ADDIS ABABA UNIVERSITY

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Title: Diversity and Distribution of Traditional Medicinal Plants in Hadero Tunto Zuria woreda, Kembata Zone of Central Ethiopia

A Thesis Submitted to Department of Zoological Sciences, Addis Ababa, University

In Partial Fulfillment of the Requirements for the Degree of Master of Science in Biology

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GRADUATE STUDIES

THESIS APPROVAL SHEET

This is to certify that the thesis prepared by Desta Abebe, entitled: Diversity and distribution of traditional medicinal plants in Hadero Tunto Zuria Woreda, Kembata Zone of Central Ethiopia and submitted in partial fulfillment of the requirement for the Degree of Masters of Science in Zoological Science complies with the regulation of the University and meets the accepted standard with respect to originality and quality.

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As members of the Board of Examiners of the MSc. in Biology thesis open defense examination, we certify that we have read and evaluated the thesis prepared by Desta Abebe and examined the candidate. We recommend that the thesis be accepted as fulfilling the thesis requirements for the degree of Masters of Science in Biology.

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DEDICATION

This thesis is dedicated to my parents Abebe Boke and Tadelach Gagabo, and my wife Miss Genet Tadewos who invested in me, in my thought, my vision, my personality, and my work habit.

DECLARATION

I declare that this thesis is my original work. I have followed all ethical principles in sample preparation, data collection, data analysis and compilation of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I confirm that I have cited and referenced all sources used in this document. Every serious effort has been made to avoid any plagiarism in the preparation of this thesis paper. Finally, all the materials used in this thesis have been duly acknowledged.

Name: Desta Abebe

Signature: _____

Date: _____

Place: Addis Ababa University

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BIOGRAPHICAL SKETCH

The author, Desta Abebe, was born in Tembaro woreda, Bada kebele, Kambata zone, Southern Ethiopia in 1982 E.C. He began his primary level education (Grade 1 – 8) from 1987 – 2005 E.C at St. Pio primary school. He attended grade 9 – 12 at Mudula secondary school from 2005 – 2007 E.C. Then he joined Hossana Teachers training college and stayed there for three years and graduated with diploma in teaching natural science in 2000 E.C. Then he served Two years in Mandoye primary school by teaching biology grade 7 and 8 students (2001 – 2002 E.C). After that he joined Dilla University to pursue BSc degree in biology in summer service program in 2002 E.C. Then he stayed in Dilla University for five years and graduated with BSc in biology in 2007 E.C. Two years later after completing the degree program, in June 2009 E.C, he joined the school of Graduate Studies at Addis Ababa University to attend his study for MSc degree in biology.

TABLE of CONTENTS

LIST OF TABLES

LIST OF APPENDICES

LIST OF FIGURES

ACRONYMS

IBCR- Institute of Biodiversity Conservation and Research

IUCN- International Union for Conservation of Nature and Natural Resources

WHO- World Health Organization

TMP- Traditional Medicinal Plant

UNESCO- United Nation Education Scientific Cultural Organization

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ABSTRACT

Medicinal Plants has long history of use in Ethiopian and in the world for treatment of different kinds of human and livestock diseases and by its effectiveness of healing ability. 80% of Ethiopian peoples of rural area depend on traditional medicine. As reported in many studies approximately 800 species grown in Ethiopia are used to relief about medicinal conditions. The study was carried out in Hadero Tunto Zuria Woreda, Kembata zone, Central Ethiopia. The study was conducted from March 13 to June 30 2023 G.C. Three kebeles namely (Ha Chacho, Mendoye and Galbe) were selected purposively . The main objective of this study was to document list and use of medicinal plants, distribution and indigenous knowledge of the people in the study area. The purposive and random sampling methods were used to select the three selected kebeles and informants, semi- structured interview was used to collect information from informants. There was diversity of MP from herb up to large trees i.e shrubs were used by (28%) and herbs by (42%) are more dominantly used when compared to trees (19%) and grasses. Also from plant parts leaves and root were used (42%) and (24%) other plants. There was no even distribution of medicinal plants in the different climatic zones, the major plant distribution were seen in high land, mid land and low land (50%) followed by mid land and low land together, high land and mid land (17%).Majority of medicinal plants were mainly found in the forest habitat and in cultivated areas as well as in market places. From 100 medicinal plants identified 72% were used to treat human ailment followed by 16% were used to treat livestock and 12% for both. Some medicinal plants were used to treat both livestock and human disease. The reason to select the area's were, the potential wealth for the presence of many medicinal plants reported to use the MP to alleviate many human and livestock aliments. Descriptive statics, graphs, tables methods were used to analyse the results. The result was different from kebele to kebele because of conservation habit difference of MP in each kebeles, attitude difference and chance of key healer presence in each kebeles, attitude difference to acquire the knowledge from parent and other, this was the matter for result difference in age group, gender. There is a need for to enhancing the conservation of medicinal plants and bring attitudinal change of young generation to use medicinal plants and interest to learn the knowledge of medicinal plant from elders. The government bodies need to give prior attention in the study area towards Exsitu and insitu conservation of medicinal plants and bring attitudinal change of youth generation for continuity of the knowledge across generations.

Key words: Distribution, Diversity, traditional, medicinal, conservation, Ethiopia

1. INTRO DUCTION

Ethiopia is the land of diversity in plant including indigenous plants (Pankhurst, 1965) as well as introduced plants, also diversified language, culture, social life in different climatic condition. Plants are basic sources such as, food, shelter, charcoal and fuel wood (Hamilton, 2003). In addition plants are the Lund of the country because of house construction, fences, edible fruit sources, act as home for wild life's, for environmental balance, protection of soil erosion and to maintain soil fertility, for contribution of fresh air especially oxygen, in the reduction of global warming by capturing high carbon dioxide from atmosphere for photosynthesis purposes, they are grant for grand dame by protect entrance of eroded soil (silts) to the dame because has great effect on power source, attract tourist for visiting purposes and research, serve as refreshing place and also timber mainly in rural areas (Hamilton, 1997, Maundu et al, 2006). The current study was focused on plants which are sources of traditional medicines and have long history in Ethiopia. Plants are used to treat many human diseases and livestock disease. (Dawit Abebe, 1986). Indigenous and local knowledge from elderly person plays a key role to prepare medicinal plants used to treat many diseases. However, there is lack of attention and interest as well as using herbal medicine by youth generation (Dawit Abebe and Ahadu Ayehu, 1993). The diversity and distribution depends on plant species which able to adapt the area that means Dega, Woina dega and Kola (Aklilu, 1974).

Forests are great sources of medicinal plants. Many medicinal plants are obtained from forest i.e sources of medicinal plants. However, the forest areas in Ethiopia have been reduced from 40% a century ago to an estimated less than 3% today due to anthropogenic and natural factors (UNEP, 1983, Kuru, 1991). The current rate of deforestation in Ethiopia is estimated to 160,000 to 200,000 hectare per year, and fertile top soil lost at an estimated rate of one billion cubic meters per year (FAO, 1981, UNEP, 1983, Constable, 1985, Kuru, 1990, Yirda, 1996), resulting in massive environmental degradation and constituting serious threat to forest, in another word also medicinal plants. The drought is one of the abiotic factors threatening factors for many multipurpose plants including medicinal plants. The drought and human activities devastated disappearance of plans as well as medicinal plants as many studies show (Ensermu Kelbessa et al, 1992, Zemede

Asfaw, 2001, Abebe Demissie, 2001). The direct and indirect loss of medicinal plants is associated with the loss of indigenous and local knowledge.

The combined knowledge of traditional medicinal plant used to diagnosis, prevention and elimination of physical, mental or social imbalance and relying exclusively on practical experience and observation handed over from generation to generation , either verbally or in written (WHO, 1978). According to the WHO developing countries primarily depend on herbal medicines to sustain their primary health care need. The countries diverse medicinal traditions comprise a wide range of therapies including inoculation, thermal baths, cauterization, counter- irritation, bleeding, bone- setting, surgery, and a range of spiritual and medico-religious treatments as well as the use of a wide variety of both animal and plant-derived remedies (Pankhurst, 2006). There are some distinctive features in different parts of the world by traditional medicine systems. Likewise, traditional life is painted with the hallmark of wide spread use of traditional medicinal plants with various levels of sophistication within the indigenous medicinal lore of Ethiopia (Pankhurst 2006). Herbalists are considered to be the biggest group that uses medicinal plants. Practitioners use in one way or the other plants and plant products in their medical practices. Some have described the traditional medical system of the country as medico-religious system (Dawit Abebe and Ahadu Ayehu, 1993) (others as magi co-religious). Such description is due to close interaction of the Christian, Islamic, and indigenous religions. The traditional medical system in the county sometimes displays features related to magic, beliefs and faith in some areas. It is widely believe in the country that the skill of traditional health practitioners is related to religion and knowledge on traditional medicines is passed orally from father to a favorite child usually a son or is acquired by some spiritual procedures. Thus, traditional healing knowledge is guarded by certain families or social groups (Mekonnen Bishaw, 1991).

Herbal medicines are essential in the primary health care of individuals and communities in many developing countries and they are safer than modern medicines (Sheldon et.al, 1997). Among many world countries Ethiopia also has long history of using herbal medicines to treat many human and livestock ailments (Dawit Abebe and Ahadu Ayehu, 1993). Before the introduction of different modern medicine, different parts of the plants

were used around the world to heal the disease both from human and animals, for instance leaf, root, stem, flower, bark and others.

Acquisition way of the traditional knowledge mainly depend on oral method, by such methods the knowledge could be transferred from generation to generation, that means it is not documented mainly (Mekonnen Bishaw, 1991). Modern medicine has its roots in traditional medicine and it is likely that many importance new remedies will be discovered and commercialized in the future as it has been now by following the leads provided by traditional knowledge and experience.

More than 95 percent of traditional medicinal preparations in the country are of plant origin (Dawit Abebe, 1986). One of the advantages of traditional medicine due to low cost for the society than modern medicine (Dawit Abebe and Estifanos Hagos, 1991, Getachew Addis et.al, 2001).

In Ethiopia 80 percent of peoples depend on the traditional medicines (Dawit Abebe and Ahadu Ayehu, 1993). Also wide spread use of traditional medicines by rural and urban areas of the country. Plant conservation is very important for sustainable use and to preserve medicinal plant to next generation both INSITU and EXSITU conservation. This will bring the best means to ensure the conservation of different plant species by putting strategies to protect from threatening activities such as over exploitation and over grazing (IUCN, 1993; Jarvis, 2000).

Establishing protected areas including national parks, forest reserves, strict nature reserve have great role in conservation. Botanic garden and other types of gardens, seed banks, and tissue culture units could play further major roles in medicinal plant conservation, intervention, domestication and breeding program (Hamilton, 2003, Maundu et al, 2006). Some medicinal plants have diverse use in addition to medicinal purposes, such as sources of food, fuel, charcoal, timber production, fences, income sources and a means of cash crop (Hamilton, 2003).

The indigenous and local knowledge of elders and key healers related with religious persons are more of secure and even difficult to easily get information from them. Modern studies on medicinal plants were started in 1973 up to recent period. Considerable researches have been done on medicinal plants, particularly on indigenous and local knowledge of traditional medicinal plant (Teshale Sori et al, 2004). However in

most part of Ethiopia diverse medicinal plant and indigenous and local knowledge diversity was not documented (Abebe Demissie, 2001, Medhin Zewudu, 2002 and Kebu Balemie et al, 2004). In Kembata Zone, in Hadero Tunto Zuria Woreda in the selected three Kebeles indigenous and local people depend on plant for different purposes in addition to medicinal purposes, such as fuel wood, charcoal, cash crop and house construction. The indigenous and local knowledge transfer to the next generation about medicinal plant in the study areas was through oral transfer. The diversity and distribution difference of medicinal plant in the study area arise from topography difference.

The geographic diversity couples with different ethnic groups with different cultural diversity that make Ethiopia the home for more diversity of traditional knowledge, practice and use of traditional medicine(Mirutse Giday, 2001).

Like many other parts of the Ethiopia, indigenous people of Hadero Tunto Zuria Woreda have the knowledge on the traditional medicinal practices. For instance, more dependency of Hadero Tunto Zuria Woreda people on traditional medicine in previous time because of inadequacy of health services coverage and the nature of some ailments, which preferred to be treated by communities. But from time to time dependence of the people on traditional medicine are declined and more dependency on modern medicine by young generation whom has got modern education. Leaves and fruits of different tree species (cultivated and wild) are essential to alleviate livestock and human health related ailments food in- security especially in the developing countries like Ethiopia.

Medicinal plants are also marketable. Mostly garden cultivated compared to wild plants. Herbs are the most dominant medicinal plants which are more common in market places in the study areas. The medicinal plants are used in addition- to medicinal values, it becomes for immediate income generation of the society in the study area

Ethno -botany studies about indigenous knowledge of people on plant diversity, how local people conserve them, use plants for different purposes, how the indigenous knowledge obtained and transferred from generation to generation and benefits of indigenous knowledge for the world and Ethiopian peoples. The people lives in the Hadero Tunto Zuria Woreda have long practice using traditional medicinal knowledge for alleviation of human and livestock (traditional healer). This knowledge has long

history for the people of Hadero Tunto Zuria woreda and Kembata Zone. The knowledge obtained from traditional healers and knowledgeable people. The source indigenous knowledge obtained is quite different; mostly from very close parents, some by observation and religious practice. The Hadero Tunto Zuria Woreda is considered as a favorable Woreda for the diverse variety of plant species because of the different agro ecological zones. The diverse medicinal plants species in the study area is as the result of different diverse agro ecologies, culture, and ethnic group as well as of the people practice and experience in using medicinal plants.

1.1 OBJECTIVES OF THE STUDY

1.1.1 GENERAL OBJECTIVE

- ✓ To understand the diversity, distribution and use of medicinal plant in Hadero Tunto Zuria Woreda , Kembata .Zone, Central Ethiopia

1.1.2 SPECIFIC OBJECTIVES

- ✓ To identify diversity of indigenous medicinal plants in Kembata zone, in Hadero Tunto Zuria Woreda.
- ✓ To document diversity and distribution of medicinal plants in Kembata Zone, in Hadero Tunto Zuria Woreda
- ✓ To compare the status and usage of medicinal plant in Kembata Zone, in Hadero Tunto Zuria Woreda.

1.2 RESEARCH QUESTIONS

- ❖ what is the mechanism of identifying the diversity, distribution and use of medicinal plants in different agro-ecologies in Kembata Zone, in Hadero Tunto Zuria Woreda
- ❖ How can the people of HaderoTunto Zuria Woreda document the medicinal plants?
- ❖ What is the gap between on using MP in today's generation and previous?

1.3 STATEMENT OF THE PROBLEM

In Ethiopia by alarm rate the natural resources including medicinal plants and forest are declining from time to time by deforestation, overgrazing, charcoal production and using

timber production, settlement of people, population explosion and unwise use of these and this like resources. Because of many indigenous plants are sources of traditional medicines (its stem, root and leaves) as mentioned in the world and in Ethiopia in many researches, scientific journals?

Traditional medicinal are cultural accepted, low coast, and high treating efficiency for example *H.abyssina*, but now a day the knowledge of key healers is dieing with them because of they lack encouragement from government and lack of attention from youth generation and they mainly focus on modern medicine.

Many medicinal plants are also disappearing because of lack of conservation habit in the people in home garden, no wise use of medicinal plant, negative attitude to grow in home garden.

1.4 SIGNIFICANCE OF THE STUDY

The study is important to know the distribution, diversity and use of traditional medicines in the study area and identifying the gap of people on its conservation, cultivation on medicinal plants. Therefore the problem that was discussed may have the following significance.

- Contributing to enhance the attitude of youth generation on the use of traditional medicines.
- Encouraging the traditional healers on how using the medicinal plants in a sustainable manner.
- Developing attitudinal change particularly on young generation about the significance of medicinal plants.
- helping to other researchers a stepping stone for further study on investigation of how, why and for what purpose, which part of medicinal plants used to treat for what type of disease?.

1.5 SCOPE OF THE STUDY

This study limited geographically, thematically and methodologically. Geographically, the study emphasized only on three rural Keble's that is found in Hadero Tunto Zuria Woreda. The scope of this study also limited to diversity, distribution and use of medicinal plants in Kembata Zone in HTZW.

2. LITERATURE REVIEW

2.1. TRADITIONAL MEDICINES

Traditional medicines is defined as “the combined or experienced all the knowledge and practices, used to diagnosis, prevention and elimination of physical, mental or social imbalance and relying exclusively on practical experience and observation handed down from generation to generation, either verbally or in writing”(WHO, 1978). Most developing countries practices of using of traditional medicines primarily in health care systems. It has maintained its popularity in all regions of the developing world. According to the WHO 80% of the developing countries is unable to make available pharmaceutical drugs and depend on traditional herbal medicines to sustain their primary health care needs. The most concerns of traditional treatment include the use of plant extract or their active ingredient (WHO, 2003). Traditional medicine is greatly based on herbs and it still supports the primary health care of more people worldwide than ‘conventional’ or modern medicine. Herbal medicines are assumed to be of great importance in the primary health care of individuals and communities in many developing countries as the herbal medicines are comparatively safer than modern medicine (Sheldon et.al, 1997).Thus, simultaneously the need for basic scientific investigations on medicinal plants using indigenous medicinal systems becomes ever more relevant (Heinrich, 2000).

2.2. TRADITIONAL MEDICINE IN ETHIOPIA

Among from the world countries Ethiopia has a long history on the use traditional medicine to treat disease (Pankhurst, 1965). The ways of using traditional medicines are in Ethiopia are different depends on the difference in cultures and norms. Traditional medicine healing practice has to account with the protection and promotion of human physical, spiritual, social, mental and material wellbeing in addition to cure the disease (Mekonnen Beshaw, 1991). Before the introduction of biomedicines the traditional forms of therapy had been the only health care system which was available in the early 1900s. The traditional medicine comprise a wide range of therapies including inoculation, thermal baths, cauterization, counter- irritation, bleeding, bone- setting, surgery, a range of spiritual and medico-religious treatments as well as the use of a wide variety of both

animal and plant-derived remedies (Pankhurst, 2006). There are some distinctive features in different parts of the world by traditional medicine systems. Likewise, traditional life is painted with the hallmark of wide spread use of traditional medicinal plants with various levels of sophistication within the indigenous medicinal lore of Ethiopia. Herbalists are considered to be the biggest group that uses medicinal plants. Practitioners use in one way or the other plants and plant products in their medical practices. Some have described the traditional medical system of the country as medico-religious system, others as magi co-religious. Such description is due to close interaction of the Christian, Islamic, and indigenous religions (Dawit Abebe and Ahadu Ayehu, 1993). The traditional medical system in the county sometimes displays features related to magic, beliefs and faith in some areas. It is widely believe in the country that the skill of traditional health practitioners is related to religion and knowledge on traditional medicines is passed orally from father to a favorite child usually a son or is acquired by some spiritual procedures. Thus, traditional healing knowledge is guarded by certain families or social groups (Mekonnen Bishaw, 1991).

2.3. INDIGENOUS KNOWLEDGE AND MEDICINAL PLANTS

In the countries of the world there exist traditional knowledge related to the health of humans and animals. It is usually unwritten and preserved in the culture through oral tradition. It refers to the knowledge system of indigenous people minority cultures (UNESCO, 1994). In the scientific view point, traditional knowledge is first and for most a resource which is considered as a body of information and skill developed by a group of people over time (Nakashima, 2000). In the past studies, many researchers have expressed their appreciation of the wealth of useful information embedded in traditional knowledge and recognized the utility of integrating scientific and traditional knowledge (Martin, 1995; Cotton, 1991; Balick and Cox, 1996b). However, the integration of indigenous knowledge into science requires the extraction of relevant knowledge through a process of scientific validation and evaluation in order to identify the useful information, objective from subjective and the indigenous science from indigenous belief (Nakashima, 2000). The body of traditional knowledge is dynamic and practitioner make efforts to widen their knowledge exchange of information with each other through reading of traditional pharmacopeia. The, modern medicine and introduced culture issues

involved in changing the focus of people's education endeavors to indigenous knowledge. This modernization has been accompanied by the inability of people, particularly the young to recognize value in traditional ways as related to their daily lives (Dawit Abebe, 2001). The majority of people in developing countries will continue to rely on non-western medicine for much of their primary health care. In parallel ways, there will be continuing declines in traditional knowledge about medical plants and traditional medical systems. As each generation matures, skills perceived as immediately useful are gained while others with a lesser perception of immediate value may be lost (Hamilton, 2003).

Plants have always been of central significance to human welfare. They provide food, fuel, medicine as well as material for construction and the manufacture of crafts and many other products for indigenous people (Hamilton, 2003). All cultures from ancient times to the present day have used plants as sources of medicines. A medicinal plant is any plant, which in one or more of its organs contains active ingredients which can be used for therapist purposes or contain foundation compounds that can be used for synthesis of useful drugs (Sofowora, 1982). Thus, plants have formed the bases of traditional medicine system that existed for thousands of years and continue to provide sources of remedies (Balick and Cox, 1996a).

Modern medicine has its roots in ancient medicine and it is likely that many important new remedies will be discovered and commercialized in the future as it has been now by following the leads provided by traditional knowledge and experience.

2.4. THE IMPORTANCE OF TRADITIONAL MEDICINAL PLANT FOR HUMAN AND LIVESTOCKHEALTH CARE SYSTEM

Traditional medicinal plants have played a vital role in the prevention and treatment of diseases since ancient times. Medicinal plants and knowledge of their uses provide a vital contribution to human and livestock health care needs. More than 95% of traditional medical preparations in the county are of plant origin (Dawit Abebe, 1986). The importance of medicinal plants to treat human livestock ailments in most parts of Ethiopia has been stated by various studies (Dawit Abebe, 1986; Mesfin Tadesse and Sebsebe Damissew, 1992; Dawit Abebe and Ahadu Ayehu, 1993; Teshal Sori et al; 2004; Miruste Giday, 2007; Haile Yineger et al, 2007; Ermias Lulekal et al, 2008). Traditional

medicine remains the main resources for a large majority of the people in the country for treating health problems. It also provides traditional medical consultancy including the consumption of the medicinal plants which has a much lower cost than modern medical attention (Dawit Abebe and Estifanos Hagos, 1991; Getachew Addis et al, 2001).

Traditional medicine has remained as most affordable and easily accessible sources of treatment in the primary health care system of resource poor communities. The local therapy by practitioners is used as means of medical treatment for such communities. Thus, the value and the role of these traditional health care systems will not diminish in the future because they are both culturally viable and expected to remain affordable while the modern health care service is both limited and expensive (Dawit Abebe, 2001). Medicinal plants are important element of indigenous medical system in Ethiopia like other countries. They have been used as traditional medicine to treat different human ailments and livestock by the local people in different regions of the country. More than 80% of the people on the country are dependent on plants for their health service (Dawit Abebe and Ahadu Ayehu, 1993).

The wide spread use of traditional medicine among both urban and rural population in the country has attributed to cultural acceptability, efficiency against certain type of diseases, physical acceptability and economic affordability as compared to modern medicine. The dependence is due to rapid increasing human population along with cultural resistances towards the use of modern medicines (Dawit Abebe, 2001), insufficient and inaccessible modern health care service of the majority of the local communities (Haile Yineger et al; 2008). The indigenous people of the country have also used traditional veterinary methods to treat livestock diseases for generations. The use and application of traditional medicine to veterinary medicine is mainly concerned with folk beliefs, knowledge, skills, methods and practices which are used in the health care of animals. The knowledge varies from region to region and from community to community (Fasil Kibebew, 2001). Ethno veterinary practice comprises traditional surgical techniques, traditional immunization, magi co- religious practices and the use of herbal medicines to treat livestock diseases (Tafesse Mesfine and Mekonnen Lemma, 2001).

The indigenous people of the country also employed plants for the largest component of diverse therapeutic elements of traditional livestock health care practices (Teshale Sori et

al; 2004). It has been developed by trial and error experimentation (Asaye Bekele and Abiy Musa, 2009). The relationship between the use of medicinal plants in animals and humans is rather complex. However, an overlap in use of plant remedies for the same indications in animals and human beings many occur pointing to a theory that humans may have tried these remedies in animals before they used them for their own medical problems. Alternatively, humans may have used their overall arsenal of medical plants to treat animals, irrespective of whether or not they used the remedies themselves (Fekadu Fullas, 2010). It is estimated that about 90% of the livestock population are treated with traditional medicine (Dawit Abebe, 1986).

The dependency on the use of traditional medicine like the use of traditional medicine for the treatment of human ailment is due to modern veterinary medicine is not well developed in the country as well as there are no modern drugs adequately available to fight livestock diseases (Miruste Giday and Gobena Ameni, 2003).

2.5. THE INTEGRATION OF MODERN AND TRADITIONAL MEDICINE

The term traditional medicine is used to explain the traditional medical practice that has been in existence even before the advent of modern medicine. It is still widely accepted and used to prevention and treatment of physical and mental disorders as well as social imbalance. It continues to be the best alternative care available for the majority of the global population, particularly for those in the rural areas of developing countries because of its intrinsic qualities, unique and holistic appearances as well as its accessibility and affordability (Dawit Abebe and Ahadu Ayehu, 1993; Getachew Addis et al., 1999).

The traditional medicinal system has been fore sighted very closely from the scientific angle in an attempt to make it more acceptable to systematic investigation to provide world of evidence based medicine. Modern medicine has benefited a lot from traditional medicine looking back from its origins. The traditional uses of medical plants have provided key leads for derivative of modern medicine. A large amount of modern pharmaceutical agents has been derived from such information which was eventually traced back to traditional uses of medical plants. Modern medicine is primarily interested in the recognition and treatment of diseases where as traditional medicine seeks to provide meaning full explanation for illness and to respond to the personal, family and community issues surrounding illness (Fekadu Fullas, 2007).

Ethiopian tends to depend on more traditional medicine in spite of modern medicine becoming more wide spread in the country. Conventional medicine services remain concentrated in urban areas and have failed to keep place with the growing population. More over modern medicine has become more focused on preventative measures and people seeking curative practices rely on indigenous medicine as primary source for health care (Dawit Abebe and Ahadu Ayehu, 1993).

In Ethiopia traditional medicine, the issue of health is seen holistically and not separated into physical health and mental health. It consists of various treatment modalities but the bulk of it employs medicinal plants as part of the treatment regimens. Consistent with the prevailing thoughts of the time, many of the old treatment methods were, as can be expected, steeped in magi co-religious beliefs. As time went by traditional medicine started receiving fresh perspective. A number of medicinal plants survived scientific scrutiny to varying degrees. Therefore, it suggested that integration of traditional and modern health care systems can solve much of the problems by providing basic health care services for the people in developing countries particularly the undeserved majority (WHO, 1978; Mwambazi, 1999).

2.6. CONSERVATION AND THREATS TO MEDICINAL PLANTS

2.6.1. CONSERVATION OF MEDICINAL PLANTS

Conservation is defined as a planned management of a natural resource to prevent exploitation, destruction for the needs of future generation (IUCN, 1980). It involves a careful preservation and protection of something, especially planned management of a natural resource to prevent neglect, over exploitation or even destruction of habitats. The vegetation of the world is being change or destroyed at alarming rate. Thus, plant conservation should be aimed at securing robust management systems in favor of conservation or sustainable production at sites where the medical plants grow. The best means of conservation is to ensure that the populations of species of plants continue to grow and evolve in the wild in their natural habitats. In situ conservation is one of the conservation strategies of species protecting and conserving the remaining natural area where they grow (IUCN, 1993; Jarvis, 2000).

Establishment of national system of protected areas can serve as an essential an dote to habitat destruction, a major means of a reservoir of medicinal species and a means of maintaining ecosystem functions that are essential to human health. Management plans protected areas need to provide for the appropriate use of medicinal species. Protected area establishment can be very useful for the conservation of medicinal plants. There are many types of protected area establishments including national parks, forest reserves, strict nature reserves, etc. Generally serving various purposes in addition to biodiversity conservation and with various rules applying to the conservation and collection of medicinal plants (Hamilton, 2003; Maundu et al, 2006). Plant species can be found away from the sites where they naturally occur in the range of contexts, including in botanic and other types of gardens, seed banks, tissue culture units, etc. This is conservation strategy is conservation of species by collecting seed to store germplsm banks or by propagating plants in the botanical garden technique is known as ex situ conservation. Priority for ex situ conservation should be given to species whose habitats may have been destroyed or cannot be safe guarded (IUCN, 1993).

Botanical gardens can play further major roles in medicinal plant conservation through developing propagation and cultivation protocols, and under taking programmers' of domestication and variety breeding. Therefore, conservation areas around the globe provide the environmental services and harbor biological organisms important to local communities and to the world as a whole (Martin, 1995). Because of the value of these resources for local health care or income, it is believed that a focus on medicinal plants in conservation or development carries the potential to save many other types inhabitants of those habitats which are valued for their medicinal plants. Thus, the presence and sustainable use of medicinal plants can be a key to conserving the whole habitats (Hamilton, 2008). Human activities have greatly reduced biodiversity of the world in various ways. Habitat loss as humans develop land and water for agriculture, grazing livestock, and unsustainable use such as draining wet lands and deforestation for agricultural land and polluting the air, soil and water through unwise use of resources greatly affect biodiversity (IBCR, 2001).

Bodies of indigenous knowledge are structured by systems of classification, sets of empirical observation about local environments, and systems of self- management that

governs resource use (Zemede Asfaw, 2001; Miruste Giday, 2001). Employing the traditional means of preserving biodiversity of the threatened biota is important. Traditional protection or community based protection of threaten biodiversity by limiting over exploitation and deforestation contribute a lot in conservation of biodiversity in general and medicinal plants in particular (IBCR, 2001). Effective of conservation of biodiversity can only be achieved through the sustained efforts of involving to participate the rural communities who largely depend on local biodiversity for their livelihoods (Hamilton, 2003). Thus, medicinal species are a subset of biodiversity with particular relevance to people; diverse serious efforts to record their distribution and subsequently to monitor their status and trends (Maundu et al, 2006). This is attributed to the message "saving life by saving biodiversity" which more directly related to the life of every one (Debela Hunde, 2007).

2.6.2. THREATS TO MEDICINAL PLANTS

Many of the threats to medicinal plant species are similar to those causing endangerment to plant diversity generally. The most serious proximate threats generally are habitat loss, habitat degradation and over harvesting (Hamilton, 1997; Maundu et al; 2006). Medicinal plants can have other uses besides as source of medicines, and threats from over harvesting may be due to effects of collection for purposes other than medicinal. The majority of species of plants in traditional or herbal medical treatments are harvested in the wild rather than cultivated. As a result, many plant species have become extinct and some are endangered. It is therefore, necessarily that systematic cultivation of medicinal plants be introduced in order to protect threatened species. As population grows, demands for traditional medicines will increase, and pressure on medicinal plant resources will become greater than over (Hamilton, 2003). Like other developing countries, the loss of valuable medicinal plants in Ethiopia due to population pressure, loss of habitat, agricultural expansion and deforestation is widely reported by different workers in Ethiopia (Ensermu Kelbessa, et al., 1992; Zemede Asfaw, 2001; Abebe Damissie, 2001; Medhin Zewudu, 2002; Kebu Balemie et al., 2004).Thus, documentation of medicinal use of plants is becoming increasingly urgent because of the rapid loss of the natural habitat for some of these plants due to anthropogenic activities.

High forests, either coniferous or broad leaved vegetation, covered 35-40 percent of Ethiopia before human settlement took place. With inclusion of savanna wood lands, some 66 percent of the country was originally covered with forest or wood lands (Briten bach, 1961, wood 1990, Kuru 1990, Yirdaw 1996).

Over the last 3000 years there has been progressive deforestation, which has accelerated tremendously during the last century. Rapid population growth, extensive forest clearing for cultivation, overgrazing , movement of political centers, and exploitation of forests for fuel wood and construction materials without replanting reduced Ethiopia's forest area to 16 percent in the 1950s and to 3.1 percent by 1982 (UNEP 1983). Further estimates of the distribution of forest and wood land areas based on information from LAND SAT image (1979) revealed that 2.8 percent of the land surface is under forest and wood land (Kuru 1991).

3. RESEARCH METHODOLOGY

This chapter deals about the study area, research design, method of the research, source of data, sampling techniques, data collection instruments, procedure of data collection and method of data analysis.

3.1. Description of the Study Area

In Kembata Zone there are 8 Woredas and six reform administrative towns:-

The zone is found in the NE part of Central Ethiopia state of southern Ethiopia. It is located between latitude 7.08—7.30^{0}N and 37.72—38.04^{0}E longitude and topographically the zone lays between altitudinal range of 501m above sea level and 3080m above sea level.

The study was conducted at Hadero Tunto Zuria Woreda (HTZW) that is found in the Kembata zone of Central Ethiopia. It is one of 8 woreda and three reform administrative towns in the Kembata Zone (KT). The HTZW consists of 14 Kebeles that use both crop cultivation livestock production as the major economic activities.

The study area found at distance of 291km south of Addis Ababa and 151km from former SNNP Hawassa and 32km from KT zone.

HTZW is boarded in the south by Dawuro zone, by south east with Woliata zone, by south west with Tembaro woreda, and south north with Hadiya zone.

The study area is rich in cash crop, for instance coffee, ginger, mango, avocado mainly in Kola and partial Woina dega. Also cereal crops, enset harvested.

The geographical location of HTZW is 7^{0}03’00’’ to 7^{0}27’00’’ North latitude and 37^{0}20’00’’ to 37^{0}42’30’’ East longitude (fig2).

Fig 2: Location map of the study area (Adopted by the investigator, 2019)

Source Ethiopia GIS (2013)

The topography of the HTZW is characterized by varieties of land forms. The highest peak of the Woreda is about mean 2400m above sea level and the lowest point of the Woreda is also 500m above mean sea level (HTZW Administrative office, 2018). The study area has a bimodal type of rain fall with March as peak for the small and July for big rain seasons. The rain fall pattern is characterized by small rain in spring and bigger in summer with May as a dry spell.

According to HTZWEPO, 2017 report the vegetation caver of HTZW is categorized as vegetation of temperate and sub- tropical lands.

Based on the 2007 sample survey conducted by the (CSA, 2012), the total population in the Woreda are 98,375 of whom 48,548 were men and 49,827 women, 23,539 or 23.93% of its population are urban dwellers. Majority of the inhabitants (91.8%) were protestant, 4.79% practiced Ethiopian Christianity, 5.36% were Muslim and 2.51% were catholic.

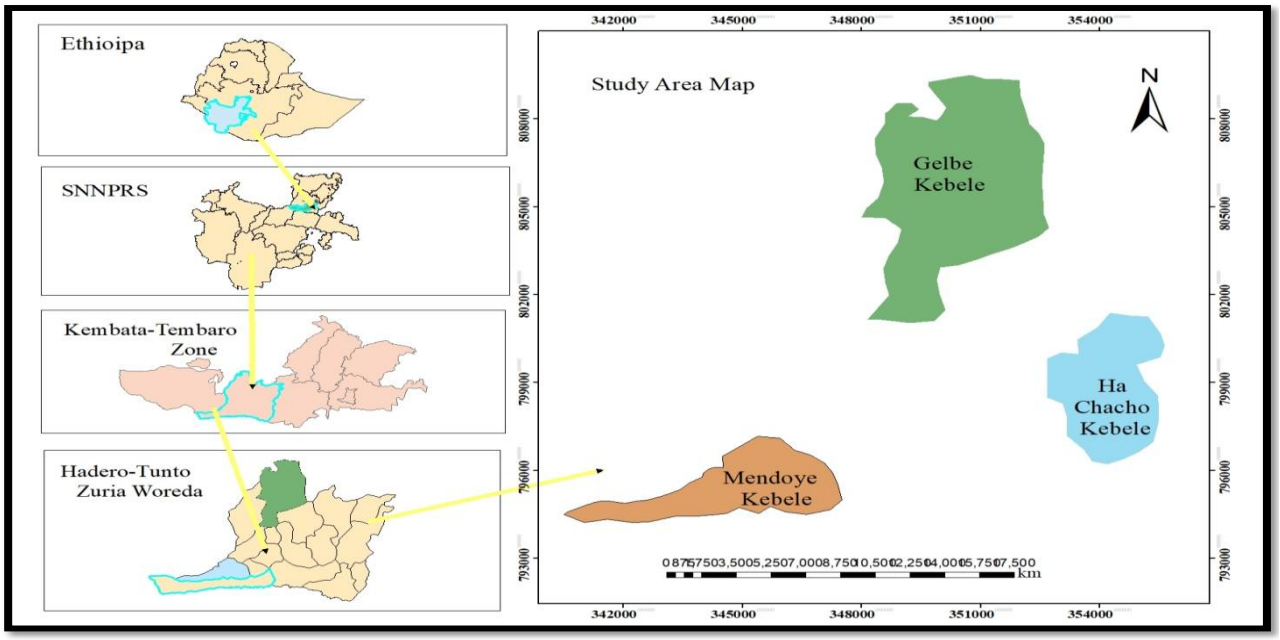

Figure 1: Map of the study Area.

Source: Own sketch from Ethio-GIS (2021).

Figure 1 : Map of the Study Area

3.2. RESEARCH DESIGN

In order to identify the diversity, distribution and use of medicinal plants in the study area simple random purpose full method was used.

3.3. SOURCES OF DATA

The information gathered from primary and secondary sources. According to this, the researcher was gathered primary data from the three selected Kebeles, of HTZW.

3.4. SAMPLING AND SAMPLING TECHNIQUES

The study involved 120 (66 male and 54 female) informants from three kebeles, comprising 5 key informants, knowledgeable elder and local user communities.

3.5. DATA COLLECTION INSTRUMENT

The researcher collected data using semi structured interview.

3.6. DATA ANALYSIS

Collected data of medicinal plants were subjected to Microsoft Excels 2007 for descriptive statistics. Graphs, tables, direct matrix ranking and priority ranking exercises used for data analysis.

4. RESULTS

4.1. DEMO GRAPHING INFORMANTS

Informants were selected based on their age, educational level, occupation, as well as marital status

Table 1; DEMOGRAPHIC INFORMATION IN HADERO TUNTO ZURIA WEREDA

Total	Age group	Educational level %	Occupation	Gender %	Religious	Marital status
30	20-30	Illiterate=5 Only read and write=5 Modern education=20	Farmer=8 House wife=5 Student=10 Gov employ=7	Male=18 Female=12	Protestant=22 Orthodox=8 Muslim=0	Married=10 Single=20 Divorced=0
45	31-40	Illiterate= 14 Only read and write=13 Modern education=18	Farmer=15 House wife=15 Student=5 Gov employ=10	Male=25 Female= 20	Protestant=32 Orthodox=12 Muslim=1	Married=30 Single=7 Divorced=8
45	41-70	Illiterate= 20 Only read and write= 18 Modern education=7	Farmer=20 House wife=17 Student=2 Gov employ=6	Male= 23 Female=22	Protestant=35 Orthodox=10 Muslim=0	Married=38 Single=2 Divorced=5

4.1.1. DISTRIBUTION OF MP IN DIFFERENT AGRO ECOLOGY

Table 2: DISTRIBUTION OF MP IN DIFFERENT AGRO ECOLOGY IN HADERO TUNTO ZURIA WEREDA

Medicinal plants were collected across the different agro ecological zones of the study area

Agro –ecology	**Number of plants/ different ecology**	**Rank**
High- land only	1	5th
Mid- land only	0	6th
Low- land only	6	4th
In above three	50	1st
High and mid land	17	3rd
Mid land low land	26	2nd

4.1.2. DIRECT MATRIX OF USE DIVERSITY OF PLANT

This rank was made on six multipurpose medicinal plants and direct matrix ranking exercise was performed by given score of five to most dominant by role to one for least dominant in role.

Table 3: USE DIVERSITY MP IN HADERO TUNTO ZURIA WEREDA

Diverse use Medicinal Plants	*Eucalyptus globules*	*Hagenia abyssinica*	*Acacia abyssinica*	*Coffea arabica*	*Moringa stenoptela*	*Cordia africana*
Incomesource	5	3	4	2	5	2
fuel wood	4	3	3	3	3	3
Construction	4	2	5	4	3	2
Medicine	5	4	3	2	4	1
Food	4	4	4	2	2	2
Total	22	16	19	13	17	10
Rank	1st	4th	2nd	5th	3rd	6th

4.1.3. PARTS OF PLANTS USED

Table 4: PARTS OF PLANT USED IN HADERO TUNTO ZURIA WEREDA

Plant parts	Total number of plant parts
Root only	24
Shoot	1
Whole plant	1
Leaf	42
Seed	12
Stem	2
Fruit	7
Branch	1
Flower	1
Bark	2
Leaf and seed	1
Leaf and stem	2
Seed and fruit	1
Fruit and flower	1
Latex	1
Leaf and fruit	1

4.1.4. HABIT

Table 5: MP HABIT IN HADERO TUNTO ZURIA WEREDA

HABIT	TOTAL NUMBER	RANK
Herb	42	1st
Shrub	28	2nd
Tree	19	3rd
Grass	1	5th
Climber	3	4th
Runner	1	5th

4.1.5. ROUTE ADMINISTRATION

Table 6: ROUTE ADMINISTRATION IN HADERO TUNTO ZURIA WEREDA

Rout administration	Total number	Rank
Ear	1	5th
Nasal	2	4th
Eye	1	5th
Oral	61	1st
Dermal	23	2nd
Oral and nasal	2	4th
Oral and dermal	9	3rd
Eye and dermal	1	5th

4.1.6. PREPARATION

The method by which medicinal plants were prepared is summarized as follows

Table 7: METHOD OF PREPARATION IN HADERO TUNTO ZURIA WEREDA

Mode of preparation	Total	Rank
Crushing	44	1st
Crush and squeezing	7	4th
Crushing and powdering	2	6th
Crushing and harvest	1	7th
Crush and cook	2	6th
Squeezing	17	2nd
Boil	2	6th
Cut	2	6th
Harvest	13	3rd
Bathing with water	1	7th
Squeezing and warm	1	7th
Chew	6	5th
Warm	2	6th

4.1.7. Application

The way by which medicinal plants taken in the study area is summarized as follows

Table 8: WAY OF APPLICATION IN HADERO TUNTO ZURIA WEREDA

Application mode	Total	Rank
Drinking	47	1st
Eating and creaming	2	4th
Cream/ointment	12	3rd
Eating	25	2nd
Inhaling and creaming	1	5th
Drinking and creaming	2	4th
Drinking and eating	1	5th
Inhaling	1	5th
Tie to neck/hung	2	4th
Chewing and dropping	2	4th
Dropping	2	4th
Drinking and bathing	1	5th
Chewing and drinking	2	4th

4.1.8: CONDITION OF MEDICINAL PLANTS USED

Medicinal plants are used in different forms depending on the type of plants and the type of illness the people encountered.

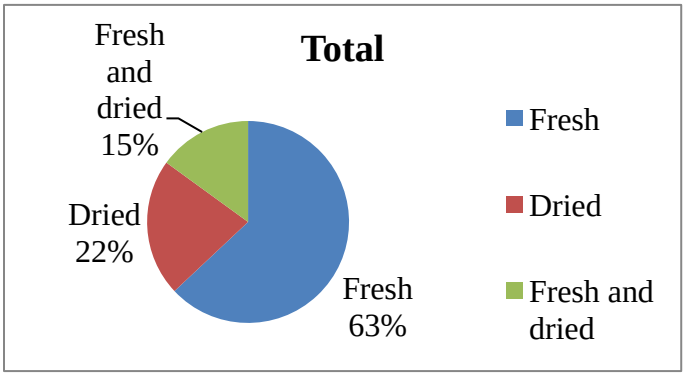

Fig 2: THE CONDITION OF PLANT USED IN HADERO TUNTO ZURIA WEREDA

4.1.9: MP USED FOR HUMAN AND LIVE STOCK

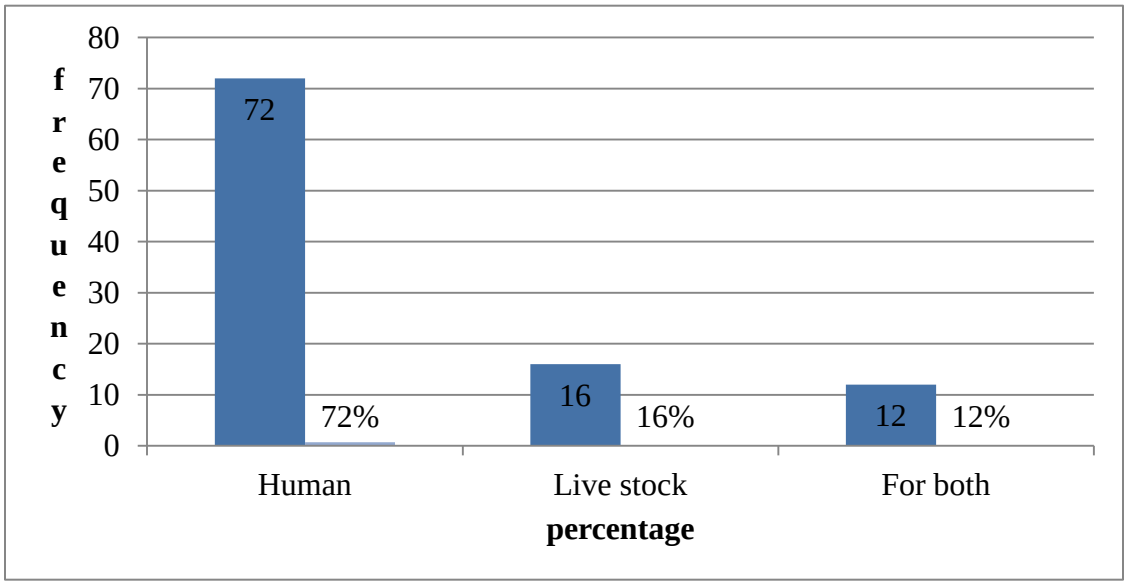

Fig 3: MEDICINAL PLANTS USED FOR HUMAN AND LIVE STOCK USED IN HADERO TUNTO ZURIA WEREDA

4.2 KNOWLEDGE TRANSFER

Ways of transfer of indigenous and local knowledge and acquisition about medicinal plants across transferred from generation to generation is summarized below

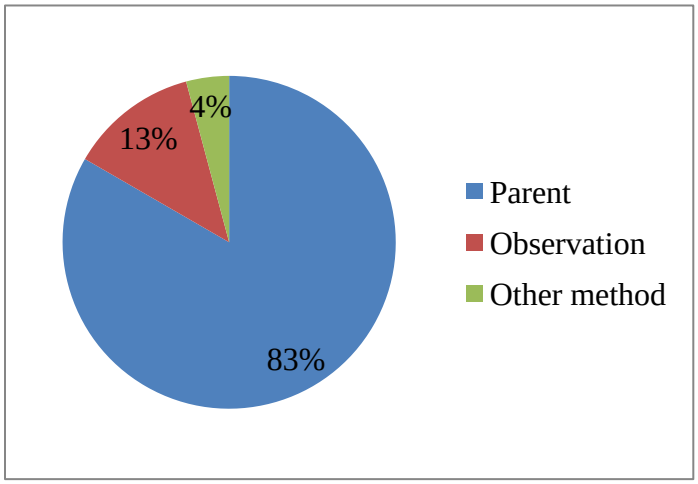

Fig4: INDIGINOUS AND LOCAL KNOWLEDGE ACQUISITION METHOD IN HADERO TUNTO ZURIA WEREDA

4.2.1. PRIORITY RANKING TO THREATS OF MEDICINAL PLANT

Priority ranking exercise was made to determine threats of medicinal plants in the study area summarized below

Table 9: MAIN THREATS OF MEDICINAL PLANTS IN HADERO TONTO ZURIA WEREDA

Threat and Respondent	Farming activity	Over grazing	Construction	Fuel activity	Over use
R1	5	3	4	3	4
R2	5	4	5	4	3
R3	4	4	4	3	3
R4	3	5	4	4	4
R5	4	3	3	3	2
R6	5	3	4	3	3
R7	5	4	5	2	3
R8	5	3	5	3	2
R9	5	4	4	2	3
R10	5	3	5	3	2
Total	46	36	39	30	29
Rank	1st	3rd	2nd	4th	5th

4.2.2. Preference ranking of Plants scarcity level

This ranking was performed for five chosen MPs to determine their scarcity in the study area. The respondents were asked to select the degree of scarcity of MPs in their environment. They were informed to (rank) scarcity level by giving score of five to most scarcity and one for least and finally each value of MP summed up and total score and rank were given to each MP.

Table 10: Ranking of medicinal plant in the study area

Scarce MP and respondent	***Hagenia abyssinica***	***Olea europaea sub sp cuspidate***	***Acacia abyssinica***	***Phytolaca dodecandra***	***Echinops kebericho***	***Ficuss vasta***
R1	5	3	4	5	3	4
R2	5	3	4	4	5	5
R3	4	5	2	4	4	4
R4	3	4	5	5	4	4
R5	5	3	3	3	2	3
R6	5	2	5	4	3	5
R7	5	1	4	5	2	3
R8	5	3	3	3	4	4
Total	37	24	30	34	27	32
Rank	1st	6th	4th	2nd	5th	3rd

4.2.3 A: MARKETABLE MEDICINAL PLANTS PHOTO/MMP

[(a) Garden MP (b) Ginger]

Photo 1 by Desta Abebe (2015 EC): medicinal plant obtained from garden (a) and ginger

Photo 2 by Desta Abebe (2015 EC) : Medicinal plant obtained from garden and farm land (i.e fruits)

Photo 3 by Desta Abebe (2015 EC): Medicinal plant obtained from garden and spices (d)

Photo 4: Medicinal plant obtained from farm land and grain (e)

4.2.: MARKETABLE MEDICINAL PLANTS IN HADERO TUNTO ZURIA WEREDA

Table 11: HABIT OF MARKETABLE MEDICINAL PLANT

Habit	Total number	Percentage
Herb	19	61.3
Tree	2	6.45
Shrub	6	19.35
T/shrub	4	12.9

Table 12: PART USED OF MARKETABLE MEDICINAL PLANTS

Part used	Number	Percentage
Root	4	12.9
Leaf	7	22.58
Seed	11	35.48
L eave and Stem	2	6.45
Fruit	7	22.58

Table 13: Number difference of marketable and non- marketable MP

Categories	Non-marketable	Marketable	Total of both
Number	69	31	100
Percent	69	31	100

4.2.4. ABUNDANCE OF MEDICINAL PLANTS

Table 14: ABUNDANCE OF MEDICINAL PLANTS IN HADERO TUNTO ZURIA WEREDA

MP abundance	Number of MP	Percentage
Common/ less abundance(availability)	71	71
Rare/least abundance	17	17
Abundant/large abundance	12	12

5. DISCUSSION and CONCLUSION

The main objective of this research was to understand the diversity, distribution and use of medicinal plant in Hadero Tunto Zuria Woreda. In the area 100 medicinal plants were identified for their reported uses to treat human and livestock ailments. This indicates the study area is the potential area for medicinal plants knowledge of using medicinal plants. The identified plants are found in different agro- ecology as well as cultivated on home garden and wild. According to respondents response now a day habit of using medicinal plants has been declining because of lack of interest and dependence of young generation on modern medicine rather than using traditional medicinal plants.

5.1. INDIGENOUS AND LOCAL KNOWLEDGE ON MEDICINAL PLANTS

The finding showed that the Indigenous and local knowledge status of the elderly people who were in the age group (41-70) was higher. In contrast the Indigenous and local knowledge of the people who were found in middle age group was medium and very less in younger generation because of their bias attitude or interest. The younger generation prefer treatment with modern medicine, did not give attention to hear key healer telling about traditional medicinal plants, since better health facilities has shift people interest. This is similar with other studies of (Zemede Asfaw, 1991; Miruste Giday, 2001). .

5.1.1. USE DIVERSITY OF MEDICINAL PLANTS

In the study area the medicinal plants were used for different uses other than medicinal purposes. This indicates how people use medicinal plants for other services i.e. use diversity of medicinal plants (the people use medicinal plants for fire wood, some for house construction, and some as income sources).Medicinal plants dominantly were used for fire wood and house construction purposes, so the medicinal plant diverse use were seen , in the study area largely people use plant for fire wood, construction, forage, medicine and other use from highest to lowest in the ranking order respectively depending level of use by direct matrix value (Table 3).

5.1.2. DISTRIBUTION OF MEDICINAL PLANTS IN DIFFERENT AGRO ECOLOGIES

The distribution patterns of medicinal plants in the study area in the different agro-ecologies were different i.e. (Dega, Woina daga and Kola). The current finding showed

that agro-ecology was one of the determinant factors of medicinal plant distribution. From 100MPs, the major plants were distributed in the high land, medium land and low land (50%) followed by medium and low land (26%) and high and medium land (17%) as shown in (Table 2).

5.1.3. PART OF PLANTS USED

Peoples use different plant part by different amount, from different plant and also to treat different ailment type. In the current study area frequently harvested plant parts from 100 medicinal plants were leaves (42%) followed by roots (24%) and seeds (12%) respectively while the remaining other parts of medicinal plants were used relatively by small percent than from other parts. This study is similar to (Haile Yinger and Delenasaw, 2007; Haile Yinger et al, 2008).

5.1.4. HABIT OF MEDICINAL PLANTS

Medicinal plants used by the people to treat different ailment of human and livestock ranges from high trees up to small herbs. The current result shows that the growth forms of the herbs were the major growth form (42%), followed by shrubs (28%) and trees (19%) respectively. So that the using level of different habit of medicinal plants were different. The selection level of medicinal plants by the people was depending on medicinal plants habit. This study is consistent with the finding of (Miruste Giday et al; 2003 and 2009, Miruste Giday, 2007)

5.1.5. ROUTE ADMINISTRATIONS

Different kinds of route of administrations were used in the study area to treat a human and livestock ailment depending on the medicinal plant habit and ailment types of human and livestock. The most commonly used method was oral administration (61%), followed dermal by (23%) and oral and dermal by (9%) respectively while the other rest methods were used by small proportion. This study agrees with other study of (Admasu Moges et al, 2019).

5.1.6. PREPARATION AND APPLICATION METHODS OF MP

In the study area the dominant preparation method was crushing accounts high percent of (44%), followed by squeezing (17%), harvest (13%), crushing and squeezing (7%) from 100 medicinal plants which was identified. From application methods drinking were

dominantly used by (47%), eating by (25%), creaming/ointment by (12%). This was similar finding with other researchers studied (Gonfa kewessa, Tesfaye Abebe and Ambachew Demessie, 2015).

5.1.7. MEDICINAL PLANTS USED FOR HUMAN AND LIVE STOCK

MP in the study area was used to treat human and livestock ailment. From 100 identified medicinal plants the major plants were used to treat human ailments (72%) followed by livestock ailment (16%) and 12% were used for both ailment treatments. Similar results were documented in the other sites of Ethiopia (Sebsebe Demissew, 2009; Miruste Giday et al., 2009)

5.1.8. CONDITION OF MEDICINAL PLANTS USED

Medicinal plants which were used by fresh condition is dominantly in large proportion (100, 63%), secondly by dried condition 22% and 15% by both condition. The present study was agreed with the finding of that of (Tesfaye Haile mariam et al., 2009; Mirutse Giday et al., 2009).

5.1.9. KNOWLEDGE TRANSFER MEANS OF MP

The knowledge about medicinal plants was acquired by several ways at previous time and currently in the study area. As a knowledge transfer method in the study area people reported knowledge access from parents, observation and other methods to transfer knowledge from generation to generation. The knowledge acquisition is strongly based on family relation and in some extent by other method. Knowledge transferred from generation to generation orally and acquisition from parent was dominant by (83%), followed by observation (12.5% and by other methods (4.2%). The current study consistent with the study of (Zemede Asfaw, 1999; Mirutse Giday, 2001).

5.2. THREATS OF MP IN THE STUDY AREA

There are different factors which influences the medicinal plants in the study area of Hadero Tunto Zuria Woreda. The major threats were farming activities (46%) followed by construction (39%) and overgrazing (36%) respectively (Table 9). This finding was similar with the findings of the others (Lulekal et al, 2008, Behilu Wizuayehu and Temesgen Assefa, 2017).

5.2.1. PREFERENCE RANKING OF MPS SCARCITY LEVEL

The five selected MPs and ranked by preference ranking method showed there was medicinal plant scarcity in the study area. The present finding was showed there was some medicinal plant scarcity in the site current study (Table 10).

5.2.2. MARKETABLE MEDICINAL PLANTS

The people might got medicinal plants from different areas, for instance it might be from forest or garden or from markets. In the study area some medicinal plants were marketable. Mostly the marketable medicinal plants were cultivated and garden plants. The marketable MPS dominantly were herbs. The main threats of marketable medicinal plants are overuse, less cultivation (conservation) status as shown in (Table 11).

5.2.3. ABUNDANCE OF THE MEDICINAL PLANTS

A total of 100 medicinal plants were identified in the study area. The major medicinal plants abundance were common (71%) followed by rare (17%) and abundant (12%). The current study disagrees with the other findings documented in the other sites of Ethiopia (Dejene K. Mengistu [1*], Jemal N. Mohammed [2], Yosef Gebrehawaryat Kidane [1] and Carlo Fadda [3], 2022).

5.3. CONCLUSION AND RECOMMENDATIONS

The people in the Hadero Tunto Zuria Woreda use MP from home garden and wild, but the conservation habit declining among people in alarming rate because of lack of awareness about threatening plant species. Population explosion, agricultural activities, deforestation are also another additional factors for scarcity of medicinal plants. The distribution of medicinal plants in the study area largely depends on adaptation capacity of areal temperature condition depending on the altitude range of the area (agro-ecology) because each plant adaptation is different from plant to plant, some tolerate high temperature and some are not and the same to low temperature. Medicinal plants used by the people ranges from herbs up to large trees i.e there is diversity of medicinal plant in the study area. Herbs, seeds, grasses, trees are used as medicinal plant to treat human and livestock ailment. Medicinal plant has additional uses other than medicinal uses that mean there is use diversity. They are used as sources of fuel, food, construction, and

income sources. The present day study indicates that all plant part is not used equally, from 100 medicinal plant identified leaf used by 42 percent, root by 24 percent and seed 12 percent while other parts can be used by small percent when compared to the above parts and also all medicinal plants not used in equal amount, herbs and shrubs used more than other plant respectively. Each plant preparation, rout administration and application is not the same i.e. crushing and squeezing is dominant preparation method and oral and dermal method dominant rout administration. The knowledgeable people of the study area use medicinal plant in different condition. They use by fresh, dried and both dried and fresh condition from high to low condition of use. Medicinal plants might be used to treat only human or only livestock ailment and some are used to treat both. Medicinal plant knowledge transfer method among people is different from person to person, because more people got this knowledge from parents, some has got their knowledge by observation and some also has got by other methods. There is luck of interest in the younger generation to use MP and IQ about MP was also when compared to older people. No documentation of medicinal plant species in the written document and there is a gap in acquisition of knowledge by young generation from knowledgeable people or older. Some medicinal plants are marketable and those plants mainly herbs, some of them are spices and some of them are grains. Based on the findings of this research the following recommendations are forwarded:

1. Enhancing the conservation habit of MP has to be largely shared the responsibilities of all people living in the study area.
2. The government and scholars have responsibility to work closely with knowledgeable people and documenting the threatening species of medicinal plants for next generation.
3. Educating, scientific supporting, and in cooperating the traditional MP knowledge in modern way, co-coordinative work of plant taxonomist, researcher, health professional with key healer were needed.
4. Changing the attitude of young generation and conservation is very essential knowledgeable peoples, NGO, Research institutes.
5. Motivation by work shop, certification of key healer people by government NGOs should be needed.

6. Promoting the growth of MP in EX-situ and IN-situ is necessary by local user, key healer, Agriculture office.
7. Rules must be put on the threats of MP to minimize the impact on the traditionally used in the country level as well as in the international level
8. It better when further laboratory investigation is made on Sena (local name) medicinal plant on its active ingredients by researchers and research institutes.
9. Root part used medicinal plants (such as Allium sattivum, Echinops Kebaricho, Goecha/local name, Borassus palm, Wessi Ababa, Zingiber officinale) more endangered (threatening) than the other parts used MPs, so they need special conservation from all people who is living in the study area.

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7. APPENDICE

APPENDIX 1: RESEARCH QUESTIONS

1, General information on respondents

1, Kebeles----------Village----------Date----------

2, Name----------Age----------Sex------

Marital status, A, couple B, single,

Educational state, A, zero grade B, 1-4 grade C,5-8 grade D, 9-12 grade E, Diploma F, degree G, MA/MS

Religion----------Ethnic----------for how long you lived in the area? ----------

3, Tell me the most common diseases of humans in your areas

4, what are the most common diseases of live stock in your area

5, How local people prevent and control a given diseases in your areas

|| Ethno- botanical information

6, Are the local people conserve the medicinal plants when we compare from other plants? A, yes B, no

7, how do you conserve medicinal plants?

8, Are the local people in your area aware of the highly threatened traditional medicinal plants

A, Diversity

9, List the plant species used to treat human disease and injuries in your area and given their local name

No	Name of plant	Disease treated	Part Used	Habit	Ha Bitat	Degree Of abundance	Rout Of admin is tration	Prep aration	Other ingredient	Dosage	Side effect	Other Use
1												
2												
3												
4												
5												
6												
7												
8												
9												

10. List the plant species used to treat live stock and given local names

No	Name of plant	Disease treated	Part Used	Habit	Ha Bitat	Degree Of abundance	Rout Of admins Tration	Prepar ation	Other ingredient	Dosage	Side effect	Other Use
1												
2												
3												
4												
5												

11, List the plant species used to treat both humans disease and their live stock in your area

B, Distribution

12, Are the medicinal plants marketable? ----------

13, is there any interference between modern and traditional medicine used in your areas?

14, Are there community members depend on more traditional medicinal plants as compared to modern medicine? Which members of the communities? Why?

15, state the major problems regarding medicinal plants in the area

16, how is the accessibility of medicinal plants compared to the past years? ----------

17, what are the threats to the medicinal plants in the area?

18, is the plant currently cultivated in the study area

19, How the indigenous knowledge of medicinal plants use transferred from generation to generation in the community?

APPENDICE 2: MEDICINAL PLANTS OF THE STUDY AREA

Had-hadiygna, Ke-kembatissa, HK- both Hadiygna and Kembatissa, Hu-human, LS-live stock, T-tree, H-herb, Sh-shrub, Or-oral, Der-dermal, Ey- eye, Er-ear, Nas-nasal, ED- eye and dermal,

OD-oral and dermal, Se-seed, L-leaf, R-root, Sm- stem, Br- bark, Fru- fruit, HL-human and live stock

No	Local name	Scientific name	Family	Habit	Part used	Used condition	Administration	Preparation and application	Disease treated
1	Sutich o/Had	*Hagenia abyssinica*	Rosacea e	T	Seed	Dri ed	Or al	Crush and drink	Tape worm/Hu
2	Sena/ HK	Un identified	Unident fied	Shr ub	Seed	Dri ed	Or al	Crush and drink	Amaeba/Hu
3	Masan a/Had	*Croton macrostachy us Hochst.exDe l*	Euphorb iaceae	T	L	Fre sh	Or al and der ma l	Cook,crus h/eat/crea m	Bleeding/H u and abdominal bloating/LS
4	Bunna /HK	*Coffea arabica*	Rubiace ae	Sh	Se	Dri ed	OD	Crush,drin k/cream	Wound, diarrhea/Hu
5	Homa /Had	*Juniperus procera*	Cupress aceae	T	L	F	ora l	Chew	Hu/tonsilliti s
6	Tuma/ HK	*Allium sattivum*	Amaryll idaceae	H	R	Dri ed	Or	Chew/crus h	Influenza/H u
7	Halak oo/H K	*Moringa stenopetala L.*	Moringa ceae	T	L	F	Or	Crush,coo k and eat	Many diseases
8	Hema ch soo/H ad	*Hordeum vulgare*	Grasses/ Poaceae	H	Se	dri ed	Or	Harvest and eat	Injuries/HL
9	Garda ma/H	*Avena sativa*	Poaceae	H	Se	Dri ed	Or	Harvest and eat	Break/HL

	K								
10	Girara /HK	*Acacia abyssinica*	Fabacea e	T	R	F	Ey	Crush and cream	Evil eye
11	Bakel a/HK	*Vicia faba L./Faba bean*	Fabacea e	H	Se	Dri ed	Or	Harvest/ea t	Injuries/LS
12	Kosho o/Had	*Nicottana tabacumL.*	Solanac eae	H	L	Dri ed	Or	Chew and drop	Influenza,le ach intestation/ LS
13	Heba/ HK	Unidentified	Not identifie d	Sh	L	Dri ed	Or	Crush and drink	Malaria/Hu
14	Chie barbar it	*Acmella caulirhiza Del.*	Asterace ae	Sh	Fru/fl ower	F	Or	Crush and drink	Epidemic/L S Mezigar/LS
15	Papay a/HK	*Carica papaya L.*	Carcace ae	T	Se andFr u	F and dri ed	Or	Crush/drin k-Se Eat-Fru	Gastritis/H u
16	Baraw a/Had	Unidentified	Unidenti fied	Sh	L	F	Or	Crush and drink	Evil eye/Hu
17	Kadal bahirz afa	*Eucalyptus Hocst.exEnd l*	Myrtace ae	T	L	F	Or	Crush, boil- cream/snif fing	Common cold/Hu
18	Jangib ela/H K	*Zingiber officinale Rosc*	Zingiber aceae	H	Rhizo me	F and dri ed	Or	Crush and boil and drink	Common cold/Hu
19	Segoo /HK	Unidentified	Unident fied	Cli mbe	Fru	F	Or	Harvest and eat	Parasite/Hu

				r					
20	Agufa /HK	Unidentfied	Unidenti fied	H	L	F	Or	Chew	Intestinal parasite/Hu
21	Zararo o/HK	*Guizo flias schimperi*		H	R	F	Or	Boil/drink	Child abdominal pain/Hu
22	Garig aro/K e	Unidentified	Unidenti fied	T	L	F	De r	Cream	Wound worm/LS
23	Woka sh/Ke	*Aframomum corrorima*	Zingiber ceae	H	Se	Dri ed	Or	Eat/chew	Bloating Tonsillitis/ Hu
24	Shunk urt	*Allium porrum L.*	Amaryll idaceae	H	R	F/ Dr y	Or	Eat	Kesta damana/Hu
25	Wede sha/H K	*Cordia africana Lam.*	Boragin acaea	T	L	F	Or	Crush and drink	Gastritis/H u Jaunice/LS
26	Loke/ Had	Unidentified	Unidenti fied	Sh	L	F	Or	Cook	Shivering/L S
27	Sinik haka/ Had	Unidentified	Unidenti fied	T	Br	F/d ry	Or	Crush/drin k	Chock/LS
28	Chiro nta/Ha d	Unidentified	Unidenti fied	T/S h	Latex	F	Or	Eat	Abdominal pain/Hu
29	Lomi/ HK	*Citrus auranfofila*	Rutacea e	T	Fru	F	Or	Sucking	Influenza,ti neaversicol or
30	Talba/ HK	*Linum usitatissimu*	Linacea e	H	Se	F	Or	Add to water/drin	Gastritis/H u

		m						k	
31	Burtucana/HK	*Citrus sinensis (L.) Engl*	Rutaceae	T/Sh	Fru	F	Or	Sucking	Stomachache
32	Odacho/Ke	*Ficus sur*	Moraceae	T	L	F	Der	Cream	Donkey warts/ LS
33	Weara/woira	*Olea europaea*	Oleaceae	T/Sh	Shoot	F	Ey	Cream	Eye irritation
34	Haranja/HK	*Phytolaca dodecaudra*	Phytolaccaceae	Sh	L	F	Or	Crush and drink	Bilharziasis/Hu
35	Dechmarache/Ke	Unidentified	Unidentified	Sh	R	Dried	Or	Crush and drink	Sudden sickness/Hu
36	Anamurcho/HK	Unidentified	Unidentified	Sh	R	F	Or	Crush, squeezing, drink	Common cold/ascaris/Hu
37	Chickchikena/Ke	Unidentified	Unidentified	Sh	L	F	Or	Crush and drink	Snake bit/Hu
38	Sanigana/Ke	Unidentified	Unidentified	T	R/Br	F	Or	Crush/drink	Epidemic diarrhea/LS
39	Agaga/Ke	Unidentified	Unidentified	T	L	F	Or	Crush/drink	Constipation/LS
40	Bosha/Ke	Unidentified	Unidentified	H	R	F	Der	Crush/cream	Wound worm/LS
41	Digiba/Had	*Ficus vasta*	Moraceae	T	L	F	Or	Crush/ drink	Diarrhea/Hu
42	Matoo/HK	*Euphorbia tirucall*	Euphorbiaceae	H	Whole	F	Or	Crush/drink	Coccoids/LS
43	Ketalama/Had	*Ruta chalepensis L.*	Rutaceae	H	L	F	Or	Chew	Bloating/Hu

44	Zazanchut/Ke	*Thymus schimperi Roninger*	Lamiaceae	H	L	F	Or	Cut and chew	Bloating/Hu
45	Michkarare/Had	*Ocimum lamifolium Hochst.ex*	Lamiaceae	H	L	F	Or	Crush, drink/bathing	Febril illness/Hu
46	Wessa/HK	*Enset ventricosum*	Musaceae	H	R	F	Or	Cut, eat	Injury/LS
47	Ulgerecho/HK	Unidentified	Unidentified	Climber	R	F	Or	Crush and squeezing/drink	Diarrhea
48	Tossa/HK	*Echinops Kebaricho*	Asteraceae	H	R	F/dry	Or	Chew	Abdominal pain/Hu
49	Laluncha	Unidentified	Unidentified	Grass	Stem	F	Der	Squeezing/cream	Ring worm/Hu
50	Dabakula/Had	*Cucurbita pepo*	Cucurbitaceaa	H	Flower /Se	F/dry	Or-Se Er-flower	Eat Drop-Er	Tapeworm/Hu, ear infection
51	Holakarchaba/Ke	Unidentified	Unidentified	H	L	F	Der	Crush/cream	Tinea versi color/Hu
52	Sama/Ke	Unidentified	Unidentified	Climber	L	F	Or and dermal	Crush/drink and cream	Wound/Hu
53	Kara/Ke	Unidentified	Unidentified	T	L	F	Or	Crush/drink	Tonsillitis/Hu
54	Timibibila/	Unidentified	Unidentified	Sh	L	F	Or	Crush/drink	Sudden sickness

	Ke								
55	Shisho/HK	*Celtis africa Burm.f*	Cnnabaceae	T	L	F	Der	Crush/cream	Tonsillitis
56	Sunfa/HK	*Lepidium sativum L.*	Brassicaceae	H	Se	F	Or	Crush/drink	Bloating/Hu
57	Wodimama/Ke	*Coriandrum sattivum L.*	Apiaceae	H	L	F	Or	Crush/eat	Bloating/Hu
58	Hebacurma/Ke	Unidentified	Unidentified	H	L	F	Or	Crush/drink	Common cold/Hu
59	Firafire nigus/HK	*Artocarpus heterophyllus*	Moraceae	T/Sh	Fru	F	Or	Cut/eat	Gastric/Hu
60	Ashikola/Ke	Unidentified	Unidentified	Sh	L	F	Or	Crush/drink	Ascaris/LS
61	Bunicurma/Ke	Unidentified	Unidentified	H	Branch	F	Der	Cut/hung in neck	Swelling/Hu
62	Woshbodala/Ke	Unidentified	Unidentified	Sh	R	F	Or	Crush/drink	Sudden sickness/HL
63	Muza	*Musa acuminata*	Musaceae	H	Fru	F	Or	Eat	Parasite/Hu
64	Baribaroo/Had	*Piper nigrum*	Piperaceae	H	Fru	F	Or	Eat	Bloating/Hu
65	Bishibisha/HK	Unidentified	Unidentified	H	Flower	F	Or	Chew/drop	Tonsillitis/Hu
66	Chat/	*Catha edulis*	Celastra	Sh	Latex	F	Or	Chew	Tonsillitis/

	HK		ceae						Hu
67	Goecha/Had	Unidentified	Unidentified	H	R	F	Or	Crush/drink	Bloating/LS
68	Sinikhite/Had	Unidentified	Unidentified	H	L	F	Or	Squeezing/drink	Chock/Hu
69	Dimbaba/Had	*Borassus palm*	Arecaceae	Sh	R	F/dry	Der	Cut/hung neck	Swelling/Hu
70	Deboo/H	Unidentified	Unidentified	H	Latex	F	Or	Chew-F	Bloating
71	Wolidaa/Had	Unidentified	Unidentified	H	L	F	Or	Crush and drink	Spinal cord problem/Hu
72	Shukarea/Had	*Ipomoea batatas*	Convolvulaceae	H	L	F	Or	Cook	Pelacenta drop out/LS
73	Kashar sarata/Had	*Melia azedarach*	Meliaceae	Sh	Se	Dried	Or	Harvest/eat	Injuries/LS
74	Bobanka	*Unidentified*	Unidentified	H	L	F	Or	Squeezing/drink	Malaria/Hu
75	Loraw a	*Unidentified*		Sh	Latex	F	Or	Chew/drop	Evil eye/Hu
	Hanchura	*Unidentified*		H	L	F	Er	Squeezing/drop	Ear lesion/Hu
77	Kobo/Had			T	Se	dried	Or	Cook/eat	Chocking/
78	Asusishana/Unide	*Brassica oleracea var.Capitata*	Brassicaceae	H	L	F	Or	Crush, cook/eat	Common cold, malaria/Hu

	ntfied Had								m
79	Boye	Unidentified		Climber	L	F	Or	Crush and drink	Diarrhea/Hu
80	Baitihaka/Had	Unidentified		Sh	L	F	Or	Boil/drink	Febril illness/Hu
81	Kossorota/Had	Unidentified	Unidentified	Sh	Se	Dried	Or	Crush/drink	Tonsillitis
82	Kazimira/HK	Unidentified	Unidentified	T	L	F	Or	Crush/drink	Tinea versicolor
83	Shonkora	*Saccharum officinarum L.*	Poaceae	Sh	Sm	F	Or	Cut/eat	Gastritis/Hu
84	Bulo/Had	Unidentified	Unidentified	T	L	F	Or	Crush/drink	Coughing/common cold/Hu
85	Sofana/HK	Unidentified	Unidentified	T	L	F	Der	Sucking	Ring worm/Hu
86	Besobila/HK	Unidentified	Unidentified	H	L	F	Or	Crush	Abdominal illness
87	Dandureta/Had	Unidentified	Unidentified	H	L	F	Or	Chew	Ring worm
88	Fagajit/Ke	*Eulsine coracana (L.)*		H	Se	Dried	Or	Crush, eat	Bloating
89	Halibe/Ke	*Amarntkus caudatus L.*		Sh	See	Dried	oral	Crush, drink	Febril illness

90	Etan/ HK	Unidentified	Unidentified	Sh	L	F	Or	Chew	Bloating/Hu
91	Kanko /Ke	Unidentified	Unidentified	Climber	Fru	F	Or	Crush, drink	Tape worm
92	Wessi Ababa /HK	Unidentfied	Unidentified	H	R	F	Or	Crush, drink	Child coughing/Hu
93	Charikuwa/ Ke	Unidentified	Unidentified	H	R	F	Or	Cut, eat	Swelling
94	Geshuta/Ke	*Pterolobium stellatum*	Fabaceae	Sh	L and stem	F	Or	Crush, drink	Parasite
95	Hemach enja/Had	*Nigella sativa*	Ranunculaceae	H	Se	Dried	Or	Crush/eat	Bloating/Hu
96	Natira /HK	Unidentified	Unidentified	H	Land stem	F	Or	Crush/eat	Bloating/Hu
97	Tumo/ Ke	Unidentified	Unidentified	H	L	F	Or	Crush/squeezing	Fiber illness/Hu
98	Chune /Ke	Unidentified	Unidentified	H	R	F	Or	Crush/squeezing	Comman cold/Hu
99	Gunisidu/Ke	Unidentified	Unidentified	H	L, seed	F	Or	Crush	Abdominal parasite/Hu
100	Hitichu/Ke	Unidentified	Unidentified	H	L	F	Or	Crush/squeezing	Abdominal pain/parasite

Appendix 3: Marketable Medicinal Plant

Roll no	Local name of plant	Scientific name	Habit	Part used	Habitat
1,	Tuma	*Allium sattivum*	H	R	Cultivated
2,	Wokashe	*Aframomum corrorima*	H	Seed	Cultivated
3,	Gabala xagut	*Nigeila sativa L.*	H	Seed	Cultivated
4,	Xalachut	*Ruta chalepensis L.*	H	L	Cultivated
5,	Talba	*Linumusitatissimum L*	H	Seed	Cultivated
6,	Jangibela	*Zingiber officinale Rosc*	H	R	Cultivated
7,	Gardama	*Tyitncum polonicum L.*	H	Seed	Cultivated
8,	Bakela	*Vicia faba L.*	H	Seed	Cultivated
9,	Michi zabu	*Ocimum lamifolium Hochst.ex*	H	Seed	Cultivated
10,	Kosorota	Unidentified	Sh/H	Seed	Cultivated
11,	Soa	*Hordeum vulgare*	H	Seed	Cultivated
12,	Bashinka	*Melia azedarach*	Sh	Seed	Cultivated
13,	Shunkurta	*Allium porrumL.*	H	R	Cultivated
14,	Papaya	*Carica papaya L.*	Sh	Frui	Cultivated
15,	Firafire nigus	*Artocarpus heterophyllus*	T/Sh	Frui	Cultivated
16,	Shonkora	*Saccharum officinarum L.*	Sh	Stem	Cultivated
17,	Buna	*Coffea arabica*	Sh	Seed	Cultivated
18,	Lomita	*Ctrus aurantifola*	T	Frui	Cultivated
19,	Sunfa	*Lepidium sativum L.*	H	Seed	Cultivated
20,	Koshoo	*Nicottana tabacum L.*	H	L	Cultivated
21,	Tossa	*Echinops kebericho*	H	R	Cultivated
22,	Dabakula	*Cucurbita pepo L.*	H	Frui	Cultivated
23,	Wordimama	*Coriandrum sat*	H	L	Cultivated
24,	Agufa	Unidentified	H	L	Cultivated
25,	Chat	*Catha edulis*	T/Sh	L	Cultivated
26,	Barbaruta	*Piper nigrum*	H	Frui	Cultivated
27,	Halako	*Moringa stenopetal aL.*	T	L	Cultivated
28,	Geshuta	*pterolobium stellatum*	Sh	L and stem	Cultivated
29,	Burtukana	*Citrus sinensis (L).*	T/sh	Frui	Cultivated

30,	Musa	*Musa acuminata*	T/sh	Frui	Cultivated
31,	Asusi hamilua	*Brassica oleracea var. Capitata*	H	L	Cultivated