



**ETHNOBOTANICAL STUDY OF MEDICINAL PLANTS IN
OLENKOMI WOREDA, WEST SHEWA ZONE OF OROMIA
REGIONAL STATE, ETHIOPIA**

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ADDIS ABABA, ETHIOPIA**

SEPTEMBER, 2020



ADDIS ABABA UNIVERSITY
SCHOOL OF NATURAL AND COMPUTATIONAL SCIENCES
DEPARTMENT OF ZOOLOGICAL SCIENCE
ETHNOBOTANICAL STUDY OF MEDICINAL PLANTS IN
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MSc THESIS SUBMITTED TO THE SCHOOL OF GRADUATE
STUDIES OF ADDIS ABABA UNIVERSITY IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE IN BIOLOGY

SEPTEMBER, 2020
ADDIS ABABA, ETHIOPIA

DEDECATION

This thesis is dedicated to the people of Olenkomi district who maintained the rich plant diversity, Ethnobotanical knowledge and associated practices for generations despite the environmental, socio-economic and socio-political challenges over the years.

DECLARATION

I, Yehualashet Wolde Haile confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis. The material contained in this thesis has not previously been submitted for a degree at Addis Ababa University or any other University and all the sources of materials used for thesis are acknowledged.

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GRADUATE PROGRAMES

This is to certify that the Thesis prepared by Yehualashet Wolde, entitled: Ethnobotanical study of Medicinal Plants in Olenkomi Woreda, West Shewa Zone of Oromia Regional State, Ethiopia and Submitted to the School of Graduate Studies of Addis Ababa University in partial Fulfillment the Requirement of Degree of Master of Science in Biology complies with the regulations of the University and meets the accepted standards with respect to Originality and quality.

Signed by Examining Board

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_____ (Chairperson)	_____	_____

ABSTRACT

Ethnobotanical study of Medicinal Plants in Olenkomi woreda, West Shewa Zone of Oromia Regional State, Ethiopia
Yehualashet Wolde, MSc Thesis
Addis Ababa University, 2019

*This research was conducted in Olenkomi district west Shewa, western Ethiopia. The aim of the study was to organize and document information on use, management and conservation of medicinal plants by Olenkomi woreda. The study involved traditional healers, knowledgeable elders, local elders and local communities. Different Ethnobotanical techniques were used to collect and analyze data generated by semi structured interview. Guided field walk; observation and group discussion were conducted. Preference ranking, paired comparison, direct matrix and fidelity level index combined with descriptive statistical analysis were performed. One hundred ten (110) informants were involved from eleven kebeles. A total of eighty one (81) plant species 37 from wild, 24 from home garden and 20 plant species from both wild and home garden. Among 81 collected medicinal plant species 45(55.55%) plant species are used to treat human ailments, 13(16.04%) are used to treat livestock ailments and the rest 23(28%) are used to treat both human and livestock ailment. Herbs were the dominant with 32(39.5%) followed by trees 19(23.45%) then 18(14.81%) species were climber. Leaf was the most frequently used part medicinal plants. The plant species that are collected from the district in addition to their medicinal value also used for food, spices, furniture, fencing, construction and charcoal. The highest informant consensus was documented to the plant *Lepidium sativum* cited by 55 informants for its medicinal value treating abdominal problem. *Rumex nepalensis*, *Ajuga integrifolia* and *Anetum graveolens* informants ranking second third and fourth respectively for medicinal value. Oral administration were the dominant route 55.55% followed by dermal 30.30%. Ocular teeth and others are also observed route of administration applied through squeezing, crushing, boiling, chewing, roasting, smoking and fluid juice. Communicating with indigenous people was the dominant knowledge transfer system while others restricted within the family. Group discussion, direct matrix, ranking results indicated that agricultural expansion was the main factor threatening medicinal plants in the study area.*

Key words: Conservation, Ethnobotany, Medicinal plants, Threats, Traditional healers, Livestock ailments

ACKNOWLEDGMENT

First and for most I would like to extend my heartfelt gratitude to my advisor Dr. Ermias Lulekal who is going to give me all his constructive advice which will support me in conducting this study from beginning to end. I also would like to thank my brothers who helped me to collect necessary data from the study site.

I would like to ward my heartily thank to those encouraging and support throughout the course of this study. And I am grateful to Addis Ababa University for sponsoring this study.

First and foremost I would like to thank the almighty God for helping me endures the rigorous of every life and to cope with the challenges of graduate studies.

I would like to extend my heartfelt gratitude to my advisor Dr. Ermias Lulekal for his unreserved guidance, assistance, follow up, valuable comments, proof reading of my work as well as consistent advices right from beginning of problem identification, proposal development, data collection organization up to the complication of the full fledged research dissertation.

I would like to acknowledge Addis Ababa University Department of Zoological science for their learning facilities support to accomplish the thesis work. My thanks also go to the Ethiopia National Herbarium, AAU for providing me with all the available facilities in plant specimen identification processes, in providing me proper place for the specimen and genuine as well as positive approach.

I am indebted to the inhabitants of Olenkomi district particularly: the traditional healers who unreservedly shared me their wonderful hospitality throughout my stay in the study area for field activities. I am very much grateful to all the local informants who shared their knowledge on the medicinal plants. Without their contribution this study would have been impossible.

My sincere thanks are forwarded to all the friends and colleagues who listened to my ideas provided suggestion and challenged my assumptions at every step of the research works. Particularly Mr. Mengesha Birhanu who spends lots of his time to support me regarding to computer usage skill. PhD students Mr.Yadessa and Mr.Kifle during plant identification processes just to mention few among many colleagues.

I wish to express my appreciation and sincere thanks to all my family and particularly to my only brother Mr. Assefa Wolde Haile who encourages me by providing financial support and in built idea. Finally I grateful to all my relatives and my uncle was farmer Dejene Mammo who gave me unlimited support during data collection.

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ACRONYMS AND ABBREVIATIONS

AAU:	Addis Ababa University
EOTC:	Ethiopian Orthodox Tewahdo Church
FL:	Fidelity Level
HIT:	Health Information Technician
ICF:	Informant Consensus Factor
IK:	Indigenous Knowledge
NGOs:	Non-Governmental Organizations
OWAO:	Olenkomi Woreda Agricultural Office
OWHO:	Olenkomi Woreda Health Office
OWLAFO:	Olenkomi Woreda Livestock and Fishery Office
SNNPR:	Southern Nation and Nationality of People Region
STI:	Sexual Transmitted Infections
WHO:	World Health Organization

CHAPTER ONE

1. INTRODUCTION

1.1 Background

Ethnobotany is the study of direct interrelations between humans and plants (Balick and Cox, 1996). The indispensable dependency of human up on plants for their livelihood was primarily started by domestication and dates back 10, 000 years (Martin, 1995). From plants, humans can obtain food, pesticides, medicines, fuel, fodder, construction materials. Furnitures and diverse aesthetic and spiritual requirements. Thus indigenous knowledge on plants appeared when humans started and learned how to use plants (Posey, 1999). Over centuries, indigenous people have developed their own locality specific knowledge on plant use, management and conservation (Cotton, 1996).

To view this Ethnobotanical studies are useful in documenting, analyzing and disseminating of knowledge and interaction between biodiversity and human society, how diversity in nature is used and influenced by human activities (Martin, 1995). Local communities have experienced indigenously in categorizations, where they use their perceptions and experiences to categorize plants. From their experience, a number of categorization and classification criteria were developed which is important in plant diversity conservation and management. The common criteria here include plant use, habitat, life form, color, abundance, morphological characteristics and combinations. It is this fact that enabled traditional people to develop several statements (proverbs and poems) that apply to plants up on which they are so immediately and intimately dependent (Alexiades, 1996).

Traditional medicine as defined by the World Health Organization (WHO) can be summarized as the sum total of all the knowledge, beliefs and practices that are used in diagnosis, prevention and elimination of physical, mental or social imbalance and rely exclusively on practical experiences and observation handed down from generation to generation (WHO, 1998). Moreover, the use of plants in medicinal sector by local people over the past period take a huge concern as they have long years lineage of utilization and management. This has been achieved through many generations of age old, time-tested

practices, and as a consequent accumulation of knowledge through a series of observations, interactions and innovation (Cunningham, 1996). In Ethiopia, little emphasis has been given to ethnobotanical studies over the past decades (Dawit Abebe, 2001). Even if there has been some attempt in investigating medicinal plants and indigenous knowledge on sustainable use and management of plant resources. The Ethiopian Biodiversity Institute has pledged to do this in its long range strategic research plan. However, there exists an accelerated devastation of plant resources with loss of indigenous knowledge. The lack of conservation actions and activities is observed in Olenkomi Woreda, which is similar to other areas in Ethiopia. Even though it is known that, the woreda has relatively better plant resources and hence, the associated traditional knowledge resource is expected to be significant. The current plant use trend shows that the environment is facing problems of resource depletion and loss of traditional medicinal plants and indigenous knowledge of traditional healers like other areas of the country. Thus, intensive ethnobotanical study plays a vital role to gain relevant information on medicinal plants and related indigenous knowledge for conservation and sustainable utilization of medicinal plants. However, to have full picture of ethnomedicinal knowledge of societies in Ethiopia, a wide range of geographical, cultural and botanical diversity studies need be conducted continuously. Recently, some studies have been addressed in some corners of Ethiopia though not adequate. This major task of medicinal plants identification, proper utilization, conservation and indigenous knowledge of the local communities has never been addressed in Olenkomi Woreda earlier.

In Ethiopia, traditional medicine is faced with a problem of sustainability and continuity mainly due to the loss of taxa of medicinal plants (Zemedu Asfaw, 2001). According to Abebe Demissie (2001), the diversity of plants in Ethiopia is on the process of being eroded mainly due to human induced pressures. The same paper states that habitat destruction and deforestation for commercial timber, 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. With the present ecological and socio-economical changes, the medicinal plants together with ethnobotanical knowledge, may disappear and thus may be lost from humanity forever (Tesfaye Awas, 2003).

The utilization of plants in the healthcare system was established as the principal means of treating various illnesses before the development of western drugs (Dawit Abebe, 1986). In Africa including Ethiopia, using traditional medicinal plants is common and forms the backbone of traditional medicine. The majority of the developing countries depend on traditional medicinal plants for their healthcare. In developing countries leaning to and favoring traditional medicinal plants is mainly due to inaccessibility of modern medical system, economic and cultural factors. Easy accessibility, efficacy on treatment and affordable cost in getting health services are also main reasons in preferring traditional medicine to modern medication (Konno, 2004). Therefore, the study focuses on gathering and documenting use and conservation practices of traditional medicinal plants and the associated ethnomedicinal knowledge of people in Olenkomi Woreda. This is believed to add up to the countries database of medicinal plants and documenting indigenous knowledge of the people.

1.2 Statement of the problem

In Ethiopia Studies and documentation on traditional medicinal plants have been started only very recently because it was neglected and assumed to be irrelevant in the past (Dawit Abebe and Ahadu Ayehu, 1993). Only very little effort has so far been made to record and document traditional medicinal plant species and indigenous knowledge of healers and local communities at large. Among rural Oromo communities of Olenkomi woreda, traditional medication is believed to be an important for use in healthcare system, which mainly involves the use of locally available medicinal plants to treat human diseases and livestock ailments. However, regarding indigenous knowledge transfer and conservation practices are currently under threat mainly because of the depletion of the locally available medicinal plant as the result of the large-scale environmental degradation following agricultural expansion activities, over utilization and over grazing of ethno botanical area that has been taking place in its worst form in this area. Literature searches did not show adequate information about the use, threat and conservation of traditional medicinal plants in the study area. The present study is then initiated with intention to add one more new document concerning indigenous knowledge

on use, threat and conservation of medicinal plants by people of Olenkomi Woreda, west Shewa, Ethiopia.

1.3 Research Questions

- What are the species of traditional medicinal plants used for treatment of human diseases and livestock ailments?
- What form of indigenous knowledge is available pertinent to utilization and conservation of practice of medicinal plants in Olenkomi woreda?
- Which parts of plants are used for medicinal purpose and how are they prepared?
- How was the trend of knowledge transfer from traditional healers to next generation?
- What are the main treathening factors to medicinal plants and associated indigenous knowledge in the area?
- What are the consrevation practices implemented by the community?

1.4. Objectives of the study

1.4.1 General objective

To identify medicinal plants used to treat human and livestock ailments in Olenkomi woreda and to record indigenous and local knowledge of people in the area.

1.4.2 Specific objectives

1. To assess, record, and document indigenous and local knowledge of community and traditional healers on medicinal plants of the study area
2. To identify and collect traditional medicinal plant species used for treatment of human and livestock ailments in the study area
3. Document plant parts used for medicinal purposes and methods of preparation in the study area
4. To investigate the mechanism of transfer of indigenous knowledge from traditional healers and the local community to next generations

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1 An overview of Ethnobotany

Although various animal and mineral products contribute to human welfare, the plant kingdom is most essential to human wellbeing especially in supplying his basic needs. This close interaction and dependency of humans on plants is studied under the field of ethnobotany. It is difficult to tell exactly when the term ethnobotany became part of modern science (Martin, 1995). However, it can be traced back to the time when humans started making conscious interaction with plants and animals. Plants have been indispensable sources of both preventive and curative traditional medicine preparations for human beings and livestock. Historical accounts of traditionally used medicinal plants depict that different medicinal plants were in use as early as 5000 to 4000 BC in China, and 1600 BC by Syrians, Babylonians, Hebrews and Egyptians (Deryet *al.*, 1999). Considerable indigenous knowledge system, from the earliest times is linked to the use of traditional medicine in different countries (Farnsworth *et al.*, 1994). Evidence obtained from observations of animals shows that even chimpanzees use a number of plant species for their medicinal value (Huffman and Wrangham, 1994)

Ethnobotanical work seems to have started with Christopher Columbus in 1492, at a time when he brought tobacco, maize, spices and other useful plants to Europe from Cuba and when other immigrants from the new world documented food, medicine and other useful plants of the Maya and Inca peoples (Martin, 1995). John Hershberger proposed the term ethnobotany for the first time in 1895 (Balick, 1996). However, this term has been given different interpretations and definitions depending on the interest of workers involved in the study (Cotton, 1996). Ethnobotanical investigation documents the knowledge on cultural interaction of people with plants. It also tries to find out how local people have traditionally used plants for various purposes, and how they incorporated plants in to their cultural tradition and religions (Balick and Cox, 1996). Therefore, traditional local communities worldwide have a great deal of knowledge about native plants on which they intimately depend (Langeheim and Thimann, 1982). To achieve more detailed and

reliable information on plants and plant use, ethno botanical study needs involvement of specialists from various disciplines, such as plant taxonomists, plant ecologists, anthropologists, linguists, economic botanists, pharmacologists and others. With such interdisciplinary and multidisciplinary approaches, ethno botany is aimed at gathering and documenting indigenous botanical knowledge, cultural practice, use and management of botanical resources and discovers benefits from plants (Martin, 1995).

2.2 Importance and Trends in Ethnobotany

Ethnobotany is a distinct branch of natural science that combines various aspects such as anthropology, archaeology, botany, ecology, systematic, religious studies, forestry, agro forestry, economics and medicine, cultural and several other disciplines. Ethnobotany is defined simply as "the study of the relationships between plants and people (Balick and Cox, 1996). Martin (1995) conceptualized Ethnobotany as the study of how local people classify, manage and use plants available in their surroundings. 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 and wild food plants that are over harvested so that in the future the coming generations could benefit from the precious plants that are a real gift of nature for the human kind (Qureshi *et al.*, 2009). It is collaborative venture between people in local communities and various scientists and specialists. In modern times, Ethnobotanical knowledge is disappearing very fast. Westernization, breakdown of traditional cultures and even the extinction of complete tribal groups are responsible. One chief goal of such a study is to ensure the local natural history becomes a living tradition in communities where it has been transmitted orally for many years. The results of this work can letter 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. It should take in to account that ethnobotanical studies are useful, for not only documenting, analyzing and disseminating indigenous knowledge of local people but also indicate the interaction between

biodiversity and human society, including how biodiversity is valued in different societies and how is influenced by human activities (Martin, 1995).

Peoples of all cultures have always depended on plants for their primary needs (food, shelter, medicines, etc.), and have indigenously 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. Although It was not called 'ethnobotany' then, ethnobotany is taken as the scientific study of plant lore and agricultural customs of a people, for example ethnobotany plays a crucial role in the study of traditional medicine (Pei, 2005). Given their extensive knowledge of medicinal plants, indigenous peoples 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 that attracts people with widely varying academic background and interests.

2.3 Medicinal plants and Ethnomedicine in Ethiopia

2.3.1 Traditional medicine in Ethiopia

Traditional medicine is the total combination of knowledge and practices that can be formally explained or used in prevention and elimination of physical, mental or social imbalance and relying exclusively on practical experience and observation handed down from generation to generation, whether verbally or in writing. About 75-90 % of the rural population in the world relies on traditional medicines as their only health care system. This is not only because of poverty where people cannot afford to buy expensive modern drugs, but traditional systems are also more culturally acceptable and meet the psychological needs in a way modern medicine does not (FassilKibebew, 2001).

According to WHO (2001), consultation of medicinal practitioners is very helpful for the development and incorporation of useful approaches in planning and budgeting system for health care provision of most developing nations and indigenous communities. In Africa, traditional medicine plays a central role in health care needs of rural people and urban poor. Here, it is said that, this situation would remain so long as modern medicine continues to be unable to meet the health care of the people of the continent effectively

(Jansen, 1981). Their value and role of this health care system will not diminish in the future, because they are both culturally viable and expected to remain affordable, while the modern health care service is both limited and expensive (WHO, 1998). Indigenous traditional medicinal practices were carried out essentially based on private practice, i.e. private agreement between consenting parties, and the knowledge of traditional practice in most cases has descended through oral folk lore (AsfawDebela *et al.*, 1999).

Traditional medicine is a complex medical system that is based on a community's culture, religion, beliefs, and natural environment. 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 vast majority of the rural populations of Ethiopia depend on Traditional medicine and its practitioners (MesseretShiferaw, 1996). Many species of Ethiopian medicinal plants have a long history of use as remedies. As in other developing country, plants are thus the major sources of medicine used by the majority of the population in Ethiopia. DawitAbebe and AhaduAyehu (1993) reported that 80% of the Ethiopian population depends on traditional medicine for their health care.

The indigenous knowledge 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 main stream medicines in developed countries. Nevertheless, there are some remarkable claims made for their effectiveness especially some traditional medicines that are used to treat burns (SebsebeDemissew and ErmiasDagne, 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 healthcare for poor communities throughout Africa (Akerele, 1987).

2.4 Plants in Ethnoveterinary Medicine

In most developing countries, particularly in Sub-Saharan Africa, disease remains one of the principal causes of poor livestock performance leading to an ever-increasing gap between supply and demand for livestock and products. The ever-declining provision of animal health services has resulted in the reappearance of a number of epizootic diseases reducing the economic efficiency of livestock production in Africa. Ethno veterinary medicine which refers to traditional animal health care knowledge and practices comprising of traditional surgical and manipulative techniques, traditional immunization, magi co-religious practices and beliefs, management practices and the use of herbal remedies to prevent and treat a range of disease problems encountered by livestock holders (TafesseMesfin and Mekonnen Lemma, 2001). Ethnoveterinary medicine provides traditional medicines, which are locally available and usually cheaper than standard treatments. Livestock holders can prepare and use homemade remedies with minimum expenses. So far, many livestock holders in rural areas where there are relatively few veterinarians and shortages of other facilities, traditional medicinal plants are the only choice to treat many ailments (McCorkle, 1995). In Ethiopia, as in other developing countries, livestock production plays an important role in the lively hood and economy of majority of the population. Estimated floras of 6500 to 7000 species of higher plants are of medically important and out of these medicinal plants 12% are endemic to Ethiopia. Crop production is almost entirely dependent on traction power provided by animals. Livestock offers in many harsh environments the only way of survival and constitutes a driving force for food security and sustainable development in developing countries like Ethiopia. Although, the gain from livestock production is directly related with safeguarding animal health convention, veterinary medical system is among the smallest in Ethiopia. Techniques such as those to treat the more wide spread ailments are common knowledge among livestock holders (Mengistu A K., (2004).

On the contrary, others are known only to a few indigenous professional healers who have over the year learned the practice. Stock raisers, both farmers and herders have developed their own ways of keeping their animal health and productivity. They treat and prevent livestock diseases using sometimes age old homemade remedies, surgical and

manipulative techniques. Taken together, these indigenous local animal health care beliefs and health care practices constitute an ethno veterinary medicine. Like other kind of local technical knowledge, ethno veterinary medicinal practice and skills are built up on over time empirical observation, mainly through trial and error and sometimes through deliberate or even desperate experimentation and innovation (McCorkle and Mathias, 1996). Ethno veterinary medicine can be useful when ever and where ever stock raisers have no other animal health care options, whether in rural or peri-urban areas. In spite of its paramount importance as livestock health care system, the various traditional veterinary practices remained undocumented in Africa and Ethiopia (DawitAbebe and AhaduAyehu, 1993). Thus, creation of awareness on ethnoveterinary medicine emphasizing on useful plants used for treatment of livestock has paramount importance to livestock management. In addition, proper documentation and understanding of farmers' knowledge, attitude and practices about the occurrence, cause, treatment, prevention and control of various ailments is important in designing and implementing successful livestock production (TafeseMesfine and Mekonen Lemma, 2001).

2.5 Traditional Medicinal Plants in Public Health Care System

Plants have been used as a source of traditional medicine in Ethiopia from the time immemorial to combat different ailments and human sufferings (Asfaw Debela *et al.*, 1999). Due to its long period of practice and existence, traditional medicine has become an integral part of the culture of Ethiopian people. According to Dawit Abebe (2001), there is a large magnitude of use and interest in medicinal plants in Ethiopia due to acceptability, accessibility and biomedical benefits. In this country, the long history of use of medicinal plants is reflected in various medico- religious manuscripts produced on parchments and believed to have originated several centuries ago (Fassil Kibebew, 2001). Medical textbooks written in Geez or even Arabic in Ethiopia between the mid of 17th and 18th century imply that plants have been used as a source of traditional medicine in Ethiopian health care system. Even today, it is common for people living in rural and urban areas to treat some common ailments using plants available around them (example,

Hagenia abyssinica expel tapeworm, *Ruta chalepensis* for various health problems) (Abbink, 1995).

The continued dependency on herbal medicine along with the side of modern medicine is largely conditioned by economic and cultural factors (Aketch, 1992). In addition to these factors, the fact that modern medical services are inaccessible to the vast majority of the populations due to their costs made herbal medicines more acceptable. The problem of ensuring equitable distribution of modern health care has become more serious, as the gap between supply and demand has continued to widen. Hence, in present day Africa including Ethiopia, the majority of people lack access to health care and where available the quality is largely below standard. Therefore, herbal remedies are the world's therapeutic means to act against diseases for a large proportion of people both rural and urban centers in developing countries like Ethiopia (Abbiw, 1996).

2.6 Indigenous Knowledge of Local Community

Indigenous knowledge refers to the accumulation of knowledge, rule, standards, skills, and mental sets, which are possessed by local people in a particular area (Quanash, 1998). The immediate and intimate dependency of local people on natural resources resulted in the accumulation of indigenous knowledge that helped people to adapt to and survive in the environments in which they live. It is local knowledge that is unique to a given culture or society and the base for agriculture, health care, food preparation, education, environmental conservation and a host of other activities (Thomas, 1995). The complex knowledge, beliefs and practices generally known as indigenous knowledge develops and changes with time and space. Hence, such knowledge includes time-tested practice that developed in the process of interaction of humans with their environment (Alcorn, 1984).

Therefore, it is the result of many generations long year's experiences, careful observations and trial and error experiments (Martin, 1995). Indigenous knowledge is a body of knowledge built up by a group of people through generations of living in close contact with nature and it is cumulative and dynamic. It builds upon the historic experiences of people and adapts to social, economic, environmental, spiritual and political change. The quantity and quality of traditional knowledge differs among

community members according to their gender, age, social standing, profession and intellectual capabilities. For instance, societies concerned with biological diversity will be most interested in knowledge about the environment; this information must be understood in a manner, which encompasses knowledge about the cultural, economic, political and spiritual relationships with the land. It provides a distinctive worldview of which outsiders are rarely aware and at best can only incompletely grasp (Balick and Cox, 1996). Indigenous people of different localities have developed their own specific knowledge on plant resources, use, management and conservation (Cotton, 1996). Thus, systematic application of indigenous knowledge is important for sustainable use of resources and sustainable development (Thomas, 1995). One of the widely used indigenous knowledge system in many countries is the knowledge and application of traditional medicine. Such knowledge, known as Ethnomedicinal knowledge involves traditional diagnosis, collection of raw materials, preparation of remedies and its prescription to the patients. Indigenous knowledge on remedies in many countries including Ethiopia, pass from one generation to the other generation verbally with great secrecy (Jansen, 1981). Such secrete and crude transfer makes indigenous knowledge or Ethnomedicinal knowledge vulnerable to distortion and in most cases, some of the lore is lost at each point of transfer, hence there is a need for systematic documentation of such useful knowledge through Ethnobotanical research (Farnsworth, 1994).

The majority of the population that lives in the rural and the poor people in urban areas rely mainly on traditional medicines to meet their primary health care needs. However, the traditional knowledge of medicinal plant in Ethiopia is not compiled (Sori T., *et al.*, 2004). Traditional medical knowledge of medicinal plants and their use by indigenous cultures are not only useful for conservation of cultural traditions and biodiversity, but also healthcare and drug development in the present and future (Tamiruet *al.*, 2013). The studies conducted on the traditional medicinal plants in Ethiopia are very limited when compared with the multi ethnic cultural diversity and the diverse flora of Ethiopia. Even though traditional knowledge of medicinal plants is very crucial to treat different diseases, there is no study conducted in Olonkomiworeda West shewa Zone of western Ethiopia on this regard. Hence, this study was designed to identify and document medicinal plant species and traditional medicinal knowledge of the traditional health

practitioners in study area. The traditional knowledge in Ethiopia is passed verbally from generation to generation and valuable information can be lost whenever a traditional medical practitioner passes without conveying his traditional medicinal plants knowledge (Pankhurst *et al.*, 2001).The secrete of information retained by traditional healers is relatively less susceptible to distortion but less accessible to the public (DawitAbebe, 1986). However, the knowledge is dynamic as the practitioners make every effort to widen their scope by reciprocal exchange of limited information with each other (Abbink, 1993).

2.7 Advantages of Herbal Medicine

Medical herbalists believe that plants should be used in their full, original form and not synthesized to form chemical drugs (Elumali and Eswariah, 2012). There are several reasons why some people prefer medicinal herbalism over western health care. These include:

I. **Regulation.** The instruction of modern drugs is extremely rigorous and the activity of bringing new medicines to the market is expensive and time consuming compared to herbal medicine (Brennan, 2007). The instruction how to use traditional medicine is simple comparing to western medicine.

II. **Protection.** Not strict intellectual property law in herbalism. Strict intellectual property law on modern medicine ensures that scientific knowledge and research is highly protected but herbalism is built around the sharing of knowledge between generations and cultures (Aburja*et al.*, 2007). Openness and honest mentality are the most important values rather than money in herbalism (Garoida*et al.*,2007).

III. **Consultation.** Herbalist treatment is mostly specific, more personal and needs short time to brief a patient's particular symptoms than western health care (Elumalai and Esveriah, 2012).

IV. **Formulation.** Herbal medicines are mostly prepared during the consultation and can be judgmentally modified to their personal made. On the other hand, western drugs are manufactured in a standardized way using standard ingredients and standard processes (Obosmsawin, 2008).

V. **Cheap and accessible.** Traditional medicine has remained as the most affordable and easily accessible source treatment in the primary health care system of resource for poor

communities. According to DawitAbebe (2001), there is a large magnitude of use and interest in medicinal plants in Ethiopia due to accessibility and biomedical benefits of the traditional medicinal plants.

2.8 Contributions of Traditional Herbal Medicines for Drug Development

WHO estimate that 70-80% of people in developing countries including Africa depend on traditional medicines for their health care (Cunningham, 1993). This is not only because of poverty, when people cannot afford to buy expensive modern drugs, but traditional systems are also more culturally acceptable, and meet the psychological needs in away modern medicine does not (Brown, 1994). The integration of modern health system and traditional medicine will provide a better public health service. Evidently, traditional knowledge of medicinal plants is important in development of new modern drugs. Currently many drugs are from plant resources (e.g. aspirin from *Ulmaria* (Rosaceae), quinine from *cinchonapubescens* (Rubiaceae), morphine from *papaversomniferum* (Papaveraceae) and ephedrine from (*Ephedra sinica*) prescribed in the North America and Europe.

Some photochemical studies have demonstrated that there is a better probability of encountering active compounds from plants when an ethnobotanical approach is used rather than a random survey (Balick and Cox, 1996). Preliminary test of medicinal plants form central America in which in vitro anti-HIV screen was detected as being active 25% of these plants species were those classified as “powerful plants” by herbal healers, on the other hand only 6% randomly collected species were active (Balick and Cox, 1996). Another useful method is a photometric survey where researchers choice close relatives of plants known to produce useful compounds (Balick and Cox, 1996). This approach might increasing the probability of encountering active compounds but unlike ethnobotanical information, little is known about their efficacy and safety, as they are not practical tested time and again through years. According to Balick and Cox (1996), the history of drug discovery shows that the ethnobotanical approach is the most productive of the plant survey methods for discovery of novel medicinal products.

2.9 Threats and Conservation of Traditional Medicinal Plants in Ethiopia

2.9.1 Threats to medicinal plants

People use many wild species of plants for food, medicine, clothing, shelter, fuel, fiber, income generation and the fulfilling of cultural and spiritual needs throughout the world (ZemedAsfaw, 2001). Ethiopia's traditional medicine as elsewhere in Africa is faced with problems of continuity and sustainability (EnsermuKelbessa *et al.*, 1992). Although, plants play vital role in treating various human and livestock ailments, they are currently under pressure. Indigenous knowledge on usage of medicinal plants as folk remedies is getting lost through various reasons. The primary causes of this problem are loss of taxa of medicinal plants, loss of habitats of medicinal plants and loss of indigenous knowledge. Some studies have shown that most of the medicinal plants utilized by Ethiopian people are harvested from wild habitats and hence this aggravates the rate of loss of taxa with related indigenous knowledge and loss of widely occurring medicinal plant species (MirutseGiday, 2001).

There are two major sources of threats to traditional medicinal plants; those are manmade and natural causes. Rapid increase in population, the need for fuel, urbanization, timber production, over harvesting, destructive harvesting, invasive species, commercialization, honey cut, degradation, agricultural expansion and habitat destruction are human caused threats to plants. Likewise, natural causes include recurrent drought, bush fire, disease and pest out breaks where by human intervention habitats and species are being lost rapidly because of environmental degradation, agricultural expansion, deforestation and urban development (EnsermuKelbessa *et al.*, 1992). As elsewhere in Ethiopia, the problem is manifested in OlonkomiWoreda due to the above-mentioned factors. In addition to this, medicinal plants are considered to be at conservation risk due to over use and destructive harvesting (ZemedAsfaw, 2001). Ethnomedicinal knowledge diminishes with the death of elderly knowledgeable members of society since only a few young people are willing to acquire the knowledge. In addition, invasion of alien weeds like *Partheniumhysterophorus* has adverse impact on medicinal plants and climate

change such as an increase of temperature from year to year and severe drought that lead to difficulty for survival of more water consuming medicinal plants in the future (Muthuswamy and Solomon, 2009).

2.9.2 Conservation of Traditional Medicinal Plants

Conservation is defined as the sustainable use of biological resources. The concept of sustainability is now seen as the guiding principle for economic and social development, particularly with reference to biological resources. According to ZemedAsfaw (2001), medicinal plants are considered to be at conservation risk due to over use and destructive harvesting roots and barks collection. DawitAbebe and AhaduAyehu (1993) found that many medicinal preparations use roots, stem and bark by effectively killing the plant in harvest.

Plant parts used to prepare remedies are different; however, root is the most widely used part. Such wide utilization of root part for human and live stock aliments with no replacement has severe effect on the future availability of the plant. 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 (ZemedAsfaw, 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 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. 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 (ZemedAsfaw, 2001).

Although various threats have profound effect on medicinal plants, local people attempt to grow medicinal plants in home garden though the effort is minimal. By ex-situ methods, traditional medicinal plants can be conserved in gene banks, botanic gardens

and field gene banks. In addition, tissue culture technique is also important in ex-situ conservation of traditional medicinal plants (AbebeDemissie, 2001). Moreover, conservation measures should be taken by government officers and NGOs to reduce the existing medicinal plants on threat (SeyoumGetaneh, 2009). KebuBalemie (2006) suggested that, raising awareness and enhancing conservation alongside urgent collection of germplasm for the severely declining of some species is important. Awareness on the contribution of traditional medical practice towards fulfilling the primary healthcare needs should be created among the youth. It was pointed out that young generation has no interest to know about medicinal plants and efforts should be made to incorporate traditional medicine in school curricula so that younger people appreciate its usefulness (MirutseGiday, *et al.*, 2009). The finding of ZemededeAsfaw (2006), also pointed out that, the dynamic indigenous knowledge practice for the optimization of the uses and management of plant resources particularly in Ethiopian dry land is among the key recommendations for the conservation, use and management of biodiversity. Documentation of indigenous knowledge and making herbaria for future use is also recommended to ensure conservation of the declining medicinal plants (Muthuswamy and Solomon, 2009).

The discipline of ethnobotany can be a novel form of science that can create a partnership between indigenous peoples and researchers aiming for the conservation of biodiversity (Laird, 2002). It can do so by integrating indigenous culture into sustainable conservation strategies (Turner, 2000). Ethnobotany focuses on documenting, analyzing and using of indigenous knowledge, beliefs and practices related to plant resources (Martin 1995; Balick and Cox, 1996; ZemededeAsfaw, 1997; Aumeeruddy-Thomas and Shengji, 2003). Ethnomedicine, that encompasses indigenous knowledge, besides studying the actual medicinal values of plants, plays a great role for the conservation of biodiversity. Studies conducted in Ethiopia have found out some cultural beliefs and traditional practices are so vital in contributing to the conservation of medicinal plants in particular and biodiversity as a whole. For example, Etana Tolosa (2007) listed out various local beliefs and cultural traditions used for the conservation of medicinal plants in Gimbi Wereda (Western Wellega). Fisseha Mesfin *et al.* (2009) also documented cultural and spiritual beliefs used for the conservation of medicinal plants in Wonago Wereda

(SNNPR). AlemayehuWassie (2008) also noted the role of Ethiopian Orthodox Tewhedo Church (EOTC), in northern part of Ethiopia, for the conservation of biodiversity. Thus, if ethnobotany is strengthened and if ethnobotanists work together with the stakeholders, including the local communities, governments, educators, NGOs, etc., it can address future environmental degradations and accelerating loss of cultural knowledge and language (Hamilton *et al.*,2003).

CHAPTER THREE

3. MATERIALS AND METHODS

3.1 Description of the Study Area

3.1.1 Geographical Locations of the Study Area.

Olenkomi district is one of the 22 districts of the West shewa Zone in Oromia National Regional State (OWAO, 2019). The relative location of the woreda is approximately 64 km West of Addis Ababa. It comprises of 3 urban and 17 rural kebeles. The woreda is bounded by Jeldu woreda in the North, Ejere Woreda in the East Dandi Woreda in the West and Dawo and Ilu in South. The woreda has an estimated total population of 112,928 of whom 57,362 are males and 55,566 are females from these 9,388 males and 9,020 females live in the town (OWAO, 2019). The ethnicity of the woreda population is Oromo and Oromiffa is the major language in the district.

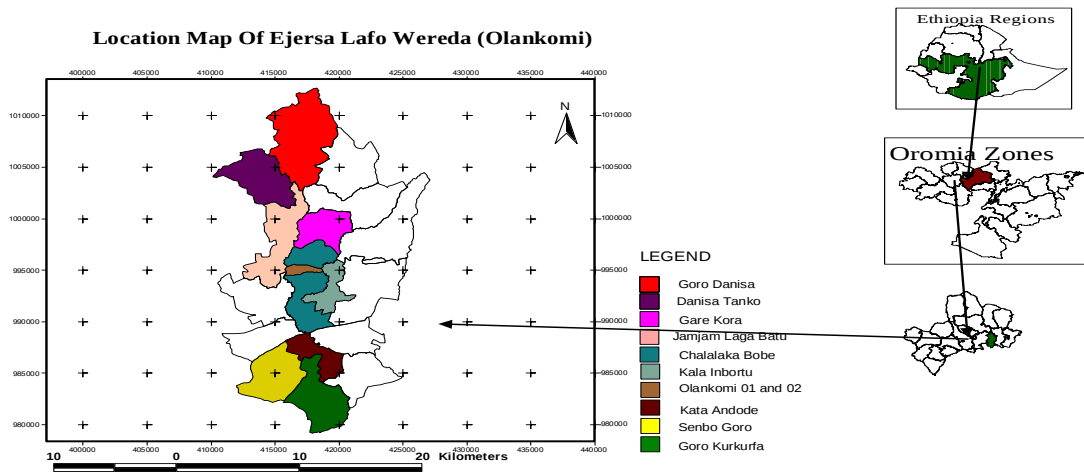


Figure 1: Map of Ethiopia showing Oromia Region and the Study District

3.1.2 Soil and Drainage

There are two dominant soil types, namely Loam and clay soil each covering about 88% and 12% respectively from Olenkomi woreda agriculture office (OWAO, 2019). The topography, vegetation and rainfall pattern in the district encourages the existence of many perennial big and small rivers respectively (Awash, Jamjam, Qalla and Laga Batu, Girfita) that have been providing an irrigational function under traditional and modern systems.

3.1.3 Climate and Ecology

The altitudinal range of the district lies between 2000-3288 meters above sea level. According to Olenkomi agricultural office (OWAO, 2019). The district is characterized by two major agro-climate zone, 26% of the area is dega (cold), and other 74% of the area is woinadega (sub-humid). The mean of daily minimum characterized by having the annual rainfall at range 750-1170mm.

3.1.4 Materials used for the Research

Field materials: including hard cover note book, permanent ink pen, pencil, collecting bags field portfolio and plant press, including old news paper, card boards and number tags.

3.1.5 Land use and agricultural systems

Based on the information obtained from Olenkomi woreda agricultural and rural development office (2019), the district covers a total area of 33,977hec (339.77km square) of which the largest that is 23,867(238.67km square) is agricultural land followed by forest and also other land features that share considerable area as listed in table 1.

Table 1: Land use patterns of Olenkomi district

Land use	Area(hectare)	Km square
Agricultural land	23,867	238.67
Grazing lands	5,939	59.39
Forest coverage	3,009	30.09
Others	1,162	116.20
Total	33,977	339.77

Source: (OWAO, 2019)

The main livelihood of the population is agricultural and livestock production in the rural and trade in the urban kebeles. Crop production is entirely rainfed and small scale irrigation practice has been recently introduced by the office of agricultural and rural development (OWAO, 2019). The rainy season varies between 750 – 1170mm, and it is important for the cultivation of both long and short cycle crops. For the land under cultivation in this district 80.2% was planted with cereals, 15.28% pulses, 2.35% oil seeds and 2.17% ageda. According to Agricultural and Rural development of Olenkomi (Ejerselafo) woreda (2019). The agricultural systems of the area encourage both farming and livestock production. The indigenous soil and water conservation techniques of farmers in the district helped them to produce cereal crops (Teff, wheat, and sorghum etc).

3.1.6 Status of human health services in the district

In 2019 the Olenkomi district had 7 NGO small clinics, 3 functional health centers (Tena tabya) and 9 Tena kella giving service to a total of 112,928 people (OWAO, 2019). There are 128 health professionals' composed of ten health practitioner, 1 health officers, 3 environmental sanitarians, 12 senior nurses, 14 junior nurses, 1 senior laboratory technicians, 4 druggists and 29 health assistances working in the district (OWHO, 2019). The top ten human diseases in the area include violence and injury, Diarrhea ,pneumonia, Acute Uritrite, Gastritis, Infection of the skin ,Helminthisis, STI, Acute febrile illness and Malaria (OWHO, 2019).

3.1.7 Status of veterinary services in the district

The population of livestock is relatively high in Olenkomi woreda district. However, their productivity is very low as in most places in the country. The livestock resources of Olenkomi district is not yet been exploited. Their performance (milk meat, egg, honey) production and contribution to the regional and national economy is very low mainly due to poor management, low genetic potential due to inbreeding, inadequate and low quality feed supply, and the prevalence of various animal diseases (OWAO and OWLAFO, 2019). There is no adequate information regarding chicken because of recent establishment of the woreda. Epizootic lymphangitis, African Horse sickness, Anthrax, black leg, Bovine or ovine pasteurellosis, Lump skin disease, Trypanosomosis, Newcastle disease, mastitis and sheep and goat pox are reported as the most top ten diseases types affecting livestock resources of Olenkomi woreda (OWALFO, 2019).

3.2 Method of data collection and analysis

3.2.1 Reconnaissance survey

Reconnaissance survey was conducted at first to have a mental picture of the study area. It was conducted from January 20-26/2011 in order to obtain an impression about medicinal plants and general understanding of the characteristics of the study area and to identify the different kebeles of the district. During the survey general information about the district was obtained.

3.2.2 Site selection

A total of 11 kebeles were selected from Olenkomi district based on vegetation cover and availability of traditional healers'. The administrative town was selectively included to represent an urban setting. The following kebeles were selected in the district; Olenkomi 01, Olenkomi 02, Gare kora, Calalk bobe, Qala imbortu, Jamjam laga batu, Goro kurkurfa, Kata andode, Sembo goro, danisa tenko, and Goro danisa (Table 2). The specimens were collected from the study area using semi structured interview, guided field walk, observation and group discussion methods. The specimens were numbered,

pressed then came to national herbarium. Finally identified after dring process was completed.

3.2 3.Characteristics of informants

Table 2: Number of Households included in the study

Cluster	Kebele	Total Househ old	Key Informant			General informant			Included Household		
			M	F	T	M	F	T	M	F	T
Wirtu Olenkomi	Kela imbortu	268	1	1	2	5	3	8	6	4	10
	Gare kora	418	2		2	4	4	8	6	4	10
	Calalak bobbe	559	1	1	2	5	3	8	6	4	10
Wirtu Jamjam	Jamjam lag batu	538	1	1	2	5	3	8	6	4	10
Wirtu Yaya	Sembo goro	788	1	1	2	5	3	8	6	4	10
	Kata andode	528	1		1	5	4	9	6	4	10
	Goro kurkurfa	770	2	1	3	4	3	7	6	4	10
Wirtu danisa	Goro danisa	548	1		1	5	4	9	6	4	10
	Danisa tenko	568		1	1	6	3	8	6	4	10
	01 Kebele	1230	1		1	5	4	9	6	4	10
	02 Kebele	1014	2	1	3	5	3	8	6	4	10
Total			13	7	20	53	37	89	66	44	110

3.2.4 Selection of informants

A total of 110 informants (male 66 female 44) were selected with age range between 20-80 years including 20 key informants who are healers, elders and knowledgeable persons from the total 11(eleven) selected kebeles. Informants were selected based on systematic sampling (key informants selected purposively) and other informants were based on recommendations from the local administrator, students, religious leaders and leaders from the community group. Furthermore, The logistic letter and list of traditional healers operating legally in the district was obtained from the Olenkomi woreda administrative office to interview openly with the understanding that the purpose of study is of academic value, Later key informants were identified, interviewed and detailed information was recorded. Other 90 informants were selected by Snowball sampling from

the community by asking every individual in the house and working fields. Informants treat to politely at least two times to get reliable information.

3.2.5 Market survey

Market survey was done in Olenkomi gabaya with the study district to observe and collect data on the Marketability and trade of medicinal plants (figure 2). Therefore, a market survey was conducted to gather the ethnobotanical information to distinguish and record the type of herbal drugs sold in the market, and the multipurpose role of some medicinal plants. Broad scale observations and interviewing was also conducted with men and women selling buying relating medicinal plants and doing many other things in the market.



Figure 2: Part of market survey in Olenkomi district (Olenkomi gabaya) women sold *Rosmarinus officinalis*, *Lippia adoensis* and *Ocimum americanum*: (photo courtesy by Yehualashet Wolde, 2019).

3.3 Data analysis procedures

3.3.1 Descriptive statistics

Facilities in SPSS statistics were utilized following survey and analytical tools for ethnobotanical method which are recommended by Martin (1995) and Alexiades (1996). Descriptive statistical methods were employed to analyze and summarize the data on medicinal plants, associated knowledge, management method, use and conservation. The most useful application, methods of preparation, route of administration, disease treated, dosage, and part used habit through appropriate software and statistical analysis.

3.3.2 Informant consensus

There should be strong agreement among the informants regarding ethnomedicinal types and uses of plants. In this case informants were asked at least two times to check the reliability of information given by them. This method was taken from Alexiades (1996).

3.3.3 Preference ranking

Preference ranking was performed using **seven selected key informants** for most important medicinal plants first on the basis of healing power of abdominal crump, bloating, liver, diarrhea and Mich diseases. Accordingly, medicinal plants was chosen to be ranked preferentially by key informants on the basis of curing of the above diseases giving values of 1 to 5 for ranking (the highest value 5 for best plant in treatment of the above listed diseases, second highest value 4 for the second best plants and least value 1 for plants with lower healing power) as compared to other plants.

3.3.4 Direct matrix Ranking

Direct matrix ranking was used following Cotton (1996) for multipurpose medicinal plants based on the relative benefits obtained from each plant. Five multipurpose plant species were selected out of the total medicinal plants based on the information gathered from the informants and nine key informants were chosen purposively to assign use value to each attribute (5=best, 4=very good, 3=good, 2=less used, 1=least used and 0=not

used). These plant species values include medicinal, food spices, fencing, fire wood, charcoal, construction and furniture making. Based on information gathered from informants, average value of each use-diversity for species was taken and the values of each species were sum up and ranked.

3.3.5 Fidelity level (FL)

Fidelity level (FL) values were calculated for each medicinal plant species obtained from the study area on the fact that the medicinal plants that had the highest FL values could be an indication of their good healing potential and commonly used ones. The FL quantifies the importance of a species for a given purpose. Most commonly used medicinal plants have high fidelity level value. Friedman *et al.* (1986) used a technique designed to highlight species that have healing potential for specific major purposes and merit further biomedical research. FL was calculated as the ratio between the number of informants who suggested the use of a species for the same major purpose (Ip) and the total number of informants who mentioned the plant for any use (IU). The FL was used in the study to quantify the importance of a species for a given purpose. The value of FL that is close to 100% showed the species are used by large number of people while a value close to 1% showed that the respondents disagree on that species to be used in the treatment of ailments (Jaroli *et al.*, 2010).

CHAPTER FOUR

4. RESULTS

4.1 Medicinal Plant diversity

The people in the study area use diverse plant species for traditional medicinal purpose to treat both human and livestock ailments. **A total of 81 plant species that belong to 44 families** were claimed to be used for traditional medicinal purpose by the local people of the district (Appendix2). Plants considered to be used to treat human ailments only were 45(55.55%) those plants used to treat both human and livestock ailments were 23(28.39%) and 13(16.04%) were those used to treat livestock only. From total of 81 species of traditional medicine plants that are found in the study area 37(45.67%) species were collected from wild natural habitat, 23(29.62%) species from home garden and the remaining 20(24.69%) were from both wild and home garden.

All informants (110) were grouped in three age groups. The group includes the young (20-40), the middle age (41-60) and the elders (61-85) informants (Table 3). The highest number of informants was obtained from the middle age of approximately 41 percent (Table 3). Males were more in number (66%) compared to females (44%). And also some (59%) of the informants were illiterate (Table 4). About 87% of the total informants were married (Table 5).

Table 3: Informant general information

Age group (in yrs)	Sex and number of informants		
	Male	Female	Total
20-40	19	15	34
41-60	26	19	45
61-85	24	7	31
Total	69	41	110

Table 4: Educational status of informants

Educational status	Sex of informants		
	Male	Female	Total
Illiterates	30	35	65
Only read & write	25	9	34
Modern education	5		5
Others(like church education	6		6
Total	66	44	110

Table 5: Marital status of informants

Marital status	Sex of informants		
	Male	Female	Total
Married	61	35	96
Not married	2	1	3
Divorce	1	1	2
Widowed	2	7	9
Total	66	44	110

4.3 Indigenous Knowledge of people on health concept in Olenkomi District

The local people of Olenkomi district uses different medicinal plants for the treatment of different human and livestock diseases. Indigenous and local people of the district believe that most health problems can be addressed using medicinal plants. Moreover, the indigenous people of the study area believe that some health problems are totally incurable by modern medication. . The practitioners' believed that some health problems such as snake bite, ,evil eye, devil , insect allergy and madness and epilepsy cannot be treated by modern medicine and they advice for local people to get treatment with traditional way. On the other hand, more than nineteen percents of the practitioners recommend the local people to go to modern health institutions for the diseases such as bleeding birth case, abortion and fire wound.

4.3.1 Indigenous knowledge transfer on medicinal plants for the treatment

The people of the study area use different medicinal plants for the treatment of different ailments. Indigenous knowledge on medicinal plants was reported to be accessed by various methods in the study area. According to informants response, the highest (45%) medicinal plant knowledge transfer in the local community was reported to be through communicating with the indigenous people or the society, (30%) of medicinal plant knowledge transfer was reported to be addressed through observing parents (healers) While the rest (15%) and (10%) transfer occurs by discussing orally with family members secretly.

4.3.2 Indigenous knowledge on landscape classification

The indigenous people classify the district land topographically. The following landscape was identified.

- Medama: This refers to plan land on which The indigenous people in Olenkomi woreda classify the landscape based on topography of the land and their knowledge on the landscape classification.settlement, agricultural activity as well as livestock grazing are practiced. It covers the highest land forms (70%).
- Wetageba: (10%) of the land refers to up and down land that is not used for agriculture but it can used for grazing
- Terarama: Relatively a mountain characterized with high altitude to other land forms. It covers small part of the district relative to the other land form (20 %).

4.3.3 Indigenous vegetation classification

The indigenous people of the district classify the vegetation in to:

- Chaka: refers to densely forested lands composed of large trees, this type of vegetation has declined in the district because of agricultural explanation and over harvesting.
- Kutkuato: refers to complex plant association in the wild, road side as well as for those plants grown in garbage area the majority of plants observed in these area

are herbs and shrubs. According to informants the plants grow in this category have medicinal value.

- Grass land: refers to an area dominated by grass and other herbaceous plants

4.4 visual vegetation classification in Olenkomi district

In this district, categorizations of vegetations in to plant community type were done with giving serious attention for the vegetation structure. To indicate the distribution of medicinal plants in the study area with respect to the dominant tree species, careful visual observation was made and vegetation of the study area was classified in to community types by taking the dominant species for naming the community. Hence, with critical observation of the district resulted the following five plant community types

1. Community dominated by *Eucalyptus globulus* plantation: type of community is recorded in almost all stud sites. It is one of the good income generating plants for the farmers in the area as a result it widely replacing croplands. The most common community type is dominantly found almost in all kebeles of the district.



Figure 3: Community dominated by *Eucalyptus globulus*: Photo courtesy by Yehualashet Wolde (2019)

2. Community dominated by *Acacia abyssinica* species such community type was recorded in Jamjam laga batu, kela imbortu, dominantly and also contributes 11 medicinal plants and the front flowering plant is *Verbascum sinaiticum* used to treat swelling.



Figure 4: Community dominated by *Acacia abyssinica* species, *Verbascum sinaiticum* (a medicinal plant) is also seen in flower as a component of this vegetation type:Photo courtesy by Yehualashet Wolde (2019)

3. Community dominated by *Olea europaea sp. cuspidata* (weyra) Common plant species dominated by *Olea*. This community type is commonly found in mountainous area of the district especially in kebeles Gare kora and Churches of the study area most plant species are found there.



Figure 5: Community dominated by *Olea europaea sp. Cuspidata* (weyra): photo courtesy by Yehualashet Wolde (2019)

4. Community dominated by *Justicia schimperiana* (Sensel). This community is predominantly observed in 01 and 02 kebeles there is also a place called sensel tera in these kebeles because of the dominancy of *Justica schimperiana*. Besides there are also other medicinal species (*vernonia amygdalina* (Grawa), *Embelia schimperi* (Enqoqo), *Calpurina aurea*, *Coccinia abyssinica*.



Figure 6: Community dominated by *Justicia schimperiana* (Sensel): Photo courtesy by Yehualashet Wolde (2019)

4.5 Medicinal plants in the study area

4.5.1 Medicinal plant use categories by the people of study area

A Total of 81 plants having traditional medicinal values was documented from the study area .In addition to their medicinal values the plants were reported to be utilized for other uses by the community. About 54 species (66.66%) of the plants were reported for only medicinal value 14 species (17.2%) were reported for their use as food, 4 species (4.93%) for spice, 3 species (3.7%) for furniture,2 species(2.46%) for charcoal, 1 species (1.23%) for construction and fire wood and the rest 3 species (3.7%) for fencing.

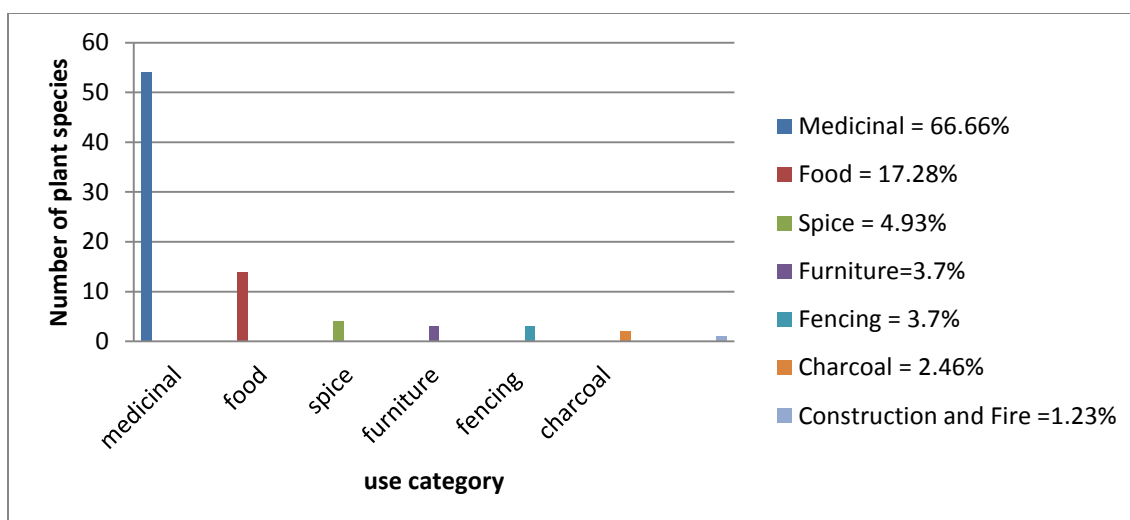


Figure 7: Use category of medicinal plants species

4.5.2 Diversity of medicinal plants in the study area

In this study 81 plant species distributed in 44 families were reported to treat both human and livestock ailments (Table 6). The family Lamiaceae, Fabaceae and Solanaceae had the highest number of plant species followed by Cucurbitaceae, Poaceae, and Euphorbiaceae, Rutaceae the rest families 2 and 1 species each.

Table 6: Number of medicinal plant Family and Species

Families	No. Plant species	Species in %
Lamiaceae	7	8.6
Fabaceae	6	7.4
Solanaceae	7	8.6
Cucurbitaceae	5	6.1
Poaceae	4	4.9
Euphorbiaceae	3	3.7
Rutaceae	3	3.7
Asclepiadaceae	2	2.4
Asteraceae	2	2.4
Alliaceae	2	2.4
Acanthaceae	2	2.4
Boraginaceae	2	2.4
Brassicaceae	2	2.4
Myrsinaceae	2	2.4
Malvaceae	2	2.4
Vitaceae	2	2.4
Others	28	34.56

4.5.3 Ethnomedicinal plant species used to treat human and livestock ailments by people of Olenkomi district

In the study area 81 medicinal plant species (Appendix 2) were documented for the treatment of human and livestock ailments. From these 45 (55.55%) species were reported to be used as human medicine, 13 (16.04%) species for treating livestock ailments and the rest 23 (28.39%) species were mentioned for treating both human and livestock ailments (Figure 8).

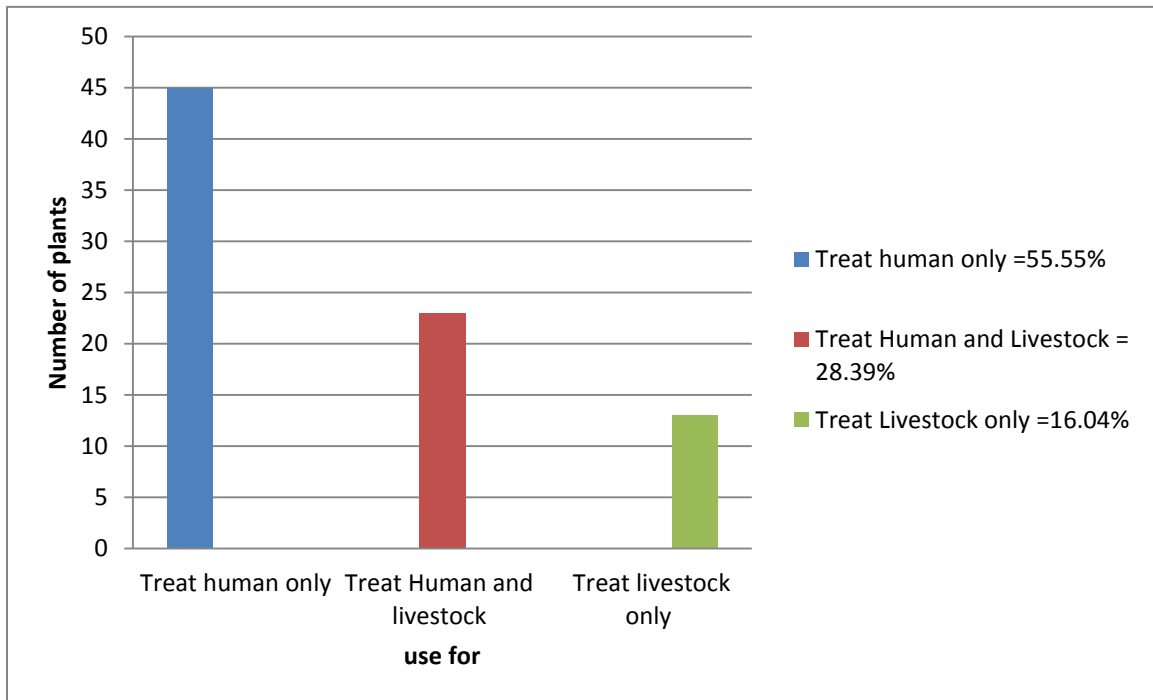


Figure 8: Ethnomedicinal plant species used to treat human and livestock ailments by people of Olenkomi district

4.5.4 Distribution of medicinal plants based on their habitat

From the total of 81 species of traditional medicinal plants that are found in the study area 37 species (45.67%) were collected from the wild natural habitat, 23 species (29.62%) from home garden and remaining 20 (24.69%) were collected both from the wild and home garden. (Figure 9).

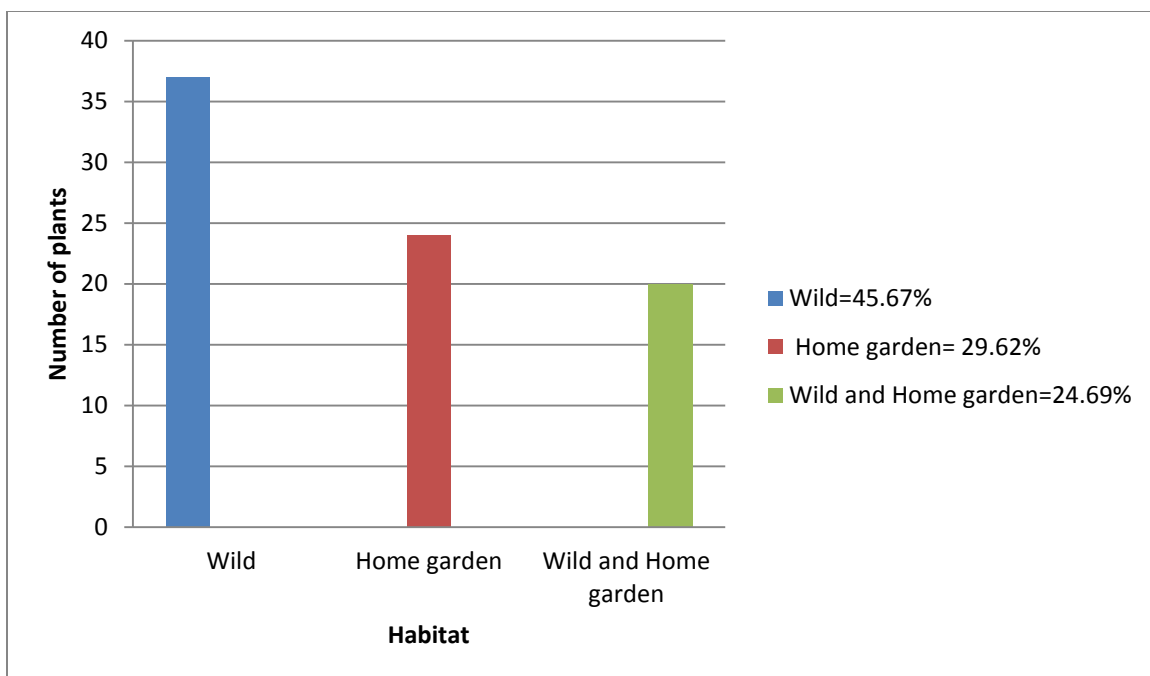


Figure 9: Distribution of medicinal plants based on their habitat

4.5.5 Diversity of habits of medicinal plants

From 81 collected and recorded traditional medicinal plants (Appendix 2,) 32 species (39.5%) were herbs, 19 species (23.45%) were trees, 18 (22.22%) shrubs and 12 species(14.81%) were climbers (Figure 10).

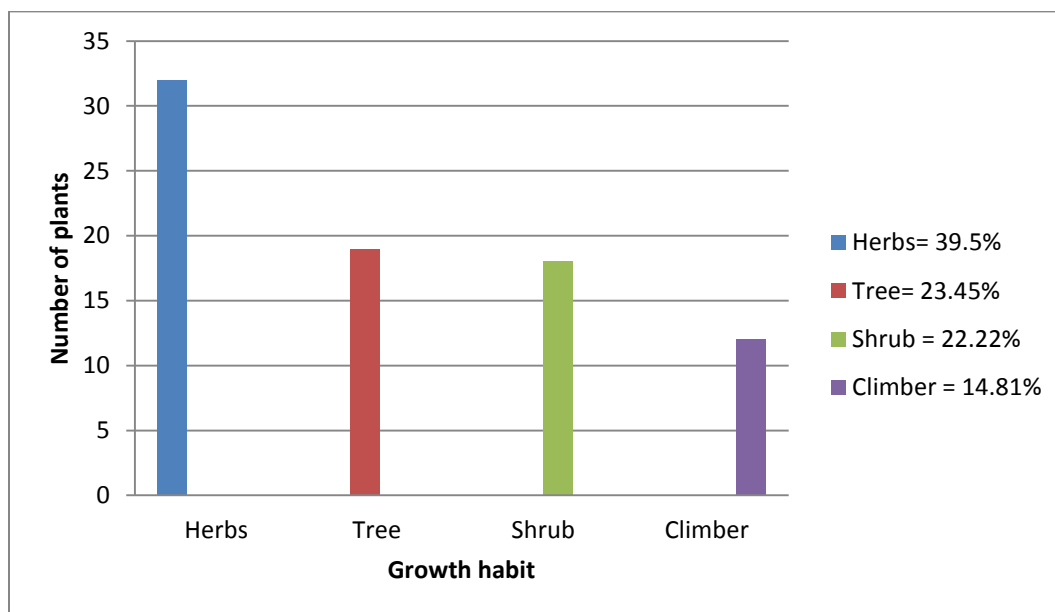


Figure 10: Diversity of habits and use categories of Medicinal plants

4.5.6 Plant parts used for human and livestock ailment

In the district different plant parts were reported to be used as a medicines (Appendix 2).The most frequently utilized plant parts were leaves 45 preparations followed by fruit 17 preparations and seeds 12 preparations .Leaves were the most commonly reported plant parts in the preparation of remedies. (Figure11).

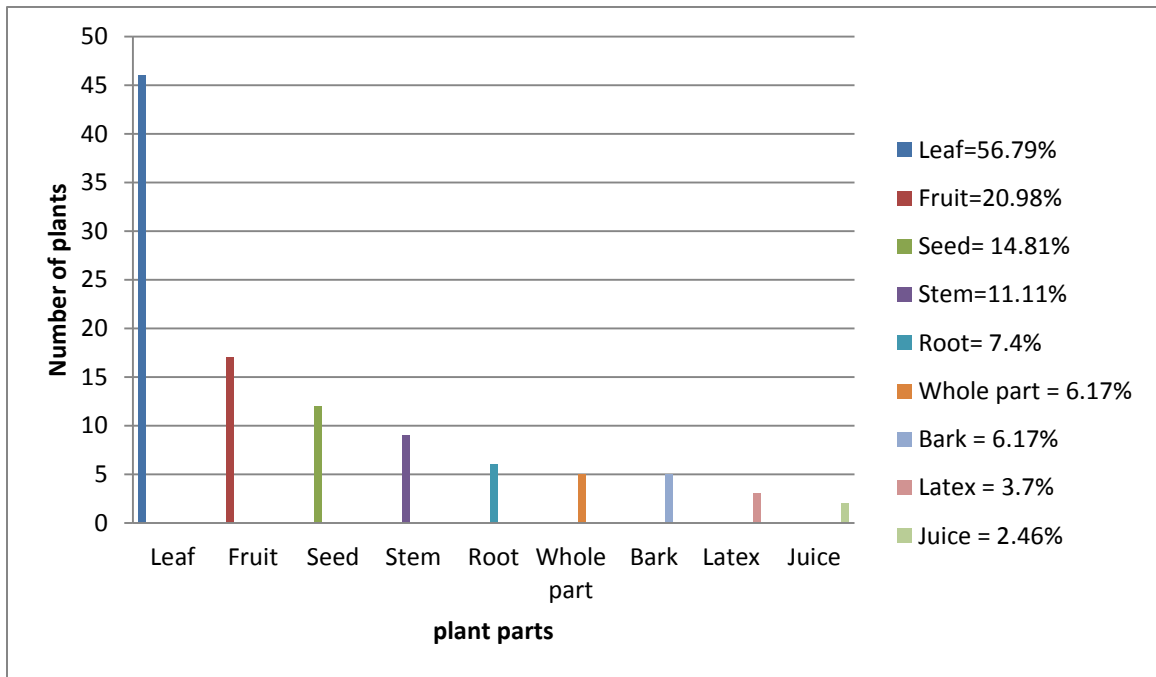


Figure 11: Plant parts used for human and livestock ailment

4.5.7 Ways of preparation traditional medicines

The local community of Olenkomi district uses different methods of preparation of traditional medicines for different human and livestock ailments (Appendix 2). The main methods of remedy preparations were reported to be through squeezing, which accounts for (45%) followed by crushing (27.5%) the rest forms of preparation also shown in (Figure11).The informants have various skills associated with remedy preparation. They tend to apply mixing of different plants. The result showed that the majority of remedies (75.30%) were prepared from single plant species and few (24.69%) are prepared from different plant species, which are combinations of two or more than two medicinal plants,(Appendix 2).

4.5.8 Dosage and routes of administration

The community of the study area used various local units of measurements and type of administration to determine the dosage. But, the measurement used to determine the dosages to treat various diseases were not standardize .In the study area, the traditional healers use different local measurement for dosage, mostly they use their finger lines for the measurement of the amount to be taken and different measuring materials like coffee cup ,tea cup, bottle and glass cups for those remedies which are taken orally doses given depend on the age, and health conditions; that is children are given less dose than adults, physically strong individual take more dose than weak individual depending on the type of disease.

Medicinal plants are applied through different routes of administration (Appendix 2,). In the study area, the most common administration of herbal medicines were oral which accounts (55.55%) followed by dermal 30.3%, nasal 4% and 3% oculars. Others accounted the remaining percent.

4.5.9 Marketability of medicinal plants

All informants agreed that plant species used for traditional purpose are not sold in the market for medicinal use only but associated with other uses such as food, spices and fumigating some of the plant species sold in the market associated with other uses were *Allium sativum*, *Ruta chalepensis*, *Artemisia absinthum*, *Brassica nigra*, *Lepidium sativum*, *Capsicum annuum*, *Citrus limon*, *cucurbita pepo*.

4.5.10 .The common human and livestock disease corresponding number of plant species used

In the study area, 48 ailments were reported to be treated using one or more medicinal plant species. Accordingly, Mich was treated using large number of medicinal plants(8 species) followed by abdominal cramp (7 species),Liver problem with (6 species), Tape worm ,with (5 species),Bloating with (4 species) and Diarrhea with (3 species). The rest diseases treated with one and two medicinal plants (Table 7).

Table 7: Common human and livestock disease that are treated by more than two species

Disease treated	Local name	No plant species	% of plants
Mich	Mich	8	24.24
Abdominal crump	Dhukuba garaa	7	21.21
Liver problem	Simbra	6	18.18
Tape worm	Kosso	5	15.15
Bloat	Bokokssaa	4	12.12
Diarrhea	Albaatii	3	9.09

4.6 Ranking of most important medicinal plants

4.6.1 Informant consensus of medicinal plant use report

Informant consensus for confirming the efficiency of a given plant species was determined based on the consensus made by informants. Accordingly to this popular and healing medicinal plants were cited by the majority of the community. The results of the study showed that 12 medicinal plants were popular than the others, in view of that, *Lepidium sativum* took the lead first where it was cited by 55 informants for its medicinal value to treat ailments. Whereas *Rumex nepalensis* was cited by 51 informants for its medicinal value (Table 8).

Table 8: List of medicinal plant species reported by 30% and more than 30% of informants

Scientific name	Local name	No of informants	% of informants
<i>Lepidium sativum</i>	Feto	55	50
<i>Rumex nepalensis</i>	Shulti	51	46.36
<i>Ajuga integrifolia</i>	Armagusa	49	44.5
<i>Croton macrostachyus</i>	Bakkanisa(Bsana)	47	42.72
<i>Allium sativum</i>	Qulubbii adi(Nech shinkurt)	45	40.9
<i>Verbascum sinatiticum</i>	Gurra harree(Yahya joro)	43	39
<i>Ocimum lamiinifolium</i>	Ancabbii(Damakese)	41	37.27
<i>Solanum marginatum</i>	Hanqorcaa	39	35.45
<i>Anethum graveolens</i>	Inslal	37	33.63
<i>Eucalyptus Globulus</i>	Bargamo(Bahir Zaf)	35	31.81
<i>Salvia nilotica</i>	Shokoksaa(hulagab)	34	30.9
<i>Ricinus communis</i>	Qobbo(Gulo)	33	30

4.6.2 Preference ranking

Preference ranking was conducted for seven most important medicinal plants used in treating abdominal crump (Table 9). Seven informants were selected to identify the best-preferred medicinal plant species for treatment of abdominal crump. Each informant was provided with seven medicinal plants reported to cure this disease with each leaf of medicinal plant used being paper tagged name, and asked to assign the highest value (7) for plant species most preferred, against this illness and the lowest value (1) for the least preferred plant and in accordance of their order for the remaining ones. These values were summed up and ranks given to each plant species.

Table 9: Preference ranking of medicinal plants used to treat abdominal crump

Informant labeled 1-7	Species						
	<i>Rumex nepalensis</i>	<i>Ruta chalepensis</i>	<i>Ajuga integrifolia</i>	<i>Brassica nigra</i>	<i>Lepidium sativum</i>	<i>Anethum graveolens</i>	<i>Artemisia rehan</i>
I ₁	1	5	3	4	2	6	7
I ₂	4	7	3	6	1	2	5
I ₃	4	3	1	5	2	6	7
I ₄	6	3	5	2	7	4	1
I ₅	7	1	6	2	5	4	3
I ₆	6	4	5	1	7	3	2
I ₇	6	4	7	2	5	3	1
Total	34	27	30	22	29	28	26
Rank	1	5	2	7	3	4	6

Toward the preference ranking exercise was performed by 7 key informants against five species which were most commonly reported to treat abdominal crump five selected plant species (Table 10) on the basis of treatment in five different ailments showed that *croton macrostachyus* the most preferred followed by *Allium sativum*.

Table 10: Preference ranking of five selected medicinal plants on the degree of healing five ailments (Abdominal crump, Bloating, Liver, Diarrhea and Micturition) by seven key informants.

Medicinal plants	I ₁	I ₂	I ₃	I ₄	I ₅	I ₆	I ₇	Total	Rank
<i>Croton macrostachyus</i>	5	3	4	4	5	4	4	29	1
<i>Allium sativum</i>	4	5	4	4	3	3	4	27	3
<i>Citrus limon</i>	3	3	3	5	4	4	3	25	5
<i>Lepidium sativum</i>	4	4	5	4	3	3	3	26	4
<i>Opuntia ficus-indica</i>	4	5	4	4	4	4	3	28	2

4.6.3 Direct matrix ranking

Direct matrix ranking exercise was done in order to compare multipurpose use of a given species and to relate this to the extent of its utilization versus its dominance. Based on information gathered from informants, five multipurpose tree-species were selected out of the total medicinal plants and seven use diversities of these plants were listed for nine selected key informants to assign use values to each species. The result is summarized in table 11. Nine key informants were chosen to conduct this activity and each key informant was asked to assign use values (5=best, 4=very good, 3=good, 2 less used, 1=least used, and 0= not used). Accordingly, each key informant's use values for the seven multipurpose medicinal plant species, average of each use-diversity for a species was taken and the values of each species were summed up and ranked.

Table 11: The seven use-values include medicinal, fodder, food, fire wood, construction, charcoal, fencing and furniture making

Species	Use-categories								Rank
	Fire wood	Construction	Furniture	Food	Fodder	Fencing	Medicine	Total	
<i>Acacia albida</i>	5	0	4	0	1	0	4	14	3
<i>Cordia africana</i>	1	0	5	5	0	0	4	15	2
<i>Croton macrostachyus</i>	1	0	0	0	2	0	5	8	5
<i>Eucalyptus globulus</i>	5	5	5	0	1	5	5	26	1
<i>Vernonia amygdalina</i>	1	0	0	0	2	3	4	10	4
Total	13	5	14	5	6	8	22		
Rank	3	6	2	6	5	4	1		

4.6.4 Fidelity level index

The fidelity level (FL) is the percentage of informants claiming the use of a certain plant species for the same major purpose to treat human and livestock ailments. Fidelity level was calculated for medicinal plants used to treat stomach problem. The result revealed

that, *Rumex nepalensis* and *Croton macrostachyus* have the highest medicinal value against abdominal crump and liver respectively. (Table 12 and 13).

Table 12: Fidelity level index for plant species used to treat abdominal crump of human in the study area

Ailments	% of informant	Species	IP	IU	Fidelity index Ip/IU
Abdominal crump	50	<i>Lepidium sativum</i>	34	55	0.61
	46.36	<i>Rumex nepalensis</i>	30	51	0.58
	44.5	<i>Ajuga integrifolia</i>	24	49	0.48
	33.6	<i>Anethum graveolens</i>	18	37	0.48

Table 13: Fidelity level index for plant species used to treat livestock Liver in the study area

Ailments	% of informant	Species	IP	IU	Fidelity index IP/IU
Liver	35.47	<i>Solanum marginatum</i>	27	39	0.69
	33.63	<i>Verbascum sinaiticum</i>	24	37	0.64
	42.72	<i>Croton macrostachyus</i>	22	47	0.46
	30	<i>Ricinus communis</i>	16	33	0.57

CHAPTER FIVE

5. DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Diversity of medicinal plants in the study area

Results of the study indicated that traditional medicine is playing a role in meeting the basic healthcare needs of the people of Olenkomi woreda. This study was important because it represents one of the pioneer efforts to document the folk medicinal plants of Ethiopia as most of the available medicinal plants (eg. Dawit Abebe, 1986; Dawit Abebe and Ahadu Ayeehu, 1993; Asfaw Debela *et al.*, 1999) were devoted to the plants which the authors themselves had put in to use.

Medicinal plants of the area were recorded on the basis of plant family, Lamiaceae and Solanaceae have accounted for highest number 7(8.64%) of medicinal plants each followed by Fabaceae 6(7.40%) and this could be attributed to the species richness of these families in the study area. Other studies conducted elsewhere in the country by different people showed that Asteraceae, Fabaceae, Lamiaceae and Solanaceae in Gulomahda District showed that some plant families contributed greater number of genera than others for traditional medicinal use to treat both human and livestock ailments. These plant families include Asteraceae, Fabaceae, Lamiaceae and Solanaceae in Seru District, Arsi Zone of Oromia region (Mengistu Gebrehiwot, 2011); Asteraceae, Rubiaceae, Lamiaceae and Fabaceae, in Bule Hora District Southern Oromia (Mersha Ashagre, 2011) Fabaceae, Aseteraceae, Solanaceae and Euphorbiaceae in Debark District North Gonder Zone; Amehara Regional State Ethiopia (Eskedar Abebe, 2011), all in Ethiopia. These families are also among the families with higher number of species which also have wide geographical and habitat distribution in Ethiopia.

5.1.2 Ethnomedicinal plant species used to treat human and livestock ailments by people of Olenkomi woreda

Among the reported medicinal plants 45 (55%) species were used as human medicine, 23 (28.3%) species used for treating both human and livestock ailments and the remaining

13 (16.04) species used as livestock medicine. This indicates that the people of the area give great attention about human ailments as compared to livestock ailments. Similar results were recorded to other areas of Ethiopia. For instance, Endalew Amenu (2007) in Ejaji area (Chelya woreda west Shewa zone Oromia region reported a total of 89 medicinal plant species which are used to treat human and livestock ailments from these, 48 (53.9%) species were noted to treat only human ailments. 27 (30.3 %) species were reported to be used to treat livestock ailments 14 (15.7%) species were reported to be used to treat both livestock and human ailments. Moreover, Getnet Chekol (2011) around Tara Gedam and Amba Remnant Forest in Libo Kemkem Woreda South Gonder Zone Amhara Region Ethiopia. Recorded 163 medicinal plant species belonging to 145 genera and 67 families of which 115 (70.6%) species were reported for treating human ailments only 34 (20%) species were reported for both human and livestock and the rest 14 (8.6 %) species were for treating livestock ailments only. Behilu Etana (2010) in Goma district Jima Zone of Oromia Region reported a total of 160 medicinal plant species which are used for the treatment of human and livestock ailments from these, 92 (76.03%) species were used as human medicine, 17 (14.04%) species were used for treating both human and livestock ailments and the remaining 12 (9.91%) species as livestock medicine. This variation indicates the availability of medicinal plants knowledge linked with local people in different district of the country.

5.1.3 Major plant use categories by the people of the study area

In addition to medicinal values herbal medicine were used to different use categories in the society. In this study a total of 54 species (66.66%) of plant were reported for their medicinal value only 14 species of plants (17.28%) were reported for their use as food and spices. This result agree with Addissie Belay (2018) who reported that food and spices take the second highest plant used next to medicinal value in Dejen east Gojam Amhara Region Ethiopia. On the other hand, Endalew Amenu (2007) reported that charcoal followed by furniture take the highest plant utilization category in Chelya district, West Shewa Ethiopia.

5.1.4 Distribution of medicinal plants according to their habitat

Natural habitats are the main sources of medicinal plants as described in other studies (Ermias Lulekal *et al.*, 2008; Fisseha Massifin *et al.*, 2009), Ermias Lulekal *et al.*, 2013 & Moa Megersa *et al.*, 2013)). This finding also agrees with the general results seen in many investigations in Ethiopia in which many medicinal plants are harvested from the natural wild than from home gardens. This indicates natural wild habitat is a home for all plant species.

5.1.5 Diversity of habits and use categories of medicinal plants

Among the collected 81 medicinal plants the majority of medicinal plants were herbs covering 32(39.5 %)species, followed by Trees 19(23.45%),and 18(22.22%) species were shrub,12(14.81%)species were climber .This finding agrees with investigations of (Getu Alemayehu (2017),and Mohammed Adefa (2009) that herbs were reported as dominant. In the contrary, Etana Tolesa (2007), Fisseha Mesfin (2007), and Getu Alemayehu (2010) have found that shrubs have the highest proportion followed by Trees. This might be due to variation in the available vegetation type in the study area.

5.1.6 Plant parts used for human and livestock ailments treatment

Different plant parts such as leaves, barks, roots fruits and some other including seeds and latex were used to treat both human and livestock diseases in the study area. Different data gathering methods like field observation, group discussion and guided field walk also showed that different plant parts were used as herbal medicine in the study area. Leaves were the most highly used parts in the preparation of remedies to treat both livestock and human ailments. The repeated usage of leaves is also noted in other parts of the country and by other researchers including Moa Megersa *et al.* .(2013), Endalew Amenu (2007);Haile Yinger and Delenasaw Yehualaw (2007);This indicates leaves are a very essential plant parts used for herbal medicine preparation Compared to other parts like roots. It is relatively better to use leaves than roots since removal of leaves up to half of a tree does not affect the growth of the tree significantly (Poffenberger *et al.*, 1992).

The local people including healers reported that they prepare herbal medicine or plant remedies in different ways including squeezing, crushing, chewing boiling fluid juice, roasting, smoking and vaporize as fumigant making concoction and decoction as well as using the plant part directly with out well processing. Among the collected traditional medicinal plants 85% were used either in the unprocessed form or in processed like crushed and pounded form to treat both human and livestock ailments. Eighty percents of the medicinal plant species were found to be used as concoction to treat livestock ailments by the people of the district. Similarly done research in Bale Mountains National Park, southern Ethiopia (Haile Yineger *et al*, 2008). Showed that concoction, crushing and pounding use of un processed form fumigation juice decoction powder roasted form and soaked plant parts are most commonly reported plant remedy preparations. On the other hand juice made from medicinal plants was the most popular mode of preparation in Oromia regional state, southern Ethiopia (Haile Yineger and Delenasaw Yehwhalaw, 2007).

The finding figure out in different regions showed that the most popular mode of preparation in one area may not be popular in other areas. Herbal preparations varied in their plant composition in the study area. Most herbal preparations were from single species and the rest few were prepared by combining two or more medicinal plant species to treat both human and livestock ailments. These findings line with the work of Mersha Ashagre (2010) in Bule Hora district Oromia Regional state of Ethiopia, Mohamed Adefa, 2009 and Behilu Etana, 2010).

5.1.7 Informant consensus of medicinal plants

The finding showed that study some medicinal plants are popular than others. Accordingly the popular and healing medicinal plants were cited by the majority of the community. The results of the study showed that 12 medicinal plants are popular than the others, in view of that, *Lepidum sativum* took the lead first where it was cited by 55 informants for its medicinal value to treat ailments. In contrast Endalew Amenu (2007) , *Ocimum lamiifolium* was cited by 51 informants its medicinal value to treat Mich. Preference ranking for seven medicinal plants used to treat Abdominal crump showed

that *Rumex nepalensis* was the most preferred followed by *Ajuga integrifolia*, *Lepidium sativum* respectively

Informants evaluate their relative importance and the extent of the threats against medicinal plants. The results of the direct matrix ranking revealed that *Eucalyptus globulus* ranked first and hence it is the most preferred plant used by the Olenkomi people for its various uses and hence the most threatened species. This scarcity is due to over harvesting of *Eucalyptus globulus* for not only medicinal purpose but also for other uses like construction, fire wood, charcoal, furniture, fence etc. Some plant species were used for food, spices, fumigation were marketable. This result agrees with the finding of Tadesse Beyene (2015) in Erbo and Gulomahda districts, Eastern zone of Tigray Region Ethiopia and Getu Alemayehu (2017) in Amaro districts of southern Nations, Nationalities and peoples Region and Gelana district of Oromia Region, southern Ethiopia. Fidelity level was calculated for medicinal plants used to treat abdominal cramp and Liver. The result revealed that, *Lepidium sativum*, *Rumex nepalensis*, *Ajuga integrifolia* and *Anethum graveolens* have the highest medicinal value against Abdominal cramp and *Solanum marginatum*, *Verbascum sinaticum*, *Croton macrostachyus* and *Ricinus communis* have the highest medicinal value against Liver (Table 12) and (table 13) respectively. This result disagrees with Endalew Amenu (2007).

5.1.8 Threats and Conservation practice of Ethnomedicinal plants in the study area

The indigenous people of the study area reported that medicinal plants were highly threatened by agricultural expansion Overexploitation, Charcoal production, overgrazing and lack of knowledge. Generally, in connection to population growth and an increase in urban expansion medicinal plants utilization and related indigenous knowledge threatened.

Also the indigenous plant use knowledge transfer was mainly oral rather than through well organized written script as a result of death of many aged healers there is a rapid decline in authentic knowledge in traditional treatment. Informants agreed that expansion of modern education, health institution. All have a contribution to cultural modification. Getu Alemayehun (2017) in Amaro and Gelana districts.

Significant number of animals graze and brows on vegetations in their locality. They put an actual effect on vegetations there during dry season, as the availability of browsable and grazable vegetation is limited. These in turn affect the survival of medicinal plants and associated knowledge. Endalew Amenu (2007)

Another threatening factor of vegetation of the study area is ceremony celebration periods. In the area, plants are harvested for celebration of ceremonies like “Ayana Gada, Jari Ioni, Atete, Gafeta midhani, and (“Gaa’ela”) or Matrimony ceremony” and spiritual ceremonies “Ayana gifti” put plants under threat. These celebrations come with selected plant parts cut for the ceremony. Plants like *Eucalyptus globulus*, *Ficus sycomorus* are affected in the area due to these activities. Even though cutting or removing the leaves of a plant up to half of a tree does not affect the growth of the tree significantly (Piffenberger *et al.*, 1992).

Plant destruction for different purpose like commercial use, spiritual values and other ceremony was observed in the study area. All these abusing activities lead the biodiversity under threat.

Conservation and Management of medicinal plants in the study area to reduce the threatening factors in the study area, there are conservation measures taken for forest and other natural plant resources in general. These natural forests are being protected by the local people in collaboration with the government. On the other hand the healers collect and plant the most threatened medicinal species in their home gardens. Zemedu Asfaw, (2001) reported that the home garden is strategic and ideal farming system for conservation.

5.2. CONCLUSION

Medicinal plants species used to treat both human and livestock ailments were recorded. But these were not the only medicinal plant species found in the study area as the indigenous people said.

Addressing all the known medicinal plant species by the community were needs wided range of time including each seasons.

Herbs were found the most dominant growth habits forms this might be variation due to the available vegetation type in the study area.

Traditional healers as well as the indigenous people of the study area faced with different challenges by modern health system, some modern professionals and few educating people.

The combination of many threats reduces the number of medicinal plants available and is also eroding the knowledge based about these plants in the study area.

Knowledge about ethnomedicinal uses conservations were highly restricted with age which means sustainable usage and conservation practices were considered as a concern of married and aged group.

5.3. RECOMMENDATION

Based on the findings of this research the following recommendations are forwarded

- ❖ The traditional healers should avoid uprooting plants species for medicinal purpose particularly before its flowering or seeding. Accordingly training should be given to them by the culture and tourism and agricultural office of the district.
- ❖ Well known traditional healers of the area should be supported by education training and finance by the Olenkomi woreda administration to have their own mini botanical gardens for medicinal plant conservation.
- ❖ In-situ and ex-situ conservation activities should be practiced in the woreda through the support of the district's administration by delivering training model farmers to ensure the continuity of threatened medicinal plants by encouraging people to grow, protect medicinal plants and establish botanical garden.
- ❖ In the study area the majority of the people use traditional medicinal plants as immediate remedies for the primary health care system. However, some modern health professionals and some educated people continue to undermine them. This situation can be harmonized by integration of the traditional and modern health system to minimize the negative attitude and build good future for herbal medicine by narrowing the gap between the two health systems. This has to be done by the collaboration between Olenkomi woreda administration and the woreda's health office
- ❖ Phytochemical and toxicological studies needed to be carried out on medicinal plants particularly on those with high informant consensus and fidelity value (*Lepidium sativum*, *Rumex nepalensis*, *Ajuga integrifolia*, *Croton macrostachyus*, and *Solanum marginatum*) to gain more information about the possibilities of identifying the activity ingredients to production of drugs.
- ❖ The woreda health office and other stake holder should encouraging people to grow and conserve *Croton macrostachyus* and *Rumex nepalensis*.
- ❖ I will go to give this document to OWAO and in the future I will do with the indigenous people of the woreda regarding sustainable usage and conservation of medicinal plants.

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APPENDICES

Appendix 1:- CHECK LIST OF SEMI STRUCTURED INTERVIEWS QUESTION FOR COLLECTING DATA

Ethnobotanical study of medicinal plants of the west showa Ethiopia: the case of
olonkomi woreda or district

Check list of questions which will be used during interviews with key informants/healers

I. Background of socio-demographic information

1.1.Date of interview:

1.2.Zone: district: kebele:

1.3.Name of the informants (with consent):

1.4.Age of the informant:

1.5.Sex of the informant:

1.6.To which ethnic group the informants belongs to:

1.7.Religion of the informants

Orthodox ☐ Muslim ☐ protestant ☐ catholic ☐ traditionalist ☐
other ☐

1.8.Marital status married: divorce: ☐ widow: ☐

1.9.Level of education of the informant

Literate (able to read and write) ☐ secondary education ☐ above secondary ☐

Information related to the medicinal use of the plants

1. What are the most common humans and livestock ailments in your area?

2. What are the main types of human ailments?

3. What are the most common diseases of livestock in your area?

4. Mention plant types used to treat a given diseases in the area (give local names).

4.1.Plant used to treat only human diseases

4.2. Plants used to treat only livestock diseases

5. What part/ parts of the medicinal plant(s) are used? (mark an “X” on one of the
given alternatives)

Flower (FI) ☐ latex (Lt) ☐

Fruit (FU) ☐ whole plant (WP) ☐

Seed (Se) ☐ Leaf (L) ☐

Bark (B) ☐ Stem ☐

6. What is the habit of the plant?

Tree (T) ☐ Shrub (S) ☐

Climber (C) ☐ Herb (H) ☐

7. Where do the medicinal plants grow? (place of collection)

7.1. In home gardens ☐

7.2. Fallow land ☐

7.3. Arable land ☐

7.4. In the forest ☐

8. What method of preparation do you use for each diseases/ the method of preparation of medicinal plants for each and every diseases you provide? (mark "X")

Fresh (F) ☐

dried (D) ☐

Crushed (C) ☐

powdered (P) ☐

Used alone (Ua) ☐

exudation (Ex) ☐

Concoction (Cn) ☐

mixed with others or water (Mw) ☐

9. Does the amount you provide (dose) vary among different age groups, sex? If yes, state for each age group and sex.

10. Is there any noticeable adverse effects (side effect) caused by the medicine you provide? If yes, is/ are there any antidotes (s) for those adverse effects?

11. How does the prepared remedies taken by the patient for each disease (s)/ routes of administration? (mark "X") Dermal (D) ☐ Anal (A) ☐ Nasal (N) ☐

Oral (O) ☐

Ear (E) ☐ other specific ☐

12. Generally which season of the year is preferred for collection of medicinal plants in your area?

12.1. Wet season ☐

12.2. Dry season ☐

12.3. All the year round ☐

13. Why you prefer that particular season?
14. Are there seasons where you do not get sufficient amount of medicinal plant parts your customers? Mention these seasons why?
15. Do you store the medicine? If yes, how and for how long?
16. How is the plant parts collected? (including the amount collected at a time)
17. Are there conditions (example like pregnancy, menstruation...) that forbids the patient? Taking the medicine.
18. Are there economic groups who mostly or occasionally use these medicinal plants?
19. Are there social groups that often use medicinal plants?
20. Is/are the medicinal plant(s) marketable in your area? If so,
21. Which group sells and exchanges them most often?
22. Which plant species are more common on a market?
23. Where are there sources?
24. What are there prices?
25. Are the medicinal plants easily accessible for you to prepare herbal medicine?
Yes ☐ No ☐ , if not why?
26. How abundant is medicinal plants in your community/ area, its trends when compared to the past 10/20 years back (is it increasing? How far do you travel to get the medicinal plants in the past and now? Tell me the difference by comparing?)
27. What is the out look of the conventional health care provides / government people to traditional herbal health care that you are providing? Are they supportive or discouraging? If discouraging why you do think?
28. Would you please tell me if there are taboos associated with the utilization, collection date and time, date and time of herbal medicine, method of collection, sex, age storage etc. of some medicinal plants in your community? If any)
29. Do you think that the medicinal plants in your area are treated? Yes, no
What are threatening factors of medicinal plants in your area? For medicinal use ☐
, food ☐ , firewood collection ☐ , charcoal making ☐ , fence ☐
construction ☐ , furniture ☐ , edible fruit ☐

30. Which particular medicinal plants species is commonly threatened in study are?
31. Would you please tell me as how the local people manage and conserve medicinal plants through there traditional practices? Tell me your experience.
32. Does the medicinal plant of your area have any use other than medicine? If yes, state them please?
33. Do you worry about the loss of the traditional medicinal knowledge and practice that you maintained from your fore fathers?
34. From whom did you acquired the knowledge? To whom you want to pass the knowledge of traditional medicine and practice you acquired?
35. Do you collaborate with other traditional healers? If you do not collaborate why?
36. Do you document your traditional medicinal practice?
37. What are the main challenges you face while you practice your healing practice in your community?

Date: -

Time: -

Appendix 2:-LIST OF MEDICINAL PLANTS USED FOR BOTH HUMAN AND LIVESTOCK

List of medicinal plants used for both Human and Livestock; Scientific name; Family ;Local name; habitat ; Growth habit Type ;part used; disease treated; methods of preparation; route of application and collection number

Key; Habitat(Ha), Home garden(H); Wild(W);Wild and home garden(W&H) ;Growth habit, Herb(H), Shrub(Sh), Tree(T), Climber(Cl), Parts used;Leaf,L;Fruit,Fu; Seed,Se; Stem,St; Root,R;Wholepart,Wh;Bark,B;Latex,La;TypeHuman(H);Livestock(Lv);Both Human and Livestock(H&L)and Route of application Oral(O);Eye(E); Nasal(N);Dermal (D);

Scientific name	Family	Local name	Growth habit	Habitat	Disease treated	Type	Part used	Modes of preparation	Route of application	Collection number
<i>Brassica nigra</i> (L.) Koch	Brassicaceae	Senafica	Herb	H	Abdominal crump	H &Lv	Se	Dry and crushed	O	077
<i>Allium cepa</i> L.	Alliaceae	Qulubidima	Herb	H	Abdominal problem	H	L or bulb	Cutting	O	078
<i>Allium sativum</i> L.	Alliaceae	Qulubiadii	Herb	H	Abdominal crump,Malaria,teet,Gastric, cough	H &Lv	L	Cutting	O	080
<i>Acacia albida</i> (Faidherbia albida)	Fabaceae	Garbi	Tree	W	Eye	Lv	L	Squeezed fresh leaf	E	025
<i>Ajuga integrifolia</i> Buch Hamex. D. Don	Lamiaceae	Armagsa	Herb	W	Abdominal crump	H	L	Squeezed and drink	O	024
<i>Aloe macropoda</i> Tod.	Aloaceae	Argissa	Herb	W	Mass(swelli ng)	Lv	L	Wash the leaf heat and Insert on swelling	D	022
<i>Ajuga crenata</i> Hochst. Ex	Lamiaceae	Qoricheja	Herb	H&G	Eye	H	L	Wash squeezed and add to eye	E	023
<i>Arundo donax</i> L.	Poaceae	Shomboqo	Tree	W&H	Liver	Lv	R	Crushed and mix with Solanum	O	021

								marginatum, Ricinus communes		
<i>Asparagus africanus</i> Lam.	Asparagaceae	Sariti	Shrub	W	Wekness during birth	H	Wh	Boild mix with Urgessa, ulma&washing	D	064
<i>Anethum graveolens</i> L.	Apiaceae	Insle	Herb	W&H	Digestion problem	H	L&St	Boild with water and drink	O	020
<i>Allophylus macrobatrys</i> Gilg	Sapindaceae	Qadidaa	Tree	W	Bloating (Making tej)	H	L&St	Crushing and mix with tej like gesho	O	063
<i>Artemisia rehan</i> L.	Asteraceae	Aritta	Herb	HG	Abdominal crump	H	L	Squeezed& mix with water and drink	O	062
<i>Arisaema flavum</i> S'chott	Araceae	Carana	Shrub	W	Loss of weight	Lv	L	Squeezed the leaf & leave for 3 days then drink	O	076
<i>Brassica carinata</i> A.Br	Cabombaceae	Goman	Shrub	HG	Constipation	Se &L	H	Crushed the seed mix with water and eat, boiled the leaf and eat	O	075
<i>Canavalia ensiformis</i> (L) DC	Fabaceae	adangua re	Climber	HG	Constipation	Se	H	Seed is boiled mix with vegetables and drink as a soup	O	065
<i>Calpurina ensiformis</i> (Ait.) Benth.	Fabaceae	Cekka	Shrub	W	Scabs	L	Lv	Squeezed and mix with water and wash Cattles body	D	061
<i>Capparis spinosa</i> Lam.	Capparidaceae	Harangama guracha	Shrub	W	Rabies L&St	L&St	H&Lv	Squeezed mix with Gura haree,sarity	O&D	066
<i>Capsicum annuum</i> L.	Solanaceae	Qariya	Herb	HG	Common cold	Fr	H	Cut the fruit & mix with Qulubi&eat	O	019
<i>Citrus limon</i> (L.)Burm. f.	Rutaceae	Lomi	Shrub	HG	Common cold, parasite, tonsil	Fr	H	Squeezed & drink,eat	O	031
<i>Cordia</i>	Boragi	Waddes	Tree	W&	Diarrhea	L	Lv	Squeezed and	O	018

<i>africana</i> Lam.	naceae	a		H				drink		
<i>Croton macrostachyus</i> Del.	Euphorbiaceae	Bakanisa	Tree	W&H	Malaria, Liver (Hepites) weakness, parasite, wound,	L	H&Lv	Squeeze and drink	O,D,N	017
<i>Cucumis ficifolius</i> A.Rich.	Cucurbitaceae	Hiddi holoto	Herb	W	Septicemia	L	Lv	Use back of leaf on the tongue	D	002
<i>Cucurbita pepo</i> L.	Cucurbitaceae	Dabaqul	Climber	HG	Tape worm	Fr, Se	H	Roast the seed Cook the fruit & eat	O	060
<i>Cymbopogon citratus</i>	Poaceae	Masarata	Herb	HG	Abdominal cramp	L	H	Wash with water squeezed the leaf and drink	O	040
<i>Cynoglossum coeruleum</i> (Hochst. ex A. Rich.) Dc	Boraginaceae	Matare	Herb	HG	Tape worm	L	H	Wash squeezed the leaf or dry crush mix with Hygenia abisinica drink	O	032
<i>Cucumis dipsaceus</i> Ehrenb. ex Spach	Cucurbitaceae	Debaqula	Climber	HG	Tape worm	Se, L	H	Heat the seed and boiled the fruit and eat	O	058
<i>Clausena anistata</i> (Willd.) Benth	Rutaceae	Ulma	Tree	W&H	Teeth	St	H	Cut the stem and chew or hold on teeth	O	057
<i>Clematis longicauda</i> Steud ex A. Rich.	Ranunculaceae	Hiddafiti	Climber	W	Swelling	L	H	Put the fresh on the swelling	D	059
<i>Chloris gayana</i> (L.) Pers	Poaceae	Coqqorsa	Herb	W	Massle, Jorodfgef	L	H	Chew the leaf and spray the saliva	D	033
<i>Cocccinia abyssinica</i> (Lam.) Cogn.	cucurbitaceae	Ancote	Climber	H	Bone fracture	R, Fr	H	Chopped the root and boiled then eat	O	056
<i>Datura stramonium</i> L.	solanaceae	Manji	Herb	W	Dandruff	L	H	Crushed dry leaf mix with	D	004
<i>Dovyalis abyssinica</i> (A Rich) Warb.	flacourtiaceae	Dhanga go	Shrub	HG	Tonsil	Fr	H	Wash the fruit and eat	O	041

<i>Embelia schimperi</i> Vatke	Myrsinaceae	hanquu	Climber	W	Tape worm	Fruit	H	Squeezed the fruit and mix with Kosso and drink	O	055
<i>Eucalyptus globulus</i> Labill	Myrtaceae	Bargamo	Tree	W&H	Mich, Common cold, Diarrhea	L	H&Lv	Squeezed mix with feto, drink, boiled and steam	O,D	026
<i>Ficus sycomorus</i> L.	Moraceae	Lugoo	Tree	W	Wound	Bar k	H	Crushed and powdered	D	015
<i>Gomphocarpus purpurascens</i>	Asclepiadaceae	Hiddacormamu	Herb	W	Wart, Hemorrhoid	La	H	Squeezed the stem use the juice	D	016
<i>Grewia ferruginea</i> Hochst. Ex A.Rich	Tiliaceae	Xoqonu	Tree	W	Abortion, birth problem, placental problem, Syphilis	L, B	H&Li	Wash squeezed mix with mich, Kosso drink	O	081
<i>Hordeum vulgare</i> L.	Poaceae	Garbu	Herb	W	Bone fracture, Gastritis	Se	H	Roasted crush mix with water eat or boiled drink	O	067
<i>Hypoestes forskalii</i> (Vah) R. Br	Acanthaceae	Qorich waransa	Herb	HG	Unspecified pain	L	H	Wash the leaf and boiled rib bone butter and drink	O	005
<i>Justicia schimperi</i> ana Hochst.ex necs T.Andres	Acanthaceae	Dhumuga	Shrub	W&H	Livestock particularly hen	L	Lv	Squeezed mix with ebicha, enjera feed	O	006
<i>Lippia adoensis</i> Hochst ex Waip	Verbenaceae	Kussaye	Shrube	HG	Chirt	L	H	Squeezed and add on skin	D	014
<i>Lepidium sativum</i> L.	Brassicaceae	Shifeco	Herb	W	Abdominal crump, teeth, diarrhea, maganaya mich bloting	Se	H&Lv	Crushed seed mix with water or coffee drink, apply on skin	O,D	068
<i>Lagenaria siceraria</i> (Molina)st andl.	Cucurbitaceae	Buqqe	Climber	W&H	Snake bit infection	Fr	H&Lv	Add water inside the fruit bottle shake then drink 1	O	013

								coffee cup		
<i>Lathyrus sativus</i>	fabaceae	Guwaya	Climber	W	Orf	Se	Lv	Roasted crushed mix with water and apply on sheep ,goat mouth	D,	069
<i>Lycopersicon esculentum</i> Mill.	Solanaceae	Timatim	Herb	HG	Skin (madiat)	Fr	H	Apply a fruit flesh on skin	D	042
<i>Malva verticillata</i> L.	Malvaceae	Litti	Herb	W	Parasite(tape worm)	R	H	Wash the root chopped and mix with Kosso and drink	O	027
<i>Myrsine africana</i> L.	Myrsinaceae	Qacama	Tree	W	Tape worm	Fr(se)	H	Crushed mix with Kosso and drink	O	054
<i>Melia azedarach</i> L.	meliaceae	Mimi	Tree	W&H	Asthma	L	H	Squeezed and insert in to nose	N	007
<i>Millettia ferruginea</i> (Hochst.) Bak	Fabaceae	Birbira	Tree	W	Mujelle	Fr or Se	H	Grind the fruit and add on foot	D	053
<i>Kalanchoe petitiiana</i> L.	Crassulaceae	Bossoqe	Herb	W	Mass(swelli ng)	L	Lv	Insert the leaf covered with gose by cutting the wound and Waitefor 9 days then take out	D	028
<i>Nicotiana tabacum</i> L.	Solanaceae	Tamboo	Herb	W&H	Depression ,evil eye, weakness	L	H&Lv	Crushedmix with water and spray on to cattle skin smoke or fumigate	D	008
<i>Opuntia ficus-indica</i> L.	Cactaceae	Adaami	Shrub	W	Hemorrhoid, wart, evil eye, diarrhea , sterility	La, Fr, R	H&Lv	Latex apply on skin for wart hemorrhoid Root with Grawa squeezed and drink ,latex with bread and eat	D,O	070

<i>Ocimum lamiifolium</i> Hochst.ex	Lamiaceae	Ancabbi	Shrub	HG	Mich, common clod, headache eye	L	H	Wash squeezed and apply on skin and drink with coffee	D,O	009
<i>Oleae europaea</i> L.subsp.cu spidata	Oleaceae	Ejjersa	Tree	W	Insect (house fly) fumigate Teeth	Wh	H&Lv	Smoke or fumigate		052
<i>Otostegia integrifolia</i> Benth.	Lamiaceae	Tunjiti	Shrub	W&H	Insect, to fumigate different food container	W & H	H&Lv	Fumigate whole part		071
<i>Ocimum americanum</i> Hochst.ex	Lamiaceae	kochobila	Herb	HG	Aroma	Fr	H&Lv	Wash remove the leaf and add to food as spices	O	051
<i>Persea americana</i> Mill	Lauraceae	Abocad o	Tree	HG	Food, Constipation ,Dandruff	Fr	H	Eat the fruit apply on hair skin	D,O	029
<i>Phytolacca dodecandra</i> L'Herit	Phytolaccaceae	Andode	Tree	W&H	Varicose, Ergbgbit,shi fta	Fr, L	H	Wash squeezed apply on fontanel crushed and mix with water drink	D,O	030
<i>Premna schimperi</i> Engl.	Lamiaceae	urgessaa	Shrub	W	Mich ,Aras washing	L	H	Boiled by mixing with ulma ,sariti then wash	D	072
<i>Periploca linearifolia</i> Quant. Dill&Rich	Asclepiadaceae	Hidda annanno	Climber	W	Liver	La	H	Squeezed the stem add on skin and nose	D,N	079
<i>Phoenix reclinata</i> Jacq.	Arecaceae	Mexii	Tree	W	Constipation	Fr	H	Eat the fruit	O	073
<i>Rumex nepalensis</i> spreng	Polygonaceae	Shulti	Herb	W&H	Abdominal crump ,eye	R, L	H&Lv	Wash the root & chew, squeezed the leaf mix with hidda annanno latex &add in to eye	E,O	003
<i>Rhamnus</i>	Rhamn	Gesho	Shrub	W&	Abdominal	L,	H	Crushed mix	O	010

<i>prinoides</i> L' Herit.	aceae			H	crump ,bloating, aroma	St, B		with Atoch then drink& for tela		
<i>Ricinus communis</i> L.	Euphor biaceae	Qobbo	Tree	HG	Dandruff liver	R, L	H	Chopped the root mix shembeko ,anqorca & drink, squeezed the leaf & apply on hair	D,O	011
<i>Ruta chalepensi</i> s L.	Rutace ae	Tenada m	HG	Her b	Abdominal crump	L, St	H	Wash squeezed &mix with Boiled milk and drink for children ,with coffee for adult	O	039
<i>Cayartia ibuens</i> IS(Hook.f)	Vitacea e	Lallu	Climber	W	Abortion	L, B	Lv	Squeezed the leaf and drink	O	050
<i>Rhoicissus tridentata</i> (L.f) Wild&Dru mmond	Vitacea e	Hidda bofaa	Herb	W	Infection	L	H	Squeezed drink	O	048
<i>Rubus apetalus</i> Pair.	Rosace ae	Gora	Shrub	W	Abdominal crump	Fr	H	Collect and eat the fruit chewing	O	049
<i>Solanum marginatu</i> m Lf.	Solana ceae	Hanqorc aa	Shrub	W& H	Liver	Fr	Lv	Crush (squeeze) the fruit mix with water and drink	O	012
<i>Solanum incanum</i> L.	Solania ceae	Hiddi	Shrub	W	Neser	L	H	Wash squeezed and insert in to the nose	N	001
<i>Sida schimperi</i> ana Hochst.ex A.Rich	Malvac eae	Gufte	Herb	W	Cleaning purpose to clean west from environment ,to clean teeth	Wh	H	Brush the environment using it	O	043
<i>Stephania abyssinica</i> (Dillon&	Menisp ermace ae	Hidda kalala	Climber	W	Infection, Abdominal crump	Wh	H&Lv	Crushed,sque ezed &mix with water &	O	046

A.rich) Walp.								drink		
<i>Salix suberrata</i> Willd.	Salicaceae	Alaltu Laga	Tree	W	Rabies, Anthrax	L	H&Lv	Squeezed mix with yaahya joro ,baal adii and drink	O	045
<i>Salvia nilotica</i> Juss.ex Jacq.	Lamiaceae	Shokoksa	Herb	W	Mich	L	H	Squeezed,cru shed mix with damakese &apply on skin	D	034
<i>Tragia plukentetii</i> Pax	Euphorbiaceae	Dobbi	Herb	W& H	For washing milk container	L, St		Collect hold together and use it		047
<i>Urtica simensis</i> Steudel**	Urticaceae	Dobbi	Herb	W& H	Gastric	L	H	Collect remove the torn wash boiled &add karya,shinkur t then eat	O	044
<i>Verbena officinalis</i> L.	Verbenaceae	Atoch	Herb	HG	Mich, Abdominal crump	L	H	Wash squeezed with gesho &drink	O	035
<i>Verbascum sinaiticum</i> Benth.	Scrophulariaceae	Gurra harree	Herb	W	Liver,swelli ng	L	H& Lv	Squeeze mix with gulo shemboko and drink for cattle put on swelling part &tigh with	D, O	036
<i>Vernonia amygdalina</i> Del.	Asteraceae	Ebicha	Tree	W& H	Mich, Fowl pox	L	H&Lv	Wash squeezed mix with sensel &drink also apply on skin	D,O	037
<i>Vicia faba</i> L.	Fabaceae	Baqela	herb	W	Ascaries,bu gunj, Jorodeg	Se	H	1,Wash stay for 1 day inside water then decant and eat for worm disease 2,Chew and put on	D,O	074

								swelling part of body and cover with gose		
<i>Withania somnifera</i> (L.) Dunal	Solana ceae	Gezawa	Shrub	HG	Evil eye foot problem	L, St, B	H	Squeeze and boiled with water and wash the leg ,smoking	D	038

Appendix 3:-INFORMANTS NAME

No	Name of informants	Sex	Age	Kebele	Occupation
1	Kuli soboka	F	40	Qela himbortu	Farmer
2	Bayisa Terecha	M	46	Qela himbortu	Farmer
3	Hunde Mulisa	M	25	Qela himbortu	Farmer
4	Gamechu Gebecha	M	50	Qela himbortu	Farmer
5	Alemayew	M	52	Qela himbortu	Farmer
6	Dandena Dadi	M	80	Qela himbortu	Farmer
7	Britu Gudeta	F	72	Qela himbortu	Farmer
8	Obse Gutema	F	60	Qela himbortu	farmer
9	Hidha hunde	M	24	Qela himbortu	Student
10	Alemi Jote	F	60	Qela himbortu	Farmer
11	Kebede keneni	M	46	Gare akora	Farmer (H)
12	Debele Batu	M	60	Gare kora	Farmer
13	Guta Taku	M	80	Gare Kora	Farmer(H)
14	Drbe Taku	F	70	Gare Kora	Farmer
15	Kuma Qabeta	F	40	Gare Kora	Farmer
16	Cala Melka	M	72	Gare Kora	Farmer
17	Abebech Negasa	F	30	Gare kora	Trader
18	Faye Guta	F	25	Gare Kora	Trader
19	Kuli Dayas	F	36	Gare Kora	farmer
20	Nata bayu	M	66	Gare Kora	Farmer
21	Cefu Beyena	M	60	Calalka Bobe	Farmer
22	Werku Cala	M	57	Calalka Bobe	Farmer
23	Aselefeh Tadese	F	75	Calalka Bobe	Trader(Healer)
24	Gamechu Ketema	M	33	Calalka Bobe	Office worker
25	Fekadu Lema	M	46	Calalka Bobe	Farmer
26	Kumssa Lammi	M	40	Calalka Bobe	Office worker
27	Alemu Hora	M	50	Calalka Bobe	Healer and Farmer
28	Almaz Legesa	F	32	Calalka Bobe	Trader
29	Kibbe Muleta	F	30	Calalka Bobe	Trader
30	Fantu Caka	F	58	Calalka Bobe	Trader
31	Dinkitu Batu	F	60	Jamjam Laga batu	Healer and Farmer
32	Beyena Geda	M	75	Jamjam Laga batu	Farmer
33	Galgel Fita	M	80	Jamjam Laga batu	Farmer

34	Adunya Cala	M	70	Jamjam Laga batu	Farmer
35	Darartu Irko	F	60	Jamjam Laga batu	Farmer
36	Gete Wakdiyo	F	60	Jamjam Laga batu	Farmer
37	Caltu Felka	F	62	Jamjam Laga batu	Farmer
38	Tadese Miessa	M	50	Jamjam Laga batu	Farmer (Healer)
39	Kebeba Beyena	M	50	Jamjam Laga batu	Farmer
40	Kassu tadese	M	24	Jamjam alga batu	Labor
41	Bidira Kumssa	M	80	Sembo goro	Farmer and Healer
42	Kabada Mulata	M	75	Sembo goro	Farmer and Healer
43	Nugusu Kabada	M	55	Sembo goro	farmer
44	Guta Tufa	M	60	Sembo goro	Farmer
45	Milkecha Tufa	M	65	Sembo goro	Farmer
46	Shalame Fixa	F	50	Sembo goro	Farmer (Healer)
47	Boyido Bayecha	M	37	Sembo goro	Farmer
48	Lomi Didha	F	37	Sembo goro	Trader
49	Lechiisse Qabeta	F	35	Sembo goro	Farmer
50	Lali Bidira	F	45	Sembo goro	Farmer
51	Tinno Hubeto	M	80	Keta andode	Farmer (Healer)
52	Merga Tinno	M	35	Keta andode	Teacher
53	Badho Mulisa	M	34	Keta andode	Farmer
54	Buzu Gurmech	F	33	Keta andode	Farmer
55	Ketema Mako	M	47	Keta andode	Farmer
56	Alemi Kebede	F	50	Keta andode	Farmer
57	Jote Kenenisa	M	81	Keta andode	Farmer
58	Terecha Geda	M	55	Keta andode	Trader
59	Brki Dabi	F	35	Keta andode	Trader
60	Kume Begna	F	60	Keta andode	Farmer
61	Dajene mammo	M	61	Goro kurkurfa	Farmer(Healer)
62	Buzu Tulu	F	60	Goro kurkurfa	Farmer(Healer)
63	Jitu damise	F	50	Goro kurkurfa	Farmer
64	Urgecha Sorii	M	70	Goro kurkurfa	Farmer(Healer)
65	Tadese Tufa	F	67	Goro kurkurfa	Farmer
66	Dabi Regasa	M	52	Goro kurkurfa	Farmer
67	Gazu Dabi	M	29	Goro kurkurfa	Farmer
68	Caltu Jote	M	39	Goro kurkurfa	Farmer
69	Gari Tuffa	M	64	Goro kurkurfa	Farmer

70	Werki Tsegaye	F	30	Goro kurkurfa	Trader
71	Soboka Dinka	M	70	Goro danisa	Farmer
72	Nigatua Mammo	M	59	Goro danisa	Farmer
73	Lemma Bitima	M	33	Goro danisa	Farmer
74	Tercha Tulu	M	40	Goro danisa	Farmer
75	Terecha Soboka	M	33	Goro danisa	Farmer
76	Dara Tulu	F	80	Goro danisa	Farmer(Healer)
77	Serbecha Gurmech	M	70	Goro danisa	Farmer
78	Dayas Dinka	M	52	Goro danisa	Farmer
79	Lelise Soboka	M	40	Goro danisa	Trader
80	Gudisa Duguma	F	20	Goro danisa	Farmer
81	Negesa Kumsa	M	71	Danisa tanqo	Farmer
82	Ashu Derecha	M	22	Danisa tanqo	Farmer
83	Dajene Biranu	M	39	Danisa tanqo	Trader
84	Mamush Mitiku	M	30	Danisa tanqo	Treder
85	Eilfu Keneni	F	60	Danisa tanqo	Farmer
86	Lomi bayisa	F	62	Danisa tanko	Farmer
87	Kuli Kenenisa	F	70	Danisa tanqo	Farmer
88	Teshome Reba	M	70	Danisa tanqo	Farmer
89	Dangiye Urgesa	F	30	Danisa tanqo	Healer
90	Million Urgesa	M	30	Danisa tanqo	Farmer
91	Derecha Tinno	M	40	Kebele 01	Teacher
92	Emunesh Muluneh	F	36	Kebele o1	Tradear
93	Taitu Soboka	F	29	Kebele 01	Trader
94	Abera Tulu	M	50	Kebele 01	Farmer
95	Biftu Kebede	F	27	Kebele 01	Office worker
96	Belachew Terecha	M	41	Kebele 01	Teacher
97	Berhanu Gutema	M	39	Kebele 01	Employee
98	Lello Urgecha	F	44	Kebele 01	Trader
99	Iticha Qacha	M	63	Kebele 01	Trader
100	Mulneh berecha	M	68	Kebele 01	Healer
101	Ketema Soboka	M	26	Kebele 02	Tailor
102	Britu dadi	F	55	Kebele 02	Trader
103	Muluneh Abesha	M	60	Kebele 02	Tailor
104	Asegu Getachew	F	57	Kebele 02	Trader
105	Chala Imana	M	50	Kebele 02	Healer

106	Abera Daba	M	66	Kebele 02	Healer
107	Qanatu Hnde	F	60	Kebele 02	Trader(Healer)
108	Birhae Taye	F	60	Kebele 02	Trader
109	Midagssa Urgecha	M	30	Kebele 02	Employee
110	Gameda Hunde	M	48	Kebele 02	Trader

Appendix 4:- TYPES OF LIVESTOCK DISEASES

NO	Scientific name	Local name
1	African Horse Sickness	Caccabsaa
2	Anthrax	Abbaa sangaa ykn Waanlafaa
3	Black leg	Abbaa Gorbaa
4	Bovine or Ovine Pasteurellosis	Gororsaa Looni ykn Gororsaa Hoola
5	Lump skin disease	Dhukkuba gogaa looni ykn Fanxaxaa looni
6	Trypanosomosis	Gowwoomsaa ykn Gandii, Bareeda
7	New Castle Disease	Fungil,
8	Mastitis	Jigoo ykn Dhukubaa muccaa
9	Sheep and Goat Pox	Fanxaxaa Hoola
10	Septicemia	Arraba Muraa
11	Fasciola	Bocboccoo Hoola ykn Looni
12	Bloat	Bokokaa ykn Bokoksaa
13	Foot and mouth disease	Qabanessaa
14	Rabies	Dhukubaa Saree
15	Fowl pox	Fanxaxaa Lukkuu
16	Orf	Handarraa
17	Leishmania	Sinbira
18	Foot Rot	Ho'ichoo
19	Tunga Penitrans or Chigger	Bunjalee

Appendix 5:- List of Human and Livestock disease treated by medicinal plants in the study area

NO	Oromiffa	Scientific name
1	Garaa	Abdominal crump
2	Urguftu	Malaria
3	Gubaa	Gastric
4	Dhukuba Ilkan	Teeth
5	Ukkaa	Cough
6	Dhukuba Ija	Eye problem
7	Xanach	Mass
8	Shimbra	Liver(Leishmania)
9	Daissa	Birth problem
10	Rakko sifaa'u	Digestion problem
11	Gogogsaa	Constipatio
12	Citto	Scabis
13	Gobbaan Qeerroo	
14	Waan laffa	Snak bit
`15	Ejaa	Evil eye
16	Fincaan dhowaa	Acute uritit
17	Waraaansa	Unespecified pain
18	Giffira	Measles
19	Hadha	Tetanus
20	Fununa	Nasaal bleeding
21	Kormammu	Wart
22	Mataa	Head ach
23	Raammoo Garaa	Parasite
24	Madaa	Wound
25	qonqqoo	Tonsillitis
26	Dhukuuba dhiraa	Syphilis
27	Michi	
28	Forofoorii	Dandruff
29	Roophii	
30	Bokokssaa	Bloating
31	Albaatii	Diarrhea
32	Hirina qaamaa	Weight loss

33	Dhukuba seree	Rabies
34	Abasengaa (Waan lafaa)	Anthrax
35	Handarraa	Orf
36	Araba muuraa	Septicemia
37	Hoichoo	Foot Rot
38	Lafee cabuu	Bone fracture
39	Gatate	Abortion
40	Qufaa	Common cold
41	ABaa gorbaa	Black leg
42	Gagabdo(Fungil)	New castle disease
43	cacabsaa	African Horse Sickness
44	Gororsaa Loonii	Bovine(Ovine) pasteurolosis
45	Qabana'aa	Foot and Mouth disease
46	Dhukuba Gogaa Lonii	Lump skin disease
47	Foot Rot	Ho'ichoo
48	Placenta	Diluu(Obatii)

The hardship of the work



Group discussion



Part of the field work



Group discussion

