	Kofa	-	-	1	1.69
22	Related with sun strike	Abirk	-	-	1	1.69
23	Related with bloating	Megagna	2	1.04	-	-
24	Rabies	Yewsha kalebat	2	1.04	1	1.69
25	Pain	Wugat	1	0.52	-	-
26	Menstrual problem	Adef/yewor abeba	1	0.52	-	-
27	Malaria	Woba	5	2.60	-	-
28	Lumpy skin disease	Nidift	-	-	1	1.69
29	Loss of weight	Yekibdet mekenes	-	-	2	3.39

			Human		Livestock	
No.	**Disease treated**	**Local Name (Amharic)**	**NMP**	**%**	**NMP**	**%**
30	Loss of appetite	Yemgib flagot mekenes	1	0.52	-	-
31	Leschmaniasis	Yeafincha kunchir	5	2.60	-	-
32	Leech infestation	Alekit	-	-	7	11.86
33	Joint pain	Kurtmat	1	0.52	-	-
34	Jaundice	Yewof/yegubet beshita	6	3.13	-	-
35	Jardiasis	Jardia	1	0.52	-	-
36	Itching/scabies	Ekek	9	4.69	-	-
37	Infertility	Mekan/mehan	-	-	1	1.69
38	Impotency (in men)	Yebilt medikum	1	0.52	-	-
39	Hypertension	Yedem gfit	2	1.04	-	-
40	Hemorrhoids	Yeahiya kintarot	4	2.08	-	-
41	Heart disease	Yelb beshta	5	2.60	-	-
42	Head-ache	Years mitat	1	0.52	-	-
43	Gonorrhea	Chebit	3	1.56	-	-
44	Gastritis	Tikusat/kar, cheguara	6	3.13	-	-
45	Fish poison	Yeasa memerez	1	0.52	-	-
46	Fever	Tikusat	1	0.52	-	-
47	Eye infection/disease	Yayin beshita	3	1.56	5	8.47
48	Evil eye	Buda	5	2.60	-	-
49	Epidemic	Worershign	-	-	4	6.78
50	Emmacilation	Kumegna	-	-	5	8.47
51	Emergency/ sudden disease	Kurba	6	3.13	-	-
52	Elephantesis	Mananish	1	0.52	-	-
53	Eczema	Chife	4	2.08	-	-
54	Ectoparasie	Yewch tigegna	-	-	4	6.78
55	Ear parasite	Kinkin	1	0.52	-	-
56	Ear lesion	Jero simegil	1	0.52	-	-
57	Dysentery	Tekmat (dem yetekelakele)	2	1.04	-	-
58	Dormancy	Yenib medikem	1	0.52	-	-
59	Difficulty in breathing	Tifna	-	-	1	1.69
60	Diarrhea	Tekimat	4	2.08	-	-
61	Delivery difficult	Yemit chigir	1	0.52	1	1.69
62	Dandruff	Forefor	3	1.56	-	-
63	Cough	Sal	6	3.13	-	-

			Human		Livestock	
No.	**Disease treated**	**Local Name (Amharic)**	**NMP**	**%**	**NMP**	**%**
64	Continuous running of mucus through nostril of equines	Kuro	-	-	5	8.47
65	Constipation	Dirket	2	1.04	2	3.39
66	Common cold	Gunfan	4	2.08	-	-
67	Colic	Yanget himem	1	0.52	-	-
68	Coccidiosis	Yedero beshita	-	-	2	3.39
69	Circumcision	Girzat	1	0.52	-	-
70	Calf rejection	Yetija tilacha	-	-	1	1.69
71	Bone fracture	Sibrat	-	-	1	1.69
72	Boil	Bigunj	2	1.04	-	-
73	Bloating	Nifat	-	-	9	15.25
74	Bleeding and /or cuts	Yedem mefises	2	1.04	-	-
75	Ascariasis	Wosfat	4	2.08	-	-
76	Amoebiasis	Ameba	1	0.52	-	-
77	Abdominal worms	Yehod tigegna	6	3.13	-	-
	Total		192		59	

Appendix 7 Name of Rural Kebeles in Farta Wereda with their Road Information (WR-stands for winter road only, WSR-winter and summer road, NS-no road at all and DK- distances in kilometer).

The Situation of the Road						
No.	**Name of Kebeles**	**WR**	**WSR**	**NR**	**DK**	**Remark**
1	Atta				0	On the line of the main road
2	Maynet				0	On the way to Gassay to Estie
3	Deremo-Axuma	√			7	From the main road
4	Wawa-Mager		√		2	From the main road
5	Kolay-Dengors		√		0	From the main road
6	Arga		√		0	From Kimir-Dingay
7	Workien	√	√		10	From Debre-Tabor
8	Awuzet-Azawur		√		0	From Gassay
9	Sahirna-Kisnat		√		0	From Gassay
10	Amjaye	√			14	From Kimir-Dingay
11	Atkena	√			15	From Kimir-Dingay
12	Debelima	√			23	From Kimir-Dingay
13	Gentegna	√			35	From Kimir-Dingay
14	Aydie	√			14	From Kimir-Dingay
15	Megendi	√			20	From Kimir-Dingay
16	Limaddo	√			23	From Debre-Tabor
17	Jarra	√			25	From Kimir-Dingay
18	Meskel-Tsion	√			19.5	From Lawaye /Estie
19	Semina	√			4	From Estie/Lwaye
20	Gena-Mechawecha	√			25	From Debre-Tabor
21	Embayko	√			38	From Debre-Tabor
22	Zimha			√	45	From Kimir-Dingay
23	Qualha	√			22	From Kimir-Dingay
24	Girbi	√			12	From Kimir-Dingay
25	Aringo	√			121	From Debre-Tabor
26	Ayvaniva	√			11	From the main road
27	Medeb-Gobida	√			27	From Debre-Tabor
28	Buro-Kantona	√			9	From Debre-Tabor
29	Mokish	√		√	10	From Gassay
30	Farta-Kusquam	√			7	From the main road
31	Addeder			√	18	From Kimir Dingay

The Situation of the Road						
No.	**Name of kebeles**	**WR**	**WSR**	**NR**	**DK**	**Remark**
32	Denquara	√			4	From Kimir Dingay
33	Kanat				3	From the main road
34	Sorras	√			6	From Gassay
35	Mahiddere-Mariam	√			42	From Gassay
36	Wukro	√			9	From Kimir-Dingay
37	Aba-Libanos	√		√	11	From Estie
38	Gassay (tawon)	√			20	From Debre-Tabor
39	Kimir-Dingay (tawon)	√			30	From Debre-Tabor
	Total	27	6	4		

Appendix 8 Checklist of Semi-structured Questions Used for Discussion and Interview

I. General Information

1. Information on Respondents

- Name……
- Age……
- Sex……..
- Marital status……
- Educational status……
- Locality……
- Religion…….
- Ethnic……..

2. Tell the traditional way of classifying forests and landscapes in your area**:**

Forests: ……

Landscapes: ……..

3. What are the most common diseases of humans in your area?
4. What are the most common diseases of animals in your area?
5. How do the local people prevent and control a given disease in the area?

II. Ethnobotanical Data

6. Mention types of plants that are used to treat a given disease in the area and give their local names.

6.1. Plants used to treat only human diseases

6.2. Plants used to treat only livestock

6.3. Plants used to treat both human and livestock diseases

7. Where do the medicinal plants grow?

7.1. In natural habitat

7.2. In homegarden

7.3. Both in the natural habitat and homegarden

8. The habit of the plant: Tree, Shrub, Herb, Climber
9. What are the most common habitats of the given plants?
10. Which part of each medicinal plant listed is used? Leaves, Roots, Barks, Stems, Flowers, Seeds Latexes or saps, Whole plants.

11. What is the method of preparation of the medicinal plant? (Fresh, dried, crushed, powdered, used alone, mixed with water or others, decoction, boiling, infusion etc.).
12. Dosage: Does it vary among age groups, sex? If you say yes, why? If not, Why not?
13. Does the medicinal plant have side effect? If you say yes, is there any means of treatment for the side effect ?
14. Which members of the community use the medicinal plants frequently?
15. Is the medicinal plant marketable?
16. Is the medicinal plant easily accessible and affordable? If not, why?
17. How is the knowledge of medicinal plants use transferred from generation to generation in the community?
18. Is there any interference between modern and traditional plants used in the area?
19. To what extent the community depends on traditional medicinal plants as compared to modern medicine? why?
20. Are there any taboos associated with medicinal plant use and utilization of medicinal plants (Method of collection, time of collection, sex, age, storage, etc.). What is the implication of the taboo? If any, state.
21. State the major problems regarding medicinal plants in the community.
22. Is there any effort made to conserve and manage properly the medicinal plants in the area?
23. Does the medicinal plants have any use other than medicine? If yes, state
24. Is the plant abundant or rare?
25. What are the threats to the medicinal plants in the area?