Jimma University

College of Natural Sciences

Department of Biology

Ethnobotanical Study of Medicinal Plant Used to Treat Human and Livestock Ailments in Dessie Zuria District, SouthWollo Zone, Amhara Regional State, Ethiopia

By: Dagmawit Addis

A Thesis Submitted to Jimma University, College of Natural Science Department of Biology in Partial Fulfillment of the Requirements for the Master's Degree in Botanical Science.

October, 2019

Jimma, Ethiopia

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# STATEMENT OF THE AUTHUR

First, I declare that this thesis is my own work and that all sources of materials used for this thesis has been fully acknowledged. This is to certify that the thesis prepared by Dagmawit Addis  entitled: Ethnobotanical Study of Medicinal Plant Used to Treat Human and Livestock Ailments in Dessie Zuria District, South Wollo Zone Amhara Regional State, Ethiopia; Submitted to Jimma University, College of Natural Science Department of Biology in Partial Fulfillment of the Requirements for the Master's Degree in Botanical Science complies with regulation of the University and meets the accepted  standards with respect to the originality and quality. I declare that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

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**Internal Examiner**                        **Signature**                                **Date**

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**External Examiner**                        **Signature**                                **Date**

# Table of Contents

# LIST of TABLES

# LIST of FIGURE

# LIST of APPENDIX

# ACRONYMS and ABBREVIATIONS

**CSA**       Central Statistical Agency

**DZDAO**     Dessie Zuria District Administration Office

**DZDAGO**    Dessie Zuria District Agriculture Office

**ETH**       Ethiopia

**GPS**       Global Positioning System

**ICF**       Informant Consensus Factor

**IK**        Indigenous Knowledge

**NGOs**      Non-governmental organizations

**WHO**       World Health Organization

# ACKNOWLEDGMENT

# ABSTRACT

*Plants have been used for medicinal purpose more than a century by most of the population in Ethiopia to treat human and livestock ailments. This study is aimed to fulfill the existing knowledge gap by identifying and documenting the indigenous medicinal plants that are used to treat human and livestock ailments at Dessie Zuria District. Totally, 396 informants participated in this study, from them 383 were household informants and 13 were traditional healers. Data was collected through administrating semi-structured interview, observation and focused group discussions. In this study, both qualitative and quantitative data were gathered. Quantitative data were analyzed by descriptive statistics methods such as percentage and frequency whereas qualitative data was analyzed manually through thematic contents. Overall 99 plant species were recorded across 88 genera and 48 families to treat 52 different human and livestock ailments. From these (62.7%) plant species were used only for human treatment, (24.2%) plant species were used for only livestock treatment and the remaining (13.1%) plants were used for treating both human and livestock ailments. Fibril illness and stomach ache were the major human ailments in the study area while Blackleg was major livestock ailment. The Asteraceae family, containing 13 species (13.2%), was the dominant family over other families. In this regard, Rumex nervosus stood first based on preference and efficacy while Cupressus lusitanica ranked first in its multi-usage. The highest informant consensus value was obtained for Ocimum lamiifolium (0.66). Most medicinal plants were herbs (48%) and the dominant habitat where medicinal plants collected was wild (56%) followed by homegarden (45%). The best-harvested plant part was leaf (64.6%) and the preferred route of application was oral (55.3%). The common method of medicinal plant preparation was crushing (45.4%) and the major application method was drinking (47.8%). Using medicinal plant for firewood (40.9%) was stated as the major cause of decreasing for the abundance of medicinal plants from the previous status. In conclusion, medicinal plants are a vital part of health care system for both human and livestock ailments and it also has multi-usage beyond its medical purpose in Dessie Zuria District. Therefore, the local people should be trained, encouraged and supported on how to conserve and manage medicinal plants.*

Keywords: **- Ailments, Dessie Zuria District, Ethnobotany, Indigenous knowledge, Medicinal Plants.**

# CHAPTER ONE

## 1. INTRODUCTION

### 1.1 Background of the study

Natural therapies are the treatment used to cure the disease using the body's natural healing power (Parekh and Chandra, 2007). Natural products in general are found in nature which includes plants, animals, minerals, microorganisms and their metabolites (Ahn, 2017). In this regard, the products of animal and microbial sources have been used by humans for millennia either in the pure forms or crude extracts to treat different diseases (Parekh and Chandra, 2007). Similarly, plants give immense value to human and livestock health care persists. Moreover, it is estimated that more than 75% of the world's population depend on medicinal plants to treat several human and livestock diseases (Getachew Alibied and Abbas Mohamed, 2016).

Throughout the past decades, the community shows interest in natural remedies, this need has increased dramatically not only in developing countries but also in industrialized countries (Arebu Issa, 2015). The use of medical plant is, a source of primary health care has increased owing to their attributes of wide biological and medicinal benefits, high safety margins and lesser costs (Negesse Mekonnen and Endalkachew Abebe, 2017). More than 20,000 plant species are being used for medicinal purposes in various human cultures all over the world (Getnet Chekole, 2011). In many developing countries traditional medicine plants are still central to their health care system (Motaleb, 2011). Also, it has played a fundamental role in combating many human and livestock diseases in several developing countries, including Africa (Elizabeth d'Avigdor *et al.*, 2014).

Africa is a continent highly endowed with an abundance of medicinal plants, which indigenous people are familiar with and have been using it over time (Getachew Alibied and Abbas Mehamed, 2016). Traditional medicine in African is oldest and perhaps the most diverse of all medicine systems (Arebu Issa, 2015). Further, more than half of the population of Africa use traditional medicinal plants for the treatment of various ailments of both human and domestic animals, which are a great concern to most of the sub-Saharan African nations (Getachew Alibied and Abbas Mehamed, 2016). Likewise, traditional medicinal practices are common in Ethiopia in

which more than 80% of the population in the country uses plant-based traditional medicine as their major primary human health care system and about 90% of the population uses traditional medicine for their livestock of which 95% of medicines are of plant origin (Tena Regassa, 2016). Dependence on traditional medicinal plant for human and livestock health care by the majority of Ethiopians are explained by the incomplete coverage of the modern medical system, unaffordable cost of drugs and the widespread belief in the effectiveness of herbal medicine (Berhane Kidane *et al.,* 2014).

On the other hand, Ethiopia is the home for a high diversity of traditional knowledge, practice and uses of traditional medicine. This is because a geographical diversity of the country coupled with the multiplicity of ethnic groups with complex cultural diversity (Getaneh Gebeyehu, 2011). Again, the knowledge of medicinal plants in Ethiopia was developed for millennia and their use have been providing a vital contribution to human and livestock health care needs throughout the country (Ketema Tolossa *et al.,* 2013) It also has become an integral part of the culture due to its long period of practice and existence (Endalew Amenu, 2007). Besides, traditional medical practice in Ethiopian has been in existence before the development of modern medicine in the country and continues to be widely accepted and used in the prevention and treatment of ailments (Getaneh Gebeyehu, 2011). Similarly, the perception of indigenous knowledge (IK) has originated from local people, which has the potential to redress some of the weaknesses of modern western knowledge (Eyasu Chama, 2017). Which means it is more culturally acceptable and meets the physical needs in a way modern medicine does not (EskedarAbebe, 2011). Also, the indigenous people who live in different localities of the country have developed their specific knowledge on the use, management and conservation of plant resources (Getaneh Gebeyehu, 2011).

In the major portion (87%) of northern Ethiopia, traditional medicine is mostly coming from plant sources while animal and mineral sources contribute little to traditional medicine use (Etana Tolasa, 2007). Similarly, in North Central Ethiopia Amhara region specifically in South Wollo Zone of Dessie Ziura district plants play vital role in traditional medicinal practice for human and livestock disease treatment. However, as many districts in Ethiopia, including Dessie Ziura district traditional medicinal plants and the associated knowledge is endangered due to different human activity (Eskedar Abebe, 2011). Moreover, in spite of accelerated destruction of plant

resources and loss of IK, ethnobotanical studies in Ethiopia have not given adequate attention to traditional medical practices over the years (Kebede Tirfessa *et al.,* 2017). Research and documentation on medicinal plants have started in recent times even though plants have been used traditionally as a source of medicine since ancient times (Kebede Deribe *et al.,* 2006). In most scenarios, IK is passed verbally from generation to generation and valuable information can be lost whenever a traditional medical practitioner passes away without conveying his or her traditional medicinal plant knowledge to others (Endalew Amenu, 2007). If this deed continues, there are probabilities of losing IK of the medical plant from Ethiopia including the study. Thus, this study will contribute in identifying and documenting indigenous knowledge of medicinal plants which have been used to cure human and livestock ailments in Dessie Zuria District. Furthermore, this study played a role in conserving traditional medical knowledge for the future generation.

## 1.2 Statement of the problem

Using medicinal plants in the traditional health care system is very common and vital for most people in developing countries including Ethiopia (Gebrekidan Abrha *et al.,* 2018). Likewise, the indigenous knowledge of traditional medicinal plants is playing a paramount role to treat different human and livestock ailments in Dessie Zuria District. Nonetheless, it is not well documented and in most cases, the knowledge is transferred orally to other persons. Ethnobotanical studies conducted in different regions of Ethiopia indicted medicinal plants are threatened due to different human and natural causes. Similarly, as many researchers reported in Ethiopia unless we become responsive to document indigenous traditional medicinal knowledge, it may be lost forever through time. For instance, Etana Tolasa (2007) stated that traditional medicine practice based on medicinal plants should be documented through botanical surveys otherwise such rich heritages will be lost due to various anthropogenic and other natural causes. Also, Getnet Chekole (2011) indicated that collecting and documenting ethnobotanical knowledge before it is lost forever is a fundamental urgent task. Thus, this study attempts to document the use of medicinal plants in traditional treatment with their ethnobotanical aspect in Dessie Zuria District. Besides, this study tries to make a contribution by documenting indigenous knowledge about medicinal plants used to treat human and livestock ailments in Dessie Zuria District including the threat and the conservation methods of medicinal plants.

## 1.3 Research Questions

This study was conducted to document and assess traditional knowledge of the local people and medicinal plant species used to treat human and livestock ailments through the following perspectives in Dessie Zuria District.

- Which medicinal plants are used to treat humans, livestock or both ailments in the study site?
- What types of ailments are treated by those medicinal plants?
- How does indigenous knowledge get transferred in the local community?
- What are the threats to medicinal plant in study area?
- What are the indigenous conservation mechanisms to preserve medicinal plant?

## 1.4 Objectives of the study

### 1.4.1General objective

- To document the uses of medicinal plant species and the indigenous knowledge of local people in treating human and livestock ailments in Dessie Zuria District.

### 1.4.2 Specific objectives

- To assess the use of medicinal plants, plant parts, habit, habitat, way of preparation, administration route and dosage in treating human and livestock ailments.
- To document the indigenous knowledge of the local people on how to use medicinal plants to treat human and livestock ailments.
- To investigate the existing threats of medicinal plants in Dessie Zuria District.
- To identify the management and conservation methods for those threatened medicinal plants in the study area.

## 1.5 Significance of the Study

Identifying and documenting the indigenous knowledge of local people on medicinal plants that have the potential to cure human and livestock diseases will have significance to preserve them from loss for the future generation. Because most of the time indigenous knowledge is transferred orally and it gets loss when knowledgeable is person passed away without well documenting his or her knowledge. Again, this study will help to know the dosage of most medicinal plants used to treat particular human and livestock ailments. This is useful to maximize the effectiveness of the medicinal plants by using a balanced dose. Also, the finding will give clear information about the major threat of medicinal plants in the study area. This is useful to the district administration and society toward measurements on those causal activates and it will help to precedes conservation action. Besides, this study will create encouragement for other investigators in the area and it will give baseline information for further study.

## 1.6 Scope of the Study

Due to time and budget constraints, the study was limit to Ethnobotanical study of medicinal plant used to treat human and livestock ailment in ten Kebele (lower administrative unit) of Dessie Zuria, South Wollo zone of Amhara region, Ethiopia.

# CHAPTER TWO

## 2. LITERATURE REVIEW

### 2.1 Description of Ethnobotany

Ethnobotany is one of the distinct branches in natural science which combines several disciplines including anthropology, archaeology, botany, ecology, systematics, religious studies, forestry, agroforestry, economics and medicine, cultural and several other aspects (Getu Alemayehu, 2017). The term ethnobotany was first mentioned by John Hershberger in 1895 and defined ethnobotany as "the use of plants by aboriginal people"(Etana Tolasa, 2007). Later, the science of ethnobotany was expanded and redefined by other ethnobotanists (Getnet Chekole, 2011). For instance, Martin (1995) broadly defined ethnobotany as the subject dealing with the study of direct interactions between humans and plants. Also, others defined ethnobotany as a multidisciplinary science that used to investigate interactions between plants and people (Getnet Chekole, 2011).

Ethnobotany encompasses studies regarding plants that describe the uses of plant resources, the interaction of local people with their natural environment and other relations which exist between humans and plants (Mathewos Agize *et al.,* 2013). The historical dimensions of ethnobotany were contemporary approaches in traditional plant knowledge which are largely listings of plant names with their role (Endalew Amenu, 2007). But nowadays ethnobotany has been developed into a new scientific field with the appropriate methodology of documenting and studying indigenous knowledge on plants which then brought quantitative methods rather than a simple listing of plants (Fikiru Ayana, 2017). Likewise, ethnobotany has become a more diversified and multidisciplinary subject that requires an expert in various fields of academic study (Eskender Abebe, 2011). Further, the scope of the subject is expanded to study modern cultures, greater interdisciplinary and recently, greater attention to its applications to conservation and sustainable development (Fikiru Ayana, 2017).

Saving plant species, documenting and preserving indigenous knowledge becomes the major concern of ethnobotanical studies (Getnet Chekole, 2011). Though, its usefulness is also to indicate the interaction between biodiversity and human society, including how biodiversity is esteemed in different societies and how it is influenced by human activities (Martin, 1995). Besides, ethnobotany also tries to deal with all aspects of plant conservation and it offers a vital role in revealing and promoting traditional practices that have been found useful in maintaining biodiversity and sustainable use of biological resources (Getnet Chekole, 2011). In this regard, ethnobotanists are now much more involved with questions of conservation, sustainable development, cultural affirmation, and the intellectual property rights of local and indigenous people (Fikiru Ayana, 2017).

## 2.2 Ethnoveterinary Medicine in Ethiopia

Ethnoveterinary medicine is traditional animal health care knowledge (Eskedar Abebe, 2011) and it comprises traditional surgical techniques, traditional immunization, magical-religious practices, and the use of herbal medicines to treat livestock diseases (Yibrah Tekle, 2015). Overall, ethnoveterinary medicine is the study of traditional knowledge, folk beliefs, skills, methods and practices used for the treatment of livestock ailments (Guluma Kitata *et al.,* 2017). Besides ethnoveterinary practices have been developed by trial and error and by actual experimentation (Yibrah Tekle, 2015) which are locally available and usually cheaper than modern treatments (Eskedar Abebe, 2011). Whereas, traditional knowledge and practice are vary from region to region and from the community to community (Yibrah Tekle, 2015).

Ethiopia is the home of many nationalities and remarkably diverse flora, including numerous endemic species that are utilized in different traditional medical practices (Guluma Kitata *et al.,* 2017). The other hand, Ethiopia is one of the leading countries of Africa in the livestock population (Eskedar Abebe, 2011). Livestock production plays an important role in the livelihood and economy for the majority of Ethiopia population (Endalew Amenu, 2007). But the economic benefits from livestock endure insignificant because of diseases that reduce livestock performance and cause a great economic resource loss especially to the poor farmers (Yibrah Tekle, 2014). Besides, in most Sub-Saharan Africa including Ethiopia 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 (Endalew Amenu, 2007). In addition to this, livestock disease has often been described as serious of constraints to both macro and micro-level economic developments (Eskedar Abebe , 2011).

In this regard, due to the insufficient modern animal health services in Ethiopia traditional ways of treatment seem to be a viable alternative to cure livestock (Yibrah Tekle, 2015). Further traditional medicinal plants used for the treatment of animals are vital to livestock management for most Ethiopian (Endalew Amenu, 2007). In certain parts of Ethiopia, livestock ailments such as anthrax, blackleg, anaplasmosis, ascariasis, abscess, leeches, trypanosomiasis, lymphangitis, stomatitis, and coccidiosis have been treated by using medicinal plants and its supplements (Yibrah Tekle, 2015). Similar to other IK ethnoveterinary medicinal plant knowledge is not well documented. Therefore, proper documentation and understanding of indigenous knowledge, attitude and practices about the occurrence, cause, treatment, prevention and control of various ailments is important in designing and implementing successful livestock production (Yibrah Tekle, 2014).

## 2.3 Traditional Medicine

According to WHO definition traditional medicine is "the sum total of all knowledge and practices, whether explicable or not, used in the diagnosis, prevention and elimination of physical, mental or social imbalances" (Sintayehu Tamene, 2011). As well as, traditional medicine depends on practical experience and observation which passed verbally or sometimes in writing from generation to generation (Mersha Ashagre, 2011).

Ancient Chinese scripture and Egyptian papyrus symbols mention the use of plants for medicinal purpose (Motaleb, 2011). Also, until the commencement of the 19th century, all medicines were traditional. Yet, in many developing countries, it is true that for the majority of the rural population, traditional medicine is the only principal kind of health care available (Eyasu Chama, 2017). However, there is no clear information about how the knowledge of traditional medicine was first started; it is presumed that the early attempts were based on assumptions and superstitions (Etana Tolasa, 2007). Further, traditional medicine is used throughout the world as it is heavily dependent on locally available plant species and plant-based products and capitalizes on traditional wisdom-source of knowledge (Ketema Tolossa *et al.,* 2013).

The healing properties of plants have been developed during primitive men and women struggled with the encountered health problems such as the miseries of pains, sickness and sustained injuries (Getnet Chekole, 2011). In addition to this, it is assumed that the treatments with traditional medicine have been started when people begin to select their food from plants growing nearby, which they thought would cure ailments (Sintayehu Tamene, 2011). Again, it was believed to be through trial and error that early man learned the knowledge on the utilization of plants for disease prevention and curative purposes (Etana Tolasa, 2007).

In all countries of the world, there is traditional knowledge related to the health care system of humans and animals (Yibrah Tekle, 2015). Similarly, many countries in Africa, Asia and Latin America use traditional medicine to meet some of their primary health care necessities for the maintenance of good health (Singh, 2015). Besides, over one-third of the populations in developing countries including Africa highly depend on traditional medicine due to lack of access for modern health care system (Kebede Deribe *et al.,* 2006). Since traditional medicine is culturally acceptable, economic affordable and efficient for against certain types of ailments than modern medicine (Ketema Tolossa *et al.,* 2013).

Africa is considering to be the foundation of humankind which marked by regional differences in healing practices with a rich biological and cultural diversity (Arebu Issa, 2015). For more than 80% of the population in Africa traditional medicine are the first and the only health care system particularly for poor and rural areas (Eyasu Chama, 2017). So, this situation would remain persistent while modern medicine continues to be unable to meet the health care of the people of the continent effectively (Mersha Ashagre, 2011). African traditional medicine in its varied forms is a holistic system involving both the body and the mind. The healer typically diagnoses and treats the psychological basis of sickness before setting medicines to treat the symptoms (Arebu Issa, 2015). In general, traditional medicine particularly using medicinal plants have been essential and the most important source of curative for livestock and both preventative and therapeutic traditional preparations for human (Fikiru Ayana, 2017).

## 2.3.1 Traditional Medicine in Ethiopia

Ethiopia is believed to be home for about 6,000 species of higher plants with nearly 10% endemism and the vegetation type is also different ranging from arid low land to Afro-alpine

vegetation (Yeneayehu Fenetahun and Girma Eshetu, 2017). The country's ecological scenery is quite diversified in altitude, climatic and ecological features. Due to this reason Ethiopia is the fifth major country in tropical Africa in terms of the diversity of flora (Getnet Chekole, 2011). The diversity is also significant in the lower plants and genetic diversity contained in the various biotic makeups is too high thus making the country a critical diversity hot spot for plants (Yeneayehu Fenetahun and Girma Eshetu, 2017).

Besides, Ethiopia has a long history of traditional medicine to combat human and livestock ailments in different ways (Kebede Deribe *et al.,* 2006). This can be confirmed by referring to the medico-religious manuscripts in the country (Negesse Mekonnen and Endalkachew Abebe, 2017). But Formal recognition to TM in Ethiopia was given in 1942 where the legality of the practice is acknowledged as long as it doesn't harm  health and the registration and licensing were introduced in 1950 (Arebu Issa, 2015). During the 1970s and 1980s, the country's health policy emphasized disease prevention and health service development in rural areas. Particularly after the adoption of the Primary Health Care Strategy in 1979 official consideration was given to the development and promotion of traditional medicine (Kebede Deribe *et al.,* 2006). Moreover, in different parts of the country healers also formed their professional associations and delivered with the provision of license for the use of traditional medicine in the official health services (Arebu Issa, 2015).

Though, the religious and secular pharmacopeia had been compiled since 15th century Ethiopian people have been using medicinal plants to treat different human and livestock ailments over many centuries (Tilahun Teklehaymanot, 2009). Medical textbooks written in Geez between the mid-17th and 18th centuries indicate that plants have been used as a base of traditional medicine in Ethiopian healthcare system (Tena Regassa, 2016). Further, traditional medicine in Ethiopia includes medicinal preparations from plants, animals and mineral substances (Mersha Ashagre, 2011). Particularly plant and animal species used for medication of different animal and human ailments over centuries when there was no modern health service provision (Guluma Kitata *et al.,* 2017). As well as the practice of traditional medicine to a large extent focuses on the use of herbs, spiritual healing, bone-setting, and minor surgical procedures (Fisseha Mesfin, 2009).

More than 95% of traditional medical preparations in Ethiopia are of plant origin (Fisseha Mesfin *et al.,* 2009). Furthermore, before some decades, plant remedies were the most important and sometimes the only source of therapeutics for closely 80% of the population in the country (Negesse Mekonnen and Endalkachew Abebe, 2017). The use of traditional medicine is still extensive in Ethiopia, and its acceptability, availability and popularity is no doubt as most of the populations use it for health care needs to both human and livestock (Yayesh Limenih *et al.,* 2015). In other words, in all regions of the country, traditional medicine has great acceptability since it is an integral part of the local culture and hence, people often depend on their efficient and less costly alternative health care (Eskedar Abebe, 2011).

Generally, medicinal plants are frequently used by peoples who live in both rural and urban areas to treat some common ailments of human and livestock (Tena Regassa, 2016). Moreover, the traditional use of medicinal plants by most Ethiopians in the health care system is ascribed to the incomplete coverage of the modern medical system, not always available prescription drugs and the widespread belief in the effectiveness of herbal medicine (Berhane Kidane *et al.,* 2014). Likewise, long-distance of the health service stations, unaffordable prices of modern medications particularly for smallholder farmers and pastoralists, emergence and re-emergence of certain ailments are some of the reasons that people use traditional medicine (Ketema Tolossa *et al.,* 2013).

## 2.4 Medicinal Plants

The plant that possesses therapeutic properties or exerts beneficial pharmacological effect on the human body is generally designated as a medicinal plant (Motaleb, 2011). The term of medicinal plants include various types of plants used in herbalism and some of these plants have a medicinal activity (Singh, 2015). Besides, a medicinal plant is a plant that provides people with medicines to prevent disease, maintain health or cure ailments (Maiti, 2007). Historical accounts show that different medicinal plants were traditionally used as early as 5000 to 4000 BC in China and 1600 BC by Syrians, Babylonians, Hebrews and Egyptians. Considerable indigenous knowledge system, from the earliest times, is related to the use of traditional medicine in several countries (Eskender Abebe, 2011).

Medicinal plant is either "wild plant species" which growing spontaneously in self-maintaining populations in natural or semi-natural ecosystems and could exist independently of direct human actions. On the other side "Domesticated plants species" is arisen through human actions such as selection or breeding and depends on management for their existence (Oladeji, 2016). The plant materials used to treat different ailments include seeds, berries, roots, leaves, bark and flowers (Arebu Issa, 2015).

Medicinal plants are a source of the wide variety of natural antioxidants and it has antimicrobial, anti-cancer, anti-diabetic, anti-atherosclerosis, immunomodulatory, even Reno-protection and other vital properties which enable to cure different disease (Rafieian-Kopaei, 2012). Moreover, medicinal plants naturally synthesize and store some secondary metabolites like alkaloids, sterols, terpenes, flavonoids, latexonins, glycosides, lactones, quinines, volatile oils, etc. (Motaleb, 2011). Secondary metabolites are organic compounds produced in a plant that doesn't have seeming functions involved in plant growth and development. It produced in different plant families, in specific groups of plant families or specific tissues, cells or developmental stages during plant development (Singh, 2015). Similarly, medicinal plants have been provided mankind large variety of potent drugs to alleviate infections and suffering from ailments in spite of progression in synthetic drugs (Oladeji, 2016).

Medicinal plants also consider as a rich resource of ingredients which can be used in drugs development and synthesis and the survival of human being (Gebrekidan Abrha *et al.,* 2018). Medicinal plants are the base for the development of new drug and the endurance of humankind as well as other livestock (Guluma Kitata *et al.,* 2017). Likewise, some medicinal plants taken as an important source of nutrition and as a result of these plants are suggested for their therapeutic values. For instance, ginger, green tea, walnuts and some other plants (Rasool, 2012).

The history of the medicinal plant used to cure disease is probably dating back to the beginning of human civilization. Our forefathers were compelled to use any natural substance which could find ease their suffering and even terminal illness (Motaleb, 2011). Nowadays there is a revival of interest in the consumption of medicinal plants in the form of standardized extracts, partly due to their multiple side effects, and the high cost of patentable chemical drugs (Rafieian-Kopaei, 2012). Besides, herbal medicine has attained an impressive role in health care system all over the

world. This involves the use of medicinal plants not only for the treatment of ailments but also as potential material for maintaining good health conditions (Oladeji, 2016). Also, medicinal plants have a promising future because there are about half million plants around the world, and most of the medical activities have not investigated yet, and their medical activities could be crucial in the treatment of present or future studies (Rasool, 2012).

## 2.4.1 Characteristics of Medicinal Plants

Medicinal plants have many characteristics. When used as a treatment it has characteristics such as Synergic medicine, Support of official medicine and Preventive medicine. Synergic medicine is the ingredients of plants all work together simultaneously, so their uses can complement or damage others or neutralize their possible negative effects (Singh, 2015). The other characteristics of medicinal plants are Support of official medicine in which components of the plants proved to be very effective in the treatment of complex cases like cancer ailments (Rasool, 2012). Finally, Preventive medicine has been confirmed that the component of the plants also characterizes by their ability to prevent the appearance of some ailments. So this will help to reduce the use of chemical remedies which will be used when the disease is already present (Singh, 2015).

## 2.4.2 Use of Medicinal Plants

Plants in overall and medicinal plants in particular are precious, fundamental and most useful to nearly all life on the earth (Eskedar Abebe, 2011). Medicinal Plants are giving benefits in one form or another for almost everyone on earth. For instance nutrition, toiletry, body care, incense and ritual healing are some of the advantages provided by medicinal plants (Maiti, 2007). Besides, medicinal Plants are an important part of our worldly wealth they serve as a vital therapeutic agent as well as valued raw material for manufacturing many traditional and modern medicines (Motaleb, 2011).

In the same way, medicinal plants may give different benefits to society. Primarily medicinal plants provide health benefits to the people who consume them as medicines (Smith-Hall *et al.,* 2012). Also, it is the mainstay for traditional medicine, which means more than 3.3 billion people in developing countries utilize medicinal plants consistently (Singh, 2015). Again it provides financial benefits to people who harvest, process, and distribute them for sale (Smith- Hall *et al.,* 2012). The economic importance of medicinal plants to their critical role in the health care

provider is valued by most populations in the world (Eskedar Abebe, 2011). Medicinal plants are also seen as an economic commodity for some members of the society who make their livings on their collection, trade or through use for treating patients as traditional medical practitioners (Getnet Chekole, 2011). In addition, it gives society-wide benefits, such as job opportunities, taxation income and better labor force (Smith-Hall *et al.,* 2012).

Medicinal plants also play a significant role in the development and advancement of modern studies by serving as a preliminary point for the development of novelties in drugs (Eskedar Abebe, 2011). Moreover, 25% of modern drugs comprise one or more active principles of plant origin (Medhin Zewdu *et al*., 2001). Likewise, several modern drugs were extracted from medicinal plants through the use of plant material as an indigenous treatment in the traditional system of medicine (Eskedar Abebe, 2011). As well as, the uppermost 25 bestselling medicines in the world originated from plant materials. Though, development of a medicinal plant is reduced by weak scientific evidence, poor practices in the process of drug development and insufficient financing (Ahn, 2017).

## 2.4.3 Threats of Medicinal Plants

Plant diversity remains essential for humans and also animals in providing a significant number of traditional and modern remedies required in healthcare (Etana Tolasa, 2007). However, harvesting of species of medicinal value is greater as there is evidence that the extinction of such plant species is noticeable (Eskedar Abebe, 2011). Similarly, it is a matter of great concern to realize that the annual extinction rate of plant species is estimated to be about 3,000 (Etana Tolasa, 2017).

Medicinal plants are collected from the wild slightly than cultivated; they are subjected to both general and specific threats. General threats include climate change and habitat loss for development and agriculture. A specific threat is over-collection to meet the increasing demand for medicines (Kling, 2016). In recent times, plant research has increased all over the world and there is widespread acceptance in which green medicines are healthier and harmless than the synthetic ones (Guluma Kitata *et al.,* 2017). As well as, progressively more people are turning to herbal remedies especially for treating minor aliments unfortunately the inclination toward the revival and use of medicinal plants has resulted in few undesirable results (Motaleb, 2011).

Besides, many people in the world exploit the Earth mercilessly, as if there were no tomorrow, the greatest danger elsewhere in our country is losing the indigenous knowledge of our own culture and our biodiversity resource including the medicinal plants of our locality (Eskedar Abebe, 2011). However, medicinal plants are limited in supply and due to the inclusive extent of use and extraction; medicinal plants are on the verge of depletion (Motaleb, 2011). Again, with population pressure, recurring drought and deforestation most of the medicinal plants are either destroyed or are on the verge of extinction (Kebede Tirfessa *et al*., 2017). The problem is further compounded by the fact that traditional knowledge on traditional medicine is also being lost at an alarming rate (Etana Tolasa, 2007).

Generally, there are two sources of threats to medicinal plant that is manmade and natural causes (Endalew Amenu, 2007). Manmade causes of threat to medicinal plants include overgrazing, firewood collection, charcoal production, urbanization, agricultural expansion and constructions (Fikiru Ayana, 2017)  Rapid increase in population, the need for fuel, timber production, over-harvesting, destructive harvesting, invasive alien species, honey collection degradation, and habitat distraction. On the other side, natural causes include recurrent drought, bushfire, disease and pest outbreaks (Endalew Amenu, 2007). Besides, to the above factors because of the younger generation underestimate the traditional system of healing the advancement and the conservation of medicinal plants and associated knowledge is in a threat (Yeneayehu Fenetahun and Girma Eshetu, 2017).

### 2.4.1.1 Threats to Medicinal Plants in Ethiopia

The various climatic and topographic conditions of Ethiopia contributed to a rich biological diversity (Yeneayehu Fenetahun and Girma Eshetu, 2017). Likewise, the Country has been described as one of the most unusual and important sources of biodiversity in the world (Elizabeth d'Avigdor *et al.,* 2014). Further, medicinal plants have played a crucial role as a source of medicine in Ethiopia from the time immemorial to combat different ailments and human sufferings (Sintayehu Tamene, 2011). But it is faced with problems of continuity and sustainability (Elizabeth d'Avigdor *et al.,* 2014).

The primary reasons for these problems are overexploitation; overgrazing, agricultural land expansion and acculturation continuously threat Ethiopian traditional medicinal plants and related

knowledge (Ermias Lulekal *et al.,* 2013). This action leads to loss of taxa of medicinal plants, loss of habitats of medicinal plants and loss of indigenous knowledge (Sintayehu Tamene, 2011). Besides, to these known factors which threat medicinal plant species other condition like types of loss of  medicinal plant and the part used also affect the medicinal plant (Yeneayehu Fenetahun and Girma Eshetu, 2017). Some investigations in certain parts of Ethiopia have shown that the rate of erosion of both indigenous knowledge and the herbs signals for the need for intervention (Kebede Tirfessa *et al.,* 2017).

Several studies have shown that most of the medicinal plants utilized by Ethiopian people are harvested from wild habitats. Hence, this aggravates the rate of loss of species with related indigenous knowledge and loss of extensively occurring medicinal plant species (Yeneayehu Fenetahun and Girma Eshetu, 2017). Furthermore, nowadays herbal practitioners have to walk greater distances for collection of medicinal plant since the availability of plants in general and medicinal plants in particular have been affected by a dramatic decrease in areas of native vegetation (Sintayehu Tamene, 2011).

Totally, in Ethiopia accessibility of plants specifically, medicinal plants have been affected due to agricultural expansion, deforestation and development of urban centers (Etana Tolasa, 2007). Moreover, uprooting and unsustainable utilization are the major cause for the loss of medicinal plants in Ethiopia. For example harvesting the roots and barks of the medicinal plant possess more of a threat than collecting leaves for medicinal value (Yeneayehu Fenetahun and Girma Eshetu, 2017). If these and other precious plant species constituting the flora of the country continue to give way to manmade and natural disasters, we would be losing medicinal plants and their surroundings within a short period (Etana Tolasa, 2007).  Similarly, indigenous knowledge on natural resources, utilization of medicinal plants not beyond the resilience of the surrounding environment is regarded as an important measure of sustainable plant biodiversity conservation (Kebede Tirfessa *et al.,* 2017).

### 2.4.4 Conservation of Medicinal Plant

Conservation of medicinal plants is the use of medicinal plants in a sustainable way and when it is essential it also protects those species which are seriously threatened (Fikiru Ayana, 2017). The idea of sustainability is now seen as the guiding principle for economic and social development,

particularly concerning biological resources (Endalew Amenu, 2007). Sustainable management of traditional medicinal plant resources is significant not only because of their value as a potential source of new drugs but also due to reliance on traditional medicine for health care system (Yeneayehu Fenetahun and Girma Eshetu, 2017). Some conservation actions have been measured around the world intended to protect threatened medicinal plants from further damage (Sintayehu Tamene, 2011). This includes in-situ and ex-situ conservation measures. Both in-situ and ex-situ conservation efforts are applied to capture medicinal plant genetic resources and the traditional practice related to them (Etana Tolasa, 2007).

In-situ conservation is the conservation of species in their natural habitats. Some traditional medicinal plants have to be conserved in their natural habitats due to the difficulty of domestication and management (Ermias Lulekal *et al.,* 2013). On the other hand, ex-situ conservation is the conservation of species outside their natural habitats. It comprises gen bank, botanical gardens and others (Yeneayehu Fenetahun and Girma Eshetu, 2017). Ex-situ conservation of medicinal plants can also be possible in homegarden s, as the home garden is a strategic and ideal farming system for the conservation, production and enhancement of medicinal plant (Endalew Amenu, 2007). Besides, homegardens have great involvement in the conservation of biodiversity in general and medicinal plants in particular (Yeneayehu Fenetahun and Girma Eshetu, 2017).

Medicinal plants can also be preserved by ensuring and encouraging their growth in special places. This is due to whether medicinal or non-medicinal plants grown in this special place are mostly forbidden to be cut for instance religious sites like churches, mosques and the like are sacred areas (Yeneayehu Fenetahun and Girma Eshetu, 2017). Therefore, this enables to conserve medicinal plants that are threatened due to natural or manmade factors (Eskedar Abebe, 2011). Furthermore, to conserve indigenous knowledge of plant use in general and traditional medicine in particular, an ethnobotanical study is very important (Eskedar Abebe, 2011). Because ethnobotanical studies can show the management problems of medicinal plants through interviews and market surveys and also, it gives solutions by promoting local traditions and customs that had conservation advantages (Yeneayehu Fenetahun and Girma Eshetu 2017). Further, if ethnobotany is strengthened and ethnobotanists work together with local communities,

governments, educators and NGOs it can address the future environmental degradations and accelerating loss of cultural knowledge and language (Eskedar Abebe, 2011).

# CHAPTER THREE

# 3. METHODS AND MATERIALS

## 3.1 Description of the Study Area

This study was carried out in Dessie Zuria District which is one of the districts in South Wollo Zone of Amhara Region, Ethiopia. It is located 31km away from Dessie administrative town (the capital city of South Wollo Zone) and 431km north of Addis Ababa. The district is situated at 10° 50' 0" - 11° 10' 0 N latitude 39° 20' 60" - 39° 50' 0"E longitude with an altitude of 1800 -3500M above sea level. Besides, the total area of the district is 973.76 square kilometer with an average density population of 183 persons per square kilometer which is greater than the zone average of 147.58 persons per square kilometer.  It is bordered on the south by Albuko and, on the north by Kutaber, on the east by Kalu and Kombolcha on the west by Legambo, Tenta and Were Ilu and Ambasel (DZDAO, 2018).
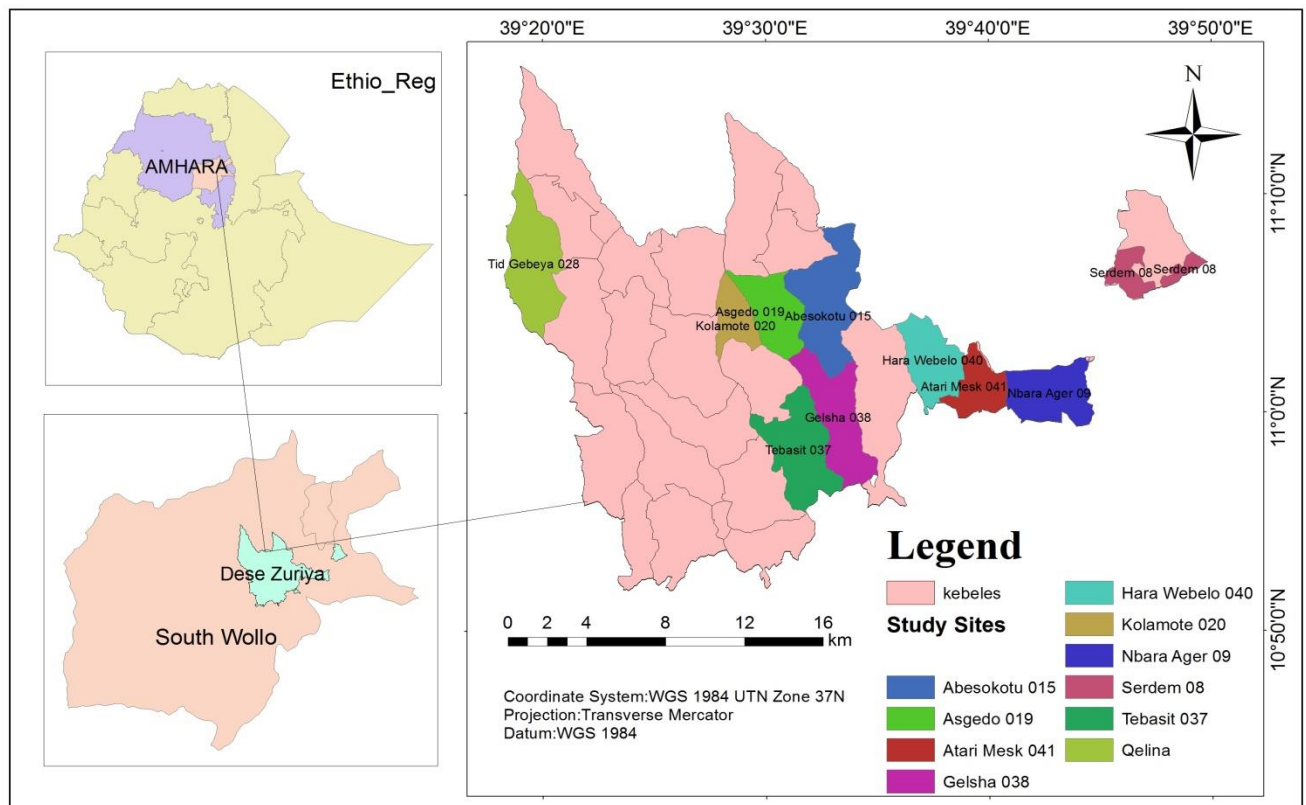


Figure 1: Map of the study area showing Dessie Zuria District, Northern Ethiopia.

Data Source: south wollo zone administration office

20

## 3.2 Climate

The study area has three distinguished climatic zones; high land (47%), mid land (45%) and low land (8%) but in most cases, the low land is included in mid land which means the total area of semi land became 53%. In Dessie Zuria District there are two rainy seasons: spring (March-May) and summer (July-September), of which summer season has the highest rainfall. As well as average annual rainfall of the district is 1100-1300 mm with an average humidity of 20-28%. During different seasons the district temperature is increased and decreased. While the maximum average monthly temperature is greater than 28 $^0$c and the minimum is less than 15 $^0$c. Besides an average annual temperature of the district is 21.5 $^0$c. In this regard, ten years mean annual temperature and rainfall from 2001-2010 is shown in Figure 2 (DZDAGO, 2019).
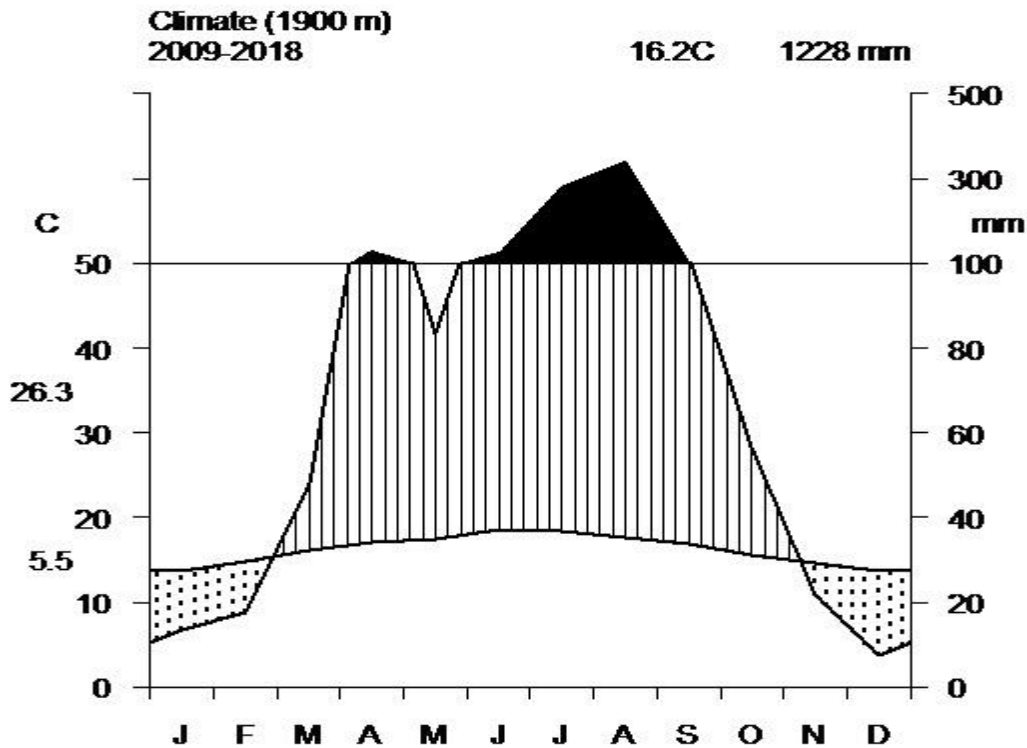


Figure 2: Climatic diagram showing mean annual temperature and rainfall from 2009-2018

Data source**:** Dessie Metrology Agency, 2019.

## 3.3 Population and peoples living system

### 3.3.1 Population

The District is largely occupied by the Amhara ethnic group (99.93%) who speak Amharic language (DZDAO, 2019). Based on the 2007 national census conducted by the CSA (2007) of Ethiopia this district has a total population of 157,679, of which 77,626 (49.2%) were male and 80,053 (50.8%) were female in which none of them were urban inhabitants. A total of 35,437 households were counted in this district, resulting in an average of 4.45 persons to a household, and 34,524 housing units. According to the recent data from the South Wollo Zone administration office, the district total population become 178,363 from this 91,719(51.5%) were male and 86,645(48.5%) were female and the household becomes 41,830. In this regard, the majority of the inhabitants were Muslim, with 97.72% reporting that as their religion, while 2.21% of the population was Ethiopian Orthodox Christianity (DZDAO, 2019).

### 3.3.2 Livelihood

In the district 44,893.15 (45%) hectare land was covered by crop, 18893.77(19.35%) hectare land used for grazing, 22236.77 (22.77 %) hectare land was used for forest and shrubs, 1992 (2.03 %) hectare land covered by water and the rest of 9656 (9.89%) hectare land used for other uses. Besides, district topography was 42% Mountainous, 35% hilly, 18% plateau and 5 % valleys (DZDAGO, 2018).

<div style="text-align:center">A        B</div>

Figure 3: Different vegetation and land type in Dessie Zuria District, Northern Ethiopia, and Photo taken by Dagmawit addis, 2019)

A. Area prone to deforestation at Abesokotu kebele.
B.  *Eucalyptus camaldulensis* and *Cupressus lusitanica* dominant plant community type at Asgedo kebele.
C. At Qelina kebebe
D. hilly land escape at  Tebasit kebebe.

In the case of vegetation, there are plantation forest and natural forest in the district. Nowadays, there is an increase in plantation forest occupying an estimate of 4009.8 hectares while the natural forest shows a decrease and covers 2577.2 hectares of the district. Besides, *Eucalyptus camaldulensis* was the dominant plant species in this district followed by *Acacia senegal, Carissa spinarum and Allophyllus abyssinicus*. The soil types are black, red, brown, and gray soils. Black soil cover 25%, red soil cover 15%, brown soil cover 40%, grey soil covers 10% and other soil types 10% of the district (DZDAGO, 2018).

Similar to other Ethiopian rural districts, different pulse crops, cereals, oil crops, vegetables, root crops, fruit and others are cultivated in the study area. In the District, pulse crops such as *Vicia faba, Pisum sativum, Cicer aestivum, Lens culinaris, Lathyrus sativus* and cereals such as *Avena*

*sativa, Triticum aestivum, Sorghum bicolor* and *Eragrostis tef* grow. In addition, oil crops like *Linum usitatissimum, Brassica carinata, Guizotia abyssinica, Sesamum indicum* and vegetables such as *Lactuca sativa, Brassica napus, Lycopersicon esculentum* and *Spinacia oleracea* are also produced. Additionally, root crops *like*, *Solanum tuberosum, Beta vulgaris, Daucus carota, Allium cepa* and *Allium sativum* and fruits like, *Persea americana, Musa paradisiaca, Psidium guajava, Mangifera indica, Citrus sinensis, Carica papaya* and *Citrus medica* are grown (DZDAGO, 2019).

### 3.3.2.1 Livestock

Livestock's is a means of income for most of the people who are living in Dessie Zuria District. The total population of livestock was described as follows: chicken (150,506), sheep (131, 217), goat (37, 633), oxen (28,525), cow (20, 166), calf (11, 825), young bull (11,318), Heifer (10,920), bees (4, 214) beehives, and camel (290). From these livestock, 11299.96 tons of beef, 646.815 tons of sheep meat, 244.188 tons of goat meat, 275 tone of Chicken, 13244 Lt. of milk, 71,843 Skin and hide and 7.4 million eggs were produced on 2010 E.C. (Dessie Zuria District livestock resource development office, 2018).

In this district totally 23 post veterinary clinics are available, that is twenty-three kebele of this district have a post veterinary clinic and the rest ten kebele don't. The people use nearby veterinary clinics which is found around their kebele. Even though, twenty-three post veterinary clinics are available, almost all are not capable enough to give quality service to their customers. Besides, scarcity of budget, shortage of professionals, shortage of clinical equipment, drug resistance due to redundancy treatment of the same drugs, poor efficiency of some drugs, difficult topography to bring diseased animals to the veterinary clinics, shortage of transportation for professional and drugs, lack of facilities of storing, handling and transporting drugs and vaccines are among the problems in post veterinary clinic. Due to this and other reason people prefer to use additional treatment for their livestock like ethno-veterinary. In this regard, main livestock disease record from the district agriculture office were Blackleg, Lumpy skin disease, Foot and mouth disease, Internal parasite and External parasite, bovine pasteurellosis, Sheep pox, Goat pox, Peste des petits ruminants disease, African horse sickness, Glanders, Newcastle

disease, Avian pox, Fowl typhoid and Coccidiosis (Dessie Zuria District livestock resource development office, 2018).

### 3.3.2.2 Human health

The available health institutions in Dessie Zuria District are 8 health stations and 31 health posts. Since there is no hospital in the district the resident need to travel nearby town Dessie to access medical treatment for their critical problems. Additionally, traditional medical treatment is also widely practiced in the area to satisfy their health needs. In this regard, Dyspepsia was the major health problem by the district, followed by musculoskeletal disease and typhoid fever from the top ten ailments. Also, Pneumonia, Helemetic, Parasitic disease, Diarrhea, Acute upper respiratory disease, Skin disease and Urinary tract infection described respectively according to their prevalence of the disease from 2008 - 2010e.c in the study area (Dessie Zuria health office, 2018).

## 3.4 Site Selection

A reconnaissance survey was conducted from March 19 to March 29, 2019. After the survey 10 kebele from a total of 33 kebele (all were rural kebele) were selected as study sites for data collection purposively by considering criteria such as agro-climatic zone, availability of more vegetation particularly medicinal plants and livestock population. Taking these criteria into consideration, the research was aimed to gather ethno-medical information from the community.

## 3.5 Sample Size and Informant Selection

Sample size determination was according to Yamane (1967) simplified formula for calculation of sample size from a population which is an alternative to Cochran's formula. According to him, for a 95% confidence level and size of the sample calculated by using the formula below:

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

Where, N is the population size and *e* was the level of precision

Total house hold in the district is 41,830 so N=41,830    e = 0.05 since the confidence level is 95%

$$N= \frac{41,830}{1+41,830(0.05)^2} =396$$

After determining the sample size, 383 household and 13 key informants (Appendix VI) were selected. Households were selected by random sampling method (281 informants were men and the rest 102 informants were women). In each kebele from 25 to 40 household informants were selected by considering the population size of the kebele. In this regard, one key informant was selected from each seven kebele and two key informants from the rest three kebele by purposive sampling method (10 of them where men and the rest 3 were women). Selection of households were done according to martin (1995) suggestion by flipping a coin in front of every house when the head was out they were selected for interview and tail out reject the house. Besides, the selection of the key informant was by consulting administrators of the kebele, agriculture office elders who found in each study site.

## 3.6 Data Source and Collection Method

Primary data sources were used for this study. In this regard, data was collected from April 1 to May 5, 2019 through administrating semi-structured interview questionnaires, observation and focus group discussion.

### 3.6.1 Semi-Structured Interview

The semi-structured interview questionnaire was prepared in English (Appendix III) and translated into Amharic language (Appendix V). It has three parts including personal information that includes the age, gender and kebele, basic medicinal plant information for human and livestock treatments and indigenous knowledge and threat level of medicinal plants and other information. Besides, for the key informant interview guide questions were set by selecting a question from which previously prepared (Appendix IV)

### 3.6.2 Observation

Field observation was done to understand in what manner people put their social and cultural practices in their day to day activities (Martin, 1995). So this method was used from the very beginning until the accomplishments of the study to understand how people put their practice in their daily activities in each study site.

### 3.6.3 Group Discussion

Group discussion was made before data collection and during the data collection. The first group discussion was made to notify all informants in each study site about the objective of the study as it is for educational purposes. Also, during ethnobotanical data collection group discussion was held by six participants. The participants were elders and traditional healers. As well as, the place and time were arranged based on the interest of the participant in both group discussions.

## 3.7 Plant Sample Collection and Identification

Homegardens, as well as wild habitat plant specimens, were collected, numbered, pressed, and dried for identification based on ethnobotanical information provided by informants from April 5 to June 2, 2019, in Dessie Zuria District. Preliminary identification was attempted in the field. But the confirmation and the identification of unidentified specimens was done at Jimma University by using volumes (1-8) of Flora of Ethiopia and Eritrea and with the assistance of experts.

A                                              B



Figure 4: Field observation and sample specimen collection Dessie Zuria District, Northern Ethiopia, photo taken by Dagmawit Addis, 2019).
- A. Photo taken with key informants at Qelina kebele.
- B. Collection of plant specimen by key informant Qelina kebele.

## 3.8 Data Analysis and Interpretation

In this study both qualitative and quantitative data were available. In this regard, by using Microsoft excels spreadsheets quantitative data such as frequency, distribution and percentages

were calculated, analyzed and summarized. Also, the quantitative data was computed by parameters such as preference ranking, direct matrix ranking, paired comparison and ICF (informant consensus factor). On the other hand, qualitative data was analyzed manually through thematic contents which are used to provide additional information for the study.

### 3.8.1 Preference Ranking

Preference ranking for this study was done by following Martin's method (1995). Seven medicinal plants used to treat both human and livestock ailments were selected in the study site and the key informant arranged these medicinal plants based on their personal preference. Each rank was given an integral value 1,2,3,4, and 5 and the most important medicinal plant was given the highest score (5) while the least important medicinal plant was given (1). Finally, the total values were summed up and the overall ranking of each medicinal plant was determined.

### 3.8.2 Direct Matrix Ranking

This analytical tool was used according to Martin (1995) suggestions. Six multipurpose plants that have the highest use-value were selected based on data collected from the society. Again seven use attributes of the plant were identified. Having these eight informants was select by random sampling method from elders and traditional healers and told to give values to each medicinal plant-based on the listed attributes. Finally, the given values were added and ranked. The values used for ranking was: 5-best, 4-very good, 3-good, 2-less used, 1-least used and 0-no value.

### 3.8.3 Paired Comparison

After identifying five medicinal plants in preference ranking which used to treat a disease in both human and livestock those medicinal plants were arrange differently from the previous order and by following martin (1995) the pairs were given to eight key informants to choose the best pair based on the efficiency of the plant to treat a disease. Also, the informants were told to give the highest mark to the best medicinal plant and the score will be sum up and lastly rank was given to each medicinal plant.

## 3.9 Informant Consensus

To verify the reliability of the information given by participants during the interview they were asked more than one time. If their responses were different from the former one it was rejected from the data as faulty information. While informant responses related to the former one it was accepted as important information. Further, Informants Consensus Factor was calculating by below formula;

*ICF = Nur – Ns / (Nur – 1)* (Heinerich *et al.,* 1998).

Where, ICF= Informants Consensus Factor

Nur= number of use citation in each category and

Ns= number of species us

## 3.10 Materials

For this study material like, Plant press, plastic bag, GPS, photo camera was used in the field and audio recorder was used to interview key informants.

# CHAPTER FOUR

## 4. RESULT

### 4.1 General information about household informants

Generally, most of the respondents were male (73.4%) and majority were found between the age of 34-49 (46%). Most of the respondents lived for 36-51 years (35.8) in the study area. The major religion in the area is Muslim (94.52%) and most respondents were uneducated with low educational status (54.6%). Regarding the marital status, most of the respondents were married (88%) and occupationally most were farmers (91.6%) (Table 1).

Table 1: Personal information of respondents (N = 383) Dessie Zuria District, Northern Ethiopia, 2019.

| Characteristic | | Frequency | Present |
|---|---|---|---|
| Sex | Female | 102 | 26.6 |
| | Male | 281 | 73.4 |
| Age | 18-33 | 72 | 19 |
| | 34-49 | 176 | 46 |
| | 50-64 | 112 | 29 |
| | >64 | 23 | 6 |
| year of resident | <20 | 27 | 7 |
| | 20-35 | 111 | 29.2 |
| | 36-51 | 137 | 35.8 |
| | >52 | 108 | 28 |
| Religion | Orthodox | 21 | 5.5 |
| | Muslims | 362 | 94.5 |
| educational status | Uneducated | 209 | 54.6 |
| | Primary | 153 | 40 |
| | Secondary | 20 | 5.2 |
| | Preparatory | 1 | 0.2 |
| marital status | Married | 337 | 88 |
| | Unmarried | 30 | 8 |
| | Divorced | 16 | 4 |
| Occupation | Farmers | 351 | 91.7 |
| | Merchants | 27 | 7 |
| | other work | 5 | 1.3 |
| Total | | 383 | 100 |

## 4.2 Basic information about medicinal plant

In the study area, 98.2% of the informants responded that they cultivate medicinal plants. From this, 55.35% cultivated in their homegarden, 35.24% in farmland and the rest 9.41% in both places. In this regard, there is no taboo to using medicinal plant and to some extent there is a restriction in using medicinal plant for pregnant women and children.

### 4.2.1 Medicinal Plant species and their genera and families

A total of 99 medicinal plant species were gathered, identified and documented from the study area used for treatment of humans and livestock ailments. These consist of 99% angiosperm and 1% gymnosperm that distributed across 88 genera and 48 families. From these, Asteraceae (13.2%) is the dominant family followed by Euphorbiaceae (Table 2).

Table 2: Genera and Families of medicinal plants from Dessie Zuria District, Northern Ethiopia, 2019.

| No. | Family | Genera | Percent | Species | Percent |
|-----|--------|--------|---------|---------|---------|
| 1. | Asteraceae | 10 | 11.4 | 13 | 13.2 |
| 2. | Euphorbiaceae | 6 | 6.8 | 8 | 8.1 |
| 3. | Solanaceae | 5 | 5.7 | 6 | 6.1 |
| 4. | Fabaceae | 5 | 5.7 | 5 | 5.1 |
| 5. | Lamiaceae | 4 | 5.4 | 4 | 4 |
| 6. | Amaranthaceae | 3 | 3.3 | 3 | 3 |
| 7. | Apiaceae | 3 | 3.3 | 3 | 3 |
| 8. | Brassicaceae | 2 | 2.2 | 3 | 3 |
| 9. | Rosaceae | 3 | 3.3 | 3 | 3 |
| 10. | Rubiaceae | 3 | 3.3 | 3 | 3 |
| 11. | Rutaceae | 2 | 2.2 | 3 | 3 |
| 12. | Myrtaceae | 2 | 2.2 | 3 | 3 |
| 13. | Acanthaceae | 1 | 1.1 | 2 | 2 |
| 14. | Cucurbitaceae | 2 | 2.2 | 2 | 2 |
| 15. | Poaceae | 2 | 2.2 | 2 | 2 |
| 16. | Polygonaceae | 1 | 1.1 | 2 | 2 |
| 17. | Oleaceae | 2 | 2.2 | 2 | 2 |
| 18. | Ranunculaceae | 2 | 2.2 | 2 | 2 |
| 19. | The Rest family | 30 | 34.2 | 30 | 30.5 |
| | Total | 88 | 100% | 99 | 100% |

## 4.3 Ailments treated and treatment method

### 4.3.1 Human Ailments treated

In this study, 52 different ailments were recorded (Appendix VIII) to be treated by 63 medicinal plant species and, from these, 38 ailments occurred only in humans. In this regard, febrile illness and stomach ache were the major human ailment treated by 21 (11%) medicinal plant species (Figure 5)
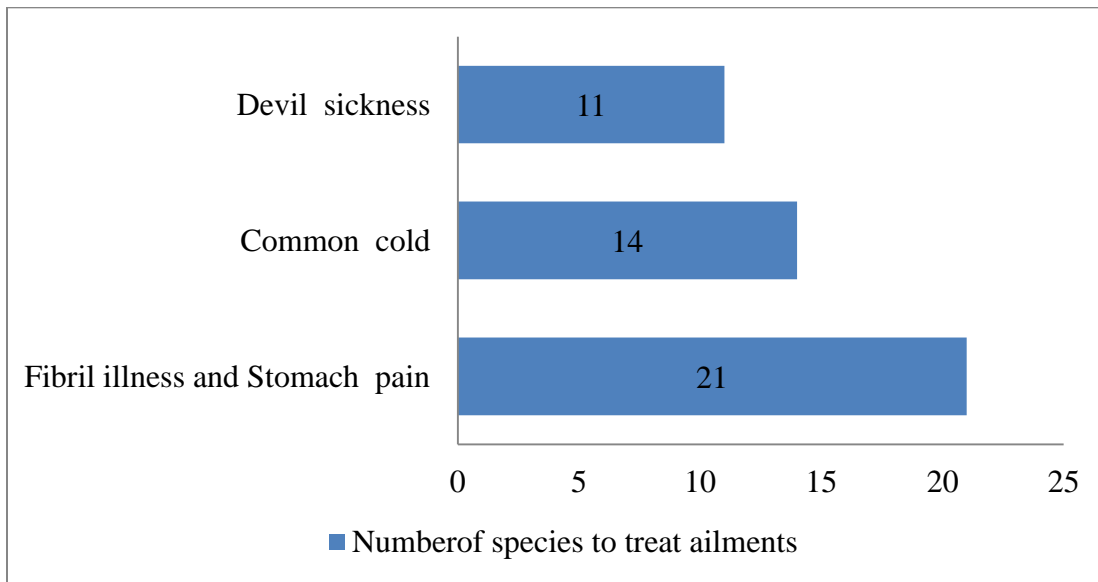


Figure 5: Top four Human ailments treated by medicinal plants in Dessie Zuria District, Northern Ethiopia, 2019.

### 4.3.2 Livestock ailments treated by medicinal plant

According to the result 14 livestock ailments were treated by 24 medicinal plants. From 14 ailments 7 were mentioned only occurred in livestock. Blackleg was the major ailment of livestock in the study area followed by leech; diarrhea, blotting and stomach ache (Table 3).

Table 3: Livestock ailments treated by medicinal plant with number of family and specie in Dessie Zuria District, Northern Ethiopia, 2019.

| Disease | No. family | No. species | Present |
|---|---|---|---|
| Blackleg | 5 | 5 | 19.8 |
| Leech | 3 | 3 | 11.5 |
| Diarrhea | 3 | 3 | 11.5 |
| Blotting | 2 | 3 | 11.5 |
| Stomach ache | 3 | 3 | 11.5 |
| Shivering | 1 | 1 | 3.8 |
| Sudden sickness | 1 | 1 | 3.8 |
| Expel parasite | 1 | 1 | 3.8 |
| Body swelling | 1 | 1 | 3.8 |
| Diuretic | 1 | 1 | 3.8 |
| Antiabortion | 1 | 1 | 3.8 |
| Eye | 1 | 1 | 3.8 |
| Lever fluke | 1 | 1 | 3.8 |
| Cough | 1 | 1 | 3.8 |
| Total | 25 | 26 | 100% |

## 4.3.3 Medicinal plant used to treats both human and livestock aliments

It was indicated in Table 8, 12 plant species categorized under 8 families were used to treat seven similar ailments which occurs in both human and livestock. In this particular, Asteraceae and Solanaceae families were dominant plant family which were used to treat both human and livestock ailment (Table 4)

Table 4: Medicinal plant used to treats both human and livestock aliments in Dessie Zuria District, Northern Ethiopia, 2019.

| Plant species | Local name | Family | Disease |
|---|---|---|---|
| *Cupressus lusitanica* | Yeferenge tid | Cupressaceae | Blotting |
| *Foeniculum vulgare* | Ensilale | Apiaceae | Diuretic |
| *Allium sativum* | Nech Shenkrut | Amaryllidaceae | |
| | Chekughn | Asteraceae | Diarrhea |
| *Artemisia abyssinica* | Chekughn | Asteraceae | Cold |
| *Nicotiana tabacum* | Tinbaho | Solanaceae | Leech |
| *Solanum marginatum* | Gaber enboye | Solanaceae | |
| *Rumex nervosus* | Embwacoe | Polygonacea | Stop Bleeding |
| *Achyranthes aspera* | Talegh/Dame adereke | Amaranthacea | |
| *Verbascum sinalticum* | Yaheya joro | Asteraceae | Stomachache |
| *Withania somnifera* | Ede buda | Solanaceae | |
| *Rhamnus prinoides* | Gesho | Rhamnaceae | |
| *Silene macrosolen* | Wegert | Caryophyllaceae | |

## 4.4 Growth form, part used, mode of remedy preparation, route of administration, dosage and additive

### 4.4.1 Growth form of plants used for preparation of traditional medicine

This study showed that herb, shrub, tree and climber were the habits of the medicinal plants found in the study area. The most used medicinal plant was herb (48%) followed by shrub (30%) and tree (15%) (Figure 6).
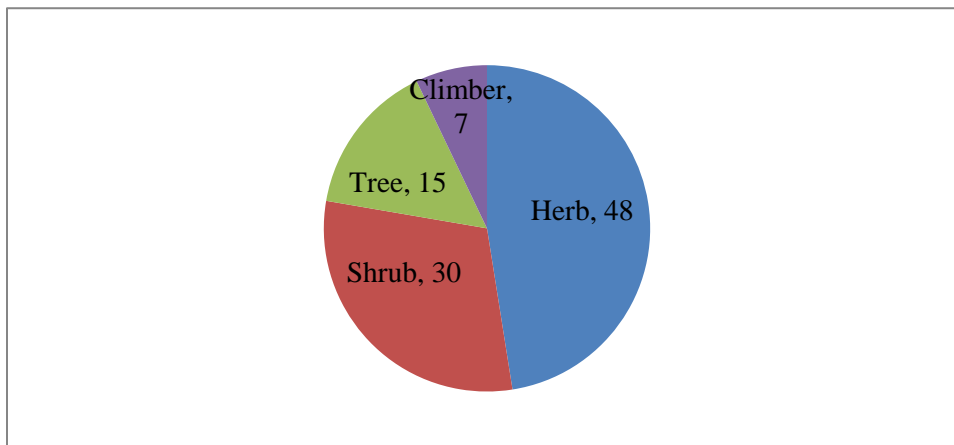


Figure 6: Habits of the medicinal plant in DESSIE ZURIA DISTRICT, Northern Ethiopia, 2019.

## 4.4.2 Plant parts used in traditional medicine preparation

From the different parts of the plant, leaf, root, bark, stem, latex(from the stem), bulb, seed, fruit and juice (from the fruit) were used to treat both human and livestock ailments in the study area. From these, leaf (64.6%) was highly mentioned by most respondents as the best part of the plant to prepare medicine followed by root (13.7%) and seed (10.6%) (Figure 7).
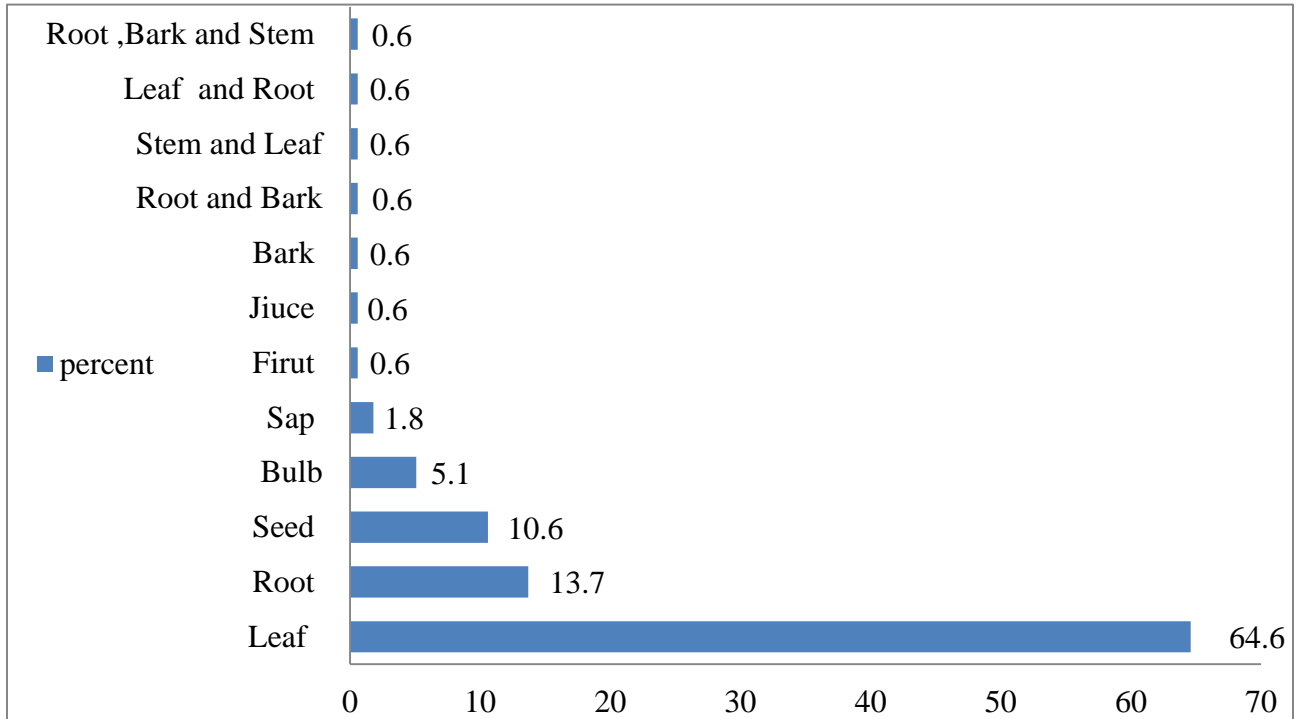


Figure 7: Plant part used to treat human and livestock ailment in DESSIE ZURIA DISTRICT, Northern Ethiopia, 2019.

## 4.4.3 Mode of preparation of the traditional medicines

The local people use different methods in the preparation of traditional medicine. According to most informants crushing (45.4 %) was the best method of medicinal plant preparation followed by grinding (18.4%) and smoking (9.2%) (Table 5)

Table 5: Method of preparation Dessie Zuria District, Northern Ethiopia, 2019.

| Way of preparation | Number | Percent |
|---|---|---|
| Crushing | 79 | 45.4 |
| Smoking | 32 | 18.4 |
| Grinding | 16 | 9.1 |
| Un processed | 12 | 6.8 |
| Pounding | 5 | 2.8 |
| Squeezing | 4 | 2.3 |
| Boiling | 4 | 2.3 |
| Grinding and boiling | 4 | 2.3 |
| Cutting and smoking | 3 | 1.7 |
| Roasting | 3 | 1.7 |
| Socking | 3 | 1.7 |
| Burning | 2 | 1.1 |
| Cutting | 2 | 1.1 |
| Boiling and Crushing | 1 | 0.6 |
| Boiling and Grinding | 1 | 0.6 |
| Grind and crushing | 1 | 0.6 |
| Roasting,Crushing and Powdering | 1 | 0.6 |
| Socking and crushing | 1 | 0.6 |
| Total | 174 | 100 |

### 4.4.4 Methods of application of the traditional medicines in the study area

Drinking (47.8%) was the main application method of medicinal plant followed by eating (14.8%) and smoking (11.3%) (Figure 8)
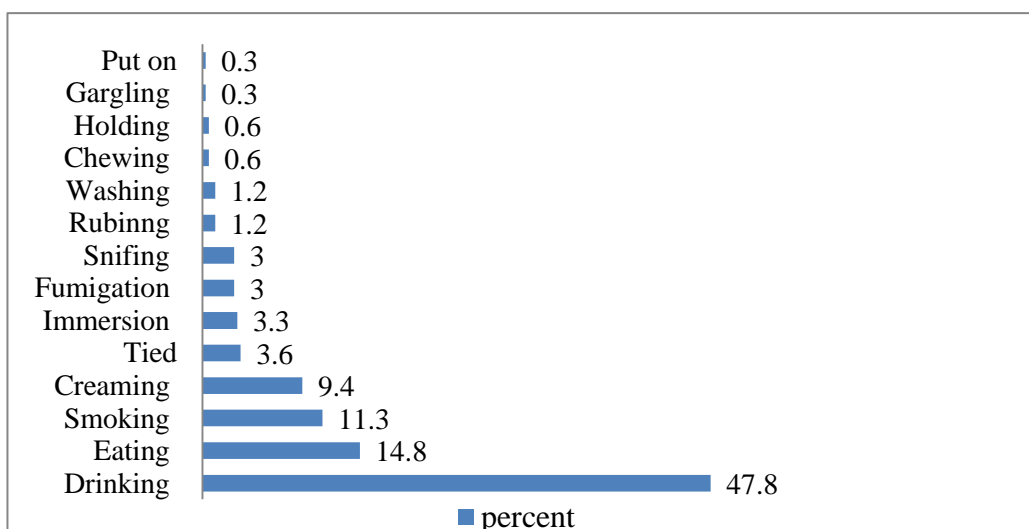
Figure 8: Application of traditional medicine Dessie Zuria District, Northern Ethiopia, 2019.

## 4.4.5 Route of administration of traditional medicine

Medicinal plants used to treat different human and livestock ailments are taken through mouth, nose, eye, ear and topically. According to descending, percentage of appropriate route of administration oral (55.3%), topical (22.1) and oral and nasal (15%) were mentioned (Figure 9)
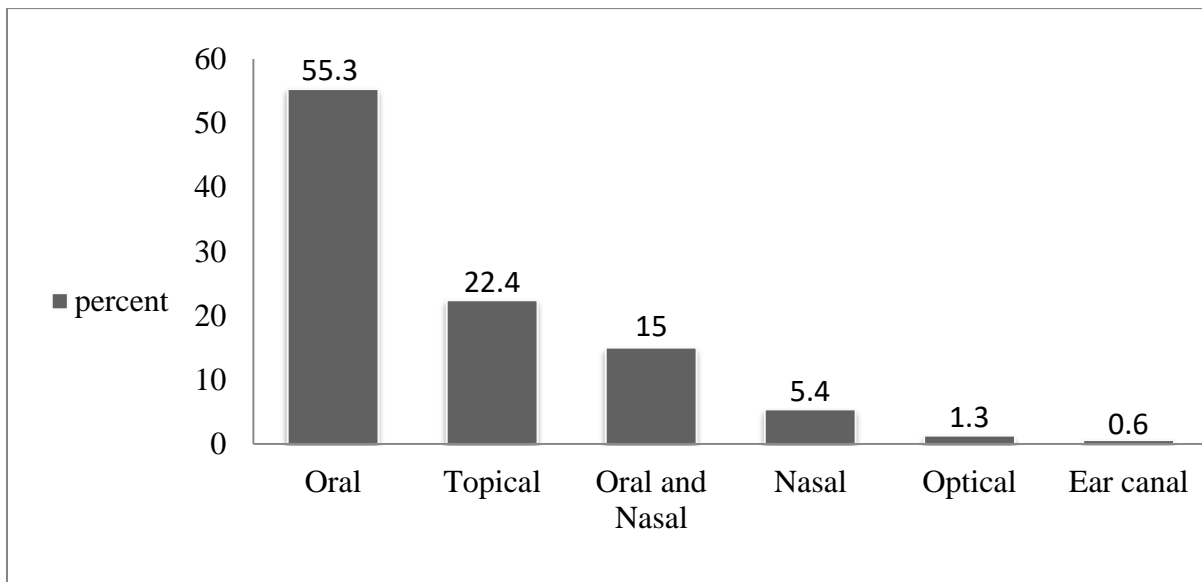


Figure 9: Route of application Dessie Zuria District, Northern Ethiopia, 2019.

## 4.4.6 Measurement of Dosage

Dosage of most medicine were measured by using different equipment measured like coffee cup, glass, Finger, tea cup, counting number of leaf, seed and fruit, pinching and so on. Coffee cup (21.7%) was the major tool used to measure the dosage followed by glass (15.9%) (Table 6).

Table 6: Equipment used to estimate amount of rational medicine Dessie Zuria District, Northern Ethiopia, 2019.

| Measurement of dose | Percent |
|---|---|
| Coffee cup | 21.7 |
| Glass | 15.9 |
| Finger | 14 |
| Tea cup | 10.2 |
| Number | 9.6 |
| Spoon | 6.4 |
| Pitcher | 2.5 |
| Plate | 0.6 |

### 4.4.7 Additives taken with medicinal plant

The study participants mentioned that there are some preparations that need additives, which includes water, butter, honey, boil coffee, injera and oil. From this water (65.5%) was highly stated by participants followed by butter (11%) and honey (9.5). while boiled coffee (8.3), injera (3.5) and oil (2.2) were respectively mentioned as least preferred additive taken with medicinal plant preparation.

## 4.5 Ranking of medicinal plants

### 4.5.1 Preference ranking

There are 12 medicinal plants used to treat similar human and livestock ailments in the study area. The people chose one medicinal plant from the other based on their preference. For ranking purpose, the seven most cited medicinal plants used to treat similar human and livestock ailments were selected and traditional healers ranked them based on their preference. *Rumex nervosus* was chosen as the most preferable medicinal plant followed by *Withania Somnifera*, *Cupressus lusitanica* and *Ocimum lamiifolium.* While *Rhamnus prinoides, Venonia adoensis,* and *Verbascum sinalticum* were least preferred medicinal plant (Table 7).

Table 7: preference ranking of medicinal plant-based on the perspective of treating both human and livestock ailments Dessie Zuria District, Northern Ethiopia, 2019.

| Plant species | R1 | R2 | R3 | R4 | R5 | R6 | R7 | Total | Rank |
|---|---|---|---|---|---|---|---|---|---|
| *Ocimum lamiifolium* | 4 | 5 | 4 | 3 | 3 | 2 | 1 | 22 | 4th |
| *Rumex nervosus* | 5 | 5 | 4 | 4 | 5 | 4 | 3 | 30 | 1st |
| *Cupressus lusitanica* | 3 | 4 | 2 | 5 | 4 | 3 | 3 | 24 | 3rd |
| *Verbascum sinalticum* | 2 | 1 | 2 | 5 | 3 | 4 | 2 | 19 | 7th |
| *Withania somnifera* | 2 | 4 | 1 | 4 | 4 | 5 | 5 | 25 | 2nd |
| *Rhamnus prinoides* | 2 | 3 | 2 | 4 | 1 | 5 | 4 | 21 | 5th |
| *Vernonia adoensis* | 3 | 4 | 5 | 3 | 2 | 2 | 1 | 20 | 6th |

## 4.5.2 Direct matrix ranking

In the study area, medicinal plants were not only used for human treatment, but also for livestock treatment, fodder, firewood, construction, charcoal, fencing and food. To assess relative usage of medicinal plant in the study area, six multipurpose plant species and six use-values were selected and its score was calculated.

In the result of direct matrix ranking, *Cupressus lusitanica* was ranked first which is the most preferable plant in its multi-usage and *Carissa spinarum* was the least preferable plant species (Table 8).

Table 8: Average rank for direct matrix ranking of six medicinal plants on their use value Dessie Zuria District, Northern Ethiopia, 2019.

| Use of medicinal plant | *Rumex nervosus* | *Dovyalis abyssinica* | *Cupressus lusitanica* | *Carissa spinarum* | *Eucalyptus globulus* | *Vernonia Amygdalina* |
|---|---|---|---|---|---|---|
| Livestock treatment | 4 | 5 | 5 | 0 | 0 | 0 |
| Construction | 0 | 2 | 5 | 0 | 5 | 5 |
| Firewood | 3 | 5 | 5 | 4 | 5 | 3 |
| Fodder | 5 | 2 | 3 | 2 | 4 | 5 |
| Charcoal making | 1 | 3 | 5 | 2 | 5 | 3 |
| Fence | 1 | 5 | 5 | 3 | 5 | 4 |
| Food | 3 | 4 | 0 | 5 | 0 | 0 |
| Total | 17 | 26 | 28 | 16 | 24 | 20 |
| Rank | 5th | 2nd | 1st | 6th | 3rd | 4th |

Key: - (Ranking value: 5-best, 4-very good, 3-good, 2-less used, 1-least used and 0-no value)

## 4.5.3 Paired comparison

After seven traditional healers select the medicinal plant based on their preference top five most preferred plants were chosen and given to eight key informants. The traditional healers selected the best pair based on the efficiency of the medicinal plant to treat both human and livestock ailments. As Table 9 indicates *Rumex nervosus, Withania somnifera* and *Ocimum lamiifolium* were ranked 1st to 3rd respectively. Though *Cupressus lusitanica* and *Rhamnus prinoides* were less chosen and less effective medicinal plant compared to the other three medicinal plants.

Table 9: Paired comparison of five selected medicinal plants used to treat both human and livestock ailments based on the group informants' perception in the study area. The one preferred over the other indicated by the first letter of their specific epithet name.

| Plant species | R1-R8 | | | | | Frequency of selection | Rank |
|---|---|---|---|---|---|---|---|
| | *Rhamnus prinoides* | *Rumex nervosus* | *Ocimum lamiifolium* | *Withania somnifera* | *Cupressus lusitanica* | | |
| *Rhamnus prinoides* | | *Rn* | *Ol* | *Ws* | *Cu* | 0x | 5th |
| *Rumex nervosus* | | | *Rn* | *Rn* | *Rn* | 4x | 1st |
| *Ocimum lamiifolium* | | | | *Ws* | *Ol* | 2x | 3rd |
| *Withania  somnifera* | | | | | *Ws* | 3x | 2nd |
| *Cupressus lusitanica* | | | | | | 1x | 4th |

## 4.5.4 Informant consensus

According to the result obtained certain medicinal plants were highly cited by most participants than the others. For instance, *Ocimum lamiifolium* was cited by 302(78.23%) informant to treat different human and livestock ailments followed by *Allium sativum* 209(54.14%), *Rumex nervosus* 201(52.07%) and *Echinops kebericho* 194 (50.25%) (table12).

## 4.5.5 Informants consensus factor (ICF)

Informant consensus factor was calculated on the identified fifteen highly cited plant species used to treat human and livestock ailment. Thus, the highest ICF value was obtained from *Ocimum lamiifolium* (0.66) and the least ICF was from *Calpurnia aurea* (0.01) (Table 10).

Table 10: List of top fifteen medicinal plants used to treat human and livestock ailment with number of citation, percentage and ICF Dessie Zuria District, Northern Ethiopia, 2019.

| No. | Scientific name | Local name | No. of citation | Percent | ICF |
|-----|-----------------|------------|-----------------|---------|-----|
| 1. | *Ocimum lamiifolium* | Damakessi | 302 | 78.23 | 0.66 |
| 2. | *Allium sativum* | Nech shenkrut | 209 | 54.14 | 0.51 |
| 3. | *Rumex nervosus* | Embwacoe | 201 | 52.07 | 0.5 |
| 4. | *Echinops kebericho* | Kabericho | 194 | 50.25 | 0.48 |
| 5. | *Artemisia abyssinica* | Chekughn | 181 | 46.89 | 0.44 |
| 6. | *Solanum dasyphyllum* | Gaber enboye | 160 | 41.45 | 0.37 |
| 7. | *Withania somnifera* | Ede buda | 150 | 38.86 | 0.32 |
| 8. | *Zehneria scabra* | Haregresa | 130 | 33.94 | 0.21 |
| 9. | *Foeniculum vulgare* | Ensilale | 125 | 32.63 | 0.18 |
| 10. | *Ruta chalepensis* | Tene adam | 120 | 31.33 | 0.15 |
| 11. | *Capparis tomentosa* | Gumero | 117 | 30.54 | 0.12 |
| 12. | *Zingiber officinale* | Zengible | 113 | 29.50 | 0.098 |
| 13. | *Aloe percrassa* | Erat | 110 | 28.72 | 0.073 |
| 14. | *Phytolacca dodecandra* | Endode | 107 | 27.93 | 0.047 |
| 15. | *Calpurnia aurea* | Degeta | 102 | 26.63 | 0.01 |

## 4.6 Habitats and abundance of medicinal plants

### 4.6.1 Habitats

According to this study both wild and homegarden were places where the medicinal plants were collected. Wild (56%) was the major source for the medicinal plant collection followed by homegarden (44%)?

### 4.6.2 Abundance of medicinal plants in the study area

Based on interview made with status of medicinal plant three responses were gathered. These were increasing, decreasing and very decreasing. Consequently, most respondents indicated that the status of medicinal plants was decreasing from time to time. About 55.4% informants assured this trend (Figure 10)
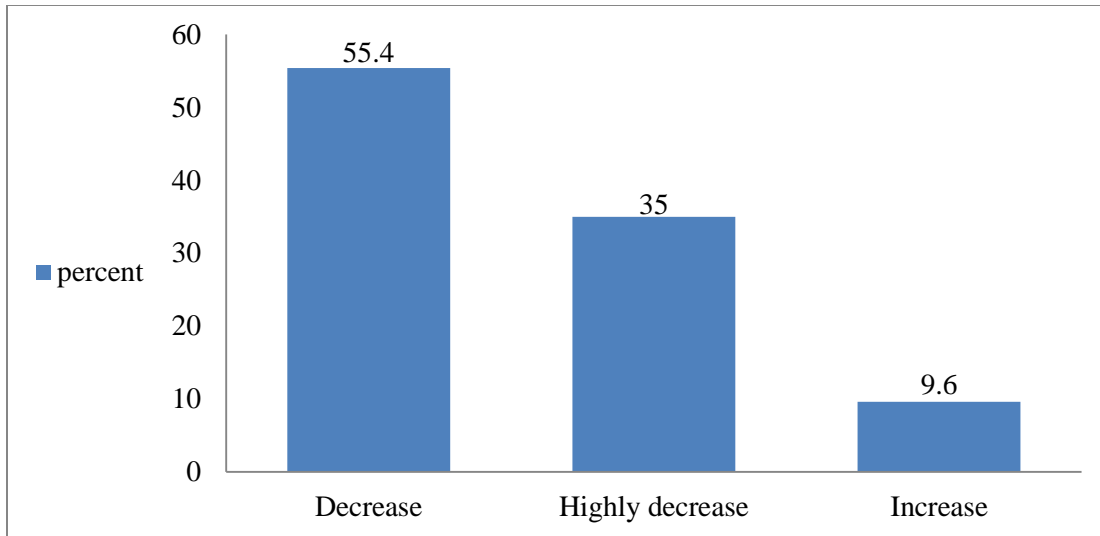
Figure 10: The abundance of medicinal plants Dessie Zuria District, Northern Ethiopia, 2019.

## 4.7 Marketability of medicinal plants and Cost of traditional medicine

### 4.7.1 Marketability of medicinal plants

According to the respondents, medicinal plants were marketed in the study area. In this particular study, from 99 plant species recorded in the study area, 23(23%) were very accessible in the market. The figure below shows dispense of medicinal pant in the local markets in the study area.

A                                                    B



**Figure** 11: Market areas in Dessie Zuria District, Northern Ethiopia, Photo taken by Dagmawit Addis, 2019.

A. Medicinal plant at market place of Abesokotu  kebele.

B. Medicinal plant at market place of Tebstit kebele.

### 4.7.2 Cost of traditional medicine

According to most traditional healers who have practice to treat a particular ailment the cost of traditional medicine depend upon the willing of customer patient known *Erenesa*. It may range from 1-50 birr.

## 4.8 Source and method of transferring indigenous knowledge

### 4.8.1 Source of indigenous knowledge

According to the result, family, observation and traditional healers were a source of indigenous knowledge who knows very well about the medicinal plant. About 49% of study participants responded that family was the best source of ingenious knowledge followed by observation (38%) and traditional healer (13%).

### 4.8.2 Method of transferring indigenous knowledge

According to the analyzed result telling indigenous knowledge to the elder son, second son, relatives and friends were the method to transfer indigenous knowledge to the next generation. Transferring indigenous knowledge to the elder son (63%) and relatives (14%) are a major way of keeping indigenous knowledge continuity (Figure 12).
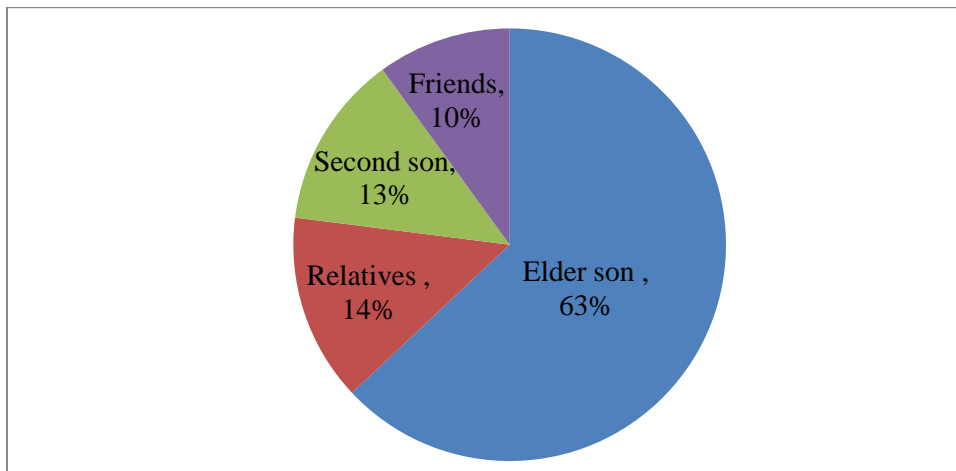


Figure 12: Method of transferring indigenous knowledge Dessie Zuria District, Northern Ethiopia, 2019.

## 4.9 Threat to medicinal plant and conservation mechanisms

As the result shows, cutting medicinal plant for medicinal purpose, food, firewood, and charcoal, fence, and construction, furniture and agriculture purpose were stated for the threat of medicinal plant in the study area. From these cutting tree for firewood reported to be a major (40.9%) cause of decreasing medicinal plants in the study area followed by agriculture (34.2%) and fence (7.8%) (Figure13).
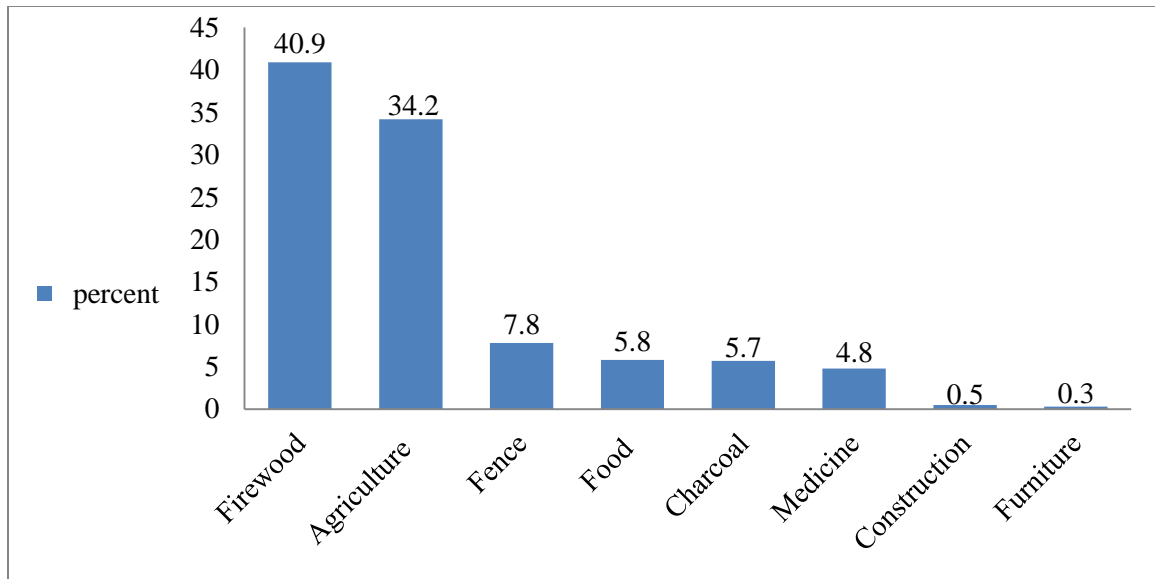


Figure 13: Threats to medicinal plants Dessie Zuria District, Northern Ethiopia, 2019.

In this particular study, cultivating medicinal plant in homegarden and protecting medicinal plant by making a fence from human activities were mentioned conservation methods that the local communities practice.

# CHAPTER FIVE

# 5. DISCUSSION

The study showed that cultivating medicinal plant is common in the area. This is because of the fact that the livelihood of the community at the study area is based on the cultivation of various plants including medicinal plants. Medicinal plants are very useful for health and they can be grown easily in the garden which makes them a preferred alternative of medication by the community. In this regard, all participants were responded that they use medicinal plants which are available in the market area. This indicates that medicinal plants might have additional usage than medication alone and society believes on the efficacy of medicinal plants in treating different ailments. Moreover, the study result indicated that except some restriction in use by pregnant women and children, there is no taboo in using plants for medication. This implies that the community believing on medicinal plants is good and the restriction might be due to the fearing of side effect at the time of pregnancy and early age. This result agrees with Etana Tolasa (2007) in which healers didn't give treatments that are taken internally to pregnant women.

As the result showed, 99 medicinal plants were recorded in the study area and it is better record than Arebu Issa *et al.* (2017); Guluma Kitata *et al.* (2017); Ketema Tolossa *et al.* (2013) and Gebrekidan Abrha *et al.* (2018) who record 45, 60, 91 and 92 medicinal plants respectively. Moreover, 52 different human and livestock ailments were recorded in the study area this is also the better report (Tesfaye Hailemariam *et al.,* 2009; Berhane Kidane *et al.,* 2014; Ketema Tolossa *et al.,* 2013 and Yayesh *et al.,* 2015) who reported 48 ailments, 47 ailments and 38 ailments, 34 ailments respectively in their study sites. Febrile illness and stomach ache were the most common human ailments recorded in the study area. In this regard, 21 medicinal plant species were mentioned for treating each ailment. This is similar to the finding of Kebede Tirfessa *et al.* (2017) in which fibril illness and stomach ache were the major human disease recorded in the study area, though in another study the largest number of species was used to treat wounds (Eskender Abebe, 2011). In this particular, blackleg was cited as the main livestock ailments in the study area. The area maybe prone to overgrazing in which the disease is soil born thus bacteria easily infects the animal. This result is opposed to the result of Endalew Amenu (2007) in which the main livestock disease in his study area was Actinomycosis.

In the study, Asteraceae was the dominant plant family to which most medicinal plant species used to treat human as well as livestock ailments belong. This is due to the widespreed of Asteraceae family in different parts of Ethiopia. These findings are in agreement with the studies conducted elsewhere in which Asteraceae is the dominant family (Fisseha Mesfin *et al.,* 2009; Endalew Amenu, 2007; Eskedar Abebe, 2011; Yayesh Limenih *et al.,* 2015; Tadesse Birhanu1, 2015 and Tilahun Teklehaymanot, 2009). However, other study reported that Solanaceae is the dominant plant family (Yibrah Tekle, 2014).

Regarding growth habit, herb, shrub, tree and climber are the habits of the medicinal plants found in the study area. Most of the medicinal plants were herb followed by shrub and tree. This is due to the herbs presence of all places nearly and most place of the study area. Besides, cultivation and the management of herb are easy compared to other growth forms of the medicinal plants. This result is similar with other studies in which herb is the dominant growth form following by shrub and tree (Kebede Tirfessa *et al.,* 2017; Behailu Etana, 2010; Getu Alemayehu, 2017; Tilahun Teklehaymanot, 2009; Guluma Kitata *et al.,* 2017; Eskedar Abebe, 2011; Atinafu Kebede *et al.,* 2016; Yalew Addisie *et al.,* 2012; Ketema Tolossa *et al.,* 2013 and Mohammed Adefa and Berhanu Abraha, 2011). In opposite, to the current study result others reported that shrub was the dominant growth form following the herb and tree (Getaneh Gebeyehu, 2011; Mersha Ashagre, 2011 and Sintayehu Tamene, 2011).

From the whole part of the plant, leaf was highly cited as the best part to prepare medicinal plants followed by root and seed. It could be due to a leaf is easily accessible part of the plant and with a high content of mineral which needs simple preparation procedures. This result is in agreement with the results of similar studies conducted in different parts of Ethiopia (Arebu Issa, 2015; Getnet Chekole, 2011; Getaneh Gebeyehu, 2011; Guluma Kitata *et al.,* 2017; Kebede Tirfessa *et al.,* 2017; Fikiru Ayana, 2017; Eskedar Abebe, 2011; Getu Alemayehu *et al.,* 2013; Gebrekidan Abrha, 2018; Sintayehu Tamene, 2011; Behailu Etana, 2010; Getu Alemayehu, 2017; Mohammed Adefa and Berhanu Abraha, 2011; Abiyu Enyew *et al.,* 2014; Yalew Addisie *et al.,* 2012; Gebrekidan Abrha *et al.,* 2018; Atinafu Kebede *et al.,* 2016 and Abiyu Enyew *et al.,* 2014). But other studies in Ethiopia reported root as the most used part of the plant for the preparation of medicinal plant Ketema Tolossa *et al.* (2013)

The major route of application to treat humans as well as livestock ailment in the study area was oral. This because most internal ailments require assimilation of medicine to inner structures than external put on. This result is quite similar to the findings of similar studies in which the major route of administration is oral (Fikiru Ayana, 2017; Getnet Chakole, 2011; Tadesse Birhanu1 *et al.,* 2015; Mohammed Adefa and Berhanu Abraha, 2011; Mersha Ashagre, 2011; Yalew Addisie *et al.,* 2012; Atinafu Kebede *et al.,* 2016; Behailu Etana, 2010 and Sintayehu Tamene, 2011). The result is contradictory to the finding of Yibrah Tekle (2014); Tilahun Teklehaymanot (2009); Getaneh Gebeyehu (2011); Guluma Kitata *et al.* (2017); Arebu Issa *et al.* (2017) and Kebede Tirfessa *et al.* (2017).

According to results there is different application of medicinal plant such as drinking, creaming, eating, smoking, tied, fumigation, put on, sniffing, immersion and other mentioned in the study area from this drinking was the main application of medicinal plant next by creaming and eating. As described before the major route of administration and additive is oral and water respectively, so this result is lead major application method to be drinking. (Tesfaye Hailemariam *et al.,* 2009; Eskedar Abebe , 2011; Mersha Ashagre 2011; Behailu Etana, 2010 and Sintayehu Tamene, 2011) were reported similar findings. Besides, from various methods of traditional medicinal plant preparation in the study, area crushing is the most popular way of preparation. In the study area the highest remedial is taken by oral, due to this crushing is the best mechanism to easily access by oral and assimilated easily to the body. This result is similar to the finding of other studies (Kebede Tirfessa *et al.,* 2017; Behailu Etana 2010; Yalew Addisie *et al.,* 2012 and Atinafu Kebede *et al.,* 2016). But, it is opposite with the finding of (Fikiru Ayana 2017; Eskedar Abebe, 2011; Getu Alemayehu, 2017 and Fisseha Mesfin *et al*., 2009) in which decoction was the popular method of preparation.  And, others also reported pounding as common way of preparation (Guluma Kitata *et al.,* 2017; Abiyu Enyew *et al.,* 2014and Mersha Ashagre, 2011).

In the preparation of medicinal plants most taken with additive. From this water is highly cited by many informants followed by butter and honey. More preference to water might be most of the medicine are taken orally and water is good solvent and used to easily move through the mouth. This is finding is similar with finding (Fikiru Ayana, 2017; Arebu Issa, 2015; Eskedar Abebe , 2011 and Tilahun Teklehaymanot, 2009), but different from the finding of other studies reported honey as major additive Giday Yirga (2010).

In the study area, coffee cap was the common equipment to measure the dosage of the medicine. This is due to the belief that the coffee cup is reasonable which didn't affect human health and enough to cure the human disease. But this result is different with other study in which mostly doses are determined by approximation of (Arebu Issa, 2015 and Arebu Issa *et al.*, 2017).

Regarding preference ranking, *Rumex nervosus* was the most preferable plant followed by *Withania somnifera*, *Cupressus lusitanica* and *Ocimum lamiifolium*. This is probably because of the efficiency of the chemical compounds it produces and the ability to react to address different human and livestock ailments in the study area. This is opposed to finding of Fikiru Ayana (2017) that is *Premna schimperi.*

In this study, *Cupressus lusitanica* was ranked first in its multiple usages. It is because of *Cupressus lusitanica* highly valuable in the mentioned use-value that is livestock treatment, construction, firewood, fodder, charcoal making and fencing than the other plant. In addition, it is a very accessible and fast-growing plant species. But this result was quite different from Endalew Amenu (2007) finding in which *Syzygium guineense* was ranked first.

*Rumex nervosus, Withania somnifera* and *Ocimum lamiifolium* were most preferred respectively than the other medicinal plant during paired comparison. This showed that these plant species were highly effective plant species than the other mention plants. It may be because the plants were rich with several chemical contents that enable them to cure different human and livestock ailments. This result is opposed to Etana Tolasa (2007) result in which *Plantago lanceolata* was stood first followed by *Rumex nepalensis.*

According to the result, *Ocimum lamiifolium* was cited by many respondents. This is probably due to the efficacy of *Ocimum lamiifolium* against the disease. This result is different from Getaneh Gebeyehu (2011) in which the dominant plant species is *Embelia schimperi* followed by *Justicia schimperiana* and *Allium sativum*. The highest ICF value was obtained from *Ocimum lamiifolium.* This result is agreed with the result of Behailu Etana (2010) in which the highest ICF value was obtained from *Ocimum lamiifolium.*

Wild was mentioned as the commonplace where the medicinal plant collected than the homegarden . This finding is Alike with finding of (Eskedar Abebe, 2011; Ermias Lulekal, 2005;

Endalew Amenu, 2007; Tadesse Birhanu1 *et al.,* 2015; Yibrah Tekle, 2014; Kebede Tirfessa *et al.,* 2017; Yalew Addisie *et al.,* 2012; Sintayehu Tamene, 2011; Behailu Etana, 2010; Atinafu Kebede *et al.,* 2016; Gebrekidan Abrha *et al.,* 2018; Arebu Issa *et al.* 2017 and Mohammed Adefa and Berhanu Abraha, 2011). In these particular, medicinal plants were marketable in the study area.  This is due to local people cultivate different types of plant species one from the other thus they sold of what they have and the purchase what they haven't to satisfy their needs. Besides medicinal plants have additional usage in day to day activity of the society beyond its medicinal value. For instance, *Allium cepa, Allium sativum, Nigella sativa, Zingiber officinale* and *Capsicum annuum* were used for spice and *Beta vulgaris, Carica papaya* and *Daucus carota* were used as food. This result agrees with the result of (Fikiru Ayana, 2017 and Eskedar Abebe, 2011) who describe medicinal plants were marketable in their study area.

Moreover, all of the traditional healers who practiced to treat a particular disease respond that the cost of traditional medicine depends on the willing of the customer (patient). This is because the person who transfers the knowledge to the orders not to ask money from a customer but the customer pays the money known as *Erenesa* due to believing the medicine is not working without that.

Most participants respond that family was the source of indigenous knowledge followed by observation and traditional healer. They need to keep their indigenous knowledge being transferred to the next generation.This result is similar to the findings of other similar studies reported the highest source of indigenous knowledge is gained from the family line (Eskender Abebe, 2011; Tadesse Birhanu1 *et al.,* 2015; Getu Alemayehu, 2017 and Getaneh Gebeyehu, 2011) Who reported that the highest source of indigenous knowledge is gained from the family followed by observation. Besides, telling indigenous knowledge to the elder son, elder daughter, brother and best friends were the methods to transfer to the next generation. Transferring indigenous knowledge to the elder son was a major way to keep the indigenous knowledge to the next generation and its transfer very relative person because it considers as top secret. This result is similar to the finding of (Eskedar Abebe , 2011 and Fikiru Ayana, 2017) who mentioned that indigenous knowledge was mainly transferred to the elder son.

Though few have contradictory opinions about the abundance of medicinal plants, most informants said that medicinal plants were decreasing in type and number from time to time. Other similar study has also been reported the decrease of medicinal plants (Gebrekidan Abrha *et al.,* 2018 and Tesfaye Hailemariam *et al.,* 2009) in which medicinal plant availability was decreasing according to most respondents. This could be because of the medicinal plant are prone to human activities such as deforestation, overgrazing and over harvesting. Cutting medicinal plant for firewood was the major cause of decreasing medicinal plants in the study area. As the study area was rural and most of the people depend on the plant for their food preparation like cooking and baking. It is similar to the finding of (Getaneh Gebeyehu, 2011; Sintayehu Tamene, 2011 and Tesfaye Hailemariam *et al.,* 2009) in which the major threats of medicinal plant was cutting medicinal plant for firewood purpose. On another side agricultural expansion is a major threat to medicinal plant depletion (Tadesse Birhanu1, 2015; Fikiru Ayana, 2017; Behailu Etana, 2010 and Mersha Ashagre, 2011).

The local people were using few conservation methods in the study area. Cultivating medicinal plants in homegarden was one of the methods that used to preserve medicinal plant from loss. This result agrees with Fikiru Ayana (2017) in which cultivating medicinal plant in homegarden describes as a conservation method. But same to Tena Regassa (2016) explanation conservation of medicinal plant in homegarden was not enough to conserve all medicinal plant in the study area because most of medicinal plants were harvested from the wild area. According to traditional healers, mostly they harvest medicinal plant on Wednesday and Friday in the study area because there is culturally believes that medicines are effective on the mentioned dates and this may contribute to minimizing the harvesting rate of the medicinal plant. This result is similar to Etana Tolasa (2007) the harvesting of medicinal plants was done on Wednesday and Friday in the study area had a contribution in conservation of the medicinal plants.

# CHAPTER SIX

## 6. CONCLUSION AND RECOMMENDATION

### 6.1 Conclusion

Generally, in this ethnobotanical study 99 plant species, 88 genera and 48 families were recorded to treat 52 different human and livestock ailments. In this regard, 38 of the recorded disease were occurring only in humans which is treated by 63 medicinal plant species and from this febrile illness and stomach ache were the major human ailments. Accordingly, 14 livestock ailments were treated by 24 medicinal and blackleg was the major livestock ailments in the study area. Besides, 12 plant species categorized under 8 families were used to treat 8 similar ailments that occur in both humans and livestock. In this particular, Asteraceae family was the dominant family in the study area followed by Solanaceae family.

In the study area, most medicinal plants were herb followed by shrub and tree. Besides, different parts of medicinal plants were used for the preparation of medicine to treat human and livestock ailments. From these, leaf was highly mentioned by most respondents as the best part of the plant to prepare the medicine. While crushing was stated as a major way of preparation in the study area followed by smoking. Drinking was mentioned as the main application method of the medicine followed by eating and smoking. Also, oral, topical and oral and nasal were mentioned respectively as the main route of administration in the study area. To measure the dosage of medicine, coffee cup was cited by most respondents as the major equipment followed by glass. In addition, there was some preparation of medicine that needs additive which includes water, butter, honey, boil coffee, injera and oil. From this water is highly stated by most participants followed by butter and honey.

Rumex nervosus were the most preferable plant to treat both human and livestock ailments followed by *Withania Somnifera, Cupressus lusitanica* and *Ocimum lamiifolium*. While *Cupressus lusitanica* was ranked first in its multiple usages of plant species. Similarly, *Rumex nervosus, Withania somnifera* and *Ocimum lamiifolium* were ranked 1st to 3rd respectively were mentioned as best pair based on the efficiency of the medicinal plant to treat both human and

livestock ailments. The highest ICF value was obtained from *Ocimum lamiifolium* (0.66) and the least ICF was from *Calpurnia aurea* (0.01).

Medicinal plants were marketed in the study area and this is because medicinal plants have additional value besides there medicinal use. In this regard, most traditional healers in the study area specialized in a particular disease and the cost of traditional medicine depends upon the willingness of the customer (patient) known as "eransa". It may range between 1-50birr.

According to the interview made with the status of medicinal plant most respondents indicated that the status of medicinal plants was decreasing from time to time. In this particular, cutting plants for firewood reported being a major cause of decreasing medicinal plants from the previous status followed by agriculture and fence. While cultivating medicinal plant in homegarden and protecting medicinal plant by making a fence from human activities were mentioned as conservation methods by the local community. Besides, family was the best source of ingenious knowledge followed by observation and traditional healer and transferring indigenous knowledge to the elder son major way of keeping indigenous knowledge to the next generation. Finally, to use medicinal plant sustainably in the study area local people should be trained, encouraged and supported on how to conserve and manage medicinal plant especially which take a long time to be raised as the recommendation.

## 6.2 Recommendation

Based on the result of the study the following recommendations forwarded.

➢ The local people should be trained, encouraged and supported on how to conserve and manage medicinal plants because the local people use only few conservation methods so, the training enables them to give further information in addition to their experience.
➢ The utilization and cultivation of medicinal plants should be encouraged due to its multiple usages.
➢ To magnify medicinal values of the plant recorded in this study further pharmacological study is needed.
➢ Encourage the society to use electric power for cooking, baking etc. as it is the major threat of medicinal plant was cutting medicinal plants for firewood.

- ➢ Traditional healers should be encouraged and recognized by the district administration to give better survive to society.
- ➢ Association of traditional healers should be established to formalize and recognize traditional medicine.

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# APPENDIX I

Appendix I includes  list of medicinal plants used for treating both human and livestock in the study ailments in the study area; with scientific name, local name, family, habit(H); herb(H), shrub(S), tree(T), climber(Cl), used to(U), (H- Human, Livestock-Li), disease treated, methods preparation (MP); rout of application(RP) oral (O), topical(T), nasal(N);parts used (Pu) leaf(L), steam(St), bark(B), root(R), latex(LA), blub(B), seed(S) respectively.

| No. | Plant species | Local name | Family | H | U | Disease | Preparation | Ra | Pu |
|---|---|---|---|---|---|---|---|---|---|
| 1. | *Artemisia absinthium* L. | Ariti | Asteraceae | H | H | Devil sickness | Cut the root and put into fire and smoke. | O and N | R |
| | | | | | | Common cold | Crush the root of the plant and mix with *Myrtus communis* and butter and eat for three days. | O | R |
| | | | | | | Measles | Crush the leaf; mix with oil and cream in the affected area. | T | L |
| | | | | | | Tonsillitis | Crush the leaf , add water and drink one glass for three days | O | L |
| | | | | | | Headache | Smoke the leaf of the plant or put one or two piece on head. | T | L |
| 2. | *Stephania abyssinica* (Dillon & A. Rich.) Walp. | Yeeyt hareg | Menispennaceae | Cl | H | Arthritis | Crush the leaf, add water and drink one glass | O | L |
| 3. | *Peumus boldus* mol. | Boter | Monimiaceae | H | H | Fibril illness | Crush the leaf, add water and drink one coffee cup. | O | L |
| 4. | *Brassica carinata* A. Br. | Gomenzer | Brassicaceae | H | H | Stomach pain | Ground the seed and mix with water and drink one glass | O | S |
| 5. | *Galinsoga quadriradiata* Ruiz & Pav. | Dehanekay | Asteraceae | H | H | Wound | Crush the leaf, mix with  butter and cream the wound | T | L |
| 6. | *Withania Somnifer* (L) Dunalin DC. | Edebuda | Solanaceae | S | H | Stomach pain | Crush the leaf and  drink cup of coffee after mixing with water | | B |
| | | | | | | Common cold Anemia Evil eye Diarrhea | Squeeze the leaf and drink 1-2 spoon of the juice. | O | L |
| 7. | *Coffea arabica L.* | Buna | Rubiaceae | S | H | Fire burn | Roasted, crushed and powdered the seed of the plant and applied on affected area. | T | S |
| 8. | *Ricinus communis* L. Chakima. | Gulo | Euphorbiaceae | S | Li | Stomacha che | Crush the leaf, add water and drink a glass of the juice. | O | L |

| No. | Scientific name | Local name | Family | | | Disease | Preparation | | |
|---|---|---|---|---|---|---|---|---|---|
| 9. | *Lawsonia inermis* Linn. | Hina | Lythraceae | S | H | Dandruff | Crush the leaf and soak it in Water, then tie around the head for Three consecutive days. | T | L |
| 10. | *Claotropis procera (Ait.) Ait.f.* | Tobbiya | Asclepiadaceae | S | H | Wart | Crush the leaf and cream skin 1-2 spoon | T | L |
| 11. | *Gladiolus candidus (Rendle), Goldblat* | Melase golgule | Iridaceae | H | H | Wart | Grind the root and smear it on the wart. | T | R |
| 12. | *Justicia ladanoides* Lam. | Menchiro | Acanthaceae | Cl | H | Cough | Boil the crushed leaf and drink with tea cup. | O | L |
| 13. | *Carthamus tinctorius L.* | Suf | Asteraceae | H | H | Cough | Boil the grinded seed and drink one glass. | O | S |
| 14. | *Brassica oleracea* L. var. acephala | Koseta | Brassicaceae | H | H | Constipation | Add *Allium cepa*, oil and Cut the leaf of the plant then eat | O | L |
| 15. | *Citrus medica* Linn. | Terengo | Rutaceae | S | H | Measles | Crush the leaf and wash with it | T | L |
| 16. | *Eheretia cymosa* Thonn. | Welaga | Boraginacea | S | Li | Blotting | Crush the leaf, add water and drink a cup. | O | L |
| 17. | *Verbascum sinalticum* Benth. | Yaheya joro/Ketetina | Scrophulariacea | H | Li | Sudden disease | Crush the leaf and make the animal drink a teacup. | O | L |
| | | | | | H | Ring worm | Smear the crushed leaf on the affected area. | T | L |
| | | | | | B | Stomach ache | Crush the root, add water and drink a glass. | O | R |
| | | | | | H | Fibril illness | Crush the leaf and apply on the affected area. | T | L |
| 18. | Grass spp | Sare | Poaceae | H | Li | Fibril illness | Smoke when animal is sick. | O and N | L |
| 19. | *Achyranthes aspera* L. | Talegh/ Dameadereke | Amaranthacea | H | B | Stop bleeding | Crush the leaf and tie around the bleeding part. | O | L |
| | | | | | H | Common cold | Crush the leaf and add 2-3 drop in to coffee. | O | L |
| 20. | *Eucalyptus camaldulensis* Dehnh. Cat. Pl. Hort. | Kay baher zaf | Myrtaceae | T | H | Fibril illness | | O and N | L |
| | | | | | | Stomach pain | Boil the leaf and fume until heal. | | |
| 21. | *Rubia cordifolia.* L. | Kaye abeba | Rubiaceae | H | H | Kuncher, | Rub the affected area with the leaf. | T | L |
| | | | | | Li | Shivering | Crush the leaf and mix water and drink. | O | L |
| 22. | *Allium cepa* L. | Key shenkurt | Alliaceae | H | H | Cough | Cut the onion bulb, boil and drink. | O | L |
| 23. | *Allium sativum* L. | Nech Shenkrut | Amaryllidaceae | H | H | Stomache ache | Crush the bulb and eat with empty stomach | O | B |

| No. | Scientific name | Local name | Family | Habit | | Disease | Preparation | Route | Part |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Common cold | Crush the bulb, add in to boiling water and fumigate. | O and N | B |
| | | | | | B | Malaria Diuretic | Grind the bulb, mix with honey and eat. | O | B |
| | | | | | H | Ring worm | Rub the affected area with the bulb. | | B |
| 24. | *Aloe percrassa* Tod. | Erat | Aloaceae | H | H | Malaria | Grind leaf and eat | | L |
| | | | | | | Fibril illness | Sock the crushed and dried root into water and drink | O | R |
| 25. | *Moringa oleifera* Lam. | Sheferaw | Moringaceae | T | H | Pressure and diabetes | Crush the leaf and mix with water and drink always | O | L |
| 26. | *Artemisia abyssinica* Sch. Bip. Ex Engl. | Chekughn | Asteraceae | H | B | Diarrhea | | | |
| | | | | | H | Common cold, Cold, Anemia And Cough | Crush the leaf, mix with water and drink | O | L |
| | | | | | | Fibril illness | Smell the leaf and put in nose. | N | L |
| 27. | *Asparagus africanus* Lam. | Yeset keset | Asparagaceae | Cl | Li | Diuretic | Chew the root until heal. | O | R |
| | | | | | H | Devil sickness | Smoke the leaf at the time of sickness. | O and N | L |
| 28. | *Beta vulgaris* L. | Kaye sere | Amaranthaceae | H | H | Anemia | Eat the bulb with injera | O | |
| 29. | *Buddleja polystachya* Fresen. | Anfar | Loganiceae | T | H | Ascarise | Crush the leaf, mix with water and drink | O | L |
| 30. | *Calpurnia Aurea* (Ait.) Benth. | Degeta | Fabaceae | S | H | Diarrhea | Roast the seed, grind, mix with water and drink a teacup. | O | S |
| | | | | | | Hepatitis | Sock leaf into water drinks a tea cup every day for Three week. | O | L |
| 31. | *Capparris tomentosa* Lam. | Gumero | Capparidaceae | S | H | Devil sickness | Cut the root and the bark and smoke once at the time of sickness. | O and N | R and B |
| | | | | | | Stomach pain | Crush the leaf, mix with water and drink. | T | L |
| | | | | | | Fibril | Pick two roots, Crush them and eat with | O | R |

| No. | Scientific name | Local name | Family | Habit | | Use | Preparation | Route | Part |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | illness | butter. | | |
| | | | | | | Kidney | Grind the root and eat with butter for a week. | O | R |
| 32. | *Capsicum annuum* L | Berbere | Solanaceae | H | H | "Barele" | Grind the leaf and smear in body. | T | L |
| | | | | | | For clearing face | Apply the Fruit on face. | T | F |
| | | | | | | Common cold Cough | Smoke the leaf for 3 days | O and N | L |
| 33. | *Carica papaya* L. | Papaya | Caricaceae | T | H | Fibril illness | Boil the leaf and drink until it gets healed. | O | L |
| 34. | *Carissa spinarum* L | Agam | Apocynaceae | S | H | Devil sickness | Smoke the root, the bark and the steam together. | O and N | R, B and St |
| | | | | | | Stomach pain | Drink the lemon juice | O | J |
| | | | | | | Tonsillitis | Gargle with the lemon juice. | | |
| | | | | | | Measles | Grind leaf, mix with water and wash the body with the mixture. | T | L |
| 35. | *Citrus aurantifolia* Burn. F. Lomy. | Lomi | Rutaceae | T | H | Common cold | Boil the seed and peel and drink. | O | S |
| 36. | *Clematis simensis* Fresen. | Yaezo hareg | Ranunculaceae | Cl | H | Wound Wart | Crush the leaf, mix with oil and apply on the affected area. | T | L |
| | | | | | H | Ring worm Skin disease | Crush the leaf, mix with butter and cream the affected area until recovery. | T | L |
| 37. | *Croton macrostachyus* Del. | Bisana | Euphorbiaceae | T | H | Devil sickness | Smoke the bark. | O and N | B |
| | | | | | H | Stomach pain Fibril illness | Crush the seed and eat empty stomach | O | S |
| | | | | | H | Nasal bleed | Crush the leaf and immerse into nose. | N | L |
| | | | | | H | Retained placenta | | | R |
| 38. | *Cucumis ficifolius* A. Rich. | Yemeder enboye | Cucurbitaceae | H | Li | Blotting | Crush the leaf, mix with water and drink one glass | O | L |

| No. | Scientific name | Local name | Family | | | Disease | Preparation | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | B | Blotting | Sock the leaf in water night decant drink one cup in morning until heal | O | L |
| | | | | | Li | Diarrhea | Crush the leaf, add water and drink | O | L |
| | | | | | | Fibril illness | Smock the leaf | O and N | L |
| | | | | | H | Common cold | | | L |
| 39. | *Cupressus lusitanica* Mill. | Yeferenge tid | Cupressaceae | T | Li | Cough | Crush the leaf, add water and drink | O | |
| | *Cyathula polycephala* Bak. | Chegogot | | | | Fibril illness | Crush the leaf, add water and drink | O | L |
| 40. | | | Amaranthaceae | H | H | Wound | Crush the leaf, mix with butter and tie in the wound | T | L |
| | | Astenager | | | H | For drying wound | Crush the leaf and creamed in the wound | T | L |
| 41. | *Datura stramonium* L. | | Solanaceae | H | Li | Leeches | Crush the leaf sock in water and give to the animal to drink | O | L |
| 42. | *Daucus carota* L. | Carrot | Apiaceae | H | H | Eye | Eat the blub frequently | O | B |
| 43. | *Dodonaea angustifolia* L. F | Kitkita | Latexidaceae | S | H | Malaria | Eat the seed with honey | O | S |
| 44. | *Dovyalis abyssinica* (A. Rich.) Warb. | Koshime | Flacourtiaceae | S | Li | Liver fluke | Crush the leaf add water and drink | O | S |
| | *Echinops kebericho* Mesfin. | | Asteraceae | | | Devil sickness Fibril illness | Cut the root and smoke | O and N | R |
| 45. | | Kabericho | | H | H | Stomachache | Eat the root once | O | R |
| 46. | *Erythrina abyssinica* Lam. Ex DC. | Kurekra | Leguminosae | T | H | Dandruff | Crush leaf and creamed in the head | T | L |
| | | | | | | Stomach pain | Grind leaf, add water and drink | O | L |
| | | | | | | Common cold, Cold | Add the leaf boiled water and fumigate and wash | O and N | L |
| 47. | *Eucalyptus globulus* Labill. | Nech bahirzaf | Myrtaceae | T | H | Fibril illness | Crush the leaf and creamed at affected area for 3 days | T | L |
| 48. | *Euphorbia platyphyllos* L. | Anterfe | Euphorbiaceae | H | H | Wart Ring worm | Crush the stem and creamed at affected area | T | S |
| 49. | *Euphorbia ampliphylla* Pax | Qulquale | Euphorbiaceae | T | H | Gonorrhea | Eat the latex with injera until healed | O | L A |

65

| No. | Scientific name | Local name | Family | Habit | Part | Disease | Preparation | Route | Status |
|---|---|---|---|---|---|---|---|---|---|
| 50. | *Euphorbia tirucalli* L. | Knchb | Euphorbiaceae | S | H | Wound | Creamed the latex on the wound | T | LA |
| 51. | *Foeniculum vulgare* Mill. | Ensilale | Apiaceae | H | B | Diuretic | | | |
| | | | | | H | Stomach pain | Crush the leaf, add water and drink half of the coffee cup | O | L |
| 52. | *Guizotia abyssinica* | Nug | Asteraceae | H | H | Cough | Grind seed, add water ,boil with honey and drink | O | S |
| 53. | *Hagenia abyssinica* (Brace) J. F. Gmel. | Kosso | Rosaceae | T | H | Askaris | Crush seed, add water and drink | O | S |
| 54. | *Hordeum vulgare* L. | Gabs | Poaceae | H | Li | Leech | Roast the seed until black, sock into water 4 -5days, then give to animal to animal until heal | O | S |
| 55. | *Jasminum abyssinicum* Hochst. Ex DC. | Tenbelel | Oleaceae | Cl | H | Lifi | Crush the leaf and tie in affected area | T | L |
| 56. | *Justicia schimperiana* (Hochst. ex Nees) T.Anders | Senseleor Simize | Acanthaceae | S | Li | External parasite | Crush the leaf and mix with water apply in the animal skin | T | L |
| 57. | *Kalanchoe petitiana* A. Rich. | Endawula/en Cobi/buseke | Euphorbiaceae | H | H | Boils | Burnt the leaf and put in boil | T | L |
| | | | | | Li | Body swelling | Crush the root then by cutting open the neck of the animal place root and sew back the skin. | I | R |
| 58. | *Lepidium sativum* L. | Feto | Brassicaceae | H | H | Fibril illness | Crush the seed and eat one spoon with injra | O | S |
| 59. | *Nicandra physalodes* (L.) Gaertn. | Kassa | Solanaceae | H | H | Fibril illness | Smoke the leaf at the time of sickness | O and N | L |
| 60. | *Nicotiana tabacum* L. | Tinbaho | Solanaceae | H | B | Leech | Crush the leaf, add water and drink one time | O | L |
| 61. | *Nigella sativa* L. | Tekure azemude | Ranunculaceae | H | Li | Stomach pain | Grind seed and eat with honey/boil water with water and honey then drink it | O | S |
| | | | | | | Cough | Sock seed and drink | O | S |
| | | | | | | Measles | Mix grinded seed with crushed garlic, ginger and honey then drink with tea. | O | S |
| | | | | | H | Every disease | Grind seed and boil with coffee | O | S |
| | | | | | Li | Fibril illness | Grind seed and mix water and drink | O | S |

| No. | Scientific name | Local name | Family | Habit | Part | Disease | Preparation | Route | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | stomachache | Grind seed and boil with coffee | O | L |
| | | | | | H | Fibril illness | Pounding the seed and apply in affected area | T | S |
| 62. | *Ocimum lamiifolium* Hochst. Ex Benth. | Damakessi | Lamiaceae | H | B | Fibril illness | Crush the leaf, mix 2-3 drops in the coffee and drink. | O | L |
| | | | | | H | Common cold | Smell the leaf or put the leaf in the nose. | N | L |
| 63. | *Olea europaea* (Wall.Ex G. Don) Cif. | Weyra | Oleaceae | T | H | Fire burn | Burn the leaf, mix with butter and then apply on the burnt area one time. | T | L |
| | | | | | | Hepatitis | Roast the bark, grid and drink with coffee | O | B |
| 64. | *Otostegia integrifolia* Benth. | Tunjut | Lamiaceae | S | H | Malaria | Crush the leaf and drink half of coffee cup | O | |
| | | | | | | Evil | Smoke the leaf at the time of sickness | O and N | L |
| 65. | *Phytolacca dodecandra* L. Herit. | Endode | Phytolacaceae | S | Li | Leech | Crush the leaf and add one plate in the river | O | L |
| 66. | *Laggera crispata* (Vahl) Hepper & Wood | Alshasume | Asteraceae | H | H | Stop bleeding | Apply the grinded leaf in bleeding area | T | |
| | | | | | | Stomachache, Ascarisis | Crush the leaf, add water and drink | O | L |
| 67. | *Rhamnus prinoides* l. Herit. | Gesho | Rhamnaceae | S | B | Stomach pain | Crush the leaf, add water and drink | O | |
| | | | | | | Measles | Crush the leaf and creamed on affected area | T | L |
| | | | | | | Toothache | Hold a piece of root by the sick teeth | O | |
| | | | | | H | Common cold | Crush the leaf and smell | N | R |
| 68. | *Rubus fruticosus* L. | Enjory | Rosaceae | S | H | Stomachache | Eat the raw seed | O | S |
| 69. | *Rumex nepalensis* Spreng. | Tult | Polygonaceae | H | Li | Stomach pain | Crush the root and eat | O | |
| | | | | | H | Fibril illness | Crush the leaf, add water and drink | O | R |
| 70. | *Rumex nervosus* | Embwaco | Polygonaceae | S | B | Stop bleeding | Crush the leaf, mix with fresh butter and tie | T | L |

| No. | Scientific name | Local name | Family | Habit | | Disease | Preparation | Route | Part |
|---|---|---|---|---|---|---|---|---|---|
| | Vahl. | | | | H | Gastric, Diabetes and Hepatitis | Crush the leaf, add water and drink | O | L / L |
| | | | | | H | Fire burn | Crush the leaf and creamed in burnt area | | L |
| | | | | | H | Wart and itch | Crush the leaf and smear in wart | T | L |
| | | | | | | Fibril illness | Put the leaf in boiled coffee with drink | O | L |
| | | | | | | Stomach pain | Grind the seed mix with honey and eat until heal | | S |
| 71. | *Ruta chalepensis* L. | Tene adam | Rutaceae | H | H | Vomiting | Crush the leaf and add in coffee drink | | L |
| 72. | *Satureja abyssinica* (Benth.) Briq | Tosene | Lamiaceae | H | H | Cough | Add dried leaf in boiled water like for 1 week | O | L |
| | | | | | | Blotting | Crush the leaf and drink or eat one time | | L |
| | | | | | | Fibril illness | Grind the seed, crush the leaf, add water and drink one cup | O | L |
| 73. | *Schinus molle* L. | Kundo berbere | Anacerdiaceae | T | H | Devil sickness | Sniff the leaf at the time of sickness | N | L |
| 74. | *Senna septemtrionalis* (Viv.) | Senafetch | Fabaceae | S | H | Stomach pain | Crush the seed and eat with injera | O | S |
| | | | | | | Fibril illness | Crush the leaf and mix with *Cyperus dichroostathyus* and honey then drink it. | O | L |
| 75. | *Sida schimperi* Hochst. Ex. A. Rich. E | Chifreg | Malvaceae | S | Li | Rh factor | Crush and apply root in body or tie the root in neck or horn | T | R |
| | | | | | B | Stomach pain | Crush the leaf and the root add water and drink | O | L and R |
| 76. | *Silene macrosolen* A. Rich. | Wegert | Caryophyllaceae | H | H | Fibril illness and Devil sickness | Crush the root and smoke at the time of illness | O and N | R |
| 77. | *Solanecio gigas* (Vatke) C Jeffrey. | Shecoko | Asteraceae | S | H | Diarrhea | Crush the leaf, add water and drink until heal | O | L |
| | | | | | H | Nasal bleed | Crush the leaf and put in nose | N | L |
| 78. | *Solanum marginatum* L.f., Suppl. | Gaber enboye | Solanaceae | S | B | Leech | Crush the leaf, sock in the water in the night and drink with empty stomach in the morning. | O | L |

| No. | Scientific name | Local name | Family | | | Disease | Preparation | | |
|---|---|---|---|---|---|---|---|---|---|
| 79. | *Galium aparinoides* Forssk. | Ashkt | Rubiaceae | H | H | Skin disease and ring worm | Rub the affected area with steam and leaf of the plant. | T | Stand L |
| 80. | *Tamarindus indica* L. | Mserech | Fabaceae. | T | H | Devil sickness | Boil the leaf with the orang and *Artemisia absinthium* then fumigate | N | L |
| 81. | *Taraxacum spp.* | Nechilo | Asteraceae | H | H | Blotting | Crush the leaf, add water and drink with glass for 1 day | O | L |
| 82. | *Trigonella foenum-graecum* J. M. Suttie | Abshe | Fabaceae | H | H | Gastric Heart | Sock the seed in the water at night and drink empty stomach in the morning | O | S |
| 83. | *Urtica simensis* Steudel | Sama | Urticaceae | H | H | Heart case | Crush steam and leaf, add water and drink until heal | O | L |
| 84. | *Vernonia adoensis* Sch.Bip ex Walp. | Yeferse zeng | Asteraceae | H | Li | Fibril illness | Smoke the leaf at the time of sickness | N | |
| | | | | | B | Cold | Grind the leaf and drink | O | L |
| 85. | *Vernonia amygdalina* Del. | Grawa | Asteraceae | S | H | Stomachache / Blotting | Crush the leaf and mix with water and drink | O | L |
| 86. | *Zehneria scabra* (Linn.f.) Sond. | Haregresa | Cucurbitaceae | Cl | H | Fibril illness | Smoke the leaf with the leaf of *Ocimum lamiifolium* or drink the crushed leaf or | N | |
| | | | | | | | Crush the steam and apply in affected area | T | L |
| | | | | | | Common cold | Crush the leaf and add in boiled water fumigate | O | L |
| | | | | | | Evil eyes | Cut the leaf and smoke at the time of sickness | O and N | L |
| | | | | | Li | Blotting | Crush the leaf, add water and drink | O | L |
| 87. | *Zingiber officinale* Roscoe. | Zengible | zingiberaceae | S | H | Stomachache Common cold | Crush the root and eat with Honey | O | L |
| 88. | *Cirsium englerianum* O.Hoffm. | Kusheshele | Asteraceae | H | Li | Diarrhea | Pounding the root add, water and give to animal to drink | O | R |
| 89. | *Clutia abyssinica* Jaub. And Spach | Fyele feg | Euphorbiaceae | S | H | Ear disease | Pounded, squeezed the leaf then its drop through ear | EC | L |
| 90. | *Tragia brevipes* Pax. | Abelbalit | Euphorbiaceae | Cl | Li | Diarrhea | Pound the root, mix with water and give to animal to drink | O | R |

| No. | Scientific name | Local name | Family | | | Disease | Preparation | | |
|-----|----------------|-----------|--------|---|---|---------|-------------|---|---|
| | *Myrtus communis* L. | Adese | Myrtaceae | S | H | Measles | Crush leaf , mix with *Artemisia Absinthium,* add water and Drink | O | L |
| | *Ferula communis* L. | Dog | Apiaceae | H | Li | Fibril illness Diuretics | Smoke the steam at the time of Illness | O and | S |
| 93. | *Guizotia schimperi* Sch. Bip.ex Walp | Mech | Asteraceae | H | H | Eye problem | Juice the leaf and drop into eyes. | OP | L |
| 94. | *Premna schimperi* Engl. | Chocho | Lamiaceae | H | A | Eye sickness | Crush the leaf and put two three drop into eyes | OP | L |
| 95. | *Rosa abyssinica* Lindley. | Kega | Rosaceae | S | H | Devil sickness | smoke  the root by the time of sickness | O and N | R |
| | *Pterolobium stellatum* (Forssk.) Brenan. | Kentefa | Fabaceae | S | H | Devil sickne | Cut the root and smoke at the time of sickness | O and | R |
| 97. | *Embelia schimperi* Vatke. | Enkoko | Myrsinaceae | S | H | Askarisisi | Eat the crushed seed | O | S |
| 98. | *Sesamum indicum* L. | Salite | Pedaliaceae | H | H | Common cold | Grind the seed boil and drink | O | S |
| 99. | *Osyris quadripartita* Decn. | Queret | Santalaceae | T | H | Hepatitis | Squeeze the leaf , add water  and Drink | O | L |

# APPENDIX II

Appendix II List of medicinal plants used for treating human and livestock in the study ailments in the study area; with scientific name, local name, family, S(source); wild(W), homegarden (H), market(M) geographical location (latitude and longitude), Altitude, Distribution(commonly, sparsely and rarely and finally C.N(collection number) mentioned respectively.

| Scientific name | Local name | Family | S | Location | | Altitude | Distribution | C.N |
|---|---|---|---|---|---|---|---|---|
| | | | | Latitude | Longitude | | | |
| *peumus boldus* mol. | Boter | Monimiaceae | W | 11°50.4540'N | 39°30.7080'E | 1971 | Sparsely | DA003 |
| *Withania somnifera* (L) Dunal. | Ede budha | Solanaceae | W | 11°42.1270'N | 39°30.6080'E | 2980 | Sparsely | DA005 |
| *Claotropis procera* (Ait.) Ait.f. | Tobbiya/Koboa wsh | Asclepiadaceae | W | 11°42.1270'N | 39°30.6080'E | 2980 | Rarely | DA009 |
| *Rubia cordifolia*.L. | Menchiro | Rubiacea | W | 11°42.1270'N | 39°30.6080'E | 2980 | Rarely | DA011 |
| *Grass spp* | Sare | Poaceae | W | 11°42.1270'N | 39°30.6080'E | 2980 | sparsely | DA018 |
| *Justicia ladanoides* Lam. | Kaye abeba | Acanthaceae | W | 11°42.1270'N | 39°30.6080'E | 2980 | sparsely | DA021 |
| *Achyranthes aspera* L. | Talegh / Dame adereke | Amaranthacea | H | 11°42.1270'N | 39°30.6080'E | 2980 | commonly | DA019 |
| *Aloe percrassa* Tod. | Erat | Aloaceae | W | 11°42.1270'N | 39°38.4930'E | 2763.4 | commonly | DA024 |
| *Artemisia absinthium* L. | Ariti | Asteraceae | W | 11°10.6350'N | 39°30.6080'E | 2980 | sparsely | DA001 |
| *Artemisia abyssinica* Sch. Bip. Ex Engl. | Chekughn | Asteraceae | W | 11°42.1270'N | 39°30.6080'E | 2650 | commonly | DA026 |
| *Asparagus africanus* Lam. | Yeset keset | Asparagaceae | W | 11°42.1270'N | 39°30.6080'E | 2478 | sparsely | DA027 |
| *Buddleja polystachya* Fresen. | Anfar | Loganiceae | H | 10°59.7340'N | 39°33.0510'E | 2974 | sparsely | DA029 |
| *Calpurnia aurea* Ait. Benth. | Degeta | Fabaceae | H | 11°50.4540'N | 39°30.7080'E | 1971 | commonly | DA030 |
| *Capparis tomentosa* Lam. | Gumero | Capparidaceae | W | 11°42.1270'N | 39°30.6080'E | 3007.9 | sparsely | DA031 |
| *Capsicum annuum* L. | Berbere | Solanaceae | H | 11°42.1270'N | 39°30.6080'E | 2610.3 | commonly | DA032 |
| *Carica papaya* L. | Papaya | Caricaceae | H | 11°50.4540'N | 39°30.7080'E | 1971 | Rarely | DA033 |

| | Agam | Apocynaceae | W | 11°40.3500'N | 39°28.6840'E | 2615 | sparsely | DA034 |
|---|---|---|---|---|---|---|---|---|
| *Carissa spinarum* L. | | | | | | | | |
| *Cirsium englerianum* O.Hoffm. | Kusheshele | Asteraceae | W | 11°50.4540'N | 39°30.7080'E | 1971 | commonly | DA087 |
| *Citrus aurantifolia* Burn. F. Lomy | Lomi | Rutaceae | H | 11°50.4540'N | 39°30.7080'E | 1971 | Rarely | DA035 |
| *Citrus medica.* Linn. | Terengo | Rutaceae | H | 11°42.1270'N | 39°30.6080'E | 2615 | Rarely | DA015 |
| *Clematis simensis* Fresen. | Yaezo hareg | Ranunculaceae | W | 11°42.1270'N | 39°30.6080'E | 2615 | sparsely | DA036 |
| *Clutia abyssinica* Jaub. And Spach | Fyele feg | Euphorbiaceae | W | 11°42.1270'N | 39°30.6080'E | 2988 | sparsely | DA088 |
| *Cucumis ficifolius* A. Rich. | Yemeder enboye | Cucurbitaceae | W | 11°42.1270'N | 39°30.6080'E | 2988 | commonly | DA037 |
| *Cupressus lusitanica* Mill. | Yeferenge tid | Cupressaceae | H | 10°59.2340'N | 39°33.0310'E | 2974 | commonly | DA038 |
| *Datura stramonium* L. | Astenager | Solanaceae | H | 11°42.1270'N | 39°30.6080'E | 2648 | commonly | DA039 |
| *Dodonaea angustifolia* L. F | Kitkita | Latexidaceae | W | 11°42.1270'N | 39°30.6080'E | 2610.3 | Rarely | DA041 |
| *Dovyalis abyssinica* (A. Rich.) Warb. | Koshime | Flacourtiaceae | H | 11°50.4540'N | 39°30.7080'E | 1971 | sparsely | DA042 |
| *Eheretia cymosa* Thonn. | Welaga | Boraginacea | H | 11°42.1270'N | 39°30.6080'E | 3007.9 | sparsely | DA016 |
| *Erythrina abyssinica* Lam. Ex DC. | Kurekra | Leguminosae | W | 11°42.1270'N | 39°30.6080'E | 2988 | Rarely | DA044 |
| *Eucalyptus camaldulensis* Dehnh. Cat. Pl. Hort. | Kay baher zaf | Myrtaceae | H | 11°42.1270'N | 39°30.6080'E | 3007.9 | commonly | DA020 |
| *Eucalyptus globulus* Labill. | Nech bahirzaf | Myrtaceae | H | 11°42.1270'N | 39°30.6080'E | 2980 | commonly | DA045 |
| *Euphorbia platyphyllos* L. | Anterfe | Euphorbiaceae | W | 11°50.4540'N | 39°30.7080'E | 1971 | sparsely | DA046 |
| *Euphorbia ampliphylla* Pax. | Qulquale | Euphorbiaceae | W | 11°42.1270'N | 39°30.6080'E | 2470 | commonly | DA047 |
| *Euphorbia tirucalii* L. | Kinchib | Euphorbiaceae | W | 11°42.1270'N | 39°30.6080'E | 2615 | Rarely | DA040 |
| *Euphorbia tirucalli* L. | Knchb | Euphorbiaceae | W | 11°42.1270'N | 39°30.6080'E | 2470 | sparsely | DA048 |
| *Ferula communis* L. | Dog | Apiaceae | W | 10°59.8130'N | 39°32.1370'E | 2470 | sparsely | DA091 |
| *Foeniculum vulgare* Mill. | Ensilale | Apiaceae | H | 11°42.1270'N | 39°30.6080'E | 2615 | sparsely | DA049 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Galinsoga quadriradiata* Ruiz & Pav. | Dehanekay | Asteraceae | H | 11°50.4540'N | 39°30.7080'E | 1971 | commonly | DA004 |
| *Galium aparinoides* Forssk. | Ashkt | Rubiaceae | W | 11°42.1270'N | 39°30.6080'E | 2988 | commonly | DA078 |
| *Gladiolus candidus* (Rendle), Goldblat | Melase golgule | Iridaceae | W | 11°50.4540'N | 39°30.7080'E | 1971 | sparsely | DA010 |
| *Guizotia schimperi* Sch. Bip.ex Walp | Mech | Asteraceae | W | 11°42.1270'N | 39°30.6080'E | 3007.9 | sparsely | DA092 |
| *Hagenia abyssinica* (Brace) J. F. Gmel. | Kosso | Rosaceae | W | 11°42.1270'N | 39°30.6080'E | 3007.9 | sparsely | DA051 |
| *Verbascum sinalticum* Benth. | Yaheya joro | Scrophulariacea | W | 10°69.1290'N | 39°36.9080'E | 2890 | commonly | DA017 |
| *Jasminum abyssinicum* Hochst. Ex DC. | Tenbelel | Oleaceae | W | 11°42.1270'N | 39°30.6080'E | 2470 | sparsely | DA053 |
| *Justicia schimperiana* (Hochst. Ex Nees) | Senseleor Simize | Acanthaceae | W | 11°50.4540'N | 39°30.7080'E | 1971 | commonly | DA054 |
| *Kalanchoe petitiana* A. Rich. | Endawula/en Cobi/buseke | Euphorbiaceae | W | 11°42.1270'N | 39°30.6080'E | 3007.9 | commonly | DA055 |
| *Laggera crispata* (Vahl) Hepper & Wood | Alshasume | Asteraceae | W | 11°50.4540'N | 39°30.7080'E | 1971 | sparsely | DA065 |
| *Moringa oleifera* Lam. | Sheferaw | Moringaceae | H | 11°42.1270'N | 39°30.6080'E | 2303.1 | Rarely | DA025 |
| *Nicandra physalodes* (L.) Gaertn. | Kassa | Solanaceae | W | 11°40.1260'N | 39°28.6080'E | 2618.2 | commonly | DA058 |
| *Nicotiana tabacum* L. | Tinbaho | Solanaceae | W | 11°50.4540'N | 39°30.7080'E | 1971 | sparsely | DA059 |
| *Ocimum lamiifolium* Hochst. Ex Benth | Damakessi | Lamiaceae | H | 11°42.7420'N | 39°38.8330'E | 2303.1 | commonly | DA061 |
| *Olea europaea subsp. Cuspidata* (Wall.Ex G. Don) Cif | Weyra | Oleaceae | W | 11°42.1270'N | 39°30.6080'E | 2470 | commonly | DA062 |
| *Osyris quadripartita* Decn. | Queret | Santalaceae | W | 11°50.4540'N | 39°30.7080'E | 1971 | sparsely | DA063 |
| *Phytolacca dodecandra* L. Herit | Endode | Phytolacaceae | W | 11°40.1240'N | 39°33.6080'E | 2610.3 | sparsely | DA064 |
| *Premna schimperi* Engl. | Chocho | Lamiaceae | W | 11°42.1270'N | 39°30.6080'E | 2303.1 | sparsely | DA093 |
| *Pterolobium stellatum* (Forssk.) Brenan | Kentefa | Fabaceae | W | 11°42.1270'N | 39°30.6080'E | 2303.1 | sparsely | DA095 |

| Scientific name | Local name | Family | | Latitude | Longitude | | | Code |
|---|---|---|---|---|---|---|---|---|
| *Rhamnus prinoides* L. Herit. | Gesho | Rhamnaceae | W | 11°42.1270'N | 39°30.6080'E | 2470 | sparsely | DA066 |
| *Ricinus communis* L. Chakima. | Gulo | Euphorbiaceae | W | 11°42.1270'N | 39°30.6080'E | 2610.3 | commonly | DA007 |
| *Rosa abyssinica* Lindley. | Kega | Rosaceae | W | 11°42.1270'N | 39°30.6080'E | 2615 | sparsely | DA094 |
| *Rubus fruticosus* L. | Enjory | Rosaceae | H | 11°42.1270'N | 39°30.6080'E | 3007.9 | sparsely | DA067 |
| *Rumex nepalensis* Spreng. | Tult | Polygonaceae | H | 10°59.7380'N | 39°30.6050'E | 2974 | commonly | DA068 |
| *Rumex nervosus* Vahl. | Embwaco | Polygonaceae | W | 11°42.1270'N | 39°28.6840'E | 2303.1 | commonly | DA069 |
| *Ruta chalepensis* L. | Tene adam | Rutaceae | H | 11°40.3500'N | 39°30.6080'E | 2018 | commonly | DA070 |
| *Satureja abyssinica* (Benth.) Briq | Tosene | Lamiaceae | H | 10°59.7480'N | 39°53.2028'E | 2979.2 | sparsely | DA071 |
| *Schinus molle* L. | Kundo berbere | Anacerdiaceae | H | 11°42.1270'N | 39°30.'E | 3007.9 | commonly | DA072 |
| *Sida schimperi* Hochst. Ex. A. Rich. E | Chifreg | Malvaceae | W | 11°12.7320'N | 39°38. 4940'E | 2756.7 | commonly | DA074 |
| *Silene macrosolen* A. Rich. | Wegert | Caryophyllaceae | W | 10°59.8120'N | 39°32.1390'E | 2478 | sparsely | DA075 |
| *Solanecio gigas* (Vatke) C Jeffrey. | Shecoko | Asteraceae | W | 11°42.1270'N | 39°30.6080'E | 3007.9 | sparsely | DA076 |
| *Solanum marginatum* L.f., Suppl. | Gaber enboye | Solanaceae | W | 11°42.1270'N | 39°30.6080'E | 2615 | commonly | DA077 |
| *Stephania abyssinica* (Dillon & A. Rich.) Walp. | Yeeyt hareg | Menispennaceae | W | 11°42.1270'N | 39°30.6080'E | 3007.9 | commonly | DA002 |
| *Tamarindus indica* L. | Mserech | Fabaceae. | W | 11°42.1270'N | 39°30.6080'E | 3007.9 | sparsely | DA079 |
| *Taraxacum spp.* | Nechilo | Asteraceae | W | 11°42.1270'N | 39°30.6080'E | 2610.3 | sparsely | DA080 |
| *Tragia brevipes* Pax. | Abelbalit | Euphorbiaceae | W | 11°42.1270'N | 39°30.6080'E | 2303.1 | sparsely | DA089 |
| *Urtica simensis* Steudel. | Sama | Urticaceae | H | 10°59.2340'N | 39°33.0310'E | 3007.9 | commonly | DA082 |
| *Vernonia adoensis* Sch.Bip ex Walp. | Yeferse zeng | Asteraceae | W | 11°40.5220'N | 39°30.8300'E | 2605.1 | Rarely | DA083 |
| *Vernonia amygdalina* Del. | Grawa | Asteraceae | H | 11°42.5200'N | 39°30.8100'E | 2602.4 | commonly | DA084 |
| *Zehneria scabra* (Linn.f.) Sond. | Haregresa | Cucurbitaceae | H | 10°99.2600'N | 39°93.0270'E | 2956 | commonly | DA085 |

# APPENDIX III

Jimma University College of Natural science

Department of Biology

Semi structured interview questions

The purpose of this study is for partial full filament of the MSc degree in Botanical science, the research is aimed to collect information about the indigenous knowledge of the society and use of medicinal plant to treat human and livestock aliments in Dessie Zuria District.

### I. Personal information

Kebele: _____ Date: _____

Sex: A. Male B. Female Age: _____

Work: A. farmer B. merchant C. other ----------------

Education status: A. Illiterate B. Primary education C. Secondary education

Religion: Orthodox_____ Muslim_____ Protestant_____ other_____

Marital status: A. Unmarried B. married C. Divorced

Year of resident_____

### II. Basic information about medicinal plants

1. What are the main human and animal health problems in your locality or Keble? -----------
2. Are you cultivating medicinal plant? A. yes B. No
3. If you answer yeas in no.1, where do you cultivate? A. homegarden B. farmland
4. Have you ever use medicinal plant? A. yes B. No
5. Are medicinal plants marketable? A. yes B. No
6. Are there taboos in the utilization of some medicinal plants in the locality? A. Yes B. No
7. If u answers yes in no. 6 mention some of the medicinal plants ------------------------------
8. Are there conditions that forbidden taking both for human and livestock the medicine? -----

**III. If you use medicinal plant to treat human and livestock disease fill the below table.**

| No. | Medicinal plant | Disease treated | For human/ domestic animal | Preparation | Route of application | Part used | Dosage | Habitat | habit | Length of prescription | Other Use |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |

IV. Indigenous knowledge related questions

1. How is the knowledge of traditional medicine passed to a family member/younger generation? A. Family    B. Traditional healer    C. Observation  D. Formal education

2. What is your way to transfer indigenous knowledge? --------------------------------------------

3. Availability of medicinal plants as compared to the past: Abundant, less abundant ‗, rare (scarce),

4. What are threatening factors of medicinal plants in your area? For medicinal-------, Food Firewood---------, Charcoal---------- Fence--------, Construction--------, Furniture------

5. How do the local people manage and conserve these medicinal plant species through their traditional indigenous knowledge?

# APPENDIX IV

## I. Checklist for traditional healer interview                Date: .........................

**Personal information**

7.  Name:

8.  Kebele:

9.  Sex:

10. Age:

11. Education status:

12. Religion:

13. Marital status:

14. Year of resident

15. Year of experience:

16. Mode of practice:

17. Do you have fixed price average?

## II. Basic information about medicinal plants

1.  What are the main human and animal health problems in your locality or Keble?

2.  Are there taboos in the utilization of some medicinal plants in the locality? If mention some of the medicinal plants?

3.  Are there conditions that forbid taking both for human and livestock the medicine?

4.  Medicinal plants used to treat human and livestock ailments?

A. Name the plant-------------------------------------------

B. Habitat of the plant---------------------------------------

C. Habit of the plant-----------------------------------------

D. Part of the plant used-------------------------------------

E. methods of Preparation ---------------------------------------

F. dosage ---------------------------------------

G. Application method---------------------------------------

H. Other uses of the plant----------------------------------

### III. Indigenous knowledge related question

1. How is the knowledge of traditional medicine passed to a family member/younger generation?
2. What is your way to transfer indigenous knowledge?
3. Availability of medicinal plants as compared to the past: Abundant ------, less abundant----, rare (scarce) …
4. What are threatening factors of medicinal plants in your area?
5. How do the local people manage and conserve these medicinal plant species through their traditional indigenous knowledge

# APPENDIX V

## የዚህ ጥናት አላማ በደሴ ዙሪያ ወረዳ የሰው እና የእንስሳት በሽታን ለማከም የሚውሉ እጽዋቶች ላይ ያለ የሀገር በቀል እውቀት መረጃ ለመሰብሰብ ነው::

ይህ መጠየቅ አራት ክፍሎች ያሉት ሲሆን ጥያቄዎቹም ክፍት ቦታ እና ምርጫ ናቸው::ለክፍት ቦታዎቹ ተገቢውን ምላሽ እንዲሰጡ ለምርጫ ጥያቄዎቹም ተገቢውን ምርጫ እንዲያከቡ በትህትና እጠይቃለሁ::

### ሀ. የግለሰቡ መረጃ

1. ስም ………………………………… ቀን……………………………..

2. ቀበሌ…………………………………

3. ጾታ    ሀ. ወንድ     ለ. ሴት

4. ስራ    ሀ. ገበሬ     ለ. ነጋዴ     ሐ. ሌላ…………

5. የትምህርት ደረጃ     ሀ. ያልተማር     ለ. የመጀመሪያ ደረጃ     ሐ. ሁለተኛ ደረጃ     መ. ሌላ…..

6. ሀይማኖት     ሀ. ፕሮቴስታንት     ለ. ኦርቶዶክስ     ሐ. ሙስሊም     መ. ሌላ……

7. የጋብቻ ሁኔታ     ሀ. ያገባ     ለ. ያላገባ     ሐ. የተፋታ

8. በዚህ ቦታ ምን ያህል አመት ኖርዋል…………………………………………

### ለ. ለህክምና ስለሚውሉ እጽዋቶች መሰረታዊ መረጃ

1. በአካባቢው ላይ ያሉ ዋና ዋና የሰው እና የእንስሳት በሽታዎች ምንድ ናቸው?-----------------------

2. ህክምና ስለሚውሉ እጽዋቶችን ይተክላሉ?   ሀ. አዎ   ለ.አልተክልም

3. ለሁለተኛው ጥያቄ መልሶ አዎ ከሆነ የሚተክሉት የት ነው?     ሀ. በጎሮ     ለ. በእርሻ መሬት

4. ለ ህክምና ስለሚውሉ እጽዋቶች ተጠቅመው ያውቃሉ? ሀ. አዎ     ለ. አላውቅም

5. ለ ህክምና ስለሚውሉ እጽዋቶች ገበያ ላይ ይገኛሉ?   ሀ. አዎ     ለ. አይገኙም

6. በአካባቢያችሁ ህክምና ከሚውሉ እጽዋቶች ውስጥ ለመጠቀም ነውር የሆነ አለ?  ሀ. አዎ ለ. የለም

7. ለስድስተኛው ጥያቄ መልሶ አዎ ከሆነ እጽዋቱን ስም ጥቀስ(ሽ)? ----------------------------

8. በአካባቢያችሁ ህክምና ከሚውሉ እጽዋቶችን ለመጠቀም የ ሚከለከልበት ገዜ አለ?-----------ለምን?

## ሐ. ለህክምና የሚውሉ እጽዋቶች የሚጠቀሙ ከሆነ ከዚህ በታች ያለውን ሰንጠረዥ ይሙሉ

| ተ.ቁ | የእጽዋቱ ስም | የሚያክመ ውበሽታ | የሰው የእንስሳት | አዘገጃጀት | አወሳሰድ | የ ሚጠቀሙት የእጽዋቱ ክፍል | መጠን | የሚያገኙኘ በት ቦታ | አይነት | የእጽዋቱሌላ ጥቅም |
|------|----------|-----------|-----------|---------|--------|----------------------|------|--------------|------|-------------|
| 1. | | | | | | | | | | |
| 2. | | | | | | | | | | |
| 3. | | | | | | | | | | |
| 4. | | | | | | | | | | |
| 5. | | | | | | | | | | |

### መ. የሀገር በቀል እውቀትን የሚመከቱ ጥያቄዎች

1. ባህላዊ የህክምና እውቀትእንዴት ነው የሚገኘው?

   ሀ. ከቤተሰብ    ለ. ባህላዊ የህክምና ከሚሰጡ ሰዎች    ሐ. በማየት    መ. ከመደበኛ ትምህርት

2. እርሶ ባህላዊ የህክምና እውቀት የሚያስተላልፉት እንዴት ነው? ………………………………………

3. ለህክምና የሚውሉ እጽዋቶች ከበፊቱ ጋር ሲወዳደር    ሀ. በብዛት ይገኛል    ለ. አነስተኛ ነው

   ሐ. በጣም አነስተኛ ነው

4. በአካባቢያችሁለ ህክምና የሚውሉ እጽዋቶች እንዲቀንስ የሚያደርገው እጽዋቶች____መጠቀም ነው።

   ሀ. ለህክምና    ለ. ለምግብነት    ሐ. ለማገዶ    መ. ለክሰል    ሰ. ለአጥር    ረ. ለግንባታ    ሠ. ቤት እቃዎች

   ሸ. ለእርሻ

5. በአካባቢያችሁ ለህክምና የሚውሉ እጽዋቶች የሚጠበቁት እንዴት ነው? ………………………

ስለ ትብብሮ በጣምአመሰግናለሁ!

80

# APPENDIX VI

List of key informants

| No. | Name | Sex | kebele | Age | Religion | Year of resident | Educational status | Year of practice | Marital status | Specialized in treating |
|-----|------|-----|--------|-----|----------|------------------|--------------------|------------------|----------------|--------------------------|
| 1. | Ahemed Akalu | M | 037 | 60 | Muslim | 60 | Illiterate | 9 | Married | Fibril illness  Eye disease for livestock |
| 2. | Ahmed Endris | M | 09 | 72 | Muslim | 72 | Illiterate | 50 | Married | "Lifi " |
| 3. | Almaze Abebe | F | 041 | 45 | Orthodox | 40 | Illiterate | 30 | Married | Fibril illness |
| 4. | Ebre Yemer | M | 037 | 90 | Muslim | 46 | Illiterate | 50 | Married | Fibril illness and wound |
| 5. | Fate Yemer | F | 012 | 56 | Muslim | 56 | Illiterate | 34 | Married | "Kuncher" |
| 6. | Hasen Ali | M | 040 | 35 | Muslim | 35 | primary | 14 | Single | Fibril illness |
| 7. | Husen Side | M | 040 | 70 | Muslim | 65 | Illiterate | 40 | Married | "Shotelaly" Rh factor |
| 8. | Mohamed Husen | M | 020 | 50 | Muslim | 50 | Illiterate | < 40 | Married | Dichasia |
| 9. | Muhe Husen | M | 015 | 45 | Muslim | 23 | Primary | 20 | Married | Body swelling for livestock |
| 10. | Said Yasufe | M | 038 | 75 | Muslim | 75 | Illiterate | 50 | Married | Rh factor for Livestock |
| 11. | Saide Yemer | M | 037 | 30 | Muslim | 30 | Maserat temert | 20 | Married | body swelling and  eye disease for livestock |
| 12. | Yasufe Husene | M | 08 | 50 | Muslim | 45 | Primer y | 20 | Married | All |
| 13. | Zyba Ahmed | F | 019 | 34 | Muslim | 34 | Illiterate | 15 | Married | "Lifi" |

# APPENDIX VII

List of human and livestock ailments which are treated by medicinal plants in the study area with in its local and English name.

| No. | Local Name | English Name |
|-----|-----------|--------------|
| 1. | Kuncher | - |
| 2. | Lifi | - |
| 3. | Dame manes | Anemia |
| 4. | Werja yemiklakle | Anti –abortion |
| 5. | Wosfat | Ascariasis |
| 6. | Aba gurba | Black lag |
| 7. | Yehode menifat | Blotting |
| 8. | kuribe | Body swelling |
| 9. | Bugenje | Boils |
| 10. | Fite lamasedate | clearing face |
| 11. | Berde | Cold |
| 12. | Gunfane | Common Cold |
| 13. | Derkate | Constipation |
| 14. | Sale | Cough |
| 15. | Forefor | Dandruff |
| 16. | Megagh/yesitan beshita | Devil sickness |
| 17. | Sekore beshita | Diabetes |
| 18. | Tekimate | Diarrhea |
| 19. | Shetemate | Diuretic |
| 20. | Yejero besheta | Ear problem |
| 21. | La hulume beshita | Every disease |
| 22. | Buda | Evil eye |
| 23. | Lewech teggna | External parasite |
| 24. | Aynebesheta | Eye problem |
| 25. | Miche | Fibril illness |

| 26. | Esat yakatelwe | Fire burn |
| --- | --- | --- |
| 27. | Cheguara | Gastritis |
| 28. | Chebte | Gonorrhea |
| 29. | Yerase mitate | Headache |
| 30. | Yelb beshta | Heart problem |
| 31. | Yewofe beshita | Hepatitis |
| 32. | Yedemgefite | Hyper tension |
| 33. | Kulalite | Kidney |
| 34. | Alekit | Leeches |
| 35. | Berara | Liver fluke |
| 36. | Weba | Malaria |
| 37. | Kufegh | Measles |
| 38. | Neser | Nasal bleeding |
| 39. | Yengdelj sizegey | Retained placenta |
| 40. | Kurtmat | Rheumatism |
| 41. | Chert | Ringworm |
| 42. | Manqteqte | Shivering |
| 43. | Yekoda beshita | Skin disease |
| 44. | Hode kurtet | Stomachache |
| 45. | Dame lamakome | Stop bleeding |
| 46. | Dingetegna | Sudden sickness |
| 47. | Kosso | Tapeworm |
| 48. | Tonsil | Tonsillitis |
| 49. | Yetres kurtemate | Toothache |
| 50. | Mastawoke | Vomiting |
| 51. | Kintarote | Wart |
| 52. | Kusel | Wound |

# APPENDIX VIII

Human and livestock aliments recorded in the study area

| List of disease | Family | Species | Percent |
|---|---|---|---|
| Fibril illness | 14 | 21 | 11 |
| Stomach pain | 18 | 21 | 11 |
| Common cold | 13 | 14 | 7.3 |
| Devil sickness | 3 | 11 | 6 |
| Cough | 4 | 9 | 5 |
| Blotting | 4 | 7 | 3.8 |
| Diarrhea | 4 | 7 | 3.8 |
| Leech | 3 | 6 | 3.2 |
| Measles | 3 | 6 | 3.2 |
| Wound | 3 | 5 | 2.6 |
| Ring worm | 4 | 5 | 2.6 |
| Blackleg | 5 | 5 | 2.6 |
| Wart | 3 | 5 | 2.6 |
| Ascarise | 3 | 4 | 2.1 |
| Diuretic | 2 | 4 | 2.1 |
| Hepatitis | 3 | 4 | 2.1 |
| Malaria | 3 | 4 | 2.1 |
| Cold | 1 | 3 | 1.5 |
| Eye | 3 | 3 | 1.5 |
| Fire burn | 3 | 3 | 1.5 |
| Stop bleeding | 3 | 3 | 1.5 |
| Diabetes | 2 | 2 | 1 |
| Dandruff | 2 | 2 | 1 |
| Evil eye | 3 | 2 | 1 |
| Gastric | 2 | 2 | 1 |
| Heart case | 2 | 2 | 1 |
| Nasal bleed | 3 | 2 | 1 |
| Skin disease |  | 2 | 1 |
| Tonsillitis | 1 | 2 | 1 |
| Rh factor | 1 | 1 | 0.5 |

| | | | |
|---|---|---|---|
| "Barele" | 1 | 1 | 0.5 |
| Body swelling | 1 | 1 | 0.5 |
| Boils | 1 | 1 | 0.5 |
| Constipation | 1 | 1 | 0.5 |
| Ear disease | 1 | 1 | 0.5 |
| Every disease | 1 | 1 | 0.5 |
| External parasite | 1 | 1 | 0.5 |
| For clear face | 1 | 1 | 0.5 |
| Gonorrhea | 1 | 1 | 0.5 |
| Headache | 1 | 1 | 0.5 |
| Kidney | 1 | 1 | 0.5 |
| "Kuncher" | 1 | 1 | 0.5 |
| "Kurtemat" | 1 | 1 | 0.5 |
| "Lifi" | 1 | 1 | 0.5 |
| Liver fluke | 1 | 1 | 0.5 |
| Pressure | 1 | 1 | 0.5 |
| Retained placenta | 1 | 1 | 0.5 |
| Shivering | 1 | 1 | 0.5 |
| Sudden disease | 1 | 1 | 0.5 |
| Toothache | 1 | 1 | 0.5 |
| Vomiting | 1 | 1 | 0.5 |
| Total | 141 | 191 | 100% |