



Jimma University

College of Natural Sciences

Department of Biology

Study of Ethnobotany of medicinal plants in Kachabira District, Kambata Tambaro  
Zone, Southern Ethiopia

By: Adanech Ashebo

Major Advisor: Tamene Belude (Asst. Professor)

Co-Advisor: Belachew Beyene (Msc)

A Thesis Submitted to Department of Biology, College of Natural Sciences, Jimma  
University, School of Graduate Studies, in Partial Fulfillment of the Requirement  
for the Degree of Masters of Science in Biology

January, 2021

Jimma, Ethiopia

Jimma University  
College of Natural Sciences  
Department of Biology

Study of Ethnobotany of medicinal plants in Kachabira District, Kambata Tambaro  
Zone, Southern Ethiopia

By: Adanech Ashebo

Main-Advisor: Tamene Belude (Asst. Professor)

Co-Advisor: Belachew Beyene (Msc)

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

January, 2021

Jimma, Ethiopia

## STATEMENT OF THE AUTHOR

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 Adanech ashebo entitled: Study of Medicinal Plants Used by People of Kachabira District to Treat Human and Livestock Aliments in Kambaata Tembaro Zone, Southern 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.

**TO BE SIGNED BY THE EXAMINING COMMITTEE:**

_____	_____	_____
Chairman	Signature	Dat

<b>Mr. Tamene Belude</b>	_____	_____
--------------------------	-------	-------

<b>Advisor</b>	<b>Signature</b>	<b>Date</b>
----------------	------------------	-------------

	_____	_____
<b>Co- Advisor</b>	Signature	Date

**Belachew Beyene**

.....	_____	_____
-------	-------	-------

**Internal Examiner Signature Date**

.....	_____	_____
-------	-------	-------

**External Examiner Signature Date**

## **List of Acronyms and Abbreviations**

GPS	Global Positioning System
ICF	Informant Consensus Factor
IK	Indigenous Knowledge
TM	Traditional Medicine

## **Acknowledgments**

First of all, I would like to thank the almighty God for helping me in all my life. I am also very grateful to my supervisors Temene Balude (Assistant Professor) and Co-advisor Belachew Beyene for their unreserved guidance and useful comments during the thesis work starting from proposal development. Their critical review of the thesis is highly appreciated.

I also acknowledge Kachabira District Education Office and Agriculture Development Office for the support letter to visit the rural kebeles and get cooperation from people and for providing me necessary information about the District and the study sites respectively.

Next, my deep appreciation and thanks also goes to Jimma University Biology Department, all my teachers for their support in identification of specimen and for their useful advice and also other staff for their friendly treatment and cooperation in various steps of this research work. I would also like to acknowledge Kachabira District and the Ministry of Education for giving me the opportunity and financial support during the years of my study.

Above all, I would like to extend my thanks to my family members particularly my husband Feleke Defasie for his moral and financial support during my study.

# Table of Contents

## Contents

Statement of the author .....	ii
List of Acronoymys and Abbreviations .....	iii
Acknowledgments.....	iv
List of Figures .....	viii
List of Tables .....	ix
List of Appendices .....	x
<i>Abstract</i> .....	xi
1 INTRODUCTION .....	1
1.1 Background of the study .....	1
1.2 Statement of the Problem .....	2
1.3 Research Questions .....	3
1.4 Objectives of the Study .....	3
1.4.1 General Objective .....	3
1.4.2 Specific Objectives .....	4
1.5 Significance of the Study.....	4
1.6 Scope of the Study .....	4
1.7. Limitation of the study.....	4
2. Literature Review.....	5
2.1 History of the use of medicinal herbs .....	5
2.2. Medicinal Plants in Ethiopia.....	5
2.3. Status of Medicinal Plants in Ethiopia .....	5
2.4 Medicinal plants for treatment of human ailments in Ethiopia .....	6
2.5 Medicinal plants for treatment of Livestock ailments in Ethiopia.....	6
2.6 Sources of Medicinal Plants .....	7
2.7 Other uses of Medicinal plants.....	8
2.8 Medicinal plant parts used, method of preparation, route of administration.....	8
2.8.1 Medicinal plant parts used for preparation of traditional remedies.....	8
2.8.2 Route of administration, dosage and methods of preparation .....	9

2.9 Threats to medicinal plant species .....	10
3 Conservation of Medical Plants .....	11
3. Materials and Methodologys.....	13
3. 1 Description of the Study Area.....	13
3.1.2 Climate of the Study Area .....	14
3.1.3 Vegetation.....	14
3.1.4 Soil types of Study Area .....	15
3.1.5 Population and Economic Activity of Study Area .....	15
3.2 Design.....	15
3.3 Site Selection.....	15
3.4 Sample size determination and Informant Selection .....	16
3.6 Methods of Data Collection .....	16
3.6.1 Semi Structured Interview .....	16
3.6.2 Observation.....	17
3.6.3 Group Discussion .....	17
3.6.4 Specimen Collection and Identification .....	17
3.6.5 Guided Field Walk .....	17
3.8.1 Preference ranking.....	17
3.8.2 Direct Matrix Ranking .....	18
3.8.3 Paired Comparison.....	18
3.8.4 Informant Consensus factor.....	18
4. Results.....	19
4.1 Medicinal plants in the study area.....	19
4.1.3 Growth form of plants used for preparation of traditional medicine .....	19
4.3 Mode of administration, application and dosage of plant medicines .....	20
4.3.1 Mode of administration .....	20
4.4. Ailments treated with medicinal plants.....	21
4.5 Ranking of medicinal plants .....	21
4.5. 1. Preference ranking.....	21
4.5.2 Direct matrix ranking .....	22
4.5.3 Paired comparison .....	23
CM=Croton macrostachyus, RP=Rhamnus prinodes, PA=Pycnostachys abissinica.....	23

4.5.4 Informant consensus on medicinal use of plants .....	24
4.7Threat to medicinal plant and conservation mechanisms.....	25
5. Discussion.....	27
6. conclusion and Recommendation .....	31
6.1 Conclusion.....	31
6.2. Recommendations .....	32
Reference .....	34
Appendix I .....	43
Appendix II General traits of the collected medicinal plants.....	45
Appendix III .....	51
Appendix IV .....	55
Appendix V Preparation method of medicinal plants.....	58
Appendix vi.....	62
Appendix VII Specimen collection and identification .....	63



## **List of Figures**

Figure 1: Map of study area -----	14
Figure 3: Plant parts used for preparation of medicines -----	22
Figure 4 Method of preparation-----	23
Figure 5: Threats of medicinal plants -----	29

## **List of Tables**

Table 1: Distribution of medicinal plant family in Kachabira district-----	20
Table 2: Preference ranking of medicinal plants-----	25
Table 3 direct matrix ranking medicinal plants-----	25
Table 4: Paired comparisons of medicinal plants-----	26
Table 5 :List of most common medicinal plants with high informant's consensus-----	27

## List of Appendices

Appendix I: Semi structural interview questions-----	46
AppendixII:Includes list of medicinal plants used for treating both human and livestock -----	48
Appendix III :List of medicinal plants for treating human, livestock and both human and livestock ailments in the study area, Kachabira District-----	54
Appendix IV:Other uses of medicinal plants in study area-----	58
Appendix V:Application of medicinal plants-----	61
Appendix VI :List of key informants-----	65
Appendix VII: Specimen Collection and Identification-----	66

## ***Abstract***

*Medicinal plants make important contributions in the healthcare system of indigenous people as the main source of medicine for the majority of the rural populations. Indigenous people in Ethiopia possess unique knowledge of plants on which they depend for food, medicine and general utility. This close interaction and dependency of humans on plants is studied under the field of ethnobotany. Totally, 355 informants participated in this study, from them 333 were household informants and 22 were traditional healers. Data was collected through administering 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 97 plant species were found which categories in to 81 genera and 45 families to treat 61 different human and livestock ailments. From these 55 (56.7%) plants species were used only for human treatment, where as 11 (11.3%) plant species were used for only livestock treatment and the remaining 31 (32%) plants were used for treating both human and livestock ailments. Stomach ache and ringworm were the major human ailments in the study area while, anthrax was major livestock ailment. The Lamiaceae family, containing 10 species (10.3%), was the dominant family over other families. In this regard, cordia africana was first based on preference and ranked first in its multi-usage. The highest informant consensus value was obtained for Croton macrostachyus (0.98). Most medicinal plants were herbs (48.5%) and the dominant habitat where medicinal plants collected were home garden (40.2%) followed by wild (39.2%). The best-harvested plant part was leaf (40.2%) and the preferred route of application was oral (82.5%). The common method of medicinal plant preparation was pounding (50.5%). 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 Kachabira district. Therefore, the local people should be trained, encouraged and supported on how to conserve and manage medicinal plants.*

***Keywords/Phrases: Ailment, Informant, Ethnobotany, Indigenous-Knowledge, Medicinal-Plants***

# **1 Introduction**

## **1.1 Background of the study**

A study showed that nearly 80% of the Ethiopian population is still dependent on traditional medicine, which largely involves the use of plants. The use of medical plant as 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 and Endalkachew, 2017). This indicates that importance of traditional medicine (TM) and its contribution to health care among humans worldwide cannot be under estimated. These medical systems are mainly dependent on various plant species and plant based products (Tilahun Tolossa and Moa Megerssa2018).The world health organization (WHO ,2001) defined traditional medicine as the total combination of knowledge and practices that can be formally explained or used in prevention and elimination of physical, mental or social imbalance and relying exclusively on practical experience and observation handed down from generation to generation, whether verbally or in writing. According to Mekonen Woldetsadk (2019) about 75-90 % of the rural population in the world depends on traditional medicines as their only health care system. This helps people to use traditional medicine easily. Traditional medicine is also, defined as indigenous medicine that is used to maintain health and to prevent, diagnose, and treat physical and mental illnesses differently from allopathic medicine based on theories, beliefs, and experiences (Tilahun Tolossa and Moa Megarssa, 2018). Africa is a continent highly endowed with an abundance of medicinal plants, which indigenous people are familiar with and have use of it over time (Getachew Alebih and Abas Mohamed, 2016). Further, more than half of the population of Africa uses traditional medicinal plants for the treatment of various diseases of both human and domestic animals, which are a great concern to most of the sub-Saharan African nations (Getachew Alebih and Abas Mohamed, 2016). About 80% of the populationof many African countries including Ethiopia uses traditional medicinal plants for different ailments of human and 90% population uses traditional medicinal plants for livestock disease (Getachew Alebih and Abas Mohamed, 2016). Throughout the past decades, the community shows interest on medicinal plant or herbal medicine, has increased dramatically not only in developing countries but mainly in industrialized countries (Arebu Issa, 2015). The use of medical plant as a source of primary

health care has increased owing to their attributes of wide biological and medicinal benefits (Negesse Mokonnen and Endalkachew Abebe, 2017).

Study of Jin *et al.* (1999) showed that documentation of indigenous knowledge using ethnobotanical studies is useful for the conservation of medicinal plants as well as sustainable utilization of resources. Due to these facts the need of conservation of the biological diversity and its indigenous knowledge has been emphasized in contemporary studies of ethnobotany). However, this conservation cannot be successful without indigenous people and application of their ethnobotanical knowledge. In general, rural communities and indigenous people particularly depend on plant resources especially for food, forage, constructions, household supplements, beds and sleeping mattresses, firewood or as shade providing plants. Moreover, indigenous people all over the world are still using medicinal plants for treatment of various diseases and the practice of traditional medicine indicates to be continued in spite of advancement in allopathic system of medicine (Akram *et al.*, 2011; Ovesnáet *al.*, 2013).

## **1.2 Statement of the Problem**

Southwest of Ethiopia is rich in medicinal plants due to the high biological and cultural diversity in the region (Anteneh Belaynahet *al.*, 2012). Most of medicinal plants are herbs, followed by shrubs and trees Majority of the medicinal plant species are found in wild forests. More than 40% of medicinal plant species have additional use value in Ethiopia, and these require further investigations (Banchiamlak Nigussie, 2019). In southern part of Ethiopia there are great number of Ethnobotanical studies that are documented, some of these are: the Amaro district (Getu Alemayehu.2017), the Benna Tsemay District (Assegid Asefa, and Tesfaye Awas.,2014), Burji district (Mersha Ashagreet *al.*,2016) Cheha District (Behailu Bzuayehu, and Temesgen Asefa.,2017), Kambatta ethnic group (Melese Maryoet *al.*, 2015), Konso ethnicity (Getachew Alebeh,*et al.*, 2013) the Konta special District ( Sebsebe Damis, *et al.*,2009) the Lemo district (Mulugeta Kidane and Erchafo Mohamed., 2017), Maale and Ari (Berhane Kidaneet, *al.*, 2014), the Wolaita zone (Takele Bassa, 2018), the Wonago District (FisihaMesfinet *al.*,2009) in south Nation and Nationalities many ethnobotanical studies done in the past decade. However, there is a gap of ethnobotanical documentation on medicinal plants and relatively few phytochemical analyses of documented medicinal plants in the Kachabira District Kambata Tembaro Zone of southern Ethiopia. Therefore, it is necessary to document medicinal plant species for

conservation and sustainable consumption. In addition, ethnobotanical studies on traditional medicinal plants are also the means to increase the capacity of the pharmaceutical industries. However, the documented medicinal plants are still limited when they are compared with the multi-cultural diversity of the people and the diverse flora in Ethiopia (Getnet Chakole, 2011). Kachabira District has diverse environment, in which traditional medicinal plant species and their uses are expected to be more. However, there is little scientific documentation on the medicinal plant resources has so far been made in Kachabira District. If any cultural changes take place in this community and the vegetation is degraded due to various factors, the knowledge of the people on the plant resource will vanish slowly. Moreover, some of the medicinal plant species may become extinct from the District before being documented and the people may lose their uses and their indigenous knowledge on them forever. Therefore, the ethnomedicinal studies on the plants of Kachabira were crucial in order to protect the plants under ex-situ and in-situ conservation and to preserve the associated indigenous knowledge in the District and beyond. Therefore, the general research purpose of this study were to collect, identify, and document medicinal plants and to collect the associated indigenous knowledge of the Kachabira District people with regard to how they treat various human and livestock ailments.

### **1.3 Research Questions**

This study was designed to answer the following research questions

1. Which medicinal plants are used to treat humans, livestock ailments or both
2. Which parts of the medicinal plants are useful to treat ailments?
3. What are the conservation statuses of medicinal plant in study area?

### **1.4 Objectives of the Study**

#### **1.4.1 General Objective**

The general objective of this study was

Assess Medicinal Plants; their uses and the associated indigenous knowledge of the local people in treating human and livestock ailments in Kachabira District

### **4.1.2 Specific Objectives.**

The specific objectives of this study were to:

Identify plant species traditionally used to treat ailments of human and livestock in the study area

Investigate traditional knowledge related to use of medicinal plants in the study area

Identify plant parts used for medicinal purposes.

Describe the preparation and administration routes of medicinal plants both for human and livestock ailments.

Assess the existing threats of medicinal plants in the study site.

### **1.5 Significance of the Study**

Identifying and documenting the indigenous knowledge of medicinal plants which have potential to cure human and livestock diseases are important to conserve them for the future generation. Because most of the indigenous knowledge is transferred orally and it may be lost when knowledgeable person is passed away without documenting his or her knowledge. Again, this study is helpful to know the dose of those medicinal plants used to treat particular human and livestock disease. This was useful to minimize the side effect which comes from taking overdose and it maximizes the effectiveness of the medicinal plants by using exact dose. Besides, this study was creating encouragement for other investigator in the area and it gave base line information for further study.

### **1.6 Scope of the Study**

Due to time and budget restraints, the study was bounded to Ethno-botanical study of medicinal plant used to treat human and animal ailments in five kebeles of Kachabira district Kambata Tembaro Zon, Southern Ethiopia.

### **1.7. Limitation of the study**

- Shortages of finance
- Shortage of time
- Lack of internet access to gather information to literature review.



## **2. Literature Review**

### **2.1 History of the use of medicinal herbs**

Determining the exact time of using plants as drug is very difficult. Evidence indicates that plants have been cultivated as drugs approximately 60 000 years ago. Scripts about medicinal plants date back to almost 5000 years ago in India, China and Egypt, and at least 2500 years in Greece and Central Asia (Fatemehet *al*, 2018). Given the fact that at that time there was insufficient information about the causes of the disease, useful plants for treating them, and the ways of using them for such purpose, everything was empirical. Over time, the reasons for the use of certain medicinal plants for treatment of certain diseases were discovered; consequently, the use of medicinal plants gradually rejected the empirical framework and was limited to the facts. The earliest written evidence of the use of medicinal plants for preparation of drugs has been found on a Sumerian clay slab from Nagpur dating back to nearly 5000 years ago (Fatemehet *al*,2018). Ancient Greek people were also familiar with the medicinal properties of some medicinal plants, and Hippocrates, the founder of Greek medicine and Aristotle, pupil of Hippocrates, used medicinal plants for the treatment of diseases. After that, Theophrastus, a Greek scientist, founded the School of Medicinal Plants. Then, Pedanius Dioscorides (He lived in the first century A.D), a physician and surgeon in the years 75-45 BC, wrote an encyclopedia, called *De MateriaMedica*, to describe 600 therapeutic medicinal plants in the form of a series of scientific studies on medicinal plants (Rios and Recio,2005).

### **2.2. Medicinal Plants in Ethiopia**

Ethnobotany is a broad term referring to the study of direct interrelations between humans and plants. The world health organization (WHO,2001) defined traditional medicine as the total combination of knowledge and practices that can be formally explained or used in prevention and elimination of physical, mental or social imbalance and relying exclusively on practical experience and observation handed down from generation to generation, whether verbally or in writing

### **2.3. Status of Medicinal Plants in Ethiopia**

About eighty percent of Ethiopia depends on medicinal plants for primary health care. Although the contribution of medicinal plant species to modern health system and the poor society who

live mainly in the rural area is very high, lack of detailed descriptions of the medicinal plants has made it difficult for the researchers to decide the identity of these plants universally with the only reference being the local names of the plants and there is very little attention in modern research and development and the effort made to upgrade is not satisfactory. One of the reasons is that the traditional medicinal plant species are not well described (MekonenWoldetsedk, 2019).

According to Sebsebe Damissew and Ermias Leulkalk *et al* (2008), when research is conducted on the medicinal plant species, it must target on the fact that the providers of the indigenous knowledge should get a fair share on the benefits of the development of medicines. According to TesfayeAwas (2007), detailed information on medicinal plants of Ethiopia could only be obtained when studies are under taken in various parts of the country where little or no botanical and ethnobotanical studies have been conducted.

#### **2.4 Medicinal plants for treatment of human ailments in Ethiopia**

Plant diversity remains crucial for human well-being and still provides a significant number of remedies required in healthcare. Medicinal plants have remained the most affordable and easily accessible source of treatment in the primary healthcare system of resource poor communities and the local therapy is the only means of medical treatment for such communities (Haile Yineger and Delenasaw Yewhalaw, 2007). For poor people, medicinal plants represent locally available, affordable and often the only effective resources for healthcare. Due to this they played a pivotal role in the treatment of various afflictions in Ethiopia (Fekadu Fullas, 2007).

#### **2.5 Medicinal plants for treatment of Livestock ailments in Ethiopia.**

Traditional medicinal practices, in various countries of the world, besides treatment of human beings have also played, and are still playing a major role in the treatment of livestock diseases. A notable feature of traditional or ethoveterinary practice is the use of medicinal plants for treatment of various ailments. This is particularly true for resource-poor farmers of developing countries and the nomadic people of the world (Mohammed, *et al.*, 2010).

In Ethiopia, like other developing countries, the available modern healthcare services are not sufficient, accessible and affordable to the majority (Haile Yineger *et al.*, 2008). As a result of this, animal diseases remain one of the principal causes of poor livestock performance, leading to an ever-increasing gap between the supply of, and the demand for, livestock products (Teshale

Sori *et al.*, 2004). In Ethiopia people have used traditional veterinary methods to treat livestock diseases for generations. Plants comprise the largest component of the diverse therapeutic elements of traditional livestock healthcare practices (Behailu Etan, 2010).

Similarly, Etana Tolosa (2010), explain that in Ethiopia people have used traditional veterinary medicine to treat livestock diseases for generations. Plants comprise the largest component of the diverse therapeutic elements of traditional livestock healthcare practices. Herbal medicine is the branch of traditional medical practices that is most amenable to scientific investigation. Plants are also invaluable subjects of international development. Knowledge of medicinal plants can empower livestock owners to solve animal health problems cost-effectively

Even if, pharmacotherapy is one of the most important means of controlling livestock diseases, it is possible only if livestock owners can afford to cover the cost of treatments. But most modern drugs are expensive and as a result of this, not affordable by the majority of Ethiopian farmers and pastoralists, most of them rely on their traditional knowledge practices and locally available plant materials in the control of diseases of their domestic animals (Mirutse Giday and Gobena Ameni, 2003).

## **2.6 Sources of Medicinal Plants**

According to Mekonin Woldetsadk (2019), medicinal plants species are grown in the natural ecosystem. Similarly, the work of Tesfaye Awas and Sebsebe Damissew (2009) indicated that most of the medicinal plants in Ethiopia are collected from the wild, some are cultivated and some others are grown in home gardens either purposely for medicinal use or non-medicinal purpose. According to Zemedesfaw (1997), plant species cultivated in Ethiopian home gardens for the purpose of medicine is about 6%. Large numbers of medicinal plant species that are used by the herbalists are collected from the natural vegetation. Local forests are sources of plant processes into therapies used in traditional medical system. The natural ecosystems of the forests, grass lands, wood lands, wet lands, field margins, contain a significant number of medicinal plants species. These are places where traditional healers and other members of the community collect medicinal plant species and use it (Mekonin Woldetsadk, 2019)

## **2.7 Other uses of Medicinal plants.**

The various climatic and topographic conditions of the country contributed to a rich biological diversity. Ethiopia is believed to be home for about 6,500 species of higher plants with approximately 12% endemism (Mekonen Woldetsadk, 2019). Like all other parts of the world, plants are used as a source of medicine in Ethiopia. In Africa traditional medicine plays a central role in health care needs of rural people and urban poor. Here, it is said that, this situation would remain so long as modern medicine continues to be unable to meet the health care of the people of the continent effectively.

Indigenous traditional medicinal practices were carried out essentially based on private practice, i.e. private agreement between consenting parties, and the knowledge of traditional practice in most cases has descended through oral folk lore ((Mekonen Woldetsadk, 2019). As it has already reported, medicinal plants are used for different purposes namely, as food, charcoal, fire wood, construction, fodder, forage, ornamental, spices, etc. many medicinal plants are used as a food. For instance, plants like *Allium sativum* (Alliaceae), *Capsicum annum* (Solanaceae), *Carissa spinarum* (Apocynaceae), *Citrus limon* (Rutaceae), *Coffea arabica* (Rubiaceae), *Cordiaafricana* (Boraginaceae), *Dovyalis abyssinica* (Flacourtiaceae), *Embelia schimperi* (Myrsinaceae), *Enseteventricosum* (Musaceae), *Ficus sur* (Moraceae), *linumusitatissimum* (linaceae), *Trigonella foenumgraecum* (Fabaceae), *Urtica simensis* (Urticaceae), *Ximenia americana* (Olacaceae) (Tigist Wondimuet *al.*, 2006). The pharmacologically active constituents in plants used as food would likely have a great impact on medicinal plant species than those in plants used as medicine which are taken only in small amounts (Mekonen Woldetsedek, 2019). Other medicinal plants like *Eucalyptus globulus*, *Prunus africana*, *Hagenia abyssinica*, *Acacia abyssinica*, *Allophyllus abyssinicus*, *Cordia africana*, *Juniperus procera*, *Millettia ferruginea*, *Olea europaeasubspCuspidata* and *Vernonia amygdalina* are used for a fire wood, constructing and charcoal

## **2.8 Medicinal plant parts used, method of preparation, route of administration**

### **2.8.1 Medicinal plant parts used for preparation of traditional remedies**

The plant parts used for medication preparation by the traditional healers are variables. As also referred from many authors, the traditional healers have harvested leaves, roots, barks, seeds, fruits, stems, flowers, barks, seeds, or latex of medicinal plants to prepare their traditional

medicines for their patient treatments. Most remedies were prepared from the leaf and root parts of the medicinal plants to treat the diseases compared to the other parts of them. According to Abraha Teklayet *et al.*, (2013) interview results, leaf was the most commonly used plant part. Medicinal principles are present in different parts of the plant like root, stem, bark, leaf, flower, fruit or plant exudates. The highest proportions of the MPs were harvested for their leaves to prepare the remedies. The preference of leaves to other plant parts seems may not cause a plant death. Likewise, the ease of preparation and the presence of more bioactive ingredients in the leaf probably made it worthy. The use of more than one MP species is well known in Ethiopian traditional medical practice (Melesse Maryo *et al.*, 2015)

### **2.8.2 Route of administration, dosage and methods of preparation**

Dosage was influenced, among others, by the type of ailment, seriousness of the illness and age of the patient. Doses of liquid remedies administered to humans were usually measured using tea or coffee glasses or plastic cups, or by number of drops. In many cases, amounts of plant part/parts to be processed and doses to be used were roughly estimated and therefore, lacked precision (Mirutse Giday *et al.*, 2009). According to Mirutse Giday and Tilahun Teklehaymanot (2009) Oral was the most frequently used route of remedy administration. The dominance of oral application of remedies could be related to the fact that most of the reported health problems are affecting internal organs (Mirutse Giday and Tilahun Teklehaymanot 2013). Most treatments were reported to be completed within one or two days; most of them taken once a day. Liquid remedies administered to humans were usually measured by tea or coffee glasses or plastic cups, or number of drops. When patients did not show any sign of recovery from their illnesses after treatment completion, they turned to a nearby modern health centers (Mirutse Giday *et al.*, 2009). Grinding, Crushing, Chewing, Squeezing, Cooking, squeezing, Roasting, mixing and Drinking were the different ways of preparation of medicinal plants. The dependency of local people on fresh materials including the removal of fresh barks and leaves put the plants under serious threat than the dried form, as fresh materials are harvested directly and used soon with its extra deterioration with no chance of preservation i.e., not stored for later use. However, during this survey local healers argue that fresh materials are effective in treatment as the contents are not lost before use compared to the dried forms. The livelihood of most traditional healers relied on fresh materials that had aggravated the decline of rare medicinal plants from the study area (Balcha Abera, 2014).

## **2.9 Threats to medicinal plant species**

As medicinal plants are part of the total plant of the different ecosystems of the earth, they are affected by anthropogenic and natural forces. Apart from other species of plants, medicinal plant species can also be exploited for their medicinal value and leads to a serious threat to the biodiversity in the area, as a result, several plant species have been exploited to such an extent that they are seldom found in unprotected areas (MekonenWoldetsadk, 2019). People who have some traditional knowledge of healing in general and those professional healers in particular harvest medicinal plant mainly from the wild habitat (Tesfaye Awas and Sebsebe Damissie 2009).

According to Dawit Abebe (2001) and Kebu Belemie *et al.* (2004), vegetation types where traditional medicinal plant species are collected are declined from time to time. Similar to other countries of Africa, medical plant species of Ethiopia is vulnerable to problems of continuity and sustainability primary due to loss of taxa of medicinal plants and loss of habitats. The threatened factors can be elaborated as lose of cultural diversity including traditional knowledge due to, uncontrolled grazing, drought, agricultural expansion, fire wood, charcoal, urbanization and construction (Mirutse Gidya andGobona Ameni, 2003) It has also been reported that medicinal plant species are affected by unsustainable harvesting for export and extraction of pharmaceuticals (MekonenWoldetsadk 2019). Beside to these known factors which treat medicinal plant species, other condition like the types of the medicinal plant and the part used also affect the medicinal plant.

The traditional health care practice is mainly dependent on medicinal plants collected from the wild. In spite of this, the medicinal plant biodiversity is being depleted due to manmade and natural calamities. Moreover, the indigenous knowledge associated with the conservation and use of medicinal plants is also disappearing at an alarming rate. The widespread use of traditional medicine among both urban and rural population in Ethiopia could be attributed to cultural acceptability, efficacy against certain types of diseases, physical accessibility, and economic affordability as compared to modern medicine. In view of this, development and its ultimate integration of traditional medicine with the modern system is believed to have significant impact in the expansion of the health care coverage. There is a traditional distinction between attitudes to the knowledge, on the parts of academia and industry (Reta Regassa, 2013). Many medicinal

plants are also harvested for non-medicinal values such as for timber implements, fuel wood and other purposes and hence they are subjected to multiple pressures like *Taverniera abyssinica* and *Prunus africana* are facing at present. Conservation measures should target habitats of such vulnerable species (Bekele Emiru, 2007).

Similarly, Bekele (2007) described threats to traditional medicinal plants like, Ecological degradation, loss of indigenous knowledge, loss of cultural assets, danger on medicinal plant through smuggling and misuse of resources, lack of suitable scheme for equitable sharing of benefits arising from biological resources, poor market situation may prevent enthusiastic cultivators from producing medicinal plants for the market and traditional healers may not participate and fully collaborate.

The future existence of medicinal plants resource and the associated knowledge is under question because of the ongoing practice of deforestation, agricultural encroachments, over exploitation or unwise use of plant resources and over grazing, and the frequent occurrence of drought (Adefe and Abraha, 2011), agricultural expansion, harvest for firewood and charcoal, home use and trade, Overgrazing important threat factors) in the study area (Agisho *et al.*, 2014), dependency of the local people on unpreserved fresh materials removal of fresh barks and leaves put the plants under serious threat than the dried form Balcha Abera, 201

### **3 Conservation of Medical Plants**

Conservation should be aimed at conserving maximum diversity within each species to ensure that its genetic potential will be available in the future Dawit Abebe (2001). Sustainable management of traditional medicinal plant resources is important not only because of their value as a potential source of new drugs built also due to reliance on traditional medicine for health. As it was reported by different researcher's plant species with medicinal value that are harvested from the wild, especially those which are highly used either for local use or trade are not found in a nearby places rather the professional traditional healers move along distance to harvest. In contrast to this problem of scarcity, the demand and recognition for traditional medicine is increased and this is a good opportunity to the medicinal plants to conserve (Zemedede Asfaw, 2001). The wise use of medicinal plants species needs the involvement of different sectors and greater public support and for this, awareness creation is recommended. As it was reported,

home gardens have a great contribution to conservation of biodiversity in general and at the same time medicinal plants species can also be conserved, thus home gardens are strategies and ideal farming systems for the conservation, production, and enhancement of medicinal plants (Zemedede Asfaw 2001). Some traditional medicinal plants are collected on selective days and seasons. An account that has been made by Cunningham (1993) indicated that plant species whether medicinal or non-medicinal plants grown in religious sites like churches, mosques and the like are forbidden to be cut. Moreover, the author reported, harvesting of medicinal plants using pointed wooden digging stick than using metal axes are some of the cultural methods of medicinal plant collection and this has contribution to the conservation strategy.

In the field, medicinal plants conservation goes side by side with conservation of ethnobotanical and ethnopharmacological information. The conservation of medicinal plants is achieved through in-situ and ex-situ conservation Methods. In-situ is a type of conservation where species are conserved in their natural habitats which include the national park and reservoirs. This method is especially preferable for those species where domestication and management are difficult out of their natural and normal habitats and ecosystem (Zemedede Asfaw 2001). Ex-situ conservation is another method of conservation where endangered species are protected by removing part of them from a threatened habitat and place them in a new location which may be a wild area or within the care of humans which includes seed gene banks, field gene banks, arboreta, botanic gardens.

In situ and ex-situ should be complementarily implanted in Ethiopia to conserve valuable plant species which are threatened due to natural or manmade factors (Dawit Abebe, 2001).



### **3. Materials and Methodologys**

#### **3. 1 Description of the Study Area**

The study was conducted in Kachabira District, Kambata Tambaro Zone. Tembaro Zone, SNNPR, South west Ethiopia, geographically located between  $07^{\circ} 12'30.1''$  -  $07^{\circ} 17'08.3''$  N and  $37^{\circ} 47'48''$ –  $37^{\circ} 50'30.6''$ E (See fig.1). The District is bounded by Angacha District in the north, Kedida-gamela District in the east, Hadiya Zone in south east and southwest with Wolayita Zone in the southwest. The District lies between. The District capital town Shinshicho is found 327 km southwest of Addis Ababa and 117 km Hawassa (regional capital). The District has a total land area of 25,944 hectare and has diversified topographic features such as flat, gentle, sloping plains and undulating to rolling plains with substantial proportion of low to moderate relief hills. The altitude of the district varies from 1600-2600 meter above sea level. The study area is characterized by two Distinct agro-ecological zones, highlands (2300-2500m.a.s.l) and mid land (1600-2300.a.s.l) was considered, for they are important in terms of area coverage and population size.

Source:

From

KTZKachbira

distric

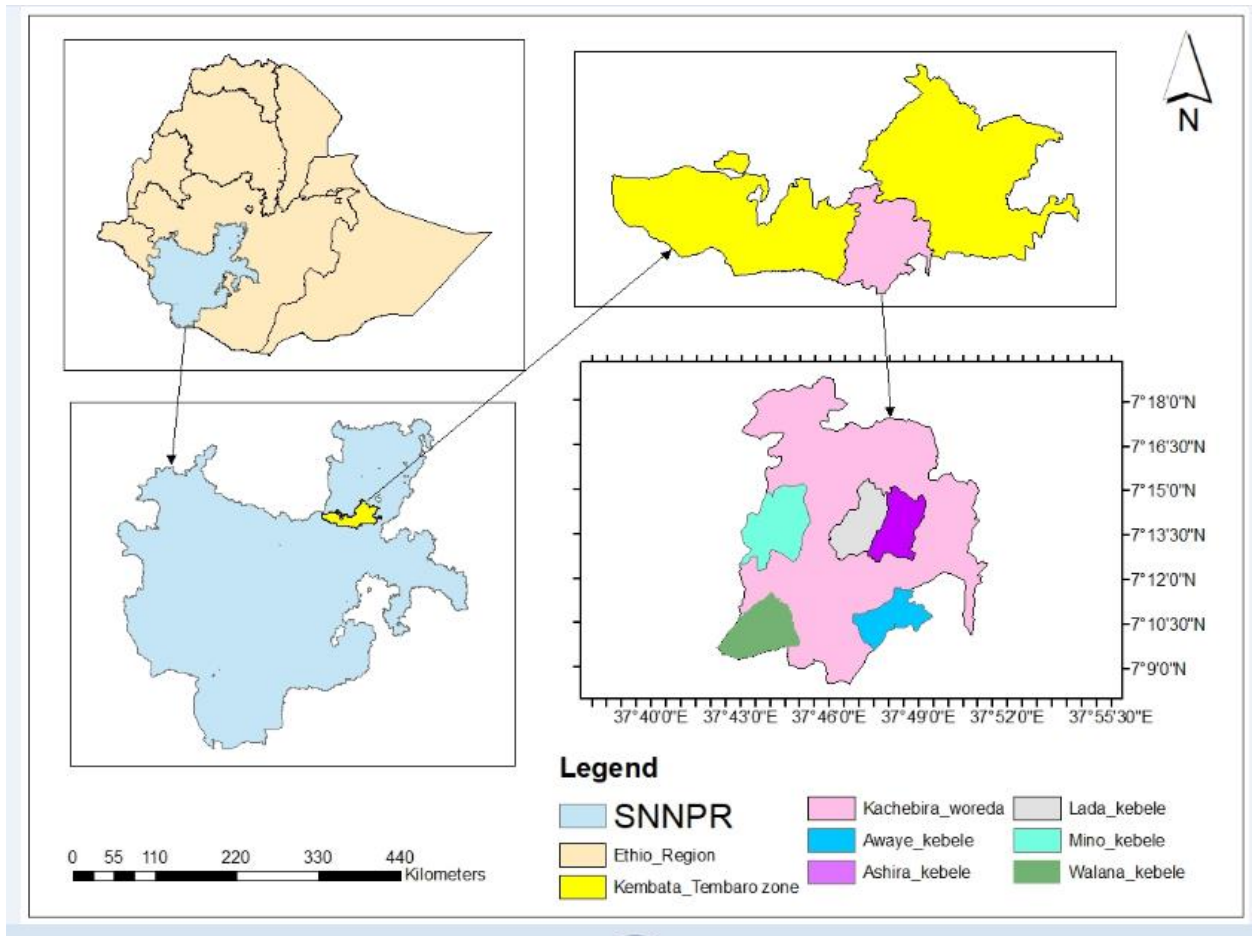


Figure 1 Map of study area

### 3.1.2 Climate of the Study Area

The District has three agroclimatic Zones: dry (7%), warm (22.25%) and cold (70.75%). The mean annual rainfall of Kachbira District is between 600mm-1200mm. The data from National Meteorology Agency, Kambata station durame branch shows that the mean annual temperature of Kachabira District ranges from 16°C to 28°C.

### 3.1.3 Vegetation

The vegetation of the study area is composed of *Olea europea* subsp. *cuspidata*, *Juniperus procera*, *Prunus africana*, *Celtis kraussiana*, *Euphorbia* spp. *Carissa spinarum*, *Rosa abyssinca*, etc (Sebsebe Damissewand Friis 2009); Getachew Tadesse *et a* 2017). also described that the presence of tree species such as *Juniperus procera*, *Olea europaea* subsp. *cuspidata*, *Acacia*

*abyssinica* etc. are good indications that a given vegetation type belongs to dry evergreen Afromontane ecosystem.

### **3.1.4 Soil types of Study Area**

The district has clay soil, sandy soil and lito soil types. From this lito soil is more dominant soil type. They are generally considered as fertile soils and stable soils with favorable physical properties. The deep porous and stable soil structure permits deep rooting and make the soil quite resistant to erosion. Thus, they are the most productive soils to produce the commonly grown food and plantation crops (FAO, 2001).

### **3.1.5 Population and Economic Activity of Study Area**

The major economic activity of the study area is agriculture, particularly mixed farming system including animal rearing. The dominant cereal crops include maize (*Zea mays* L.), teff (*Eragrostis tef* L.), sorghum (*Sorghum bicolor* L.), barley (*Hordeum vulgare* L.), and with a rarely pulse crops like beans (*Phaseolus vulgaris* L.), peas (*Pisum sativum* L.).

The total population of Kachabira District has 153,676 (85,135 male and 78,543 female), from this the majority of the population lives in the rural area and depends on agriculture. The major ethnic group is Kambaata, rarely Hadya, and major spoken language is Kambaategna and rarely Wolaitegna. In relation to religion, protestants are most common (Agago Sadoroet *al.*, 2015).

## **3.2 Design**

In this study to reach the stated research objectives both qualitative and quantitative research approaches (Mixed-method approach) was used.

## **3.3 Site Selection**

Kachabira district has twenty-one kebeles from these five rural kebeles. This was due to the assumption that the peoples in rural kebeles (smallest administration) know, cultivate and use medicinal plants and they are more familiar and dependent on traditional medicine than the people who live in the urban kebeles. In addition, the entire study sites were selected by purposive sampling method by considering the availability of more vegetation particularly medicinal plants and the presence of traditional healers with deep indigenous knowledge in the

sites during reconnaissance survey and simple random sampling method was used to select household heads.

### **3.4 Sample size determination and Informant Selection**

Sample size was determined using Yamane (1967). It is a simplified formula for calculation of sample size. According to him, for a 95% confidence level, sample size of the sample is calculated by using the formula below:

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

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

Total household in the study kebele is 3125 so N=3125, e = 0.05 since the confidence level is 95%

$$n = \frac{3125}{1 + 3125(0.05 \times 0.05)} = 355$$

The total participants were 355 households. From these, 22 key informants (traditional healers) were purposely selected based on their knowledge and practices on medicinal plants and the rest 66 informants from each kebeles were randomly selected.

### **3.6 Methods of Data Collection**

Ethnobotanical data was gathered from primary data sources. The primary data sources were collected mainly from direct field study in the area using semi-structured questionnaires, observation and group discussion and other original materials.

#### **3.6.1 Semi Structured Interview**

The semi structured interview 66 informants were interviewed and the questions set in English (appendix I) and it was translated into Amharic language. It has three parts including personal information that includes the name, 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's interview guide questions were set by selecting question from which previously prepared (appendix I).

### **3.6.2 Observation**

Observation is a means to enable and 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 activity in each study sites.

### **3.6.3 Group Discussion**

Group discussion was made before data collection and during the data collection. The prior group discussion was made to notify all informants in each study site about the objective of the study as it is for educational purpose. In addition, during ethno botanical data collection group discussion was held by six participants in each study kebele had three groups. The participants were only elders. As well as, the place and time were arranged based on interest of the participants in both group discussions.

### **3.6.4 Specimen Collection and Identification**

Home gardens as well as wild habitat plant specimens were collected, numbered, pressed, and dried for identification based on ethnobotanical information provided by informant's from Kacha Bira 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.

### **3.6.5 Guided Field Walk**

Field observation was supported by local guide and participating informants to obtain the necessary data in the study area. By applying both etic and emic perspective of categorization, all the necessary information was recorded about medicinal plants, plant communities and landscape. Mainly as the observation continues, the etic perspectives on vegetation type, plant habit, parts of plants used for medicinal purpose was identified by the researcher.

### **3.8.1 Preference ranking**

Preference ranking data were collected during the field study and later computed following Martin (1995). Six key informants have been selected to assess the degree of effectiveness or priority of six medicinal plants against stomachache. The medicinal plant believed to be most effective to treat the abdominal ache received the highest value (5), and the one with the least

effective received the lowest value (1). The value of each species was summed up and the rank for each species was determined based on the total score. This helped to indicate the most effective medicinal plants used by the community to treat the disease.

### **3.8.2 Direct Matrix Ranking**

Direct matrix ranking was performed following Martin (1995) in order to compare multipurpose use of medicinal plants. Multipurpose plant species commonly reported by informants was selected out of the total collected medicinal plants and use diversity of this plant was listed for key informants to order them by considering several attributes at a time. Then, each chosen key informants were asked to assign to attribute of each species (5=most valuable, 4=very good, 3=good, 2=less used, 1=least valuable, and 0=not used). The values of each species were summed up and ranked for each informant, and then for the total informants.

### **3.8.3 Paired Comparison**

In paired comparison, eight key informants were asked to choose according to personal perception of the best items from a pair of medicinal plants used to treat a certain disease. In this study six top medicinal plants used for a common ailment were identified and present in three pairs and paired comparison was made by random table and tossing a coin. A total score was obtained by summing from the number of each item chosen. The species with the highest frequency of choice had highest score.

### **3.8.4 Informant Consensus factor**

To verify the reliability of information given by participants during the interview they were asked more than one times. If they responded differently from the former one it was excluded from the data as faulty information, while informant responses related to former one was accepted as important information. Further, Informants Consensus Factor was calculated by below formula;  $ICF = \frac{Nur - Ns}{(Nur - 1)}$

Where, ICF= Informants Consensus Factor the

Nur= number of use citation in each category and

Ns= number of species use

## 4. Results

### 4.1 Medicinal plants in the study area

A total of 97 plant species used for medicinal purpose were collected from the study area. They are distributed in 81 genera and 45 families and 95 Angiosperm and 2 Gymnosperms (Appendix 2). The most popular family was Lamiaceae which contributed 10 (10.3%) species followed by Solanaceae and Asteraceae with 7 (7.2%) species. About 40.2% of the total medicinal plants were collected from the home garden and 39.2% from wild and the remaining 21% were collected from farmlands (Appendix 2). From 97 medicinal plants 55 (56.7%) species are used for the treatment of human ailments, while, 11 (11.3%) species are used for livestock disease treatment and the rest 31 (32%) species are used to treat both human and livestock diseases treatment (Appendix 3).

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

The current study showed that herb, shrub, tree and climber were the habits of the medicinal plants found in the study area. The most collected medicinal plant was herb with 47 (48.5%) followed by 24 (24.7%) species shrub, 18 (18.6%) tree and 8 (8.2%) species climber. The study showed that the plant parts widely used for the preparation of the remedies in the study area were leaves with 39 (40.2%) while the least used were bud, bark, latex and gum.

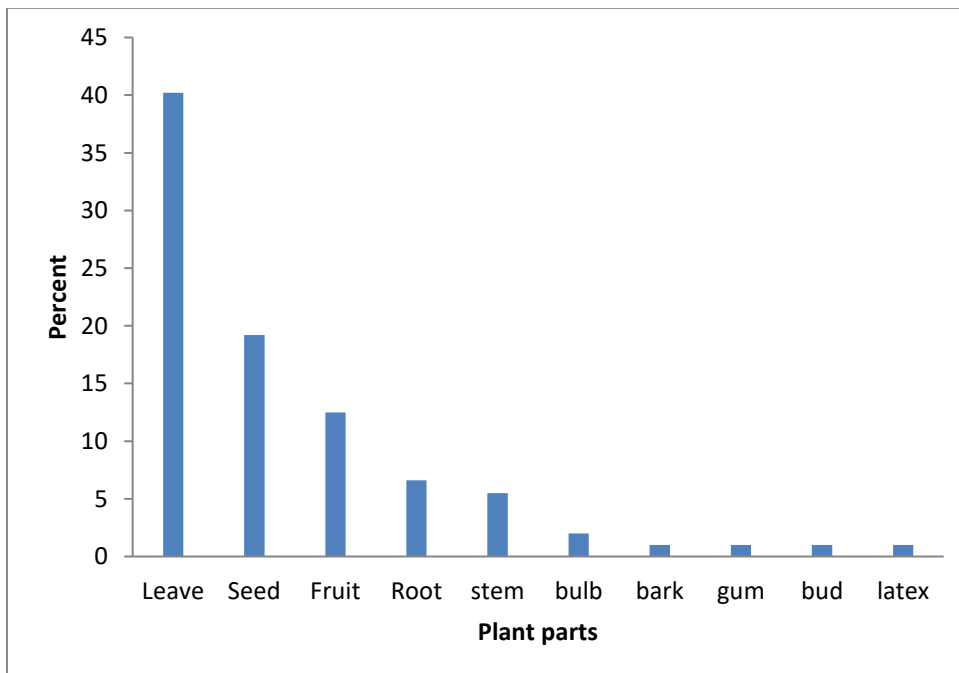


Figure 2 Plant parts used for preparation of medicines

### 4.3 Mode of administration, application and dosage of plant medicines

#### 4.3.1 Mode of administration

Traditional medicine preparations were administered through different modes of administration. The modes of administration in the study area include oral, dermal, and nasal. In this study, the most popular way of administration of herbal medicine was oral which accounted for 80 (82.5%) while the least administration way was nasal 2(2.1%) (Figure 6)

Regarding the preparation of medicine for human, the local community employs various methods of preparation of traditional medicines for different types of ailments. The preparations vary based on the type of disease treated and the actual site of the ailment. The principal methods of plant parts remedy highly popular way preparation forms was pounding 49(50.5%), while the least preparation method was roasting 4(4.1%).

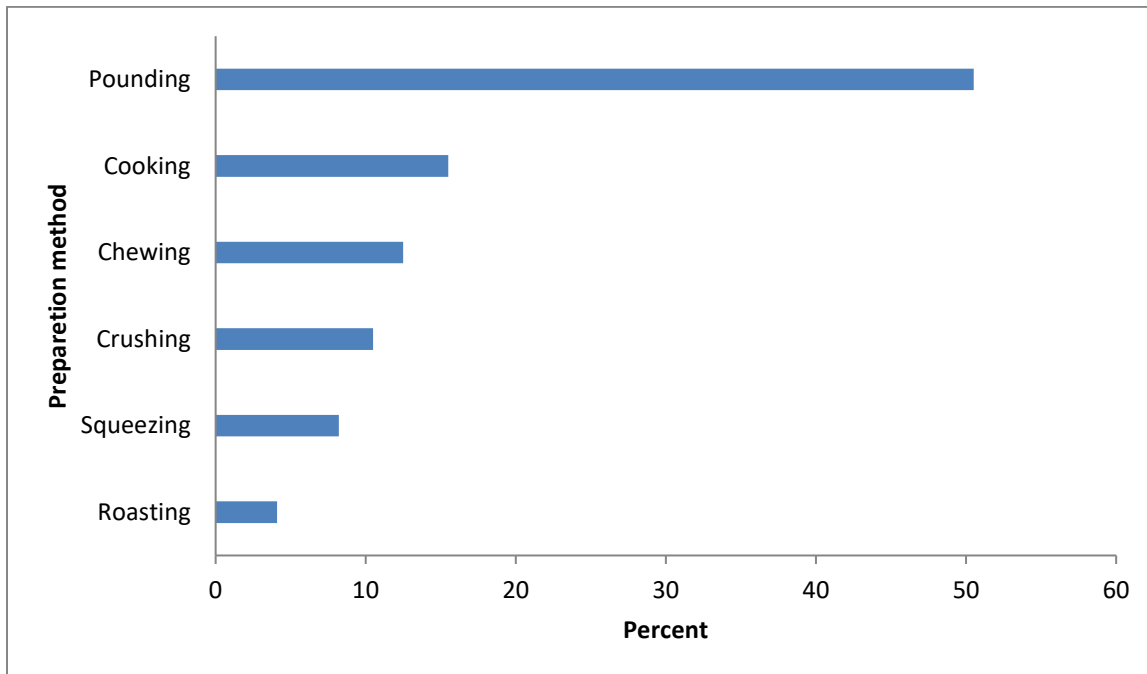


Figure 3 Method of preparation

#### 4.3.3 Measurement of dosage

Local healers provide the traditional medicines to patients by estimating the dosage using local units such as finger length for root and stem; different measuring materials (e.g., spoon, coffee



cup, tea cup and glass and tin cans) for powders and liquids and numbers for leaves, seeds, fruits, bulbs, flowers and latex). They depend on the age, type and exact site of ailment, physical fitness, stage of illness, the infected part, presence or absence of diseases other than the diseases to be treated and duration of disease. The dosage prescription for children was mostly lower than for adults. The amounts of remedy and prescription rates were generally dependent on the degree and duration of the ailment. Treatment durations varied between 1 and 7 days.

#### **4.4. Ailments treated with medicinal plants**

In this study, a total of 61 different ailments (33 of human, 9 of livestock and 19 of both human and livestock ailments) were recorded (Appendix 3). Traditional practitioners had a good knowledge to distinguish these diseases by their symptoms and provision of medicinal plants that are effective to treat them. The most frequently cited health problems were abdominal ache, ringworm, common cold, anthrax, evil eye, and others. Among 55 plant species used to treat human ailments, 21 (34.8%) species were used to treat abdominal ache, 7 (12.3%) species were used to treat common cold and 6 (10.5%) species were used to treat ring worm etc.

#### **4.5 Ranking of medicinal plants**

##### **4.5. 1. Preference ranking**

The Six repeatedly mentioned medicinal plants were reported for the efficient treatment of abdominal ache and subjected to preference ranking. Six key informants were asked to rank the given medicinal plants based on the given value for the medicinal plant which they thought was the most preferred for the treatment of abdominal ache, and 1 for the least effective plant and six for the most effective. *Croton macrostachyus* was chosen as the most preferable medicinal plant followed by *Echnopskebercho*, *Nigell sativa*, and *Rumex abyssinicus*. While *Embelia schimperi* and *Cynodon dactylon* were list preferred medicinal plant to treat abdominal ache (Table 2).

Table 2 Preference ranking of medicinal plants

Plant species	R1	R2	R3	R4	R5	R6	Total	Rank
<i>Nigella sativa</i>	3	3	4	2	2	5	20	3 <sup>rd</sup>
<i>Embelia schimperi</i>	2	3	4	2	3	2	17	5 <sup>th</sup>
<i>crotonmacrostachyus</i>	5	5	4	3	1	2	20	1 <sup>st</sup>
<i>Echnopskebercho</i>	5	1	2	4	3	3	23	2 <sup>nd</sup>
<i>Rumex abyssinicus</i>	3	4	3	3	4	4	21	4 <sup>th</sup>
<i>Cynodon dactylon</i>	2	1	1	2	3	3	13	6 <sup>th</sup>

#### 4.5.2 Direct matrix ranking

The study comprises number of medicinal plants found to be multipurpose species being utilized for variety of uses. The common uses include fodder, food, firewood, construction, charcoal, fence and timber production. Six commonly reported multipurpose species and seven use categories were involved in direct matrix ranking exercise in order to evaluate their relative importance to the local people (Table: 3).

Table showed, *Cordia africana*, *Podocarpus falcatus*, *Mangifera indica*, *Acacia abissinica* *Croton macrostachyus* and *Olea europea* were ranked 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> respectively multi-purpose species. From this result it was clear that the species have multipurpose use value. So they wereto give several benefits. *Cordia Africana* and *Podocarpus falcatus* were highly multipurposed plants and *Croton macrostachyus* and *Olea europea* were medicinal plants with least multipurpose use

Table 3 direct matrix ranking medicinal plants

The most dominant and selected	Food	fodder	fence	charcoal	Firewood	Timber	Construction	Sum	Rank
<i>Cordia africana</i>	0	0	5	3	5	5	5	23	1 <sup>st</sup>
<i>Mangifera indica.</i>	5	0	5	2	5	0	2	19	3 <sup>rd</sup>
<i>Croton macrostachyus</i>	0	0	5	3	5	3	2	18	4 <sup>th</sup>
<i>Olea europeasubsp. Cuspidata</i>	0	1	5	5	3	0	1	15	6 <sup>th</sup>
<i>Podocarpus falcatus.</i>	0	0	5	2	5	5	4	21	2 <sup>nd</sup>
<i>Acacia abyssinica</i>	0	2	4	5	5	0	0	16	5 <sup>th</sup>

### 4.5.3 Paired comparison

In this study, eight key informants were selected to specify the efficacy and popularity of plant species used to treat human and livestock ringworm using paired comparison of six medicinal plants (Table: 4). *Croton macrostachyus*, *Pycnostachys abyssinica*, *Rhamnus prinodes*, *Rumex abyssinicus* were ranked 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> in that order, *Persea americana* 5<sup>th</sup> *Commelina benghlensis* 6<sup>th</sup> and to treat ringworm were less preferred and less efficient as compared to other

Table 4 Paired comparisons of medicinal plants

Name of medicinal plants	List of respondents (R1-R7)							Frequency of selection	Rank
	Croton macrostachyus	Rhamnus prinodes	Persea americana	Commelina benghlensis	Pycnostachys abissinica	Rumex abyssinicus			
<i>Croton macrostachyus</i>		CM	CM	CM	CM	CM	5x	1st	
<i>Rhamnus prinodes</i>			RP	RP	PA	RA	3x	3rd	
<i>Persea americana</i>				CB	PA	RA	0x	6th	
<i>Commelina benghlensis</i>					PA	RA	1x	5th	
<i>Pycnostachys abissinica</i>						PA	4x	2nd	
<i>Rumex abyssinicus</i>							2x	4th	

CM=Croton macrostachyus, RP=Rhamnus prinodes, PA=Pycnostachys abissinica

Name of medicinal plants	Vernacular name of TMP	List of respondents (R <sub>1</sub> -R <sub>7</sub> )									
		R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>	R <sub>7</sub>	R <sub>8</sub>	Total	Rank
<i>Croton macrostachyus</i>	Masana	5x	4x	5x	4x	5x	4x	5x	4x	36	1 <sup>st</sup>
<i>Rhamnus prinodes</i>	Geesha	3x	2x	4x	3x	4x	5x	4x	5x	30	3 <sup>rd</sup>
<i>Persea americana</i>	Abokatuta	2x	1x	1x	1x	2x	2x	2x	2x	13	6 <sup>th</sup>
<i>Commelina benghensis</i>	Lalunca	1x	3x	1x	4x	5x	1x	3x	1x	19	4 <sup>th</sup>
<i>Pycnostachys abissinica</i>	Tontona	4x	5x	3x	5x	3x	3x	3x	5x	31	2 <sup>nd</sup>
<i>Rumex abyssinicus</i>	shishonda	2x	3x	2x	2x	1x	2x	1x	1x	14	5 <sup>th</sup>

#### 4.5.4 Informant consensus on medicinal use of plants

Some medicinal plants are more popular than others, which are well known by the local people/healers in the study area and cited repeatedly as remedy for the treatment of different diseases. Based on this informant's consensus, certain species which were independently cited by many of the informants for their medicinal uses against different human and livestock ailments are shown in Table 8. Informant consensus factor was calculated on the identified nine highly cited plant species used to treat human and livestock ailment. The value was obtained from *Croton macrostachyus* (Masana) (0.98) and the least ICF was from *Leucas stachydi formis* (0.86) (Table 8)

Table 5 List of most common medicinal plants with high informant's consensus

No	Scientific name	Local name	Total informant s	No. of citation (frequency)	Informant co nsensus (%)
1	<i>Croton macrostachyus</i>	Masana	62	412	0.98
2	<i>Eucalyptu glabulus</i>	Wojju baarzafa	42	130	0.94
3	<i>Allium sativum</i>	Tuma	55	295	0.97
4	<i>Nicotiana tobacum</i>	Tumbeeu	28	120	0.93
5	<i>Olinia rochetiana</i>	Shommolut	25	118	0.93
6	<i>Prunus afiricana</i>	Gamballa haqa	49	250	0.93
7	<i>Zingiber officinale</i>	Zingibeelu	57	205	0.96
8	<i>Echinops kebercho</i>	Toosa	52	100	0.92
9	<i>Leucas stachydiformis</i>	Ximbibilla	20	62	0.86

#### 4.7Threat to medicinal plant and conservation mechanisms

The cause of threats to medicinal plants can be generally grouped into natural and human induced factors. However, as reported in this study most of the causes for the threats to medicinal plants and the associated indigenous knowledge are the anthropogenic factors such as deforestation due to over exploitation of plants for different uses including charcoal making, fire wood collection, collection of construction woods, fence, cutting and burning of plants to create new agricultural lands. From this, the most highly threatening factor was collection of fire wood, 40.9%, while least thereaging factor was from the furniture.

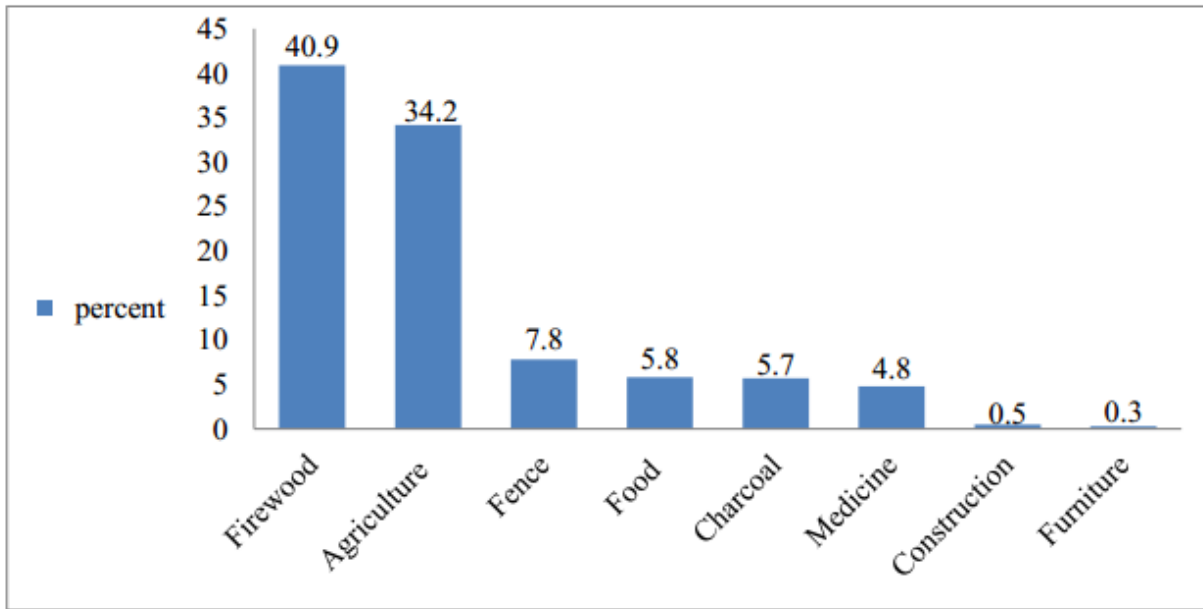


Figure 4Threat to medicinal plants.

## 5. Discussion

Medicinal plant species documented from the study area, claimed by the local people as valuable for the treatment of human and livestock ailments were 97 and this could be an indication of the key role of herbal remedies in addressing the primary healthcare needs of the people (Negesse and Endalkachew, 2017). The diversity of medicinal plants in the study area has shown that, the families Lamiaceae, Solanaceae, Asteraceae and Poaceae were represented by high numbers of medicinal plant species than the other families and this could probably be attributed to the overall species richness (high number of similar species in an area) of these families in the area following the general pattern of the Flora of Ethiopia. In the study, Lamiaceae was the dominant plant family to which most medicinal plant species used to treat human as well as livestock ailments. This was due to the widespread of Lamiaceae family in different parts of Ethiopia. The current findings were in agreement with the studies conducted elsewhere in which Lamiaceae was the dominant family (Teklay Abraha *et al*, 2013, Ketema Tolossa *et al*, 2013). The study showed that home garden medicinal plant was common in the area. This is due to the fact that the livelihood of the community in the study area was 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. This finding is also agreed with (Tesfaye Awas and Sabissibe Damissew, 2007). From the totally collected plants 56.7% human, 11.3% livestock and 32% were used against diseases of different ailments, this finding is similar with (Teklay Abraha *et al*, 2013; Gidey Yirga, 2010).

Moreover, 61 different human and livestock ailments were recorded in the study area this was the same as before (Tesfaye Hailemariam *et al*, 2009; Berhane Kidane *et al*, 2014; Ketema Tolossa *et al*, 2013 and Yayesh Limenhet *et al*, 2015) who reported 48 ailments, 47 ailments and 38 ailments, 34 ailments respectively in their study sites. Stomach ache, Fibre, Ring worm, Fibre illness and Anthrax were the most common human ailments recorded in the study area. In this regard, 21 medicinal plant species were mentioned for treating stomach ache.

Regarding growth habit, herb, shrub, tree and climber are the habits of the medicinal plants found in the study area. In which most of the medicinal plants were herb followed by shrub and tree. This is due to herb was found in most place of the study area. Besides, cultivation and the management of herb was easy compared to other growth forms of the medicinal plants. This

result is inline with other studies in which herb was the dominant growth form following by shrub and tree (Kebede Tirfessa *et al.*, 2017; Behailu Etan, 2010; Getu Alemayehu, 2017; Reta Regassa, 2017; Guluma Kitate *et al.*, 2017).

Plants contain active chemical constituents in their leaves, roots, seeds, stems, barks, fruits, and other parts, which produce a defined curing physiological response in the treatment of various ailments in humans and livestock. The study shows that, the most sought plant part for the preparations of remedy in the area were leaves, which accounted for 39 (40.2%) species followed by seed for 19 (19.9%) species. This indicates that, collecting leaves does not pose a great danger to the existence of an individual plant when compared with the collection of seed, root and other plant parts. This finding agrees with the sets of work that were carried out previously in other areas in Ethiopia, which showed that leaves followed by roots are the most frequently used plant parts for remedy preparations (Mirutse Giday and Tilahun Teklehaymanot, 2013; Tesfaye Awas and Sebissibe Damissew, 2009; Haile Yirga and Delenasaw Yewhalaw, 2007).

Local communities employ various methods of preparation of traditional medicines for different types of ailments. Traditional healers also reported to process remedies mainly through pounding, the major remedy preparation method, which accounted for 49 (50.5%) followed by cooking 15.5% and chewing 12.9% and others. This finding is similar with the finding of ethnobotanical study conducted by (Behailu Etana, 2010; Abiyu Enye., *et al* 2014). But it differs from Fisseha Mesfin's (2009) finding, in which 46 (37.4%) preparations were made by the process of powdering followed by 42 (34.1%) by crushing and pounding. Concerning the dosage, local people of the study area used various units of measurement such as finger length (e.g., for root, bark, and stem), pinch (e.g., for powdered), and numbers (e.g., for leaves, seeds, fruits, and flowers) and locally made spoons from plants were used to estimate and fix the amount or dosage of medicine. For human disease treatment, the smallest number was one and the highest was 7 for the case of leaves. In the case of palm measurement units, the lowest was half palm and the highest was 3 palms depending on the age of the patients. The lack of precise dosage was one of the drawbacks of using traditional medicinal plants. According to respondents; preparations were prescribed to patients differently for different age groups, sex, and other conditions. The dosage prescription for children was mostly lower than for adults. The amounts of remedy and prescription rates were generally dependent on the degree and duration of the



ailment. Treatment durations varied between 1 and 7 days. In this study *Cordia africana* was ranked first in its multiple usages. This was because of *Cordia africana* was highly valuable for livestock treatment, construction, firewood, charcoal making, fodder and fencing than the other plant. In addition, it was 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.

*Croton macrostachyus*, *pynostachyus abissinica* and *Rhamnus prinodes* were most preferred than the other medicinal plant during paired comparison. This showed that these plant species were highly effective plant species than the other mentioned plants. It may be because the plants were rich with several chemical contents that enable them to cure different human and livestock ailments like ring worm. This result was opposed to Etana Tolossa (2007) result in which *Plantago lanceolata* was stood first followed by *Rumex nepalensis*.

According to the result, *Croton macrostachyus* was cited by many respondents. This is probably due to the efficacy of *Croton macrostachyus* against the ailments. The highest ICF value was obtained for *Croton macrostachyus*. This result is disagreed with the result of (Fisseha Mesfin, et al.; 2009, Behailu Etana, 2010) in which the highest ICF value was obtained from *Ocimum lamiifolium*.

A complementary *In-situ* and *Ex-situ* conservation strategy is very vital in plant life persistence. As the results of this study showed, cultivation of plant species in and around homegardens for different purposes, protecting some areas for spiritual and other purposes, educating people about plant use, transferring indigenous knowledge to the new generation, avoiding use of plants before maturation and others have great contribution to the conservation of medicinal plants and the associated knowledge.

Medicinal plants recorded in the study area for livestock ailments use by the medicinal practitioners to treat livestock are 11 species treat only livestock ailments. (Appendix 3). The majority of these plants are wild, from these species 9 (81.8%) were wild, 2 (18.2%) were home garden and the most effective habit was tree counted 7 (63.6%) and the remaining shrub and herb were 2 (18.2%) each. The application methods were 10 by pounding and 1 chewing and the dosage were different depending on their age and physical feature of the animal this means one glass up to one litre. In the current study area, traditional healers follow up the patterns of cattle grazing

and identify those plants ignored (due to their taste or smell) by cattle and try out these plants to treat different 12 livestock ailments.

Many of the threats to medicinal plant species are similar to the general endangerment of plant diversity. According to Ensermu Kelbessa *et al.* (1992), Ethiopia's traditional medicine, as elsewhere in Africa, is faced with problems of continuity and sustainability primarily due to loss of taxa, habitat of medicinal plants and other threats categories. The main threats to medicinal plants in the study area as ranked by key informants were use of fire wood, due to over growth of population, which dictates the people use firewood highly, followed by agricultural land. Although over harvesting of medicinal plant species for various purposes was considered to be a threatening factor. These findings are similar with (Ermias Leulekele *et al.*, 2008; Mengistu Gebrehiwot, 2010).

The natural resource protection office of the district had a positive influence in protecting such natural vegetation areas. Due to this, now the majority of the informants had good knowledge on the conservation of plants as a whole and medicinal plant when compared to the past time. The results of the study also indicated that, even the effort made by the community to conserve medicinal plants is not satisfactory, some practitioners know the importance of conserving medicinal plants using both *in-situ* and *ex-situ* conservation methods. Homegardens are important sites for the conservation of medicinal plants and for transferring of the indigenous knowledge from older to the younger generation. Some traditional practitioners have started cultivating medicinal plants in homegardens. According to Zemedu Asfaw (2001), cultivation for medicinal value accounted for 6% of the plants maintained in homegardens in Ethiopia. Similarly, the results of the current study showed that, some traditional practitioners have started cultivation of wild plants in the homegardens primarily for medicinal purposes.

## **6. conclusion and Recommendation**

### **6.1 Conclusion**

The ethnobotanical study of medicinal plants indicates that the study area was rich in its medicinal plant composition. Ninety seven medicinal plants were recorded of which 55 species were noted to treat human ailments while, 11 species are documented to treat livestock ailments and 31 species were used to treat both livestock and human ailments and from this stomach ache and ring worm were the major human ailments. 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

Medicinal plants were harvested mostly from the home garden followed by wild. Herbs were found to be dominant medicinal plant remedies in the study area followed by shrubs, trees and climbers. Leaves were also found to be the most harvested plant parts for the preparation of the remedies followed by seed as described in various studies. Traditional medicine preparation mostly involves single plant; the mode of administration was mainly internal in which oral administration was the common route. Some medicinal plants were more preferable than the others in the study area to cure the ailments like stomachache, ring worm, wound, skin infection, common cold, evil eye, malaria, uveitis, diarrhea and anthrax. Beside their medicinal value many medicinal plants were also used for different purposes like charcoal, firewood, construction, household tools and others. Also, oral, dermal and nasal were mentioned respectively as the main route of administration in the study area.

A good proportion of medicinal plants used by Kachabira people were collected from home garden. Although the reasons for the loss of medicinal plants and associated traditional knowledge systems were many, deforestation for fire wood was the most visible one in Kachabira district. With high rate of population growth, expansion of farmlands by clearing vast area of forest annually, the loss or scarcity of many medicinal plants at least locally was inevitable.

Under such circumstances the use of plants for medicinal purposes will also decline and consequently the once effective traditional health care system will also be lost. This will affect the health service provided by the traditional sector in the area for the future.

Compared to human diseases, livestock diseases are treated with a few number of plant species. As obtained from informants, fewer numbers of medicinal plants are used to treat livestock diseases than humans. However, most of the informants revealed that in most cases they treat their livestock by indigenous medicine and rarely look for modern medication.

## **6.2. Recommendations**

Based on the results the following recommendations are forwarded:

Many medicinal plant species are reported and observed to be rare in the area. So, an urgent attention is needed to conserve these rare plants both in-situ and ex-situ, in order to optimize their use in the primary healthcare system and also other uses. Priority species with this regard are *Prunus africana*, *Withania somnifera*, *Cordia africana*, *Millettia ferruginea* and *Podocarpus falcatus*. So, promoting the establishment of in-situ conservation measures especially for those medicinal plants which are only found growing in the wild and this should be encouraged as some medicinal plants are collected from wild habitats.

The government need to raise awareness of the community and establish conservation measures to ensure the sustainable use of multipurpose plants and widely used medicinal plants as many medicinal plants are obtained from the wild. This can be achieved by:

- ✓ Encouraging the people to grow medicinal plants in homegardens, mixing with crops in farmlands and as live fences.
- ✓ Raising awareness of the community to prevent human induced threats to plants.
- ✓ Establishing local botanical garden at least at the district level.
- ✓ Training the local community to plant indigenous plant seedling.
- ✓ Government agents need to encourage the conservation of medicinal plants and provide incentives to the people for cultivation of medicinal plants to ensure that conservation issues are taken carefully.
- ✓ Encourage the local herbal medicine practitioners to enhance the use of traditional herbal medicine and to establish their own medicinal plants garden

- ✓ Creating awareness to the local society through adopting livestock medicinal plant species giving especial emphasis to livestock medicinal plants cultivation.
- ✓ Encourage the local herbal medicine practitioners to enhance the conservation mechanism of livestock medicinal plants.
- ✓ There is loss of indigenous knowledge in the Wereda. So, Wereda administration office should provide education and awareness rising to encourage traditional healers to transfer their indigenous knowledge on medicinal plants to the next generation.
- ✓ The Wereda administration in collaboration with health office and healers also needs to coordinate the modern practitioner and the traditional healers, and raise awareness to work together about the medicinal value, use, management of dose and conservation of traditional herbal medicine.

## Reference

- Abiyu Enyew, Zemedede Asfaw, Ensermu Kelbessa and Raja Nagappan (2014). Ethnobotanical Study of Traditional Medicinal Plants in and Around Fiche District,
- Agago Sadoro, Worku Tashale, Shafi Hussein and Mulu Orshido (2015). Socio-economy and geo-special data analysis and dissemination core work process. Hadiya zone, SNNP, P-109.
- Agisho H, Osei M. and Lambor T. (2014). Traditional medicinal plants utilization, management and threats in Hadiya Zone, Ethiopia, *Journal of Medicinal Plants Studies*: 2(2) Pp -94 – 1085(26), pp. 6233-6242
- Akram M, Siddiqui MI, Akhter N, Waqas MK, Iqbal Z, Akram M, Khan AA, Madni A, Asif HM. (2011). Ethnobotanical survey of common medicinal plants used by people of district Sargodha, Punjab, Pakistan. *J Med Plant Res* 5:7073 - 7075. and Jos GM Houdijk3
- Anteneh Belemie, Zemedede Asfaw, Sebsebe Damissie, Negussie FB (2012). Medicinal plants potential and use by pastoral and agro pastoral communities in Erer Valley of Babileworeda, eastern Ethiopia. *J Ethnobiol Ethnomed.*;8:42
- Assegid Asfaw and Tesfaye Awas (2014). Ethnobotanical study of wild medicinal trees and shrubs in Benna Tsemay District, southern Ethiopia. *JSD*.2 (1):17–33
- Arebu Issa, eferi Gedif, Tsige Gebre-Mariam, Kaleab Asres (2017). Ethnomedicinal uses of plants among the Somali ethnic group, Jigjiga Woreda, Somali Regional State, Eastern Ethiopia, *Ethiopia journal of health development*. **31**(3):188-199.
- Atinafu Kebede, Shimelis Ayalew, Akalu Mesfin and Getachew Mulualem (2016). Ethnobotanical investigation of traditional medicinal plants commercialized in the markets of Dire Dawa city, eastern Ethiopia, *Journal of Medicinal Plants Studies*; 4(3): 170-178.
- Balcha Abera, (2014). Medicinal plants used in traditional medicine by Oromo people, Ghimbi District, Southwest Ethiopia *Journal of Ethnobiology and Ethnomedicine*. 10:40

- Banchiamlak Nigussie, (2019). Ethnobotanical study of medicinal plants in the HawassaZuria District, Sidama zone, Southern Ethiopia. *Journal of Ethnobiology and Ethnomedicine* volume 15.
- Behailu Bzuayehu and Temesgen Asefa (2017). Ethnobotanical value of medicinal plant diversity in Cheha district, Guraghe zone, southern nations, nationalities and peoples (SNNPR) of Ethiopia. *Academic Journals J Med Plants Res.* 11(28):445–54.
- Behailu Etana (2010). Ethnobotanical Study of Traditional Medicinal Plants of Goma Wereda, Jima Zone of Oromia Region, Ethiopia. M.Sc. Thesis, Addis Ababa University.
- Bekele Emiru. (2007) Useful trees and shrubs of Ethiopia: Identification, Propagation and Management for 17 Agroclimatic Zones, World Agroforestry Centre, East Africa Region, Nairobi Kenya.
- Berhane Kidane, Tinde Van Andel, Laurentius JG, Zemedede Asfaw (2014). Use and management of traditional medicinal plants by Maale and Ari ethnic communities in Southern Ethiopia. *J EthnobiolEthnomed.*2014; 10:1–46. *biology and Ethno medicine.* 9:1-15.
- Brehane Emiru, Ermias Ayenekulu, Makuria wolde and Degitu Endale (2011). Management, use and ecology of medicinal plants in the degraded dry lands of Tigray, Northern Ethiopia. *J Med Plants Res.* 5(3):309–18.
- Bussmann RW, Swartzinsky P, Worede A, Evangelista P. (2011). Plant use in Odo-Bulu and Demaro, Bale region, Ethiopia. *J EthnobiolEthnomed* 7: 28
- Cotton CM. (1997). *Ethnobotany: Principles and Applications.* John Wiley & Sons, Chichester, UK.
- Cunningham A. B. (1993). African medicinal plants: setting priorities at interface healthcare between conservation and primary health care. UNESCO, Paris. pp. 1-50.
- people and plants, working paper 4, pp.18-25(Sample, A.ed).UNESCO, Paris.
- Dawit Abebe (2001). The role of medicinal plants in Health care Coverage of Ethiopia, the possible benefits of integration, In: *Conservation and Sustainable Use of Medicinal plants*

- in Ethiopia. pp. 107-118. (MedhinZewdu and AbebeDemissie (eds.)). Proceeding of the National workshop on Biodiversity Conservation and Sustainable use of medicinal plants in Ethiopia, 28 April-01 May 1998, IBCR, Addis Ababa.
- Dery B.B, Ofsynia R. and Ngatigwa C. (1999). Indigenous knowledge of medicinal trees and setting priorities for their domestication in Shinyanga region, Tanzania, International Center for Research in Agroforestry, Nairobi, Kenya
- Desalegn, Desisa(1997).Economic value of medicinal plants in Ethiopia, a case study. Paper prepared for the National Workshop on Biodiversity Conservation and Sustainable Use of Medicinal Plants In Ethiopia. April 26-May 1, 1998. Addis Ababa. P, 1997.
- Endalew Amenu (2007). Use and management of medicinal Plants by indigenous people of Ejaji area (chelya woreda) West Shoa, Ethiopia:
- Ensermu Kelbessa, Sebsebe Demissew, Zerihun Woldu and Edwards, S. (1992). Some threatened Endemic plants of Ethiopia. In: (Edwards, S. and Zemedede Asfaw eds.).The status of some plants in parts of tropical Africa. pp. 35-55. NAPRECA, No.2.Botany 2000: East and Central Africa.
- Ermias Lulekal, Ensermu Kelbessa, Tamrat Bekele and Haile Yineger (2008).An ethnobotanical study of medicinal plants in Mana Angetu wereda, south eastern Ethiopia. J. Ethnobiology.Ethnomed.4: 10.
- Eskedar Abebe (2011). Ethno-botanical study on medicinal plants used by local communities in debark wereda, north Gondar zone, amhara regional state, Ethiopia.
- Etana Tolossa (2010). Use and Conservation of Traditional Medicinal Plants by Indigenous People in GimbiWoreda, Western Wellega, Ethiopia.Ethnoveterinary Practices of Borana Pastoralists, Southern Ethiopia.InternationalJournal of Applied Research and Veteternary Medicine 2: 3.
- Fatemeh,J, Zahra L., Hossein, A.(2018).Medicinal plants: Past history and future perspectiveJHerbmedPharmacol. 7(1): 1-7



FAO (2001). Some medicinal forest plants of Africa and Latin America. FAO, UN, Rome.

Farnsworth, N.R. (1980). The development of Pharmacological and chemical research for the application to traditional Medicine in developing countries. *J.Ethiop. Pharmacol.*, 2: 175-181.

Fisseha Masfin., Sebsebe, Damissie. and Tilahun Tolesa (2009). An ethnobotanical study of medicinal plants in Wonago district, SNNPR, Ethiopia *Journal of Ethnobiology and Ethnomedicine* 5:28.

Gebrekidan Abrham, Sibhatleab, Hintsu. and Gebrekiros Geberemadin (2018). Indigenous knowledge based identification of medicinal plants in Central Zone of Tigray, North Ethiopia, *International Journal of Biodiversity and Conservation*. 10(6): 265-275

Getachew Alebie, Zemedu Asfaw and Zerihun Woldu (2013). Ethnobotany of wild and semi-wild edible plants of Konso ethnic community, South Ethiopia. *Ethnobot Res Appl.* 11:121–41.

Getachew Alebie and Abas. Mohamed (2016). An ethno-botanical study of medicinal plants in Jijjiga town, capital city of Somali regional state of Ethiopia, *International Journal of Herbal Medicine*. 4(6): 168-175.

Getachew Tadessa, Melaku Bekele .and Bereket Tesfaye (2017). Farmers' Perceptions and Adaptation Strategies to Climate Change and Variability the Case of Kachabira Woreda, Kembata Tembaro Zone, Southern Nations, Nationalities and Peoples Ethiopia *Journal of Environment and Earth Science* ISSN 2224-3216 (Paper) ISSN 2225-094.

Getnet Chakole (2011). An Ethno-botanical Study of Plants Used in Traditional Medicine and As Wild Foods In And Around Tara Gedam And Amba Remnant Forests In Libo Kemkem Wereda, South Gonder Zone, Amhara Region, Ethiopia. 1-102.

Getnet Chakole (2017). Ethnobotanical study of medicinal plants used against human ailments in Gubalafto District, Northern Ethiopia. *Journal of Ethnobiology and Ethnomedicine*. 13:55 DOI 10.1186/s13002-017-0182-7

- Getu Alemayahu (2017). Plant diversity and ethnobotany of medicinal and wild edible plants in Amaro district of Southern nations, nationalities and peoples region and Gelana district of Oromia region, Southern Ethiopia. PhD Dissertation. Addis Ababa: Addis Ababa University.
- Giday Yirga (2010a). Assessment of traditional medicinal in Enderta district south east Tigrai, Northern Ethiopia, *African Journal of Plant Science*. 4(7):257.
- Guluma Kitata, Debela Abdeta and Morka Amante (2017). Ethnoknowledge of plants used in veterinary practices in midakegn district, west showa of oromia region, Ethiopia. *Journal of medicinal plants studies*. 5(5): 282-288.
- Haile Yineger, Ensermu Kelbessa, Tamrat Bekele and Ermias Lulekal (2008). Floristic Composition of and Structure of the Dry Afromontane Forest at Bale Mountains National Park, Ethiopia. *Ethiop. J. Sci.*, 31: 103-120
- Haile Yineger, Delenashaw Yewhalwa and Demel Teketay (2008). Ethno medicinal plant knowledge and practices of the Oromo ethnic group in south western Ethiopia.  
Indigenous people in Tenta District, South Wollo, Ethiopia
- Jin C Yin-Chun S., Gui-Qin, C., Wen-Dun, W. (1999). Ethnobotanical studies on wild edible fruits in southern Yunnan: Folk names, nutritional value and uses. *Econ Bot* 53: 12 - 14.
- Kebede Tirfessa, Tamene Belude and Dereje Denu (2017). Ethnobotanical study of medicinal plant.
- Kebu Belemie, Ensermu Kalbessa. and Zemedede Asfaw (2004). Indigenous medical plant utilization, management and threats in Fentalle area, Eastern Shewa, Ethiopia. *Ethiop. J. biol. Sci.* 3(1): 37-58.
- KTZFPO: (2011) Kambatta Tembaro Zone Finance, Planning and Economic Development Office: The socio economic profile of Kambatta Tembaro Zone, Durame, 2011.

- Ketema Tolossa, Etana Debela, Spiridoula Athanasiadou, Adugna Tolera and Gebeyehu Ganga(2013). Livestock ailments by traditional healers in South Omo, Southern Ethiopia, *Journal of Ethno*
- Martin G.J. (1995). *Ethno-botany: A Method Manual*. Champan and Hall, London. *Medicinal Plants Studies*. 5(2): 353-360.
- Mekonen, Woldetsedeke (2019). Traditional Medicinal Plants in Ethiopia *International Journal of Biology, Physics & Matematics* ISSN: 2721-3757, Volume 1, Issue 1, page 80 - 87.
- Melesse Maryo, Sileshi Nemomisa and Tamirat Bekele (2015). An ethnobotanical study of medicinal plants of Kembatta ethnic group in Enset-based agricultural landscape of Kembatta Tembaro (KT) Zone, Southern Ethiopia. *Asian Journal of Plant Science and Research*, 5(7):42-61 ISSN : 2249-7412
- Mengistu Gebrehiwot (2010). An ethnobotanical study of medicinal plants in Seru Wereda, Arsi Zone of Oromia region, Ethiopia. M.Sc. Thesis, AAU, Ethiopia.
- Mersha Ashagire, Zemed Asfaw and Ensermu Kalbessa (2016). Ethnobotanical study of wild edible plants in Burji district, Segan area zone of southern nations, nationalities and peoples region (SNNPR), Ethiopia. *J Ethnobiol Ethnomed*. 12:1–32.
- Mesfin K, Tekle G. and Tesfay, T. (2013). Ethnobotanical Study of Traditional Medicinal Plants Used by Indigenous People of Gemada District, Northern Ethiopia, *Journal of Medicinal Plants Studies*: 1(4) pp- 32-37
- Mirutse Giday, Zemed Asfaw and Zerhun Wolde (2009). Medicinal plants of the Meinit ethnic group of Ethiopia: An ethnobotanical study. *J Ethnopharmacol* 124: 513 - 521.
- Mirutse Gidya (2007) Medicinal plant of the Bench, Meinit and Sheko cultural groups in Ethiopia with emphasis on use diversity, informant consensus, abundance and habitat. Ph.D Dissertation. Addis Ababa: Addis Ababa University.
- Mirutse Gidya, Zemed Asfaw Zerihun Wolde and Tilahun Tolesa (2009). Medicinal Plant Knowledge of the Bench Ethnic Group of Ethiopia: An Ethnobotanical Investigation.

Journal of Ethnobiology and Ethnomedicine, 5: 34. doi: 10.1186/1746-4269.Ethnomedicine 4 (11): 1-15.

- Mirutse Giday and Tarekegn Teklehaymanot (2013): Ethnobotanical study of plants used in management of livestock health problems by Afar people of Ada'ar District, Afar Regional State Ethiopia. *J Ethnobiol Ethnomed* 2013, 9(8):1–10.
- Mirutse, Gidya. and Gobona, A. (2003). An ethnobotanical survey on plants of veterinary importance in Two Woredas of Southern Tigray. Northern Ethiopia. *SINET: Ethio. J. Sci.*, 26(2): 123-136. New York, USA. Pp. 219-224.
- Mohammed, R., Jobaer, A., Bulbul, A., Israt, J., Mariz, S., Nahreen, K., Shahnaz, R., Rownak, J. (2010). An Ethnoveterinary Survey of Medicinal Plants Used by Folk Medicinal Practitioners to Treat Cattle Diseases in Randomly Selected Areas of Bagerhat District, Bangladesh. *Am. Eurasian J. Sustain. Agric.*, 4:386-396. 10.5897/AJAR2017.
- Mohamed Adefa, and Abraha, B. (2011). Ethnobotanical survey of traditional medicinal plants in Tehuledere District, South Wollo, Ethiopia. *Journal of Medicinal Plants Research*:
- Mulugeta Kidane and Erchafo Mohamed (2017). Indigenous knowledge on use of medicinal plants by indigenous people of Lemo District, Hadiya zone, Southern Ethiopia. *Int J Herb Med.* 5(4):124–35.
- Negesse Mekonnen and Endalkachew Abebe (2017). Ethnobotanical knowledge and practices of traditional healers in Harar, Haramaya, Bati and Garamuleta, Eastern Ethiopia, Ethiopia
- Nigusse Amsalu (2010). An Ethnobotanical Study of Medicinal Plant In Farta Wereda, South Gonder Zone of Amhara Regional State, Ethiopia. M.Sc. Thesis, Addis Ababa University. Addis Ababa. *Veterinary Journal.* 21(2):40-61.
- Nicole, B. (2015). Overexploitation of the environmental literacy council. of medicinal plants studies. 5(5): 282-288.
- Ovesná, J., Kučera L, Vaculová, K., Milotová, J., Snape, J., Wenzl, P., Huttner E., Martelli, G., Milella, L. (2013) Analysis of the genetic structure of a Barley Collection using DNA

diversity array technology (DArT) *Plant MolBiol Rep* 31:280 - 288. DOI: 10.1007/s11105-012-0491-x. plants in Akaki district, East Shewa Zone, Oromia regional state, Ethiopia, *Journal of*

Reta Regasa (2013) Assessment of indigenous knowledge of medicinal plant practice and mode of service delivery in Hawassa city, Southern Ethiopia. *J Med Plant Res.*7(9):517–35.

Rios, JL., Recio, MC. (2005). Medicinal plants and antimicrobial activity. *J Ethnopharmacol*;100(1-2):80-4. doi: 10.1016/j.jep.04.025.

SabsibeDemissewand Friis, I. (2009). Natural vegetation of the flora area In: *Flora of Ethiopia and Eritrea*. (Hedberg, I. Friis, I. and Person, E., eds). Addis Ababa, Ethiopia and Uppsala, Sweden. Vol. 8 Pp. 27-32.

Teklay Abraha, Balcha Abera and Mirutse Giday (2013).An ethnobotanical study of medicinal plants used in Kilte Awulaelo District, Tigray Region of Ethiopia

Takele Bassa (2018). Ethnobotanical study of medicinal plants in Wolaita zone, Southern Ethiopia.*J Health Med Nursing.*48:2422–8419.

Taye Brehanu and Ashenafi, A. (2017).Assessment of the invasive alien plant species *Lantana Camarain* Nile River Millennium Park, Bahir Dar, Ethiopia. *Global journals inc.* (USA).17 (1) Online ISSN: 2249-4626 & Print ISSN: 0975-589.

TesfayeAwas and SebsebeDemissew. Ethnobotanical study of medicinal plants in Kafficho people, southwestern Ethiopia.In: *Proceedings of the 16th International Conference of Ethiopian Studies*; Trondheim: Edited by Ege S, Aspen H,

Birhanu Teferra andShiferaw Bekele 2009. 711-726.veterinary practices in midakegn district, west showa of oromia region, Ethiopia. *JournalWHO* (2001). *Regulatory situation of herbal medicines: A Worldwide Review*, Pp. 1-9 Geneva.

Tesfaye Awas, Zemedet Asfaw, Ingar N.and Sebsebe, Damissie (2012). Ethnobotany of Berta and Gumuz people in Western Ethiopia. *Biodiversity* 11 (3 & 4): 45-53.

- Tesfaye Awas. (2009). Plant Diversity in Western Ethiopia: Ecology, Ethnobotany and Conservation. PhD Dissertation, Faculty of Mathematics and Natural Sciences, University of Oslo, Norway.
- Teshale Sori, Merga Bekana, Girma Adugna and Ensermu Kelbessa (2004). Medicinal Plants in the
- Tibebu Tefera and Mesele Yihune (2018). Ethnobotanical study on medicinal plants used by
- Tigist Wondimu, Zemedet Asfaw and Ensermu, Kelbessa. (2006). Ethnobotanical Study of food plants around Dheeraa' town, Arsi zone, SINET: Ethiop. J. Sci., 29(1):71-
- Tilahun Tolossa and Moa Megersa (2018). Ethnobotanical Study of Medicinal Plants Used to Treat Human Diseases in Berbere District, Bale Zone of Oromia Regional State, South East Ethiopia.
- WHO (2001). Legal status of traditional medicinal and complementary/ alternative Medicine; a worldwide review, WHO, Geneva.
- Yamane (1967). Simplified formula to calculate sample size
- Yalew Addisie, Debebe Yared, Ashok Kumar, Zewdneh Tomas and Assefa Awo 1 (2012). Traditional Medicinal Plants used by People in Libo-Kemkem District, South Gondar, Ethiopia. *Asian J. Agricultural Research* 4: 171-176.
- Zemedet Asfaw. (1997). Survey of Indigenous food plants, their preparations and home gardens in Ethiopia. In: Indigenous African food Crops and useful Plants. Edited by B. Okigbo. ICIPE science press, Nairobi, Kenya.
- Zemedet Asefaw (2001). Survey of Indigenous food plants, their preparations and home gardens in Ethiopia. In: Indigenous African food Crops and useful Plants. B6.N. Okigbo
- Zemedet Asfaw (1999). Ethnobotany of Nations, Nationalities and Peoples in Gambella, Benishangul-Gumuz and Southern Regions of Ethiopia. Addis Ababa University Press, Addis Ababa, Ethiopia.

## Appendix I

Jimma University  
College of Natural sciences  
Department of Biology

### Appendix I Semi structured interview questions

The purpose of this study is for partial fulfillment 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 ailments in kachabira district

#### I. Personal information

Kebele: ----- Date: -----

Sex: A. Male B. Female

Age: -----

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

Education status: A. Illiterate B. Primary education C. Secondary D) Diploma and above.

Religion: a) Orthodox \_\_\_\_\_ b) Muslim \_\_\_\_\_ c) Protestant \_\_\_\_\_ d) others \_\_\_\_\_

Marital status: A) Unmarried B).widow C. Divorced

Year of residence-----

Ethnicity-----

Source of income-----

#### II. Basic information about medicinal plants

1. What are medicinal plants in your kebele?

2. How to prepare medicinal plants for medicinal purposes in your surrounding?

- 3 What are the main human and animal health problems in your locality or Kebele?
- 4 Could you list the most common human diseases in your area?
5. Could you mention the most common animal diseases in your area?
6. Which part of medicinal plant are the most important for medicinal value?
7. Could you list the plant species used to treat livestock diseases in your area?
8. Could you list the plant species used to treat both human and their livestock disease in your area?
9. How you use medicinal plants for medicinal value?
10. Which growth form are the most available in your kebele? A) Herb B) Shrub C) Tree

### III. Indigenous knowledge related questions

1. How the knowledge of traditional medicine passed to a family member/younger generation?  
A) To selected family member only B) orally C) through traditional healers
2. What is your means o transfer indigenous knowledge?
- 3 What are availability status of medicinal plants as compared to the past: a) Abundant \_\_\_\_\_ b) less abundant \_\_\_\_\_ c) rare (scarce) \_\_\_\_\_,
- 4 What are threatening factors of medicinal plants in your area?  
A) Harvesting for medicinal value B) Food C) Fire wood D) Charcoal
5. Which medicinal plants species is commonly threatened in the study area? \_\_\_\_\_
6. How do the local people manage and conserve these medicinal plant species through their traditional indigenous knowledge? -----



## Appendix II General traits of the collected medicinal plants

No	Scientific Name	Family name	Local name	Disease	Habit	Habitat	Plant part used	Route	Form used	Hu/Li
1	<i>Acacia abissinica</i> Hochts	Fabaceae	Odorich haqomada	Abdominal ache, hip bone breakage	T	W	gum	oral	co	Hu
2	<i>Acanthus sennii</i> Chiov.	Acanthaceae	coca	Abdominal parasite	Sh	W	leave	oral	P	Li
3	<i>Achyrospermum shimper</i> (Hochst ex Briq. ) perkins,	Lamiaceae	Zamizameta	Ascariasis, Rheumatism, Evil eye, tooth ache	Sh	W	leave	oral	P	Both
4	<i>Aframomum corrorima</i>	Zingiberaceae	wokasha	Abdominal ache	sh	Fl	seed	Oral	P	Hu
5	<i>Ajuga integrifolia</i>	Lamiaceae	Anamuru	Internal parasite	cl	W	leave	oral	P	Hu
6	<i>Albizia schimperiana</i> Oliv	Fabaceae	Maatta	Singultus	T	W	Leave	oral	P	Li
7	<i>Allium capeses</i>	Alliaceae	shunkurtata	Hepatitis	H	Fl	bulb	oral	Co	Hu
8	<i>Allium sativum L</i>	Alliaceae	Tuma	Common cold,tuberculosis, Mitch	H	Hg	bulb	oral	P	Hu
9	<i>Amaranthus caudatus</i>	Amaranthaceae	Haliba	Mouth infection	H	Hg	seed	oral	P	Hu
10	<i>Anethum foeniculum L</i>	Apiaceae	Wolenga	Hepatitis, kidney infection	H	Hg	root	oral	P	Both
11	<i>Artemisia absinthium L</i>	Asteraceae	Aguffa	Abdominal ache	H	Hg	leave	oral	P	Hu
12	<i>Asparagus africanus</i>	Asparagaceae	Saretita	Anthrax	H	W	leave	oral	P	Li
13	<i>Bersama abyssinica</i> Fresen	Melanthaceae	Bitanssa	Human eye problem, tuberculosis	T	W	buds	oral	P	Both
14	<i>Brassica carinata</i> A.	Brassicaceae	Danqale illita	Abdominal pain,taifoid	H	Hg	seed	oral	P	Hu
15	<i>Brassica carinata</i> A. Br.	Brassicaceae	Hamiilu	Eye vision	H	Hg	leave	oral	co	Hu
16	<i>Brassica nigra</i> (L.)Koch	Brassicaceae	Sanaficha	Eye evil	H	Hg	seed	oral	Ro	Hu
17	<i>Brucea</i>	Simaroubaceae	Duqeta	Abdominal ache	T	W	leave	oral	P	Bo

	<i>antidysentrica</i> J. F	e									th
18	<i>Capsicum annuum</i> L.	Solanaceae	Qaare barbaru	Intestinal parasite, eye problem	Sh	Hg	fruit	oral	ch		Hu
19	<i>Carica papaya</i> L.	Cucurbitaceae	Papaya	Tuberculosis, stomach pain	T	Hg	fruit	oral	ch		Hu
20	<i>Cicer arietinum</i> L.	Fabaceae	Shimbra	Blotting	sh	Fl	seed	oral	ch		Hu
21	<i>Citrus aurantifolia</i>	Rutaceae	Lomita	Blood pressure, abdominal ache	T	Fl	fruit	oral	Sq		Hu
22	<i>Coffea arabica</i> L	Rubiaceae	Bunna	Abdominal pain, neck problem, wound	Sh	Hg	seed	oral	P		Hu
23	<i>Colocasia esculenta</i> (L.) Schot	Araceae	Gabiza	Abdominal ache	H	Fl	stem	oral	Co		Both
24	<i>Commelina benghalensis</i> L	Commelinaceae	Laaluncha	Ringworm	H	Fl	latex	dermal	Cr		Hu
25	<i>Conyza schimperi</i> Sch. Bip. Ex A. Rich ,	Asteraceae	Natra	Blood pressure	H	Hg	whole	oral	cr		Both
26	<i>Cordia africana</i> Lam.	Boraginaceae	Wanja	wound	T	Hg	leave	oral	P		Li
27	<i>Coriandrum sativum</i> L.	Apiaceae	wodimamu	Intestinal parasite	H	Hg	whole	oral	P		Both
28	<i>Croton macrostachyus</i>	Euphorbiaceae	Masana	Ring worm, Obesity, Intestinal worms, Snake bite	T	W	Whole part	oral	P		Both
29	<i>Cucurbita maxima</i> /pepo	Cucurbitaceae	Dabaqula	Tape worm	cl	Hg	fruit	oral	Co		Hu
30	<i>Cupressus lusitanica</i> Mill	Cupressaceae	Faranji hooma	Abdominal ache	T	Hg	leave	oral	P		Both
31	<i>Cynodon dactylon</i> L.	Poaceae	Hitichua	Abdominal ache	H	Hg	whole	oral	P		Hu
32	<i>Cyperus fischerianus</i> A. Rich.	Cyperaceae	Naaqa	Abdominal ache	H	Hg	root	oral	P		Hu
33	<i>Datura stramonium</i> L.	Solanaceae	Macharaqa	Wound and tooth ringworm	H	W	leave	Dermal	sq		Hu
34	<i>Daucus carota</i> L.	Apiaceae	Karota	Vision problem	H	Hg	stem	oral	Co		Hu
35	<i>Dovyalis abyssinica</i> (A. Rich.) Warb	Flacourtiaceae	Koshima	Liver fluke	Sh	W	fruit	oral	ch		Li
36	<i>Echinops</i>	Asteraceae	Toosa	Abortifacien,	H	Hg	root	oral	p		Hu

	<i>kebericho</i>			abdominal ach Epilepsy, Atrophy, Devil sickness, Dingategna						
37	<i>Ehretia cymosa</i> Thonn.	Boraginaceae	Ulaagaa	Skin dry, milk problem	T	W	leave	oral	co	Li
38	<i>Elusine</i> <i>coracana (L.)</i>	Poaceae	Fagajit	Bone breakage	H	Fl	seed	oral	Co	Bo th
39	<i>Embelia</i> <i>schimperii</i> Vatke	Myrsinaceae	Qanquta	Tape worm, internal parasite	T	W	leale	oral	P	Hu
40	<i>Ensete</i> <i>ventricosum</i>	Musaceae	Wesita	Amoebiasis, bone breakage	H	Fl	stem	oral	co	Bo th
41	<i>Eucalyptus</i> <i>globulus</i>	Myrtaceae	Wojju baarzafa	Common cold, anthrax Head ache	T	Hg	leave	Nas al	sq	Bo th
42	<i>Euphorbia</i> <i>candelabrum</i>	Euphorbitacea e	qoomu	Ring worm	cl	W	leave	der mal	Cr	Hu
43	<i>Euphorbia</i> <i>abissinica</i>	Euphorbitacea e	Carchuta	wound	T	W	Leave	Der mal	sq	Hu
44	<i>Euphorbia</i> <i>pulcherrima</i>	Euphorbiacea e	Ceenna	External parasite	Sh	Fl	leave	der mal	Sq	Li
45	<i>Ficus sur</i> Forssk.	Moraceae	odeechuta	Heart disease	T	W	bark	oral	p	Hu
46	<i>Guizotia</i> <i>byssinica</i>	Asteraceae	Nuga	Common cold abdominal ache	H	Fl	seed	oral	P	Bo th
47	<i>Guizotia</i> <i>schimperii</i> Sch. Bip.ex Walp	Asteraceae	Cuua	Mitch	H	W	root	oral	P	Hu
48	<i>Hagenia</i> <i>abyssinica</i>	Rosaceae	Xeenchuta	Tap worm	Sh	W	seed	oral	P	Hu
49	<i>Hordeum vulgare</i> L	Poaceae	Soa	Common cold	H	Fl	seed	oral	co	Hu
50	<i>Hypoestes</i> <i>forskaolii</i>	Acanthaceae	Omoruta	Mouth infection, tooth ache eye problem	H	Hg	whole	oral	Co	Hu
51	<i>Impatiens rothii</i> Hook.f.	Balsaminacea e	Gishilt	Abdominal ache	T	Hg	Fruit	oral	ch	Hu
52	<i>Justitia</i> <i>schimperana</i> (Hochst.ex Nees)	Acanthaceae	Gulbaana	Malaria, Abdominal complaints, Jaundice	Sh	W	leave	Ora l, der mal	p	Bo th
53	<i>Lepidium sativum</i> L.	Brassicaceae	Fexuta	Tooth infection, Mitch	H	Hg	seed	oral	P	Hu
54	<i>Leucas</i> <i>stachydiformis</i>	Lamiaceae	Xinbililla	Acarida, uterus infectionproblem	T	W	leave	oral	P	Bo th

55	<i>Linum usitatissimum L</i>	Linaceae	Talba	Gastric ulcer, external west	H	Fl	seed	oral	P	Bo th
56	<i>Lycopersicon esculentum Mill.</i>	Solanaceae	Timatima	anemia	H	Fl	fruit	oral	Co	Hu
57	<i>Mangifera indica L.</i>	Anacardiaceae	Mango	Stomach pain	T	Hg	fruit	oral	ch	Hu
58	<i>Momordica foetida Schumach</i>	Cucurbitaceae	Woribebuta	Snake bit	cl	W	whole	der mal	Ro	Bo th
59	<i>Musa paradisiaca L.</i>	Musaceae	Muuza	Kidney infection	Sh	Fl	fruit	oral	Ch	Hu
60	<i>Nicotiana tobacum L</i>	Solanaceae	Tumbeeu	Leech/parasite abdominal ache	H	Hg	leave	oral	P	Bo th
61	<i>Nigella sativaL.</i>	Ranunculaceae	Gamballata xaguta	Abdominal ache,	H	Fl	seed	oral	P	Hu
62	<i>Ocimum basilicum L</i>	Lamiaceae	Basobilla	Internal parasite	H	Hg	whole	oral	sq	Hu
63	<i>Ocimum gratissimum L.</i>	Lamiaceae	Minatofa	Human eye problem	H	W	leave	der mal	Ro	Bo th
64	<i>Ocimum lamiifolium</i>	Lamiaceae	Damakase	Head ach,Mitch	Sh	Hg	leave	der mal	sq	Hu
65	<i>Olea europaea L</i>	Oleaceae	Weera	Gonorrhoea, internal parasite	T	Hg	leave	oral	P	Li
66	<i>Olinia rochetiana A. Juss.</i>	Oliniaceae	sho'mmolluta	Pertussis, Odontalgia, Abdominal complaints,eye ache,tooth ache	Sh	W	leave	oral	P	Bo th
67	<i>Oncocalyx glabratus</i>	Loranthaceae	chati kurumu	Tonsillitis	Sh	Fl	leave	oral	P	Hu
68	<i>Orthosiphon suffrutescens J. K</i>	Lamiaceae	Anganbiisha	Head ache,mitch	Sh	Hg	whole	nas al	Cr	Hu
69	<i>Osyris quadripartita Decne</i>	Santalaceae	Kaaruta	Mitch	cl	W	root	oral	P	Hu
70	<i>Persea americana Mill.</i>	Lauraceae	Abokatuta	Ring worm	T	Hg	fruit	oral	Ch	Hu
71	<i>Phaseolus vulgaris L.</i>	Fabaceae	Wokita	Jaundice	H	Fl	seed	oral	co	Hu
72	<i>Phytolacca dodecandraL. Herit</i>	Phytolaceae	Haranja	Leech, intestinal parasite	Cl	W	leave	der mal	P	Bo th
73	Podocarpus falcatu	Podocarpaceae	Zagiba	Stomach ache	T	W	leave	der mal	p	Hu

74	<i>Premna schimperi</i>	Lamiaceae	Xoxxanqqetta	External parasite	Sh	W	Stem	oral	G	Li
75	<i>Prunus africana</i>	Rosaceae	Garbichu	Intestinal parasite	T	W	leave	oral	P	Li
76	<i>Punica granatum</i> L.	Punicaceae	Romaana	Gonorrhoea	Sh	Hg	fruit	oral	Ch	Hu
77	<i>Pycnostachys abyssinica</i>	Lamiaceae	Tontona	Ringworm	sh	W	leave	oral	P	Hu
78	<i>Rhamnus prinoides</i>	Rhamnaceae	Geesha	Intestinal parasite, ringworm	Sh	Hg	Whole part	Dermal	p	Both
79	<i>Rubus fruticosus</i> L.	Rosaceae	Hamarouu	Abdominal ache	cl	W	seed	oral	Ch	Hu
80	<i>Rumex abyssinicus</i>	Polygoniaceae	Shishonda	Hepatitis, Ring worm, kidney infection	sh	W	root	oral	P	Both
81	<i>Rumex nepalensis</i> Spreng ,	Polygoniaceae	Kashala Go'echu	Abdominal ache	H	W	leave	oral	P	Hu
82	<i>Ruta chalepensis</i> L.	Rutaceae	Xalachuta	Common cold, eye evil	Sh	Hg	whole	oral	sq	Both
83	<i>Saccharum officinarum</i> L.	Poaceae	Shenkora	Cough, Gastritis	Sh	Fl	stem	oral	sq	Both
84	<i>Schinus molle</i> L. <b>T H</b>	Anacardiaceae	Qonde barbaru	Blotting , Fibril illness	Sh	Hg	leave	oral	cr	Hu
85	<i>Solanum incanum</i> L.	Solanaceae	Hombororita	Parasite	Sh	W	fruit	dermal	P	Hu
86	<i>Solanum macrocarpon</i>	Solanaceae	Buluta	Tuberculosis, cough	Sh	Hg	leave	oral	Co	Hu
87	<i>Solanum margnatum</i>	Solanaceae	Maheta	Parasite	Sh	W	leave	dermal	P	Hu
88	<i>Stephania abyssinica</i>	Menispermaceae	Ma'irasisa	Human eye problem	H	W	leave	oral	Ro	Li
89	<i>Teclea nobilis</i> Del.	Rutaceae	Adara	Abdominalache	H	W	leave	oral	co	Hu
90	<i>Thymus schimperi</i> Roninger ,	Lamiaceae	Zazanchuta	Blood pressure	cl	Hg	whole	oral	P	Hu
91	<i>Trifolium rueppellianum</i> Fresen	Fabaceae	Godoro-oo	Tonsillitis, Ear infection	H	Hg	leave	oral	P	Hu
92	<i>Trigonella foenum-graecum</i> L.	Fabaceae	Abisha	Abdominal ache	sh	Fl	seed	oral	cr	Both
93	<i>Triticum polonicum</i> L.,	Poaceae	gardamu	Bone breakage	H	Fl	seed	oral	co	Both
94	<i>Verbena</i>	Barnabaceae	Modolita	Abdominal ache	H	W	leave	oral	P	Hu

	<i>officinalis</i> L. ,									
95	<i>Vernonia amygdalina</i>	Asteraceae	Hebba	Intestinal parasite blood clotting	sh	W	leave	oral	P	Bo th
96	<i>Vernonia auriculifera</i> Hiern	Asteraceae	Reejja	Stop bleeding	sh	W	Leave	der mal	cr	Hu
97	<i>Zingiber officinale</i> Roscoe.	zingiberaceae	Zinjbeelu	Common cold, stomach ache	H	Fl	stem	oral	ch	Bo th

AppendixII includes list of medicinal plants used for treating both human and livestock ailments in the study area; with scientific name, local name, family, habit(H); herb(H), shrub(S), tree(T), climber(Cl), (Hu- 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.Cl cultivated land, Hg =home garden, W= Wild, H= Herb, T= Tree S =Shrub, C= Climber, L Leave, R= Root, St= stem, B= Bulb, O =Oral, N= Nasal, D =Dermal, T= Topical, P= Pounding, Cr= crushing, Co= Cooking, Sq =Squeezing, Ro = Roasting, Ch =Chewing, Li= livestock, Hu =Human, Bo= Both

### Appendix III

#### List of medicinal plants for treating Human, Livestock and Both Human and Livestock disease in study area Kachabira district

List of medicinal plants for treating Human disease in study area, Kachabira district				
No	Scientific name	Family name	Local name	Disease
1	<i>Embelia schimperi</i> Vatke	Myrsinaceae	Qanquta	Tape worm, internal parasite
2	<i>Brassica carinata</i> A. Br.	Brassicaceae	Hamiilu	Eye vission
3	<i>Brassica nigra</i> (L.) Koch	Brassicaceae	Sanaficha	Eye evil
4	<i>Capsicum annuum</i> L.	Solanaceae	Qaare barbaru	Intestinal parasite,eye problem
5	<i>Carica papaya</i> L.	Cucurbitaceae	Papaya	Tuberculosis,stomach pain
6	<i>Brassica carinata</i> A.	Brassicaceae	Danqale illita	Abdominal pain,taifoid
7	<i>Coffea arabica</i> L	Rubiaceae	Bunna	Abdominal pain, neckproblem,wound
8	<i>Datura stramonium</i> L.	Solanaceae	Macharaqa	Wound and tooth rinworm
9	<i>Hygnia abyssinica</i>	Rosaceae	Xeenchuta	Tap worm
10	<i>Lepidium sativum</i> L.	Brassicaceae	Fexuta	Tooth infection, Mitch
11	<i>Ocimum lamiifolium</i>	Lamiaceae	Damakase	Head ach,mitch
12	<i>Schinus molle</i> L. T H	Anacardiaceae	Qonde barbaru	Blotting ,Fibril illness
13	<i>Allium sativum</i> L	Alliaceae	Tuma	Common cold,tuberculosis,Mitch
14	<i>Cyperus fischerianus</i> A. Rich.	Cyperaceae	Naaqa	Abdominal ache
15	<i>Hypoestes forskoolii</i>	Acanthaceae	Omoruta	Mouth infection,tooth ache eye problem
16	<i>Orthosiphon suffrutescens</i> J. K	Lamiaceae	Anganbiisha	Head ache,mitch
17	<i>Osyris quadripartita</i> Decne	Santalaceae	Kaaruta	Mitch
18	<i>Cynodon dactylon</i> L	Poaceae	Qorixxu	Snak bite
19	<i>Amaranthus caudatus</i>	Amaranthaceae	Haliba	Mouth infection
20	<i>Solanum macrocarpon</i>	Solanaceae	Buluta	Tuberculosis,cough
21	<i>Daucus carota</i> L.	Apiaceae	Karota	Vision problem
22	<i>Ocimum basilicum</i> L	Lamiaceae	Basobilla	Internal parasite
23	<i>Persea americana</i> Mill.	Lauraceae	Abokatuta	Ring worm
24	<i>Musa paradisiaca</i> L.	Musaceae	Muuza	Kidney infection
26	<i>Punica granatum</i> L.	Punicaceae	Romaana	Gonorrhoea
27	<i>Euphorbia abissinica</i>	Euphorbitaceae	Carchuta	wound
28	<i>Solanum margnatum</i>	Solanaceae	Maheta	Parasite
29	<i>Euphorbia Candelabrum</i>	Euphorbitaceae	qoomu	Ring worm
30	<i>Lycopersicon esculentum</i> Mill.	Solanaceae	Timatima	anemia
31	<i>Nigella sativa</i> L.	Ranunculaceae	Gamballata	Abdominal ache,

			xaguta	
32	<i>Rubus fruticosus</i> L.	Rosaceae	Hamaroou	Abdominal ache
33	<i>Saccharum officinarum</i> L.	Poaceae	Shenkora	Cough, Gastritis
34	<i>Guizotia schimperi</i> <i>Sch. Bip.ex Walp</i>	Asteraceae	Cuua	Mitch
35	<i>Commelina benghalensis</i> L	Commelinaceae	Laaluncha	Ringworm
36	<i>Cynodon dactylon</i> L.	Poaceae	Hitichua	Abdominal ache
37	<i>Oncocalyx glabratus</i>	Loranthaceae	chati kurumu	Tonsillates
38	<i>Pycnostachys abyssinica</i>	Lamiaceae	Tontona	Ringworm
39	<i>Rumex nepalensis</i> Spreng ,	Polygoniaceae	Kashala Go'echu	Abdominal ache
40	<i>Thymus schimperi</i> Roninger ,	Lamiaceae	Zazanchuta	Blood pressure
41	<i>Trifolium rueppellianum</i> <i>Fresen</i>	Fabaceae	Godoro-oo	Tonsillitis, Ear infection
42	<i>Verbena officinalis</i> L. ,	Lamiaceae	Modolita	Abdominal ache
43	<i>Artemisia absinthium</i> L	Asteraceae	Aguffa	Abdominal ache
44	<i>Aframomum corrorima</i>	Zingiberaceae	wokasha	Abdominal ache
45	<i>Citrus aurantifolia</i>	Rutaceae	lomita	Blood pressure, abdominal ache
46	<i>Teclea nobilis</i> Del.	Rutaceae	adara	abdominalache
47	<i>Solanum incanum</i> L.	Solanaceae	Hombororita	Parasite
48	<i>Ajuga integrifolia</i>	Lamiaceae	Anamuru	Internal parasite
49	<i>Cucurbita maxima/pepo</i>	Cucurbitaceae	Dabaqula	Tape worm
50	<i>Vernonia aunoniariiculfera</i>	Asteraceae	Reejja	Stop bleeding
51	<i>Cicer arietinum</i> L.	Fabaceae	Shimbra	Blotting
52	<i>Mangifera indica</i> L.	Anacardiaceae	Mango	Stomach pain
53	<i>Echinops kebericho</i>	Asteraceae	Toosa	Abortifacien, abdominal ach Epilepsy,Atrophy,Devil sickness,Dingategna
54	<i>Podocarpus falcatu</i>	Podocarpaceae	Zagiba	
55	<i>Ficus sur</i> Forssk.	Moraceae	odeechuta	Heart disease

**List of medicinal plants for treating Livestock disease in study area, Kachabira district.**

1	<i>Asparagus africanus</i>	Asparagaceae	Saretita	Anthrax
2	<i>Cordia africana</i> Lam.	Boraginaceae	Wanja	wound
3	<i>Olea europaea</i> L	Oleaceae	Weera	Gonorrhea, internal parasite
4	<i>Prunus africana</i>	Rosaceae	Garbichu	Intestinal parasite
5	<i>Albizia schimperiana</i> Oliv	Fabaceae	Maatta	Singultus
6	<i>Ehretia cymosa</i> Thonn.	Boraginaceae	Ulaagaa	Skin dry, milk problem
7	<i>Euphorbia pulcherrima</i>	Euphorbiaceae	Ceenna	External parasite
8	<i>Acanthus sennii</i> Chiov.	Acanthaceae	coca	Abdominal parasite
9	<i>Premna schimperi</i>	Lamiaceae	Xoxxanqgetta	External parasite



10	<i>Stephania abyssinica</i>	Menispermaceae	Ma'irasisa	Human eye problem
11	<i>Dovyalis abyssinica</i> (A.Rich.)Warb	Flacourtiaceae	Koshima	Liver fluke
<b>List of medicinal plants for treating both human and livestock diseases in the study area, Kachabira district</b>				
1	<i>Eucalyptus globulus</i>	Myrtaceae	Wojju baarzafa	Common cold, anthrax Head ache
2	<i>Croton macrostachyus</i>	Euphorbiaceae	Masana	Ring worm,Obesity,Intestinal worms,Snake bite
3	<i>Linum usitatissimum</i> L	Linaceae	Talba	Gastric ulcer, external west
4	<i>Rhamnus prinoides</i>	Rhamnaceae	Geesha	Intestinal parasite,ringworm
5	<i>Ruta chalepensis</i> L.	Rutaceae	Xalachuta	Common cold,eye evil
6	<i>Guizotia byssinica</i>	Asteraceae	Nuga	Common cold abdominal ache
7	<i>Acacia abissinica</i> Hochts	Fabaceae	Odorich haqomada	Abdominal ache, hip bone breakage
8	<i>Phaseolus vulgaris</i> L.	Fabaceae	wokita	Jaundice
9	<i>Allium capeses</i>	Alliaceae	shunkurtata	Hepatitis
10	<i>Hordeum vulgare</i> L	Poaceae	Soa	Common cold
11	<i>Leucas stachydiformis</i>	Lamiaceae	Xinbililla	Ascarid, uterus infectionproblem
12	<i>Coriandrum satvum</i> L.	Apiaceae	wodimamu	Intestinal parasite
13	<i>Nicotiana tobacum</i> L	Solanaceae	Tumbeeu	Leech/parasite abdominal ache
14	<i>Colocasia esculenta</i> (L.)Schot	Araceae	Gabiza	Abdominal ache
15	<i>Vernonia amygdalina</i>	Asteraceae	Hebba	Intestinal parasite blood clotting
16	<i>Olinia rochetiana</i> A. Juss.	Oliniaceae	sho'mmolluta	Pertussis,Odontalgia,Abdominal complaints,eye ache,tooth ache
17	<i>Achyrospermum shimper</i> (Hochst ex Briq. ) <i>perkins</i> ,	Lamiaceae	Zamizameta	Ascariasis, Rheumatism, Evil eye,tooth ache
18	<i>Anethum foeniculum</i> L	Apiaceae	Wolenga	Hepatitis, kidney infection
19	<i>Brucea antidysentrica</i> J. F	Simaroubaceae	Duqeta	Abdominal ache
20	<i>Elusine coracana</i> (L.)	Poaceae	Fagajit	Bone breakage
21	<i>Momordica foetida</i> <i>Schumach</i>	Cucurbitaceae	Woribebuta	Snake bit
22	<i>Ocimum lamiifolium</i>	Lamiaceae	Minatofa	Human eye problem
23	<i>Triticum polonicum</i> L.,	Poaceae	gardamu	Bone breakage
24	<i>Cupressus lusitanica</i> Mill	Cupressaceae	Faranji hooma	Abdominal ache
25	<i>Rumex abyssinicus</i>	Polygoniaceae	Shishonda	Hepatitis, Ring worm, kidney infection
26	<i>Phytolacca dodecandra</i> L. Herit	Phytolaceae	Haranja	Leech,intestinal parasite
27	<i>Ensete ventricosum</i> (Welw)	Musaceae	Wesita	Amoebiasis,bone breacage

28	<i>Justitia schimperana</i> (Hochst.ex Nees)	Acanthaceae	Gulbaana	Malaria,Abdominal complaints,Jaundice
29	<i>Zingiber officinale</i> Roscoe.	zingiberaceae	Zinjbeelu	Common cold,stomach ache
30	<i>Impatiens rothii</i> Hook.f.	Balsaminaceae	Gishilt	Abdominal ache
31	<i>Trigonella foenum- graecum</i> L	Fabaceae	Abisha	Abdominal ache

## Appendix IV

No	Scientific name	Family name	Local name	Other uses
1	<i>Embelia schimperi</i> Vatke	Myrsinaceae	Qanquta	Fodder
2	<i>Asparagus africanus</i>	Asparagaceae	Saretita	Fodder, firewood
3	<i>Brassica carinata</i> A. Br.	Brassicaceae)	Hamiilu	Food
4	<i>Brassica nigra</i> (L.) Koch	Brassicaceae	Sanaficha	Food
5	<i>Capsicum annuum</i> L.	Solanaceae	Qaare barbaru	Food
6	<i>Carica papaya</i> L.	Cucurbitaceae	Papaya	Food
7	<i>Brassica carinata</i> A.	Brassicaceae	Danqale illita	Food
8	<i>Coffea arabica</i> L	Rubiaceae	Bunna	Fence, food
9	<i>Cordia africana</i> Lam.	Boraginaceae	Wanja	Timber, fence, firewood
10	<i>Croton macrostachyus</i>	Euphorbiaceae	Masana	Fence, firewood, fence
11	<i>Datura stramonium</i> L.	Solanaceae	Macharaqa	None
12	<i>Hygnia abyssinica</i>	Rosaceae	Xeenchuta	Timber, firewood, fence, charchol
13	<i>Eucalyptus globulus</i>	Myrtaceae	Wojju baarzafa	Firewood, Construction, fence
14	<i>Linum usitatissimum</i> L	Linaceae	Talba	Food
15	<i>Lepidium sativum</i> L.	Brassicaceae	Fexuta	None
16	<i>Ocimum lamiifolium</i>	Lamiaceae	Damakista	None
17	<i>Olea europaea</i> L	Oleaceae	Weera	Fence, fumigant, charchol, firewood
18	<i>Schinus molle</i> L. TH	Anacardiaceae	Kundo berbere	Blotting ,Fibril illness
19	<i>Rhamnus prinoides</i>	Rhamnaceae	Geesha	Food, fence
20	<i>Ruta chalepensis</i> L.	Rutaceae	Xalachuta	Spice
21	<i>Allium sativum</i> L	Alliaceae	Tuma	Spice
22	<i>Guizotia byssinica</i>	Asteraceae	Nuga	Food oil
23	<i>Cyperus fischerianus</i> A. Rich.	Cyperaceae	Naaqa	Abdominal ache
24	<i>Hypoestes forskalii</i>	Acanthaceae	Omoruta	None
25	<i>Leucas stachydidiformis</i>	Lamiaceae	Xinbililla	fence, fodder
26	<i>Orthosiphon suffrutescens</i> J. K	Lamiaceae	Anganbiisha	None
27	<i>Osyris quadripartita</i> Decne	Santalaceae	Kaaruta	Fodder
28	<i>Prunus Africana</i>	Rosaceae	Garbichu	fence, firewood, charchol
29	<i>Acacia abissinica</i> Hochts	Fabaceae	Odorichu	fence, firewood, charchol
30	<i>Coriandrum sativum</i> L.	Apiaceae	wodimamu	Food
31	<i>Nicotiana tobacum</i> L	Solanaceae	Tumbeeu	None
32	<i>Ehretia cymosa</i> Thonn.	Boraginaceae	Ulaagaa	Agricultural tools, fence
33	<i>Amaranthuscaudatus</i>	Amaranthaceae	Haliba	Food
34	<i>Solanum macrocarpon</i>	Solanaceae	Buluta	Food
35	<i>Daucus carota</i> L.	Apiaceae	Karota	Food
36	<i>Colocasia esculenta</i> (L.) Schot	Araceae	Gabiza	Food, fodder
37	<i>Euphorbia pulcherrima</i>	Euphorbiaceae	Ceenna	Fence

38	<i>Vernonia amygdalina</i> Del.	Asteraceae	Reejja	fence
39	<i>Ocimum basilicum</i> L	Lamiaceae	Basolilla	Spice
40	<i>Persea americana</i> Mill.	Lauraceae	Abokatuta	Food,fence,fodder,fairewood
41	<i>Musa paradisiaca</i> L.	Musaceae	Muuza	Food,fooder
42	<i>Punica granatum</i> L.	Punicaceae	Romaana	Food
43	<i>Euphorbia abissinica</i>	Euphorbitaceae	Carchuta	Fence,fairewood
44	<i>Solanum margnatum</i>	Solanaceae	Maheta	Fairwood,fence
45	<i>Vernonia amygdalina</i>	Asteraceae	Hebba	Fence,fairwood,fodder
46	<i>Olinia rochetiana</i> A. Juss.	Oliniaceae	sho'mmolluta	Fence,fairewood,charchol
47	<i>Euphorbia candelabrum</i>	Euphorbitaceae	Qoomu	None
48	<i>Lycopersicon esculentum</i> Mill.	Solanaceae	Timatima	Food
49	<i>Achyrospermum shimper</i> (Hochst ex Briq. ) perkins,	Lamiaceae	Zamizameta	fodder
50	<i>Nigella sativa</i> L.	Ranunculaceae	Gamballata xaguta	Food
51	<i>Rubus fruticosus</i> L.	Rosaceae	Hamarouu	Fence
52	<i>Allium capeses</i>	Alliaceae	shunkurtata	Spice
53	<i>Guizotia schimperi</i> Sch. Bip.ex Walp	Asteraceae	Cuua	None
54	<i>Acanthus sennii</i> Chiov.	Acanthaceae	Chocha	Fence
55	<i>Anethum foeniculum</i> L	Apiaceae	Wolenga	Spice
56	<i>Bersama abyssinica</i> Fresen	Meliantaceae	Bitanssa	Fence,fairewood,charchol
57	<i>Brucea antidysentrica</i> J. F	Simaroubaceae	Dugeta	Fence
58	<i>Commelina benghalensis</i> L	Commelinaceae	Laaluncha	Fodder
59	<i>Cynodon dactylon</i> L.	Poaceae	Hitichua	Spice
60	<i>Elusine coracana</i> (L.)	Poaceae	Fagajit	Food
61	<i>Momordica foetida</i> Schumach	Cucurbitaceae	Woribeebuta	None
62	<i>Ocimum lamiifolium</i>	Lamiaceae	Minatofa	None
63	<i>Oncocalyx glabratus</i>	Loranthaceae	chati kurumu	None
64	<i>Premna schimperi</i>	Lamiaceae	Xoxxanqgetta	Fence
65	<i>Pycnostachys abyssinica</i>	Lamiaceae	Tontona	None
66	<i>Rumex nepalensis</i> Spreng	Polygoniaceae	Kashala Go'echu	Fodder
67	<i>Thymus schimperi</i> Roninger	Lamiaceae	Zazanchuta	Spice
68	<i>Trifolium rueppellianum</i> Fresen	Fabaceae	Godoro-oo	None
69	<i>Triticum polonicum</i> L.	Poaceae	Gardamu	Food,fodder
70	<i>Verbena officinalis</i> L.	Lamiaceae	Modolita	Fodder
71	<i>Cupressus lusitanica</i> Mill	Cupressaceae	Faranji hooma	Fence,fairewood,house clean
72	<i>Artemisisa absinthium</i> L	Asteraceae	Aguffa	Spice

73	<i>Aframomum corrorima</i>	Zingiberaceae	Wokasha	Spice
74	<i>Citrus aurantifolia</i>	Rutaceae	Lomita	Food
75	<i>Teclea nobilis</i> Del.	Rutaceae	Adara	Fence, firewood
76	<i>Rumex abyssinicus</i>	Polygoniaceae	Shishonda	Fodder
77	<i>Solanum incanum</i> L.	Solanaceae	Homborrit	Fairewood, fence
78	<i>Stephania abyssinica</i>	Menispermaceae	Ma'irasisa	Fodder
79	<i>Ajuga integrifolia</i>	Lamiaceae	Anamuru	Fodder
80	<i>Cucurbita maxima</i>	Cucurbitaceae	Dabaqula	Food
81	<i>Dovyalis abyssinica</i> (A. Rich.) Warb	Flacourtiaceae	Koshim	Fence
82	<i>Phaseolus vulgaris</i> L.	Fabaceae	Wokita	Food, fodder
83	<i>Phytolacca dodecandra</i> L. Herit	Phytolaceae	Haranja	None
84	<i>Hordeum vulgare</i> L	Poaceae	Soa	Food, fodder
85	<i>Mangifera indica</i> L.	Anacardiaceae	Mango	Food, fence, fairwood
86	<i>Albizia schimperiana</i> Oliv	Fabaceae	Maatta	Fairewood, fence
87	<i>Echinops kebericho</i>	Asteraceae	Toosa	
88	<i>Ensete ventricosum</i> (Welw)	Musaceae	Wesita	Food, fodder
89	<i>Justitia schimperana</i> (Hochst. ex Nees)	Acanthaceae	Gulbaana	Fence
90	<i>Zingiber officinale</i> Roscoe.	Zingiberaceae	Zinjbeelu	Spice
91	<i>Podocarpus falcatu</i>	Podocarpaceae	Zagiba	Timber, fairwood, fence
92	<i>Ficus sur</i> Forssk.	Moraceae	odeechuta	Timber, charchol, fairwood
93	<i>Cicer arietinum</i> L.	Fabaceae	Shimbra	Food, fodder
94	<i>Cynodon dactylon</i> L	Poaceae	Qorixxu	foder
95	<i>Saccharum officinarum</i> L.	Poaceae	Shenkora	Food, fodder
96	<i>Impatiens rothii</i> Hook.f.	Balsaminaceae	Gishilt	Food, fence
97	<i>Trigonella foenum-graecum</i> L.	Fabaceae	Abisha	Spice

Appendix IV other uses of medicinal plants in study area

## Appendix V Preparation method of medicinal plants

No	Scientific name	Family name	Local name	Preparation method
1	<i>Embelia schimperi</i> Vatke	Myrsinaceae	Qanquta	Crush seed, add water and drink
2	<i>Asparagus africanus</i>	Asparagaceae	Saretita	Pound, add water and drink
3	<i>Brassica carinata</i> A. Br.	Brassicaceae)	Hamiilu	Cooking and eating with injera
4	<i>Brassica nigra</i> (L.) Koch	Brassicaceae	Sanaficha	Pounding and add water.
5	<i>Capsicum annuum</i> L.	Solanaceae	Qaare barbaru	Grind the leaf and smear in body.
6	<i>Carica papaya</i> L.	Cucurbitaceae	Papaya	Form juice and drink
7	<i>Brassica carinata</i> A.	Brassicaceae	Danqale illita	Ground the seed and mix with water and drink one glass
8	<i>Coffea arabica</i> L.	Rubiaceae	Bunna	Roasted, crushed and powdered the seed of the plant and applied on affected area.
9	<i>Cordia africana</i> Lam.	Boraginaceae	Wanja	Pound its leaf, add water and drink
10	<i>Croton macrostachyus</i>	Euphorbiaceae	Masana	Crush the leaf, mix with butter and cream the affected area until recovery.
11	<i>Datura stramonium</i> L.	Solanaceae	Macharaqa	Crush its leaf and
12	<i>Hygienia abyssinica</i>	Rosaceae	Xeenchuta	Crush seed, add water and drink
13	<i>Eucalyptus globulus</i>	Myrtaceae	Wojju baarzafa	Crush the leaf and creamed at affected area for 3 days
14	<i>Linum usitatissimum</i> L.	Linaceae	Talba	Pound dry seed, cook and eat
15	<i>Lepidium sativum</i> L.	Brassicaceae	Fexuta	Pound dry seed small
16	<i>Ocimum lamiifolium</i>	Lamiaceae	Damakista	Crush the leaf, mix 2-3 drops in the coffee and drink
17	<i>Olea europaea</i> L.	Oleaceae	Weera	Roast the bark, grind and drink with Coffee
18	<i>Schinus molle</i> L. T H	Anacardiaceae	Kundo berbere	Crush the leaf
19	<i>Rhamnus prinoides</i>	Rhamnaceae	Geesha	Eat the raw seed
20	<i>Ruta chalepensis</i> L.	Rutaceae	Xalachuta	Crush the leaf and add in coffee drink
21	<i>Allium sativum</i> L.	Alliaceae	Tuma	Crush the bulb, add in to boiling water and fumigate.
22	<i>Guizotia byssinica</i>	Asteraceae	Nuga	Boil the grinded seed and drink one glass.
23	<i>Cyperus fischerianus</i> A. Rich.	Cyperaceae	Naaqa	Crush the root
24	<i>Hypoestes forskalii</i>	Acanthaceae	Omoruta	Cook freshy leave and drink
25	<i>Leucas stachydiformis</i>	Lamiaceae	Xinbililla	Pound freshy root and drink
26	<i>Orthosiphon suffrutescens</i> J. K.	Lamiaceae	Anganbiisha	Crush freshy leave small
27	<i>Osyris quadripartita</i> Decne	Santalaceae	Kaaruta	Pound freshy root and drink
28	<i>Prunus Africana</i>	Rosaceae	Garbichu	Pound freshy leave, cook and drink
29	<i>Acacia abissinica</i> Hochts	Fabaceae	odorichu	Pound bark, cook and eat

30	<i>Coriandrum sativum</i> L.	Apiaceae	wodimamu	Poun fresshy leave and drink
31	<i>Nicotiana tobacum</i> L	Solanaceae	Tumbeeu	Pounding its leave
32	<i>Ehretia cymosa</i> Thonn.	Boraginaceae	Ulaagaa	Pound fresshy leave,cook and drink
33	<i>Amaranthuscaudatus</i>	Amaranthaceae	Haliba	Pound dry seed,cook and eat
34	<i>Solanummacrocarpon</i>	Solanaceae	Buluta	Cook fresshy leave and eat
35	<i>Daucus carota</i> L.	Apiaceae	Karota	Cook root and eat
36	<i>Colocasia esculenta</i> (L.) Schot	Araceae	Gabiza	Cook its root
37	<i>Euphorbia pulcherrima</i>	Euphorbiaceae	Ceenna	Crush fresshy leave and brush affected area
38	<i>Vernonia amygdalina</i> Del.	Asteraceae	Reejja	Crush its leave
39	<i>Ocimum basilicum</i> L	Lamiaceae	Basolilla	Crush fresshy leave and add with leave coffe
40	<i>Persea americana</i> Mill.	Lauraceae	Abokatuta	Eat fresshy fruit
41	<i>Musa paradisiaca</i> L.	Musaceae	Muuza	Eat fresshy fruit
42	<i>Punica granatum</i> L.	Punicaceae	Romaana	Eat fresshy fruit
43	<i>Euphorbia abissinica</i>	Euphorbitaceae	Carchuta	Eat the latex with injera until healed
44	<i>Teclea nobilis</i> Del.	Rutaceae	adara	Pound its leave anddrink
45	<i>Vernonia amygdalina</i>	Asteraceae	Hebba	Crush leave and drop on affected area
46	<i>Olinia rochetiana</i> A. Juss.	Oliniaceae	sho'mmolluta	Pound leave, add water and drink
47	<i>Euphorbia Candelabrum</i>	Euphorbitaceae	qoomu	Crush its leave and brush affected area
48	<i>Lycopersicon esculentum</i> Mill.	Solanaceae	Timatima	Cook its seed
49	<i>Vernonia amygdalina</i>	Asteraceae	Hebba	Pound its leave and drink
50	<i>Nigella sativa</i> L.	Ranunculaceae	Gamballata xaguta	Pound seed and add water
51	<i>Rubus fruticosus</i> L.	Rosaceae	Hamarouu	Eat seed
52	<i>Allium capeses</i>	Alliaceae	shunkurtata	cut the onion bulb, boil and drink.
53	<i>Guizotia schimperii</i> Sch. Bip.ex Walp	Asteraceae	Cuua	Pound its root and add water and drink
54	<i>Acanthus sennii</i> Chiov.	Acanthaceae	chocha	Pound leave and drink
55	<i>Anethum foeniculum</i> L	Apiaceae	Wolenga	Crush the leaf, add water and drink a cup.
56	<i>Bersama abyssinica</i> Fresen	Meliantaceae	Bitanssa	Brush with leave

57	<i>Brucea antidysentrica</i> J. F	Simaroubaceae	Duqeta	Pound seed and brush affected area
58	<i>Commelina benghalensis</i> L	Commelinaceae	Laaluncha	Crush its leave and brush affected area
59	<i>Cynodon dactylon</i> L.	Poaceae	Hitichua	Pound its leave,add water and drink
60	<i>Elusine coracana</i> (L.)	Poaceae	Fagajit	Pounding its seed and cook
61	<i>Momordica foetida</i> Schumach	Cucurbitaceae	Woribeebuta	Cook and brash on affected area
62	<i>Ocimum lamiifolium</i>	Lamiaceae	Minatofa	Crush its leave and add milk
63	<i>Oncocalyx glabratus</i>	Loranthaceae	chati kurumu	Chew its leave
64	<i>Premna schimperi</i>	Lamiaceae	Xoxxanqqetta	Chew freshy leave
65	<i>Pycnostachys abyssinica</i>	Lamiaceae	Tontona	Crush leave and put on affected area
66	<i>Rumex nepalensis</i> Spreng ,	Polygoniaceae	Kashala Go'echu	Pound its root and drink
67	<i>Thymus schimperi</i> Roninger ,	Lamiaceae	Zazanchuta	Crush its leave and smeall
68	<i>Trifolium rueppellianum</i> Fresen	Fabaceae	Godoro-oo	Crush its leave and drop 2-3 droplet
69	<i>Triticum polonicum</i> L.	Poaceae	gardamu	Pound seed and cook and eat
70	<i>Verbena officinalis</i> L.	Lamiaceae	Modolita	Pound its leave and drink
71	<i>Cupressus lusitanica</i> Mill	Cupressaceae	Faranji hooma	Crush the leaf, add water and drink
72	<i>Artemisisa absinthium</i> L	Asteraceae	Aguffa	Pound its leave and drink
73	<i>Aframomum corrorima</i>	Zingiberaceae	wokasha	Pound its seed and eat
74	<i>Citrus aurantifolia</i>	Rutaceae	lomita	Drink fruit
75	<i>Teclea nobilis</i> Del.	Rutaceae	Adara	Pound leave and drink one cup
76	<i>Rumex abyssinicus</i>	Polygoniaceae	Shishonda	Pound its root, cook and drink one glass
77	<i>Solanum incanum</i> L.	Solanaceae	Hombororrita	Pound fruit and add on affected area
78	<i>Stephania abyssinica</i>	Menispermaceae	Ma'irasisa	Pound leave add on affected area
79	<i>Ajuga integrifolia</i>	Lamiaceae	Anamuru	Pound its leave,add water and dirink one glass
80	<i>Cucurbita maxima</i>	Cucurbitaceae	Dabaqula	Eat fruit
81	<i>Dovyalis abyssinica</i> (A.Rich.)Warb	Flacourtiaceae	Koshim	Eat seed
82	<i>.Phaseolus vulgaris</i> L.	Fabaceae	wokita	Cook its seed and eat
83	<i>Phytolacca dodecandra</i> L. Herit	Phytolaceae	Haranja	Crush the leaf and add one plate in the River
84	<i>Hordeum vulgare</i> L	Poaceae	Soa	Roast the seed until black, sock into water 4 -5days, then give to animal to animal until heal
85	<i>Mangifera indica</i> L.	Anacardiaceae	Mango	Eat its fruit
86	<i>Albizia schimperiana</i> Oliv	Fabaceae	Maatta	Pound its leave and add water and drink
87	<i>Echinops kebericho</i>	Asteraceae	Toosa	Eat the root once
88	<i>3.Ensete ventricosum</i>	Musaceae	Wesita	Eat its stem
89	<i>Justitia schimperana</i> (Hochst.ex Nees)	Acanthaceae	Gulbaana	Pound its leave drink



90	<i>Zingiber officinale</i> Roscoe.	zingiberaceae	Zinjbeelu	Pound its root and drink
91	<i>Podocarpus falcatu</i>	Podocarpaceae	Zagiba	Pound its leave
92	<i>Ficus sur</i> Forssk.	Moraceae	odeechuta	Pound its bark
93	<i>Cicer arietinum</i> L.	Fabaceae	Shimbra	Chew its seed
94	<i>Cynodon dactylon</i> L	Poaceae	Qorixxu	Pound and add water and sheak
95	<i>Saccharum officinarum</i> L.	Poaceae	Shenkora	
96	<i>Impatiens rothii</i> Hook.f.	Balsaminaceae	Gishilt	Eat fruit part
97	<i>Trigonella foenum-graecum</i> L.	Fabaceae	Abisha	

Appendix table V Application of medicinal plants

## Appendix vi

No.	Name	Sex	Age	kebele	Religion
1	Mekiso Dobamo	M	55	Awaye	Chirstian
2	Adanech Shamebo	F	45	Ashira	chirstian
3	Erkalo fuge	M	39	Lada	chirstian
4	Ansho Wagesho	F	60	Lada	chirstian
5	Lego Sodano	F	53	Mino	chirstian
6	Mamo Lerebo	M	48	Mino	chirstian
7	Badore Lambebo	M	54	Awaye	chirstian
8	Lachame Buka	F	36	Awaye	chirstian
9	Sadore Shoge	M	47	walana	chirstian
10	Molla Larago	M	56	walana	chirstian
12	Anshebe Lire	F	57	Ashira	chirstian
13	Abebech Lodamo	F	42	Ashira	chirstian
14	Mathewos Babo	M	37	Mino	chirstian
15	Sidamo Onke	M	61	Mino	chirstian
16	Ayelech Abebe	F	43	Lada	chirstian
17	Ashame Wawo	F	54	Lada	chirstian
18	Doilo Wakena	M	51	Awaye	chirstian
19	Shomoro Bole	M	34	Ashira	chirstian
20	Gorebe Dikaso	F	43	Walana	chirstian
21	Fikiru Abebe	M	25	Walana	chirstian
22	Dolamo Sorato	M	64	Lada	chirstian

## Appendix VI List of key informants

**Appendix VII Specimen collection and identification**



**Appendix VII Specimen collection and identification**