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BAHIR DAR UNIVERSITY

COLLEGE OF SCIENCEDEPARTMENTOFBIOLOGY

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A THESIS SUBMITTED TO COLLEGE OF SCIENCE IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN BIOLOGY (BOTANY)

September, 2015

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Supervisor: Ali Seid (PhD)

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SCHOOL OF GRADUATE STUDIES

BAHIR DAR UNIVERSITY

APPROVAL AND EVALUATION SHEET

Declaration

I declare that this Msc thesis is my original work that has not been presented in any university for fulfillment of degree program and all the source used manuscripts are certainly acknowledgement.

Belayneh Tessema _____ _____

Name **Signiture** **Date**

As thesis research advisor, I certify that I have read and evaluated the thesis prepared by Belayneh Tessema, entitled "Ethnobotany of traditional medicinal plants in Guangua district, Awi Zone, west Ethiopia'' I recommend that it be submitted as fulfilling the thesis requirement for the Degree of Master of Science.

Ali Seid (PhD) _____

Major advisor **Signature** **Date**

As Members of the board of examiners of the MSc thesis open defense examination, we certify that we have read and evaluated the thesis prepared by Belayneh Tessema and examined the candidate. We recommended that the thesis be accepted as fulfilling the thesis requirement for the Degree of Master of Science.

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Chair person **Signature** **Date**

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

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

STATEMENT OF THE AUTHOR

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Place: Bahir Dar University, Bahir Dar

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ACRONMS

ANOVA -------Analysis of Variance

ARDO----------Agricultural and Rural Development Organization

DCP----------Dried, Crushed and Pounded

GWARDO--------Guangua Wereda Agricultural and Rural Development Office

GWFEO----------Guangua Wereda Finance and Economy Office

GWHO----------Guangua Wereda Health Office

IUCN----------International Union for Conservation of Nature

NDA----------Natural Data base for Africa

REA----------Rapid Ethnobotanical Appraisal

RRA----------Rapid Rural Appraisal

TEK----------Traditional Ecological Knowledge

USAID----------United state Agency Institution Development

WCMC----------World Conservation Monitoring Center

WHO----------World Health Organization

ABSTRACT

An ethnobotanical survey of traditional medicinal plants was done in Guangua wereda, Awi Zone West Ethiopia from September 20, 2014 to June/2015. Purposive random sampling design were employed for selection of the study area (8 kebels and 20 Gots) and 65 informants (M=45 and F=20). Ethnobotanical data were collected using semi-structure checklist interview, field observation, field walk, group discussion and botanical collecting tools. Descriptive and inferential statistics (simple linear correlation and one way ANOVA), informant consensus, preference ranking, direct matrix ranking and fidelity level index analyzed data. A total of 88 medicinal plants identified, 77 were used as treatment of human and 11 used for treatment of livestock ailments. Medicinal plants were pressed and documented in Bahir Dar University. The majority of medicinal plants (46.6%) were harvested from wild. Large numbers of plants were herb (45%), followed by shrubs (36%) and trees (13%). The most frequently used plant parts for ethnomedicine were leaves (47.1%), root (19.3%) and seeds (17.6%); but both leaves and root (36.4%) and seeds (9.1%) used for livestock ailment. Most traditional medicine were prepared by grinding (21.8%) for treatment of human ailments, however, mixed concoction (54.5%) as a major remedy for treatment of livestock ailment. The majority of preparations medicinal plants used for treatment of human ailments (80.7%), for livestock ailments (5.7%) and (6.8%) are both ailments. The Pearson correlation analysis (r=0.99) indicated a significant association of medicinal knowledge with age at 95% level of significance. However, it is insignificance with educational level (r=-0.83, t-cal=-1.3 and t-crit=3.25). ANOVA showed insignificance medicinal knowledge variation between sexes at 99% percentage level of significance. Informant consensus show that *Allium sativum* is most frequently reported (42%) medicinal plant followed by *Zingiber officinale* (35%) and *Ociumum sativum* (32%). Direct matrix analysis indicates that *Cordia africana* is most important species followed by *Ziziphus spina-christi*. The principal threatening factors reported were deforestation (37%) and agricultural encorchment (29%). Many wild species of medicinal plants are threaded from various man made factors. Give awareness about the benefit of traditional medicine to young and educated people.

Keywords:-Ethnomedicine, Ethnoveternary, Guangua and Indigenous knowledge.

1. INTRODUCTION

1.1. Background

Since the ancient time, people have used plants for multiple purposes, for instance, as sources of food, medicines for human beings and livestock, and as materials for construction and the manufacture of crafts, tools, fuel, paints, and poisons. Dery *et al*., (1999) indicated that traditionally used medicinal plants depict that different medicinal plants were in use as early as 5000 to 4000BC in China, and1600 BC by Syrians, Babylonians, Hebrews and Egyptians. Much of an indigenous knowledge system, from the earliest times, also found linked with the use of traditional medicine in different countries (Farnsworth, 1994). Martin (1995) indicated that any ancient, culturally based healthcare practice are different from scientific medicine and commonly regarded as indigenous, unorthodox, alternative or folk and largely orally transmitted practice used by communities with different cultures. WHO (2003) also mention traditional medicine as health practices, approaches, knowledge and beliefs incorporating plant, animal and mineral based medicines, spiritual therapies, manual techniques and exercises applied to treat, diagnose and prevent illnesses.

In the world, there are more than 50,000 species of angiosperms used for traditional medicinal purposes (Tilahun Teklehaymanot and Mirutse Giday, 2007). Therefore, the majority of world population (70-90%) uses plant remedies for their primary health care system (Nair and Nathan, 1998). Beside their use in fighting various ailments at local level, different medicinal plants were used as export commodities, which generate considerable income. These plants normally traded in dried or freshly preserved form as whole or comminuted; and their global markets were found in China, India, Germany, France, Italy, Japan, England and USA (Laird, 1999). Moreover, the high cost of drugs and the inability of many developing countries to purchase modern drugs have forced local communities to look for product in the form of medicinal plants that are proved effective, safe, inexpensive and culturally acceptable (Sofowora, 1993).

Balcha Abera (2003 indicates that Ethiopia has varieties of climatic and ecological condition having various diversity of flora and fauna including large number of useful medicinal plants more extensively available than any other part of the world. Mirutse Giday, (1999) indicates that traditional medicinal practices are common in which about 80% of the population in the country use plant-based traditional medicine primary for various health problems. Likewise Ethiopian

traditional medicine system is characterized by various, and is shaped by the ecological diversities of the country, and socio-cultural background and historical development of the different ethnic group (Tilahun Tekelhymanot and Mirutse Giday, 2007) which are related to migration, introduction of foreign culture, language and religion (Debela Hunde *et al.,* 2004).

Traditional medicinal plants Knowledge mostly available in rural community. In most case indegenious knowledge transfer by orally, inheriting the medico-spiritual manuscript, within families and small communities (Dawit Abebe and Ahadu Ayehu, 1993). These have been achieving through many generation age old and time-tested practices, and consequent accumulation of knowledge through series of observations, practices, interaction and innovation (Cunningham, 1996). Traditional people depend on their own knowledge or neighborhood for treatment that usually involves the use of plants in surrounding area (Mesfin Tadesse *et al.,* 2005*).* This indigenous knowledge was also dynamic as practitioners make every effort to widen their scope by reciprocal exchange of limited information with each other (Debela Hunde *et al.,* 2006).

However, Tesfaye Seifu *et al*., (2006) indicate that deforestation, agricultural-encroachment, over harvesting, over grazing and alarming population growth was principal problems of medicinal plants. Similarly, like many other countries in Ethiopia cultivation of medicinal plants is not yet widely practiced. Due to this traditional medicinal practitioner travel long distance in search of medicinal plants from wild habitat (Mesfin Tadesse *et al.,* 2005). Therefore, the majority of medicinal plants currently under threats are harvested, and many potentially useful plant species are disappearing throughout the world before they are even documented (WCMC, 1992).

In Guangua district, the local people have their own indigenous medicinal knowledge with traditional practices accumulated for generations to treat both human and livestock ailments. However, the district has been losing its indigenous flora over what went before mainly due to human influence that endangers the availability of medicinal plants at wild unpublished source (GWARDO, 2014). As if all information gathered was showed that there were not ethnobotanical studies or written document conducted to introduce the existence of traditional practice. As well as plant species of medicinal value, which is, used by the traditional healers to treat various diseases in the district.

Generally, this study identified traditional medicinal used by the local people to add one or more document concerning medicinal plants and the associated indigenous knowledge in Guangua wereda before losing the traditional medicinal knowledge of indigenous people. In addition the documentation of the indigenous knowledge on medicinal plants was part of the information source for those who want to conduct further research in ethnobotany and the development of modern drugs. In addition, the study was categorized threatened plants and to take appropriate conservation measures. Also it was used as sources of information on the relevancy of medicinal plants for sustainable use and development in the district. Furthermore, the present study documents the means of indigenous knowledge on utilization, management and conservation of medicinal plants as well as the threats to the plants in Guangua wereda, Awi Zone, western Ethiopia.

1.2. Objectives of the study

1.2.1. General objective

The main aim of this study is to conduct ethnobotanical investigation for documenting traditionally used major medicinal plants and the associated knowledge practiced for treatment of human and livestock ailments in Guangua wereda.

1.2.2. Specific Objectives

Specifically, the study was aimed at:-

- describing traditionally used medicinal plants for the treatment of human and livestock ailments in Guangua werwda:
- identifying and documenting the common type of traditional ethnomedicinal practices in the study area:
- comparing whether there exist medicinal plants knowledge difference or not between ages, educational levels and gender:
- identifying the current and potential major threats of medicinal plants and associated knowledge: and
- describing traditional methods of conservation being practiced by the local people in the Guangua Wereda.

2. LITERATURE REVIEW

2.1. Theory and principles of Ethnobotany

Ethnobotany is a sub-field of ethnobiology concerned on the reciprocal between human population and plants. It is also defined as the study of the relationship between plants and people with a particular emphasis on traditional cultures. Traditional medicine was once again redefined in 2008 as the sum total of knowledge, skill and practices based on the theories, beliefs and experience (WHO, 2008). Accordingly, Gerique (2006) indicated, it was an inter-multi-disciplinary science focusing on documenting and analyzing the use of indigenous knowledge, beliefs and practice related to plant resources. Starting from its beginning, the documentation of traditional knowledge on the medicinal uses of plants were provided many important drugs of modern day (Dery *et al*., 1999). The term ‘’ethnobotany’’ was first suggested by John Harshberger in 1895 that it was defined as’’ the use of plants by primitive and aboriginal peoples’’ (Balick and Cox, 1996). During the century, which has intervened, a considerable attention has also given on how plants had perceived and managed by human societies (Shrestha *et al*., 1997).

The term ‘’Ethnobotany’’ was published in 1896 in the scientific literature and started being considered as a field which elucidates the cultural position of tribes who used the plants for foods, shelters or clothing. In 1916, Robcins and his co-workers began to introduce some new theoretical notions and methodologies relevant to ethnobotany in particular and ethnobiology in general. Ethnobotany is more than collecting and identify plants with native name, but also actual ‘’scientific work’’ valuable for scientific method of investigations (Martin, 19995). Currently, the interest of botanist and anthropologists increases explorers to document the potential uses of plants used by indigenous societies (Balick and Cox, 1996).

According to Gerique, (2006), ethnobotanical studies have based largely on qualitative methods. However, in recent years researchers have used ecological approach introducing studies about the interaction between the natural environment and humans. Ethnobotanical data collection requires purposive approach; information can be collected through actual field observations, interview (informal, unstructured, semi-structured or structured), market survey, checklist interview, group and field interview etc; depending on the particular objectives of the research

(Martin,1995).Moreover, ethnobotanical investigation of plants but also for understanding and documenting their relevancy to conservation and sustainable development (Gerique, 2006)..

The herbarium label should include the name of the institution and collector(s), collection number, family, genus and species of the specimen, locality, habit and habitat, plant description and collecting date. The selection and identification of plant samples should based on the representativeness of the plant species. Moreover, the identified plant should possess flower, fruit, leave or both in order to make their identification easier, and specimens should press in the field whenever possible. Data can analyzed statically and allow the researcher to check the accuracy of the data collected increasing the methodological scientific flexibility of the research (Gerique, 2006). Accordingly, Gerique, 2006) cited Fidelity levels (FL), the percentage of informants are clime the use of certain plant species for the same major purpose. These an be calculated for the most frequently reported diseases or ailments are given by FL (%) = (Np/N) X100; where Np is the number of informant that claim use of plant species to treat a particular disease while N is the number of informants that use the plants as a medicine to treat any disease.

Fisseha Messfin, (2007) indicates that ethnobotany the use of plants indigenous cultures for food, medicine, rituals, building, household's utensils and implements, musical instrument, fire wood collection, pesticides, clothing, shelter and other purposes. As the consequence, the conservation of plants, including medicinal ones, and the associated knowledge as part of living cultural knowledge and practices between communities and the environment is essential for perpetuation of biodiversity (Martin, 1995).

2.2. Traditional ecological knowledge

Traditional ecological knowledge indicates the knowledge, innovations and practices of indigenous and local communities around the world (Gerique, 2006). Moreover, there are many alternative names for traditional ecological knowledge (TEK), which is also known as traditional environmental knowledge; which indicates specific place, culture or society. Traditional ecological knowledge is dynamic in nature that belongs to groups of people who live in close contact with natural system that contrasts with modern or western formula of scientific knowledge (Gerique, 2006).

In general, traditional ecological knowledge is a cumulative body of knowledge and beliefs handed down through generations by cultural transmission on the relationship of living thing with one another and with their environment. Furthermore, it includes a system of classification, a set of empirical observations about the local environment, and a system of self-management that governs resource use in the locality (Studey, 1998).

2.3. Indigenous medicinal knowledge and activities

According to WHO (2009) media center, traditional medicinal knowledge is the sum total of knowledge, skill and practices based on the theories, belief and experiences indigenous to different cultures that improve health. Traditional medicine constitutes an extremely fascinating and attractive world under enormous points of view for a wide range of users in developing and developed countries. For instance, it may be either highly secretive, mystical and extremely localized, codified and very well regulated. However, world health organization (WHO) has delineated a working definition of traditional medicine. As "diverse health practices, approaches, knowledge and beliefs incorporating plant, animal and mineral based medicines, spiritual therapies, manual techniques that prevent illness" (WHO, 2003).

The term traditional medicine was sometimes replaced by other terms like complementary, alternative, or non-conventional medicine. The different terminology was frequently used in countries where traditional medicine was practiced. Even though it is not part of the countries own tradition, or not integrated into its dominant health care system (WHO, 2001). Traditional medicine therapies can be categorized as medication therapies (when they use herbal medicines, animal parts and minerals) and as non- medication therapies (when they are carried out mainly without the use of medication as in the case of acupuncture or manual therapies (WHO, 2009). The use of traditional medicine in the prevention diagnosis and treatment of an extensive range of diseases has been increasing over the last 20 years. Traditional medicines are considered as more accessible and affordable than allopathic medicine (WHO, 2000).

According to USAID traditional practitioners in sub-Sahara Africa, traditional medicine practitioners are allopathic practitioners hundreds to thousands (Vongo, 1999). Traditional medicine becomes the only source of health care system, especially for rural people and urban poor communities of African countries. Furthermore, one does not have to forget that traditional medicine also plays a role in developed countries, people were mostly affected by non-

communicable diseases. For its holistic approach to health, it also highlights the importance of prevention and maintaining a certain style of life avoiding risk factor.

2.4. Historical background of traditional medicinal plants

Human being was used plants for several purposes including for disease control and prevention. The knowledge of medicinal plants is very important because there is the potential not only to discover new alternatives treatment of illness but from a conservation point of view (Chinsembu, 2010). Physical evidences gathered from burial sites of Neanderthal man discovered in Iraq revealed that the use of medicinal plants in the area goes to some 600 years back. It is believed that starting from 5000-4000BC several drugs were in use in most parts of China. Traditional medicinal plants were also well popular as early as 1600BC among Syrians, Babylonians and ancient Hebrews (Dery *et al*., 1999).It is certain that man has acquired the knowledge on the utilization of plants for disease prevention and curative purposes (Etana Tolasa, 2007). It assumed that the early attempts had based on speculation and superstition though how the knowledge started has not clearly known. For instance, 'Evil eye'' causes individual to be ill so that it was necessary to find out substances that can relief and make the Baby resistance against it (Etana Tolasa, 2007).

Many of the traditionally used medicinal plants contain pharmaceutical active compounds and used in the preparation of both traditional and modern medicine (Okigbo *et al*., 2008). It estimated that over twenty five percent (25%) of the pharmaceutical preparations in the world and more than 50% in united state of America (USA) contain plant-derived activities ingredient (Robert and John, 1983). In order to facilitate the sustainable utilization of medicinal plants and indigenous knowledge, there is a need for coordinated activities including phytochemical screening of ethnobotanical pharmacopeia clinical evaluation of traditional health practices and surgical procedures and the census of traditional medicinal practitioners in many parts of the world (Savarimuthu, 2011). The antiquity of Ethiopian traditional use of medicinal plants cannot be disregarded (Mirtuse Giday, 1999).

2.4.1. Diversity and Conservation of medicinal plants in Africa

Traditional medicine, as a major African socio- culturally heritage has been in existence for hundreds of year (Elujoba *et al*., 2005). It is once believed to be primitive and wrongly challenged by foreign religions dating back during the colonial rule in Africa, and subsequently

by the conventional Muslims and Christian Orthodox medicinal practitioners (Okigbo *et al*., 2008). However, medicinal plants are plants containing inherent active ingredients tending or used to cure disease. On the other hand, aromatic plants have strong characteristic smell or fragrance (King, 1992).

The populations of African countries continue to rely heavily on the use of traditional medicines as their primary source of health care (Cunningham, 1994). Ethnobotanical studies carried out throughout Africa confirmed that native plants are the main constituent of traditional African medicines (Okigbo *et al*., 2008). Habitat conversion threatens not only the loss of plant resources, but also traditional community life, cultural diversity, and the accompanying of the medicinal value of the several endemic species. As medicinal plant supplies diminish, constructive resource management and conservation strategies based on clear knowledge of the surrounding medicinal plants use must be designed (Okigbo *et al*., 2008).

1. In-situ conservation: -Involves protection and establishment of plants and other biological resources in the location of their natural occurrence. In order to ensure the representative of wild populations of vulnerable medicinal plant species are maintained and core conservation areas or other protected habitats that will allow natural processes to continue undisturbed should be designated (Cunningham, 1996). Since it is, only in nature that plant diversity at genetic, species and ecosystem levels can be conserved on long-term basis, identification of ecosystems with diverse medicinal plant species is very essential.

2. Ex-situ conservation: - involves an establishment of plantations, maintenance of living collections in farm fields, home gardens, botanical gardens, and arboreta in location outside the zone of their natural occurrence (Okibo *et al*., 2008). The essence of *ex-situ* conservation is the rapid development of alternative supply sources of medicinal plants through cultivation in large enough quantities and at low enough price in order to compete with prices obtained by gathers of wild medicinal plant stocks (Cunningham, 1996).

Africa is one of the main world producers of medicinal and aromatic plants that many of them are well known in international markets like China, India, Germany, France, Italy, Japan, England and USA(Sofowora, 1993; Elujoba *et al*., 2005). For instance, *Ancistrocladus abbreivatus* is a plant with anti-HIV potential and endemic to Cameroon (Sofowora, 1993). Africa continent had made up of many developing nations with very limited resources like

minerals or petroleum oil to sustain their economic development. Therefore, majority of the inhabitants of these nations depend on the natural vegetation as a source of necessities, such as fuel building martial, food, fodder and fiber (Kokwaro, 1993). At present time, there is a resurgence of natural product-based industries and pharmaceutical products because of the increasing interest in traditional medicine and natural products in developing countries (Cunningham, 1996). The production, processing and sale of phytomedicine products create employment for the producing countries.

2.4.2. Phytochemical composition of medicinal plants

Phytochemicals are present in a variety of plants utilized as important components of both human and animal diets; include fruits, seeds, herbs and vegetables (Okwu, 2005). In addition to these substances, plants contain other chemical compounds, which can act as agents to prevent undesirable side effects of the main active substances. Most of these phytochemical constituents are strong bioactive compounds found in medicinal plants parts that are precursors for the synthesis of useful drugs (Sofowora, 1993).

In contrast to synthetic pharmaceuticals are based upon single chemicals, many medicinal and aromatic plants use their beneficial effects through the additive or synergistic action of several chemical compounds acting at single or multiple target sites associated with a physiological process (Tyler, 1999).

2.4.3. Medicinal plants and ethnomedicine in Ethiopia

Ethiopia is the land of great topographical diversity with altitude ranging from 200 meters below sea level at Danakil Depression to about 4,500 meters above sea level at Semen Mountains. The topographical variation of the country has made diversified climatic condition (tropical, sub-tropical and temperate) possessing a heterogeneous and rich endemic species of vegetation (Dawit Abebe and Ahadu Ayehu, 1993). There are about 213 families of flowering plants in Ethiopia, and of these 92 families and one family of each gymnosperms and ferns, are known to contain species with medicinal properties (Edward and Zemede Asfaw, 1992). Generally there are about 700-800 species of plants used in the traditional health care system to treat nearly 300 mental and physical disorders (Tilahun Teksehymanot and Mirutse Giday, 2007) most of which are believed to be confined to southwest Ethiopia (Haile Tineger and Delenarsaw Yewhanaw, 2007).

Ethiopian traditional medicine practices consists of the use of herbs cupping, cauterization, stream bath, spiritual healing, holy water bone setting and minor surgical procedures (Etna Tolasa, 2007). Ethiopian medicinal plants utilization for combating various disorders (Physical and mental) can be confirmed by referring the recent collection of medico-religious Manuscripts of the Axumite kingdom (Fassil Kebebew, 2001). Even though, the traditional medicinal practitioners are the best source of information about the knowledge of the medicinal plants, it has found difficult to obtain their indigenous knowledge on traditional medicine believing that their indigenous knowledge is a professional secret, which is only to be pass their old son at their oldest age (Fisseha Mestine, 2007). However, many practitioners of traditional medicine plant remedies in preventing various ailments still plays a significant role in most parts of the country, particularly traditional herbal healing is widely practiced through the rural population as their primary health care system (Tilahun Teksehymanot, 2007).

2.4.4. The importance of traditional medicinal plants in Ethiopia

According to Dawit Abebe, (2001) the large magnitude of use and interest in medicinal plants in Ethiopia is due to acceptability, accessibility, biomedical benefits and socio-economic reason. Medicinal textbooks written in Arabic or Geez in Ethiopia between 17^{th} and18^{th} centuries can confirm that plants have used as a source of traditional medicine in Ethiopia health care system (Asfaw Debela *et al*., 1999). Traditional medicine has become an essential part of the culture of Ethiopian people from the time immemorial to fight various ailments and human suffering (Mirgisa Kaba, 1998). Even today, some common ailments have treated using medicinal plants in almost all rural and poor urban communities. For instance, *Hagenia abyssinica* used to expel tapeworm; and *Ruta chalepensis* leaves for treatment of several health problems (Endalew Amenu, 2007). In fact, the continuous dependency on herbal medicine along side with modern medicine is largely owing to economic and cultural factors (Fisseha Mesfin, 2007). Based on varied and extensive range of their practices, some authors have attempted to classify traditional healer as herbalists, surgeons, traditional birth attendant, spiritual health care etc at local or even at country level. However even, they found it difficult clearly put them into distinct categories based on their specialization and methods of the treatment (Belackew Addis *et al*., 2002).

Moreover, as the result of incomplete coverage of modern medicinal system, shortage of pharmaceuticals and unaffordable prices of modern drugs, the majority of Ethiopian still depends on traditional medicine (Endalew Amenu, 2007). Modern medicine for health care has never

been and probably will never provide adequate and equitable health service for the future anywhere in Africa, including Ethiopia, due to the financial limitations related to rapid population growth, political instability and poor economic performance (Anokbonggo, 1992). Consequently, for most resources account for anything up to 95% of their survival requirements (Endalew Amenu, 2007).As a result, herbal remedies are the world's therapeutic means to act against for large proportion of people both rural and urban centers in developing countries like Ethiopia. It is also true that Ethiopian community rely on traditional medicinal plants rather than modern medical drugs because of medicinal plants rather than modern medical drugs because of medicinal plants are easily accessible either local areas, while modern drugs are dispensed in remote health institution (Cunningham, 1996). Today, traditional medicine is still the predominant means of health care in developing countries where about 80% of their total population depends on it for their wellbeing.

However, the knowledge of medicinal plants is, rapidly dwindling due to the influence of western lifestyles, reduction in the number of traditional healers and lack of interest of the younger generations to carry on the tradition and associated knowledge (Dyubeni, 2012). This indicates the need for in-depth investigation and documentation of medicinal plants traditionally used for rational consumption and conservation of plant resources and the associated knowledge (Dawit Abebe and Ahadu Ayehu, 1993). In most developing countries, particularly in sub-Saharan countries, disease remains one of the principal causes of poor livestock performance leading to an ever-increasing gap between the supply and demand for livestock and its products. Similarly, the ever-declining provisions of animal health services has resulted the re-appearance of a number of epizootic disease reducing the economic efficiency of livestock production in Africa (Tafesse Mesfin and Mekonnen Lemma, 2001).

Ethnovterinary medicine provides traditional medicines that are locally available and usually cheaper than standard treatment. So far and even today, traditional medicinal plants remedies are the sole choice to treat various ailments of many livestock in rural areas where there are relatively few veterinarians and shortage of other facilities (Mc Corkle, 1995). Stock raisers, both farmers and holders, have developed their own ways of keeping their animals' health and productivity by preparing and using homemade remedies with minimum expense (Mc corkle and Mathias, 1996). They treat and prevent livestock diseases some time using old age home prepared, surgical and manipulative techniques. Taken together these indigenous local animal

healthcare beliefs and practices constitute ethnovterinary medicine. Like other local technical knowledge, ethnovternary medicinal practice and skills was built up on over time empirical observation, mainly through trial and error and sometimes through deliberate (Mc Corkel and Mathias, 1996).

The various traditional veterinary medicinal practices had not documented though the paramount importance as a livestock health care system is certain. Therefore, creation of awareness on ethnovterinary medicine emphasizes important plants used for treatment and management of livestock. Generally, proper documentation and understanding of farmers' knowledge, attitude and practices about the occurrence, cause, treatment, prevention and control of various ailments is necessary in developing and implementing of successful livestock production strategy (Tafesse Mesfin and Mekonnen Lemma, 2001).

2.4.5. Methods of preparation, dosage and administration routes of medicinal plants

The preparation and uses of medicinal plants accomplished in various formulations. Ethnobotanical studies done so far showed that most common methods of medicinal plant preparation are simple crushing and pounding a particular plant(s) or plant parts. Additionally homogenizing it in water, that is used form of herbal preparation for both human and livestock health problem (Etana Tolasa, 2007). Researches on medicinal plants in various parts of Ethiopia, for instance, reports in Fentalle area by (Kebu Balemie *et al*., 2004), depicted the existence of application in which oral (51.7%), dermal (31%), nasal and other (0.1% each) are common. The dosage or amount and unit of measurement of medicinal plants used by traditional healers vary with the type of health problem. This shows that lack of precision and standardization as drawback for the recognition of traditional health care system (Kebu Balemie *et al*., 2004).

2.4.6. Medicinal plants research studies in Ethiopia

Fisseha Mesfin, (2007) indicated that world health organization (WHO), in1978, has officially organize an international program to promote and develop basic and applied research in traditional medicine. In the early time, only small fractions of world's plant have investigated scientifically, human being already reaped enormous benefits from them (Etana Tolasa, 2007). Therefore, medicinal plants used as human and livestock ailment due to these needs scientific study (WHO, 1998).

Medicinal plants gives attention and regional offices had established to coordinate basic and applied research activities on plant species. Moreover, pharmaceutical industries and western researchers have discovered on plant-based drugs, which contribute to the discovery of new, effective, safe and profitable therapeutic agents (Pistorius and Van Wiik, 1993). In Ethiopian similarly basic, but few researches was documenting medicinal plants. Some of them are Amare Getahun, 1976; Mesfin Taddese, 1986; Mesfin Taddes and Sebsebe Demissew, 1992. Dawit Abebe and Ahadu Ayehu,1993; Mirutse Giday, 1999. Edela Hunde, 2001; Abiyot Birhanu, 2002; Belachew Addis *et al*., 2002; Balcha Abera, 2003. Debela Hunde *et al*., 2004;Kebu Balemie *et al*., 2004; Ermias Lulekal, 2005; Mesfin Taddese *et al*.,2005;Tesfaye Seifu *et al*., 2006; Debela Hunde *et al*., 2006. Endalew Amenu,2007; Etana Tolasa, 2007; Tilahun Teklehymanot and Mirutse Giday et al.,2007;Haile Yineger and Delenasaw Yewhalaw, 2007;Fisseha Mesfin, 2007, and also mamy others. Hence, the attention should give to the field of ethno-botano-medicine of the country with all necessary endeavors to have a full image of the country's medicinal plant potentials for future generation.

2.5. Threats and conservation of medicinal plants and knowledge

2.5.1. Threats to medicinal plants and knowledge

According to Fisseh Mesifn, (2007) most of medicinal plants used in the world, including Ethiopia, are harvested from wild vegetation. Ethiopia has diversified climatic condition that account for the existence of about 6000 higher plant species of which about 700-800 species are believed to be employed in traditional health care system of the country in which 600 of them have been collected and identified (Department of drug research, 1997). There is a high extinction of enormous traditional knowledge and use of medicinal plant species in Ethiopia because of the existence of divers' language, cultures, beliefs and significant geographical diversity, which favored the formation of different habitat for medicinal plant (Cunningham *et.al*., 2001).

The traditional knowledge in Ethiopia had passed verbally from generation to generation and valuable information can be lost whenever a traditional medicine practitioner passes without conveying his traditional medicinal plant knowledge. In addition, the loss of valuable medicinal plant due to population pressure, agricultural expansion and deforestation is widely by different

workers. The traditional medicinal plants in Ethiopia are limited when compared with the multi-ethnic cultural diversity and the diverse flora of Ethiopia.

Ethiopian traditional medicine has faced a problem of continuity and sustainability elsewhere in Africa (Ensermu Kelbessa *et al*., 1992). Similarly; evidences show that, many plant species globally threatened with extinction owing to extensive deforestation, urbanization and drought that cause for loss of habitat of medicinal plants and thereby loss of habitat, medicinal plant and thereby the loss of indigenous knowledge (Kebu Balemie *et al*., 2004). Traditional herbal practitioners are important custodian of indigenous knowledge on the utilization of medicinal plants. This knowledge and usage of medicinal plants is being lost globally at a faster rate due to the impact of modern education, increase in health coverage and urbanization (WHO, 2002).

2.5.2. Conservation of medicinal plants and knowledge

Conservation can literally defined as the sustainable utilization of biological resources. According to Zemede Asfaw, (2001) found that concepts of sustainability were seen as guiding principle for economic and social development, typically with reference to biological resources. The knowledge on medicinal plants can be lost whenever the medicinal plants are lost or when a traditional medicinal practitioner dies without conveying his or her knowledge to other (Fisseha Mesfin, 2007). Dawit Abebe and Ahadu Ayehu, (1993) indicate that, medicinal preparations use roots, stems and barks by specifically killing the plant in harvest.

In addition, studies done so far depicted that remedies prepared from root is the most widely used form of preparation (Dawit Abebe and Ahadu Ayehu, 1993). Such widely utilization of root part for human and livestock ailments without replacement is adversely affecting the future availability of the plants.

3. MATRIAL AND METHODS

3.1. Description of the study area

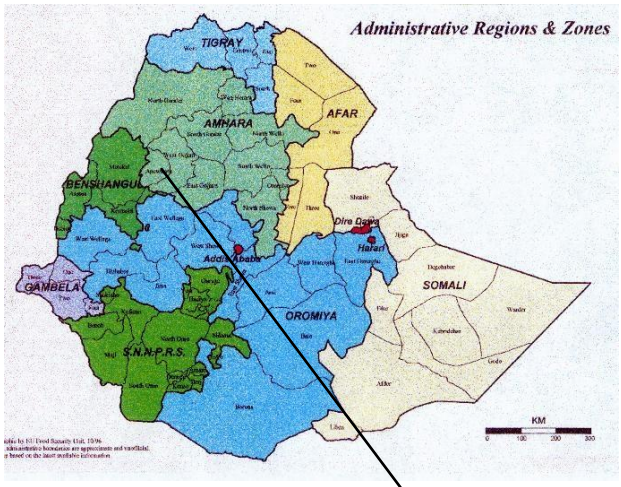
3.1.1. Location and land use of the wereda

Guangua district is one of 11 district of Awi zone located at distance about 505km from Addis Ababa, west Ethiopia. The capital of the distinct is Chagni located on the main high way about 52km south from Enjibara (the capital of Awi zone) (figure 1). District bordered in the North by Dangela Wereda, on the East Banja and Ankasha Wereda, on the south Zigam Wereda, on the west Benishangul Gumuz Region (Debati and Mandura wereda) districts. The altitude ranges from 1600-1710m above sea level. The total area of district is108901.3 hectare (1089.017km^2) of which the largest 50431 hectare (46.308%) is agricultural land, grazing land 7623.09 hectare (6.99%), Bush and shrub land 22022 hectare(20.2%), forest land 4464.95 hectare (4.1%) and the remaining covered by others (Table 1).

The topography consists of three types of features mountainous 28%, plain 60%, valley 12% having 5 urban and 15 rural kebeles from unpublished source (GWARDO, 2014).

Therefore, the major vegetation cover of the district is agricultural land and the least coverage is that of natural forest. For instance, there are hill areas covered by vegetation such as “Brandy area”, ’’Waykela area ,’’Chehuay kana’’ and “Ambo area”, which is a forest area with natural vegetation species denominated by *Albizia schimeperiana*, *Syzygium guinense*, *Olea europea,* and very few species of *Acacia abyssinica* and *Carissa edulis*. In addition, some areas of the land covered by manmade tree like *Eucalyptus camaldulensis* and *Juniperus procera* Unpublished report (GWARDO, 2014).

Stare indicates selected kebels



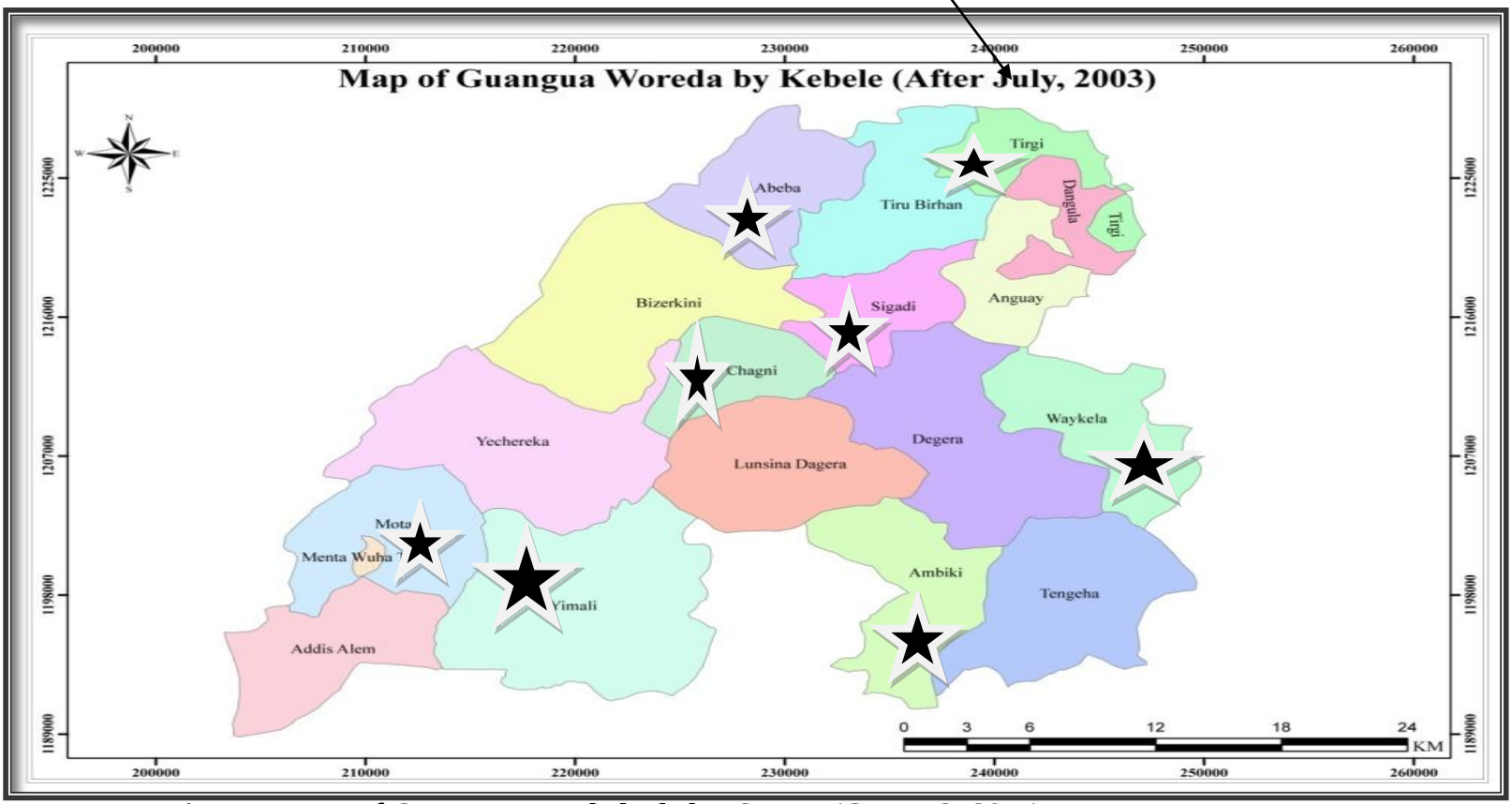


Figure 1: Map of Guangua wareda by kebe: Source (GWFEO, 2014)

3.1.2. Climate and ecology of the study area

The agro-ecology of the district comprises of '*Woina Dega'* (65%) (mid-temperate-mid-high land) and '*kolla*' (35%) (hot -temperate-low land). The district has two cropping seasons, Belg (short cropping season) and Maher (main cropping season). The Belg season is from January to

March, while the Maher season is from May to September. The rain during the belg season is non-consistent and inadequate. The Maher rain is also irregular in amount and distribution. The belg season is now widely used for land preparation and planting of sorghum and maize (GWARDO, 2014). The mean annual highest and lowest average temperature range of the study area is 27.7^{0}c and 13.3^{o}c respectively. However, the monthly highest temperature range is 31.2^{0}c and the lowest temperature is about 8^{0}c. The mean annual rainfall is 1819.5mm. Monthly maximum and minimum rainfall is about 402.6mm and 1.9mm respectively. Tenth years average rainfall and temperature has 1740mm and 28.7^{O}C (finger 2) respectively (National Metrological Agency as Waleter, 1985). Variation does exist in amount and distribution between the two agro-ecological zones if shortage of rainfall is more sever in kolla than woina dega unpublished data (GWARDO, 2014).

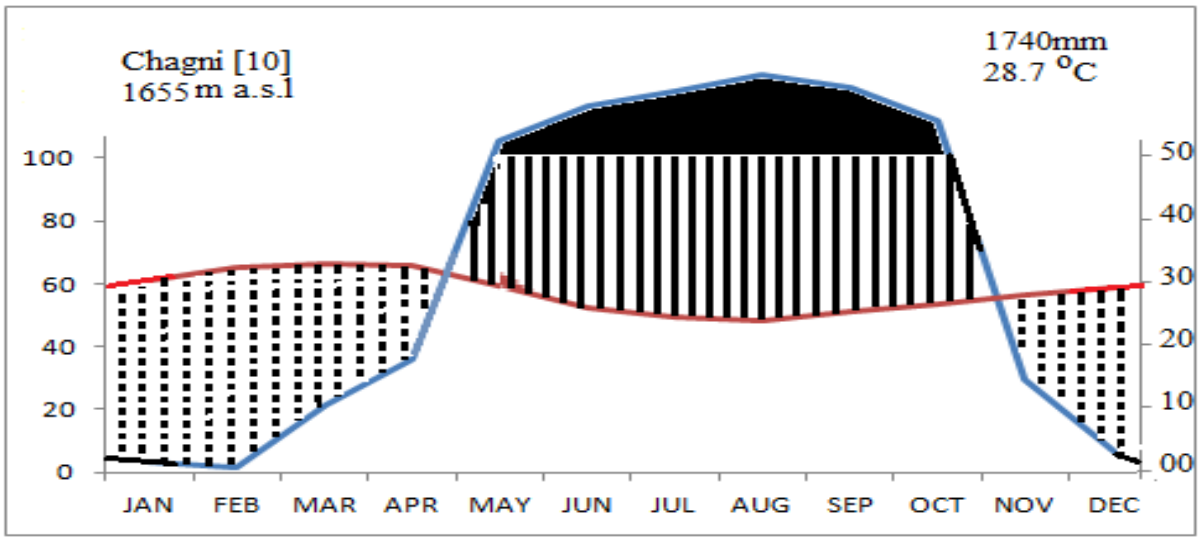


Figure 2: Climadiagram of Chagni as Waleter (1985).National Metrological Agency

3.1.3. Population structure and health service

The total number of population is about 165266 (male=82034 and female= 83232). Of which 117064 (male=58637 and female=58427) live in 15 rural kebeles, while 48202 (male=23397 and female=24805), live in five urban kebeles. About 91% of the inhabitant's are engaged in agriculture; of which 28% conduct crop production, and 62% mixed farming. The majority of population (>90.5%) practice Christianity, while the rest practice Islam. They are linguistically Cushitic speaking, using the widely spoken *Awi* language (GWFEO, 2014).

The health coverage of the district reaches about 71.2% in which there are about 17 health care centers fairly distributed in all kebeles and 7 health's center, 10 private clinics. However, in health center there is not enough drug, equipments and knowledgeable health workers distribute in all heath center and the drug cost of private clinics are very high (GWHO, 2014). This shows that the health service given is not satisfy the need of people. Therefore, people were forced to consult to traditional healers. In the study area, there is organizational structure at the district level that encourages the local herbal medicinal practitioners to enhance the use of traditional medicine and licensing the work of practitioners. Licensing traditional healers has opened an office or clinic in chagni town to treat ailments.

3.1.4. Farming system of the study area

The local community grouping soil on the basis of the color, substrate and moisture content as locally says 'Demi','Tserky' and 'walhey'in (Amharic 'Kei', 'Tikur' and 'Walka') which mean 'Red', 'Black' and water logged but getting cracked in dry season soil types, respectively. The color of the soils due to the presence of organic nutrients ''composted soil'' are also common in the study district. Similarly, the people discriminately know crop plants that can grow in each soil type. The number of livestock found in the district is cattle, sheep, Goat, Mules, Horses, Donkeys and Poultry. The major types of croup grown were Tiff, Dagusa, Baqolo/maize, Mashela/sorghum, Leguminous, oil croup and others (GWARDO, 2014).

The numbers of livestock include Cattle 142511, Sheep and Goats 50975, Mules, Horses, and Donkeys 13928 and Poultry 78662. However, their productivity is very low as in most parts of the country. The major reported livestock diseases are anthrax (*abasenga*), lack of appetite, lung disease, broken body, exotic/foreign, castration and others unpublished report (GWARDO, 2014).

3.2. Study design and methodology

Same kebeles are remote not infrastructure like transportation for these reason cross-sectional study (i.e, collection of data at one point of time of several variables) with integration of Rapid Ethnobotanical Appraisal approach (REA); has small sample size and area had taken to sketch out how the community act as whole types of design was used. A preliminary survey was conducted, before start of the actual study, on some kebeles to sketch out overall status of medicinal plant distribution and medicinal plant use practices in study area. However, medicinal

plants collection and documentation of the associated knowledge was performed by using the following tools. Cutting tools (e.g. scissors), polyethylene bag for holding and transporting plant specimens, camera to grasp pictures, notebook, and plant press.

The study was conducted in eight (8) kebeles with the 20 Gotes (Figure 1). The selection of kebele has made by purposive sampling based on information on the relative status of forest coverage, population settlement and availability of practitioners with the help of Agricultural and Rural Development Office (ARDO) of the district and local Community Development Agents.

3.3. Selection of local informants

In this study, 65 informants (45 male and 20 females) with the age between 20 -85 were included regardless of gender, social status and educational background (Appendix 2). Eleven key informants (marked * in Appendix 2) selected purposively following (Alexiade, 1996) with the help of local administrators, the office of the district's traditional healers association and local elderly people. Nominations on knowledge depth of respondents were collected from local elderly people, heads of the district's traditional healers association and the local administrators of each Kebele. The other informants were selected randomly from the local people of the study area.

3.4. Ethnobotanical data collection

3.4.1. Interview and discussion

Ethnobotanical data were collected using semi-structured interviews and group discussion between December 25 to March 30/2015 where two field visits made to each gotes/sites based on procedures recommended by (Alexiades, 1996). Data collection was made based on questions prepared in Amharic (Appendix 8). The items include the respondents' background, health problems treated, diagnosis and treatment methods, local name of medicinal plants used, source of collection (wild/ cultivated) growth form, degree of scarcity, plant part used, methods of preparation and application, threats to medicinal plants and conservation practices of respondents were carefully recorded. The entire interview and discussion with informants were done through direct face-to-face contact between the researcher and informants. The willingness of informants was first confirmed before starting data collection from the entire respondent selected from the study kebele.

3.4.2. Direct observation and illustration checklist interview

Botanical data on plant habit, habitat and status of availability of medicinal plants were collected on field observation, guiding filed walk and illustrated checklist. Observations were made on the morphological features and habitats of each medicinal plant species in the field. Moreover, informants were visited twice for confirming the consistency of the data collected from local people. This was done through awareness making for informants by describing the post-significance of the research for study area in particular and for the country in general.

3.4.3. Collection and identification of medicinal plants

Medicinal plants used by the local community of the study area were collected during field walk and direct field observation of informant from December 25 to March 30/2015. Representative specimen possessing, as much as possible, both reproduction and vegetative parts were collected to make the identification process easier.

Medicinal plants collection was made by using basic botanical collecting tools, such as cutting tools like scissors, polyethylene bags for holding and transporting individual plants, camera to grasp images, note books for recording additional information, topographical map to navigate the study area(gotes), locally fabricated plant press for flattening and drying plant specimens for identification and preservation.

Identification of Voucher specimen was done on the field while collecting and pressing them. However, unidentified medicinal plants had brought to Bahir Dar University Biology department Temporal Herbarium for identification. Further identification was performed by using the Natural Data base for Africa (NDA, 2008) software, comparison with authentic specimens, illustrations and taxonomic keys and published volumes of the Flora of Ethiopia and Eritrea. The label for collection or pressed specimens includes the name of institution and collector, local name (in *Awi* language), English name, Botanical name (Family and genus), collecting date, locality, habitat, and habit, collecting number and its indigenous use or application.

3.5. Methods of data analysis

3.5.1. Statistical analysis

A descriptive statistic procedure like measure of percentage, central tendency like frequency were employed for analyzing plant habit, plant parts used and methods of preparation, dosages, administration route and threats. Moreover, inferential statistics like simple linear (Pearson

correlation) coefficient test, excel for drawing graphs and one way ANOVA were calculate to know if there is the relation or significance difference between medicinal plant knowledge versus explanatory variables (like sex, age, educational level).

3.5.2. Informant consensus

One way of confirming the efficaciousness of a given plant species is using the consensus made by informants. In such cases, popular and curative medicinal plants were indicated by the majority of local people in a given area due to medicinal value of stomachache, headache, and malaria. According to Alexiades, (1996) in order to evaluate the reliability of information recorded during the interview, informants were contacted at least two times for the same ideas and the validity of the information was proved and recorded.

3.5.3. Preference Ranking

Followed by Martin, (1995) preference ranking was performed using six selected key informant for most important medicinal plant first on the basis of healing power of stomachache and secondly on the bases of degree of healing several ailment. Accordingly, ten medicinal plants have chosen to rank preferentially by key informants on the bases on curing stomachache. Giving the highest value ten for best plant in treatment of stomachache and the least value one, for plants with lower healing power as compared to other plants, 10 medicinal plants have ranked based on healing power of stomachache. However, eight for highest value or best plants in treatment different disease and the least value one for plant with lower healing power as compared to other plants. Eight medicinal plants has ranked based on healing power of medicinal plants selected bases of degree of healing several ailments.

3.5.4. Direct Matrix Ranking

In order to compare multi-purpose use of a given species and to infer the multiple significance of one species as compared to other species and to relate the extent of its utilization with its threatening can be checked by using direct matrix ranking recommended by (Martin, 1995). Direct matrix ranking exercises conducted for 11 medicinal plants according to the information gathered from informants on the multi-purpose use categories of the plants. Accordingly, Martin, (1995) 11 multi-purpose species had selected out of the total medicinal plants and eight use categories like medicinal, food, forage, fencing, firewood, construction, charcoal, and furniture

were listed for eight selected key informants to assign use value to each species. Each key informants were oriented to assign use value (five =very highly common, four= highly common, three=good, two=less used, one=least used and zero=not used). Finally, the average use-value for each category was calculated and then the mean value of each use-category had summed up for each plant species and ranked them accordingly. Similarly, four major threats has ranked based on their frequency of occurrence in the locality.

3.5.5. Fidelity Level Index

According to Alexiades, (1996), the fidelity level (FL) is percentage of informants claiming the uses of a certain plant species for the same major purposes or ailment to treat. Fidelity level has calculated for medicinal plants used to treat diarrhea and malaria two of the diseases that frequently reported in the direct and to see the contribution of the herbals against human mortality by these diseases.

$$FL\ (\%) = (Np/N) \times 100.$$

Where Np is number of informants that claim the use of plant species to treat a particular diseases and N is the number of informants that use the plants as a medicine to treat any disease as described by (Alexiades, 1996). Therefore, fidelity level index has calculated for seven medicinal plant species used for treating malaria four Species and diarrhea three species.

4. RESULT AND DISCUTION

4.1. Indigenous Knowledge of the study area

4.1.1. Indigenous medicinal Knowledge

In the study area, the local communities were their own indigenous medicinal knowledge. For instance, they were vast knowledge on preparation of plant remedies for health problems that could occur in their locality. Most informants participated in this study had herbal medicinal knowledge 54 (83%) informants. About 6 (9%) informants were traditional birth attendances, 3 (5%) informants were to give spiritual therapy, and 2 (3%) informants give bone-setting (massaging) services (Figure 3).

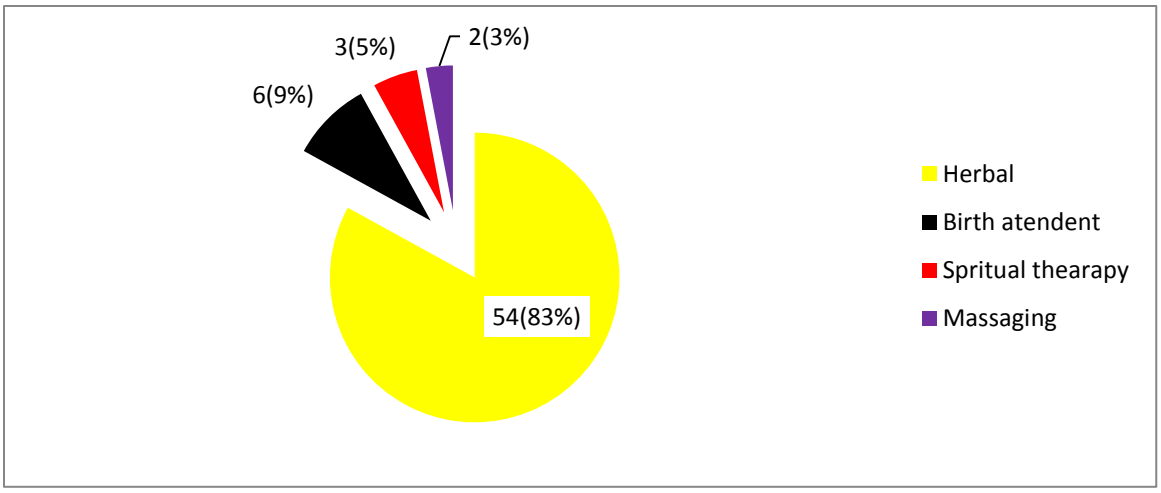


Figure 3 : Ttraditional medicinal knowledge of informants in Guangua district

The result showed that different types of medicinal practitioners and indigenous traditional medicinal knowledgeable people were found in Guangua district.

In Guangua district, any health problem is believed to have plant, animal or spiritual remedies which can especially be practiced by indigenous medicinal practitioners ''Ejutane'' in local name in (Amharic ''Bahalawy Medihanit Awakwach"). The majority of practitioners were developed their knowledge from their parents 41 (63.1%) informant, partners 13 (20%) informants, self-experience or discovery 8(12%) informants and religious books 3(5%) informant (figure 4). However, some health problems were believed to be incurable by modern medication but they believed that they were treating by traditional medicine. For instance, Spiritual inherited disease like ''Gudaly''(Evil ey) treated only traditional ways. On the other

hand, curable diseases like sever bloody diarrhea local community prefer modern medication than traditional medicine.

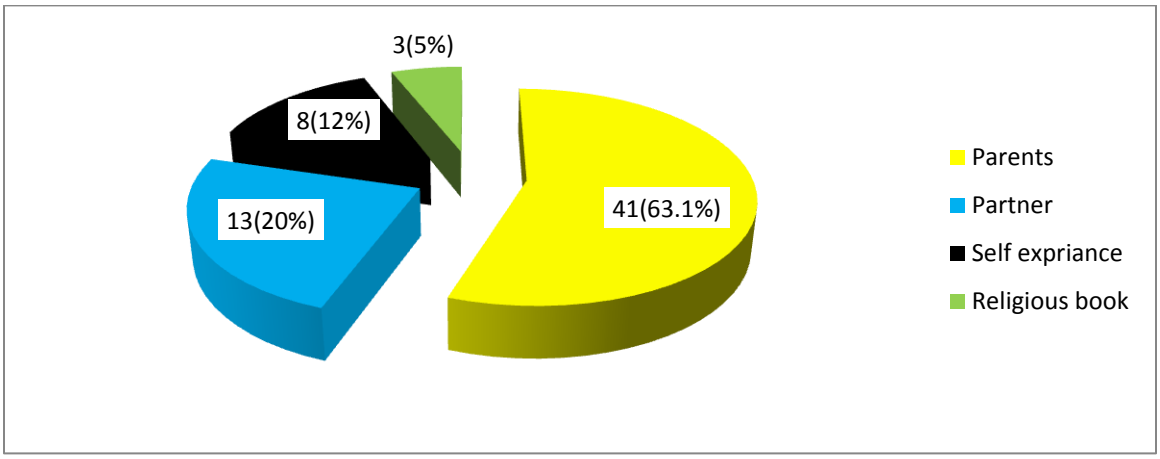


Figure 4: Sources of knowledge traditional medicine

4.2. Human and livestock traditional medicinal plants in study area

In the study area, 88 medicinal plants species was documented (Appendix 1&3); 42 medicinal plants are pressed and documented BDU department of biology and indicated in photograph (Appendix 7). From the total 88 medicinal plant species documented, the local community used 71(80.7%) species as remedies for treatment of human ailment (Appendix 1), 5 (5.7%) species (Appendix 3) were used for curing livestock disease, and 6(6.8%) species was used as common remedies for treatment of both human and livestock disease (Figure 5). The existence and utilization of large number of medicinal plants by the people of the study area indicated the dependency of local people on traditional medicinal plant remedies for treatment of both human and livestock health problems. In general, the local people in Guangua district used traditional medicine for any health problem occur in both human and livestock health problem before going to modern medication.

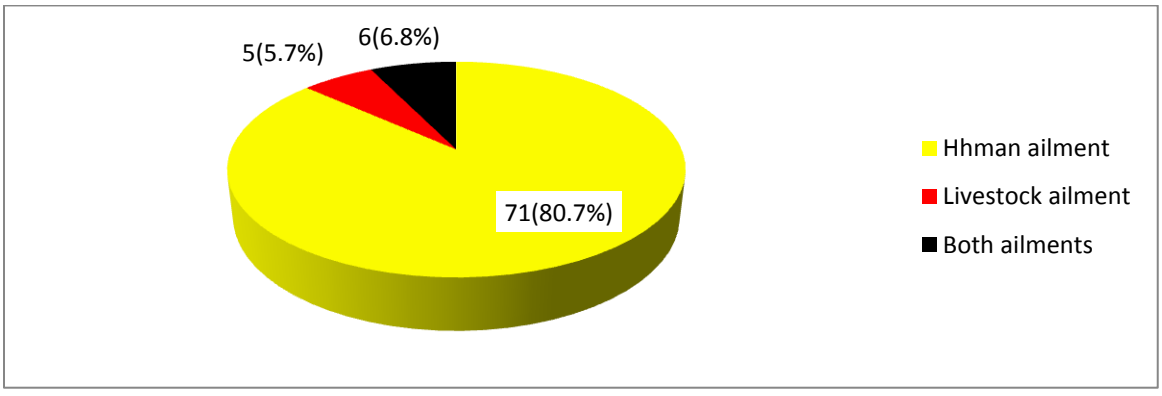


Figure 5: The uses of traditional medicinal plants in Guangua district

4.3. Distribution of habitat, habit and sources of medicinal plants

Analysis showed that, in Guangua district, growth form of plants used by local community for treatment of both human and livestock ailments dominated by herbs 37(45%) proportion (Table 1), very few species of climbers 4(5%), and only one epiphyte species (Appendix 1&3). In this regard, similar findings were reported by Debela Hunde, (2001) and in their ethnomedicinal research in Boosta wereda (Welenchiti area). While this study was not supported by Haile Yineger and Delenasaaw Yewhalaw, (2007) and Ermial Lulekal *et al*., (2008) were found shrubs to make up the highest proportion of medicinal use followed by herbs in their ethnobotanical research of Sekoru and Mana Angetu district, respectively.

Table 1: Number of ethnomedicin and ethnovtrenary growth forms of medicinal plants

Growth forms/habit	No. of medicinal plants	Percentage(%) total
Herbs	37	45%
Shrub	30	36%
Tree	11	13%
Climbing	4	5%
Epiphyte	1	1%

Following, in this study, the major sources of medicinal plant species were harvested in wild vegetation. Accordingly, out of 88 medicinal plants documented, highest number (41) of species was collected from wild 41(46.6%) vegetation, 32(36.4%) species was harvested from cultivation and only 15(17%) medicinal plant species were harvested in both wild and cultivated (Table 2). Generally, most medicinal plants were harvested in wild or natural vegetation area, these result indicates that there is a problem of wild vegetation from Unpublished source (GWARDO, 2014). Mirutse Giday, (1999) found a similar findings in medicinal plants of the Zay people that live in the island and along shore of Ziway.

Table 2: Sources of ethnomedicine and ethnovtrenary medicinal plants in Guangua district

Source	Medicinal plants	Percentage
Wild	41	46.6%
Cultivated	32	36.4%
Both	15	17%
Total	88	100%

4.4. Human and livestock taxonomic distribution of medicinal plants

In study area, the total of (88) medicinal plant species were distributed in to 82 genera and 47 families. Nevertheless, equal number of medicinal plant species was not distributed for each

genera or families. Therefore, families *Asteraceae* constituted 8(17%) species, *Euphorbiaceae* were constituted of 5(10.6) species, *Solanacea, Leguminosa (Fabaceae)* and *Rutaceae* 4(8.5%) species each, followed by *Labiatae, Liliaceae, Poaceae, Rosaceae, Rhamnaceae* and *Cucurbitaceae* 3(6.3%) species each. *Polygonaceae, Ranunculaceae, Oleaceae, Acanthaceae, Cruciferae* and *Vitaceae* share 2(4.3%) species each. While similarly, familie *Rubiaceae, Crassulaceae, Agavaceae, Amaranthaceae, Moringaceae, Amaryllidaceae, Apocynaceae, Boraginace, Capparidaceae, Caricaceae, Chenopodiaceae, Cupressaceae, Cyperaceae, Loranthaceae, Malvaceae, Meliaceae, Melianthaceae, Menispermaceae, Moraceae, Myrtaceae, Phtyolaceae, Piperaceae, Sapindaceae, Myrsinaceae, Apiaceae, Musaceae* and *Zingiberaceae* are constituted by 1(2.1%) species each (Appendix 4).

This result indicted the presence and utilization of more medicinal plant species in the study area. In most instances, plant species family *Asteraceae (Compositae*) were reported in great medicinal values. Similarly, this result was supported by other study; Endalew Amenu, (2007) was reported that *Asteraceae* made the largest proportion of medicinal plant used by the people of Ejaji area Chelya Wereda, West Shoa. These results indicate the wider utilization of *Asteraceae* family in other part Ethiopian region.

4.5. Traditional medicinal plants used to treat human ailment

The local communities in the study area, use quit large species of medicinal plants in number and types. Medicinal plants are the primary remedies for treatment of several ailments in the study area. Accordingly, the 77 (87.5%) medicinal plant species having great medicinal importance for treatments of diseases were recorded. However, it is only 71(80.7%) species were used only for treatment of human ailments.

The taxa distribution of species revealed that the plant comprises 77 genera and 47 families. Accordingly, family *Asteraceae (Compositae*) makes up highest proportion6 (12.8%) species. *Euphorbiaceae, Rutaceae, Legumiosae* and *Fabaceae* 4(8.5%) species each. *Solanaceae, Labiatae, Liliaceae, Poaceae, Rhamnaceae* and *Cucurbitaceae 3*(6.4%) species each. *Polygonaceae, Ranunculaceae, Rosaceae, Oleaceae, Acanthaceae* and *Cruciferae* 2(4.3%) species each. While similarly, families *Vitaceae Rubiaceae ,Crassulaceae, Agavaceae, Amaranthaceae, Amaryllidaceae, Apocynaceae, Boraginaceae, Capparidaceae, Caricaceae, Chenopodiaceae, Cupressaceae, Cyperaceae, Loranthaceae, Malvaceae, Meliaceae,*

Melianthaceae, Menispermaceae, Moraceae, Moringacea, Myrtaceae, Phtyolaceae,Piperaceae, Verbenaceae, Myrsinaceae, Apiaceae,Musaceae and *Zingiberaceae* are constituted by 1(2.1%) species each (Appendix 1).

On the other hand, in the study area growth forms of medicinal plants used to treat human ailments dominated by herbs 34(44.6%) proportion (Table 3) very few species climbers 3(3.9%) and only one epiphyte 1(1.3%) species(Appendix 1). However, this result was opposed by the other studies, Ermias Lulekal *et al*., (2008) were reported that shrubs constitute the largest proportion of species of medicinal plants in their research in Mana Angetu district, Southeastern Ethiopia.

Table 3: Ethnomedicine growth form distribution of medicinal plants

Growth forms	Number of medicinal plants	Plant percentage (%)
Herb	34	44.6%
shrub	28	36.4
Tree	11	14.3%
Climber	3	3.9%
Epiphyte	1	1.3%

Additionally the major source of medicinal plant species to treat human ailment harvested from wild 34(44.2%) vegetation (Table 4) and a limited number of plants harvested both wild and cultivated 14(18.2%) area (Appendix 1). This analysis indicates that the practitioners depend on the wild source or the natural environment rather than home gardens or cultivated medicinal plants. Hence, traditional healers deforested the traditional medicinal plants, as well as traditional practitioner in the study area was over exploits many of useful traditional medicine. However, the local people were practicing cultivation of medicinal plants in their home garden and farming lands that reduce the existing challenges on wild vegetation and minimize the scarcity of important medicinal plants from their natural habitat. Similarly, this result was supported by other research Endalew Amenu, (2007) in their respective ethnobotanical survey Ejaja area.

Table4: the number and sources of ethnomedicinal plants

Frequency distribution	Number of medicinal plant	Total percentage (%)
Wild	34	44.2%
Cultivated	29	37.7%
Both	14	18.2%

4.5.1. Plant parts and method of preparation of remedies for human ailment

In the study area, traditional medicine was prepared by using various medicinal plant parts. Analysis showed that, the most common plant parts used widely to treat human health problems include root, stem, leaves and others (Table 5). Therefore, the highest used plant parts for preparation traditional medicinal remedies were largely leaves 56(47.1%) and the next was root 23(19.3%) (Appendix1). This result was identical by other ethnobotanical research study Haile Yineger and Delenasaw, (2007) reported that leaves followed by roots to be predominantly used in the treatment of various health problem. On the other hand, Ermias Lulekal *et al*., (2008) have found roots to take the highest proportion in the preparation of remedies in Mana Angetu district.

Hence, in Guangua district uses of more leave for preparation of traditional medicine result reduce the loss of medicinal plant in natural habitats. Plant harvested involving root, rhizomes, bulb, bark and stem having serious effect of the Mather plant in its habitat (Dawit Abebe and Ahadu Ayehu, 1993).

Table 5: Percentage of medicinal plant parts used for preparation of ethnomedicine

No.	Plant parts	No. of preparation	Percentage(%)total
1	Leave	56	47.1%
2	Root	23	19.3%
3	Seed	21	17.6%
4	Bark/wood	10	8.4%
5	Fruit	4	3.4%
6	Bulb	2	1.7%
7	Whole plant	3	2.5%
6	Flower	1	0.8%

In Guangua district, there are different methods of preparation traditional medicine such as concoction, decoction and crushed and homogenized in water. Of these methods of preparations grinding 26(21.8%) preparation and Concoction 24(20.2%) preparation was constituted the highest type of preparation form, followed by squeezing 21(17.6%) preparation. In addition to these, the local people of Guangua district was use several other forms of preparation (Table 6). This indicates that medicinal plant remedies are also prepared from mixture of several plant parts rather than only used alone that could improve the efficacy of the remedies in treating ailments. This result was opposed by Ermias Lulekal *et al*., (2008) was reported concoction to be largely

used in Mana Angetu district, while Endalew Amenu, (2007) was establish that pounding and powdering to be the most frequently used methods of preparation in Ejaja area.

This is because medicinal plants used and knowledge was the reflection of types and density of flora and fauna found in the locality, as well as the cultural background of the society in that area. Generally, plants used alone constitute the largest proportion with 87(72.5%) preparations; while remedies from mixture of different plants share 33 (27.5%), preparations (Table 6**)**. This result was against on the other research study by Endalew Amenu, (2007) state preparations from mixture of different plant species takes the largest proportion in Ejaja area.

Table 6: Methods of preparation traditional medicine by local people in treatment of human ailments

Form of preparation	Methods of preparation	Preparation number(frequency)	Percentage (%) Total
Use single plant	Crushing	13	10.9%
	Grinding	26	21.8%
	Squeezing	21	17.6%
	Single decoction	10	8.4%
	Roasting	5	4.2%
	Heating	7	5.9%
	Dried, crushed, grinding & homogenized with water	5	4.2%
Mixed with other plants	Concoction	24	20.2%
	Mixed decoction	9	7.6%

Accordingly, Mirutse Giday, (1999) additional substances like coffee, salt, honey, butter and oils are necessary while preparing some plant remedies. Uses of such additional substance also practiced elsewhere in Ethiopia. Additional substance used to prepare some remedies important to reduce the adverse effect of some heavy remedies like reduce the possibility of vomiting and abdominal discomfort that improve the hailing power of remedies.

4.5.2. Administration routs of human traditional medicine

In the study area, major administration route of medicinal plant preparations were applied through oral, topical or dermal, and nasal. The route of application actually depends on the kind of diseases to be treated. Accordingly, analysis of rout of applied (Table 7), 62(52.1%) preparations were taken orally, 35(29.4%) preparations were employed dermal ways, and these two were the high rout of application (Appendix 1). Similarly, in other search oral was the major

route followed by dermal application, however, methods of application (oral and dermal) of remedies allow and enhance the physiological reaction of remedies with the pathogens that in turn increasing the healing power of the medication (Debela Hunde *et al.*, 2004; and Ermias Lulekal *et al*., 2008). Therefore, according to informants, different cautions were considered while after taking medicinal remedies, which depend on the kind of ailments. This is because the agents had perceived to have a disturbance effects on the remedial action of the preparations agent hepatitis and they were considered to render the reappearance of the disease if they ear taken after recovery. Such cases also are common in modern medications where patients were advised to cease taking some agents that could disrupt the action of drugs against the diseases.

Table7: Percentage routs of applications of ethnomedicine

Routes of application	Preparation number	Percentage (%)
Burial/Insert/	2	1.7%
Ocular/eye/	2	1.7%
Eustachian/ear/	4	3.4%
Fumigation/apply chemical/smoking	4	3.4%
Nasal	11	9.2%
Dermal	35	29.4%
Oral	62	52.1%
Total	120	100%

In the study area, about 31% of preparations were taken with known dosages mostly quantified by spoon, cup of tea, palm and other equipment. The highest plant remedies (69%), however, taken with no fixed dosage (Appendix 1). The efficiency of a given traditional medicine was depends up on the dosage to administer (Finger 6). According to Ermias Lulekal *et al*., (2008) such dosage quantification depends up on the type of preparations and disease to be treated in Mana Angetu district. In most instances, dosage with half to three cups of tea was the common quantity of medication taken through oral route of application. Similarly, Dawit Abebe and Ahadu Ayehu (1993), Etana Tolasa (2007) and other research are reported the absence of fixed dosage in a traditional treatment of ailments. Therefore, the limitation of a fixed dosage in preparation of traditional medicinal plant remedies was the problem of various parts of the world including Ethiopia.

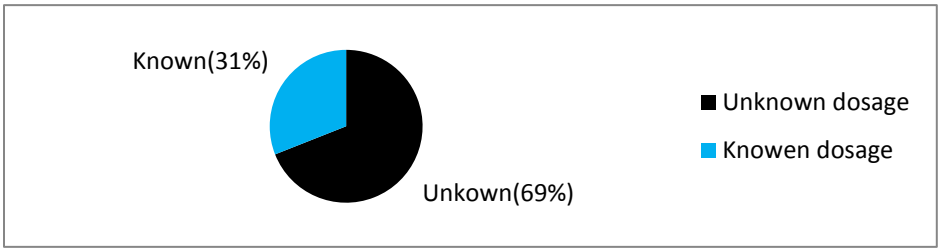


Figure 6: The dosage administration of ethnomedicine in Guangua district

4.5.3. Description of most common human traditional medicinal plants

1. *Allium sativum L. (Liliaceae)* (Garlic)(Fuchy Shgurchy):- annual plant with adventitious roots and compound bulbs composed of several cloves enclosed in a common membrane. The clove was the basis of foliage leaves and smaller bulbs formed from axillaries bulbs. The leaf was erect; rough margin of 1cm.wide and up to 15cm.long (Finger 7) .The, unbranched stem bears an apical umbel of rose-white to greenish flowers. The plant has originated from India and central Asia, but now it is widely cultivated throughout the world. In Ethiopia, garlic grown in home garden, farm area within the altitude of 1800-2800m.above sea level (Tewolde Brehan Gebre Egziaber and Edwards, 1997).

In Guangua district, these medicinal plant species locally named as ”Fuchy shgurchy” was used for treatment stomachache, headache, malaria and treatment of many other several diseases. The method of preparation either alone or being mixed with other plant species. For instance, the clove of garlic pounded mixed with *Cicer arietinum* and left for 12hr, which the concoction was then ready for drinking in morning for treatment of malaria. Many researchers in different parts of the world including Ethiopia prove the efficacy of *A.sativum*. For example, clove of this plant used elsewhere in Ethiopia to jaundice and coetaneous leshimaniasis (Getachew Addis *et al*., 2001).

Figure 7: Description of highly used ethnomedicinal plant (*Allium sativum L.)*

2. *Nigella sative L. (Ranunculaceae)(*Black cumin)''Tsearky Abesuda'':- An annual small herb with erect and branching stem of 70cm height. Leaves are alternate, deeply cut and grayish-green with' bi' or 'tri' even more-pinnately dissected sub- linear lobes. The flowers are solitary and terminal with grayish or pale white color. The fruit capsule is grayish to yellow-brown when ripe, and seeds are compressed which usually are three-corned, two side flat with one convex, black or brown externally strong aromatic odor (Finger 8). The plant is believed to be indigenous to Egypt and Eastern Mediterranean, and now widely cultivated in Ethiopia where the cumin 'seed' is obtained from the dried plants by threshing and or marketed as the whole seed and as the ground spice (Redhead and Boelen, 1990).

In study area, the medicinal plant was locally named as ''Tsearky Abesuda'' (Appendix 7) and used for treat several ailments such as, treatment of headache, allergic, common cold, stomachache. The plant part used for preparation of traditional medicine is seed. The methods of preparation mixed with other plant species like for treating stomachache the seed pounded mixed with *A. sativum* and *R. Chalepensis* with adding lemon juice this is concoction then eaten with spoonful every morning before breakfast, until when the disease is recover. Accordingly, Dawit Abebe *et al*., (2003) the seed had roasted and mixed with honey and taken orally for treatment of asthma and headache.

Figure 8: Description of highly used ethnomedicinal (*Nigella sativum)*

3. *Zingiber officinale Rosc (Zingiberaceae)(*Jenjbly):- A perennial herb, with irregularly branched and pale-yellow to light-brown rhizome, and with one or more aerial leafy stem. The leaves are linear to lanceolate up to 20cm.long and 2cm.wide (Figure 9). Misra and Bharaprakasha (1989) cited plant species was widely distributed in India, Bangladesh, Nigeria, and Ethiopia.

In the study area, the species locally named as ‘’Jenjbly’’ plant parts used to prepare traditional medicine was rhizome. Methods of preparation used parts was rhizome, pounded and mixed with other plant species such as *R.chalrpensis* and *A. sativum*. Then the traditional medicine was drink or ingested used to treat stomachache and common cold (Appendix 1). Similar, results mentioned Dawit Abebe *et al., (*2003) medicinally uses of rhizome was important for treatment of stomach complaints.

Figure 9: Description of highly used ethnomedicinal plant (*Zingiber officinale)*

4. Moringa stenopetala (Moringaceae) **(Shifraw):-** Species commonly called cabbage-tree has planted by agriculturalists on the complex system of terraces built high up in Ethiopian highlands. It becomes domesticated and bred to improve productivity. The cabbage-tree is small tree up to 12 m (39 ft), with many-branched crown and sometimes with multiple trunks. The leaves are bi- pinnate or tri -pinnate, with about five pairs of pinnate and three to nine elliptic or ovate leaflets on each pinnate. The flower creamy-pink sepals, white or yellow petals, and white stamens (Figure 10). The fruits are long reddish pods with a grayish bloom (Jahn, 1991).

In Guangua district, Maringa locally named as shifraw. The plant part used for preparation of remedies was leaf and root and; method of preparation cooking/decoction and then eaten. Therefore, local people use morning for varity of medical value used for treat malaria, hypertension, stomachache, asthma, diabetes, leprosy, itching, common cold and diarrhea. The other studies Jahn, (1991) reported that the leave and root extract of *Moringa stenopetala* also tasted against the infective stage of *Trypanosome brucei* (parasite that cause sleeping sickness) that is common in tropical Africa like Kenya.

Figure 10: description of highly used ethnomedicinal plant (*Moring stenopetal)*

4.5.4. Common human diseases and medicinal plant species used to treat them

Total of 77 traditional medicinal plants species were documented in the study area used to treat 37 human diseases and health defect. Of these, (Figure 11) 20(16.8%) ailments were treated using two or more medicinal plant species while 100(83.3%) ailments were treated using only one plant species (Appendix 1).

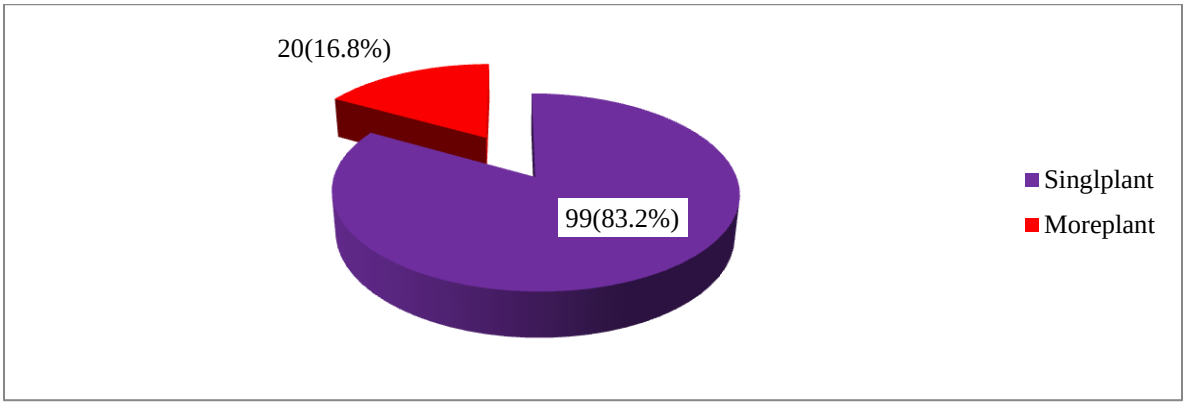


Figure 11: The major human disease to treat single and or two or medicinal plant in study area

Analysis given, stomach complaint was treated using highest medicinal plants 15 followed, by" Evil eye" was treated by 10 species. Wound sore was treated by 7 plant species, Hepatitis, Ascaries using 5 plant species. Diarrhea, Tonsillitis, Erectile disinfection, Eczema/skin disease/chiffe 4 plant species. Furthermore, the other ailments were treated using less than four plant species indicated in (Table 8). Therefore, according to the result mention above traditional medicinal plants used to treat several human health problem or ailments (Appendix 1). The treatment of ailment using different plant species is owing to the frequent occurrence of

disease(s) and accessibility of medicinal plants to treat the ailments. Researchers in some parts of Ethiopia reported treatment of ailments by more than a single species for instance; Endalew Amenu, (2007) found practices of treating diseases using more than one plant species in Ejaji district.

Table 8: Common human diseases and the number of corresponding medicinal plant used

Diseases(injuries)	Number of medicinal plants	Diseases(injuries)	Number of medicinal plants
Stomach complaints(ache)	15	Miscarry(abortion)	2
Evil eye	10	Swelling	2
Wound sour	7	Herpes zoster/skin leap/ reproductive organ disease	2
Hepatitis	5	Toothache	2
Ascaries	5	Rheumatic (attachment place	2
Eczema/skin disease/chiffe	4	Eye disease	2
Diarrhea	4	Broken leg/hand	2
Tonsillitis	4	Infection on swelling	1
Erectile dysfunction(impotence)	4	Fire damage(scare)	1
Malaria	3	Hemorrhoid/see/	1
Arthritis(bone attachment disease	3	Wart/kintarot	1
Placental retention(delay)	3	Boil	1
Headache	3	Gonorrhea	1
Face fungus	3	Cough	1
Ring worm	2	Athlete's foot	1
Bleeding	2	Allergic	1
Stroke/syncope/abnormal/epilepsy	2	Itching	1
Common cold	2	Thorn inside body	1
Febrile(fever)	2		

4.6. Ethnovternary medicinal plants in study area

4.6.1. Distribution and habits of ethnovternary medicinal plants

In study area, the local community 11 medicinal plant species used to treat livestock ailments. However, this does not mean people only prefer ethnovternary medicine. They also use modern veterinary medication if ailment was not controlled by traditional medicine. Therefore, out of 88 medicinal plants documented in study area 12.5% of them was used for the treatment of livestock disease (Appendix 3). The species were belonging to 11 genera and 10 families. Among families, families *Solanaceae* consists of 2(18.2%) species, while the other families

Euphorbiaceae, Rubiaceae, Cucurbitaceae, Compositae, Crassulaceae, Rhamnaceae, Vitaceae, Phytolacaceae and *Sapindacea* were represented by 1(9.1%) species each (Appendix 3).

Analysis indicates, major source of medicinal plant species was harvested in wild 7(63.6%) vegetation (Table 9), very few plant species 3(27.3%) harvested either home garden or farmland and only 1(9.1%) species of plant harvested both wild and cultivated (Appendix 3). The traditional practitioner was harvested small amount in home garden and farmland shows medicinal plants were threatened.

Table 9: Percentage occurrence of medicinal plants used to treat livestock disease

Frequency	No. of medicinal plants	Total percentage (%)
Wild	7	63.6%
Cultivated	3	27.3%
Both	1	9.1%

However, analysis of growth forms of plants used by local community for treatment livestock aliments dominated by shrub 6(54.5%) proportion (Table 10), few species of herbs and only one climber species (Appendix 3). In this result, the amount of herbs is smaller than to those of shrubs that are the opposite from what was stated for medicinal plants used to treat human ailments in previous sections was herbs take larger than shrubs. Therefore, the result was shown different types of plants used for both groups as human and animals are different in parts and size of the plant spices. Similarly, these findings agree with the study by Etana Tolasa, (2007) shrubs take the larger proportion followed by herbs and trees in Gimbi Wereda Western wellega.

Table 10: Number of growth forms of ethnovtrenary plants

Growth form(habit)	Number of distribution of medicinal plants	Percentage (%) total
Herb	4	36.4%
Shrub	6	54.5%
Climber	1	9.1%

4.6.2. Plant parts and method of preparation of remedies for livestock ailment

Analysis showed that, majority of plant parts used for preparation of traditional medicine for livestock treatment was both leaves and roots 4(36.4%) (Table 11), and only one plant parts of seed, bark/wood and fruit used for preparation of plant remedies (Appendix 3). Therefore, preparation of plant remedies using leaves are easier and faster than preparation using roots in case of humans but in livestock similarly used both leaves and roots. However, this result was

against by other research by Debela Hunde (2001) and Kebu Balemie *et al*., (2004) roots take highest frequency followed by preparations from leaves.

Table 11: Percentage of plant parts used in preparation of ethnovternary medicine

Plant parts	No. of preparation of plant remedies	Percentage (%)
Leaves	4	36.4%
Root	4	36.4%
Seed	1	9.1%
Bark/wood	1	9.1%
Fruit	1	9.1%

In study area, the highest frequently useful forms of preparing ethnovternary medicine was mixed concoction 6(54.5%), followed crushing and least preparation methods were dried, crushed & pounded (DCP) and homogenizing in water and pounding or grinding (table 12). Therefore, mixed concoction was taken as the most common methods of preparation traditional medicine used for livestock ailment (Appendix 3). However, this result was against by other research study Ermias Lulekal *et al*., (2008) reported crushing and homogenizing in water were the highest proportions followed by concoction and powdering in Mana Angetu district. This is due to difference in traditional medicinal knowledge and practice of different ethnic groups of different ecological areas.

Table 12: Methods of preparation ethnovternary medicine

Form or methods preparation	methods preparation	Frequency	Percentage(%)total
Used alone	Crushing	2	18.2%
	Pounding/grinding	1	9.1%
	Single decoction	1	9.1%
	DCP and Homogenized with water	1	9.1%
Mixed	Concoction	6	54.5%

4.6.3. Administration routs of livestock traditional medicine

In Guangua district, common administration routs were oral, nasal, & ocular of plant remedies commonly adopted for 11 preparations by indigenous people for treatment of livestock diseases. Analysis showed major routs of application were oral 7(63.4%) application (Table 13) and the other is both nasal and ocular. On the other finding, Ermias Lulekal *et al*., (2008) found that most preparations were administered via oral rout in treating livestock in their studies. However, in

this section, anal, dermal and some other types of routs used in human ailment not used in livestock ailment in study area.

Table 13: Common administration routes of ethnovternary medicine

Administration routs	No. of medicinal plants remedies	Percentage (%)
Oral	7	63.4%
Nasal	2	18.2%
Ocular/eye	2	18.2%

4.6.4. Description of most commonly used ethnovternry medicinal plants

1. *Cucumis ficifolius A. Rich (Cucurbitaceae)(* Local name Chaha kampa):- A perennial herb with woody roots; simple and palmately 3-5 lobed leaves; conscious greenish-yellow flowers (Finger 12), and dark-green with 10 paler longitudinal stripes (deep yellow when ripe) of thinly to dense fruits.

The local name of (Awi) this medicinal plant was ‘’Chaha kampa’’ and the local community used for treatment of livestock ailments. The plant part used for preparation of remedy was root and methods of preparation was pounded or crushed mixed with water. Therefore, in study area when cattle attack from disease like hair erectile and lack of appetite use this traditional medicine by feed the cattle (Appendix 3). Ermias Lulekal, (2005) reported that plant is used for treatment of rabies, jaundice and gonorrhea in the Mana Angetu moist montane forest of Bale area. The leaves and/or stem and fruit produce 0.075% and 0.4% cucumin, respectively (Harborne and Baxter, 1993).

Figure 12: Highly used ethnovternary medicinal plant species (*Cucumis ficifolius)*

2. *Cyphostema Sp. (Vitaceae)* (Milasgogul-Vernacular) (Emburdedy):- Herbaceous climbing plant with striate stems; reddish flower; glabrous, purplish (Finger 13). The species is widespread in the savanna region of tropical Africa (Stevenson, 2008).

In study area, plant species locally named as ‘’Emburdedy’’ and species are used for treatment of livestock ailments. However, plant parts used for preparation of traditional medicine was root, method of preparation pounded mixed with other medicinal plants such as *J.sativum*, and *A.sativum*. Therefore, root of *Cyphostema sp*. mixed with leaf of *J.sativum* and *A. sativum*; when disease occurred like stomach swelling and anthrax in livestock, prepared medicines was feed when disease appears (Appendix 3).

Figure 13: Highly used ethnovternary medicinal plant species *Cyphostemma sp*.

4.6.5. Common livestock diseases and used medicinal plant species

In study area, their was11 livestock diseases (Table 14) treated by using 11 medicinal plants (Appendix 3) and major disease appears were lack of appetites. The local communities indentify livestock disease by forming symptom on different parts of bodies. Like human aliment, single medicinal plants used for several livestock aliments. Livestock disease occurrence was very small and traditional medicinal healers were take priority for human ailments also traditional medicinal healers not take attention about livestock ailment. As result, the chance of losing medicinal plant knowledge was very higher. Similarly, Endalew Amenu, (2007) was reported that ethnovetrnary medicinal knowledge and practices are lower than ethnomedicinal knowledge and practices in Ejaji area of Chely wereda.

Table14: Common livestock diseases and corresponding numbers of medicinal plant used

Livestock diseases	No. of medicinal plants used	Total percentage (%)
Lack of appetite	3	27.3%
Broken body part	2	18.2%
Eye disease	2	18.2%
Exotic disease(disease outbreak) /foreign	2	18.2%
Anthrax	1	18.2%
Thinning/thin disease	1	9.1%
Castration	1	9.1%
Hair erectile with high fever	1	9.1%
Lung disease	1	9.1%
Diarrhea	1	9.1%
Stomach swelling	1	9.1%

4.7. Comparing medicinal plant knowledge with age level, education and gender

In study area, knowledge of traditional medicinal plant increase with age. When age increases, the traditional medicinal knowledge was higher. Accordingly, the inferential statistics like simple (Pearson) correlation coefficient(r=0.99) test calculated **(**Table 15), showed the existence of strong and positive association between age and knowledge of medicinal plant.

Table15: Age classes of informants and average medicinal plants reported in Guangua district (Appendix 2)

Age range	Mid-points(X)	Average medicinal plants cited(Y)	XY	X^2	Y^2
21-33	27	7	189	729	49
34-46	40	7.5	300	1600	56.25
47-59	53	8	424	2809	64
60-72	66	10.5	693	4356	110.25
73-85	79	13.5	1066.5	6241	182.25
Total	265	46.7	2672.5	15735	461.75

Analysis of t-test (t calculated= 19.9) population correlation coefficient (P) with t- critical (t crit= 5.84) at 95% level of significance and 3 degree of freedom (df= n-2, n=5) these result was shown the presence of significant correlation, i.e., When age increases the indigenous medicinal knowledge of people was greater possession. Since the t-calculated value is greater than the t-critical one, it fails in the critical region. There is enough evidence to reject the null hypothesis (NH) of no correlation and argue the presence of significant correlation between age and

medicinal plant knowledge. However, this result was against by other research Haile Yineger and Delenasaw Yewhalaw, (2007) absence of such a correlation between ages of traditional healers and medicinal plants knowledge in Sekoru district, Jimma zone.

On the other hand, Pearson correlation analysis (r=- 0.83) calculated (Table 16) shows the presence of moderate and negative association between educational status and medicinal plant knowledge. However, relationship was found insignificant by a t-test calculated for population correlation coefficient (P).

Table 16: Levels of education and medicinal plants reported by informants of the study area

Educational status		Grade assigned (X)	Average med. plant cited (Y)	XY	X^2	Y^2
Illiterates (uneducated & irregular education)		1	10.5	10.5	1	110.25
Regular education (Literate)	Primary & Secondary school	2	9	18	4	81
		3	7	21	9	49
		4	8	32	14	64
		5	8.5	42.5	25	72.25
		7	6.5	45.5	49	42.25
		9	8	72	81	64
		10	8.5	85	100	72.25
		11	9	99	121	81
	Diploma	13	8	104	169	64
	Degree	15	8	120	225	64
Total		80	91	649.5	798	764

The t- calculated was found (t- cal=- 1.3) and t-critical (t- crit=3.25) at 95% level of significance and 9 degree of freedom (n=11), and since t-calculated value is less than t-critical value, t-calculated fails outside the critical region indicates there no enough evidence to reject the null hypothesis (NH), i.e, insignificant. This means, there is no difference between literate and illiterate on medicinal plant knowledge. However, the correlation coefficient(r) indicated the existence of moderate and inverse correlation between education status and medicinal plant knowledge. Similar findings were obtained by Haile Yineger and Delenasaw Yewhala, (2007) the presence of negative correlation between level of education and medicinal plant knowledge. Even if the t- test shows, there is no significant difference between literate and illiterate on

medicinal plant knowledge but the literates in study area were less interested to practices in traditional medicinal.

Analysis of variance (ANOVA) for medicinal plants knowledge between genders indicated insignificance variation or there was no difference between sexes. The raw data converted by square root transformation (Table 17) to achieve the assumptions of ANOVA.

Table 17: Transformed average number of medicinal plants reported by informants based on gender (Appendix 2).

	Gender		
	Male	Female	
	2	1.4	
	2.24	1.7	
	3.2	2	
	3.5	2.24	
	3.7	2.45	
Total	14.64	9.79	Grand total=24.43
Mean	2.9	1.96	Grand mean=2.43

Generally, analysis of variance shows the presence of insignificant variation in medicinal plants knowledge between sexes in study area (Table 18).

Table18: ANOVA table for medicinal plant knowledge variation of genders

Source of variation	df	SS	MS	F	F- crit
Between gender(SSB)	1	4.095	4.095	10.2	11.26
Within gender (Error) SSW	8	2.98	0.4		
Total(SST)	9	7.075			

Therefore, in Guangua district, there were no knowledge differences between male and female thus women involvements in process of preparing traditional medicine together with men. This result was against by other studies, Tilahun Teklehymanot, Mirutse Giday, (2007) and Getachew Addis *et al*., (2001) indicated that the presence of significance variation between male and female with regard to medicinal plant knowledge in Zegie peninsula (Northwest Ethiopia) and Shirka district (Arsi zone), respectively.

4.8. Informant consensus

There were several methods of identifying the efficaciousness of medicinal plant species. Among different types one-way of identifying the efficaciousness of a given medicinal plant species in study district was using consensus made by informants. In study area, famous traditional medicinal plants treated several ailments were selected from other medicinal plants.

In this study, *Allium sativum* was reported by 27(42%) informants the highest followed by, *Zingiber officinale* 23(35%) informants. *Ocimum sativa* 21(32% informants, *Zehneria scabra* 19(29%) informants, *Nigella sativa* 17(26%) informants. *Lepidium sativum* 15(23%) informants, *Moringa stenopetala* and *Adhatoda schimperiana* 14(22%) informants, each and *Ocimum lamiifolium* 13(20) informants, was ranked in treatment of stomach complaints, headache, and malaria. The method of preparation, however, varies from disease to disease (Appendix 6). Therefore, the most popular or famous plant for treatment of stomach complaints, headache and malaria was *Allium sativum*, followed by *Zingiber officianale*, *Ocimum sativa* etc (Table 19). For instance, as stated above, *Allium sativum* has wide range of diseases it could treat than the other listed medicinal plants.

Table 19: Lists of medicinal plant species reported by five or more number of informants (Appendix 6)

Species	Informants reporting (No.)	Percentage (%) total	Species	Informants reporting (No.)	Percentage (%) total
Allium sativum	27	42%	*Taraxacum sp.*	9	14%
Zingiber officinale	23	35%	*Croton macrostacyus*	9	14%
Ocimun sativa	21	32%	*Carissa edulis*	9	14%
Zehneria scabra	19	29%	*Adhatoda schimperiana*	9	14%
Nigella sativa	17	26%	*Rumex nervosus*	9	14%
Lepidium sativum	15	23%	*Capparis tomentosa*	8	12%
Moringa stenopetala	14	22%	*Clutha sp.*	8	12%
Ocimum lamiifolium	13	20%	*Eucalyptus globules*	8	12%
Ruta chalepensis	12	18%	*Brassica carinata*	7	11%
Trigonella foenum-graecum	11	17%	*Carica papaya*	7	11%
Cucumis ficifolius	10	15%	*Phytolacca dodecandra*	7	11%
Rhamnus prinoides L. Herit	10	15%	*Citrus limon*	7	11%
Achyranthes asper	10	15%	*Piper nigrum*	6	9%
Rumex steudelli	9	14%	*Coriandrum sativum*	6	9%

4.9. Preference ranking of most popular medicinal plant species

In study area, there were several types of traditional medicinal plant species treatment single aliment. Due to this, indigenous people show preference towards plant species based on their healing power against a given disease. Analysis of preference ranking for ten selected plant

species based on healing stomachache (Table 20) indicates *Nigella sativa* was the most preferred species followed by *Allium sativum.* Six key informants were selected to give score, based on species healing power of stomach complaints as basic criteria (Appendix 2). The largest value ten were given for species having greatest healing potential 2nd largest value nine for species considered to have 2ndhealing power, and least value one for species having low healing potential as compared to species listed.

Table20: Preference ranking of medicinal plants based on healing stomachache

Species	**Respondents**								
	R2	R5	R15	R21	R23	R30	Total	mean	Rank
Nigells sativa	9	10	9	10	8	10	56	5.6	1st
Allium sativum	9	10	8	9	8	8	52	5.2	2nd
Taraxacum sp.	9	9	8	8	8	7	49	4.9	3rd
Ruat chalepensis	8	6	8	7	5	5	39	3.9	4th
Lepidium sativum	6	6	7	8	4	3	34	3.4	5th
Zingiber officinale	3	2	5	4	5	9	28	2.8	6th
Artemisia abyssinica	4	5	6	5	3	4	27	2.7	7th
Clutha sp.(Euphorbiaceae)	2	3	4	2	5	5	21	2.1	8rd
Clutias abyssinica	1	3	2	5	2	3	16	1.9	9th
*Aloe sp.(*Liliaceae)	2	1	1	1	1	2	8	0.8	10th

However, medicinal plant species were used in treatment of several health problems. On the same time, people show preference towards medicinal plant species having healing potential of several ailments (Appendix 6). Similarly, preference ranking performed by selecting six key informants and eight selected medicinal plant species (Appendix 2) based on treating several diseases. In addition, score was given on the basis of healing power of a species for several ailment, that is, first large value eight for species having great healing potential, second large value seven for species considered to have second healing power, and least value one for species having low healing potential as compared to species. Therefore, analysis indicated that *Allium sativum* was the most preferred one followed by *Nigells sativa (*Table 21*).*

Table 21: Preference ranking of medicinal plants based on healing of several ailments

Species	Respondents								
	R2	R9	R33	R46	R50	R54	Total	Mean	Rank
Allium sativum	8	8	7	8	8	7	46	5.8	1st
Nigells sativa	7	7	8	8	7	6	43	5.4	2nd
Zingiber officinale	5	5	6	7	4	7	37	4.6	3rd
Ruta chalepensis	6	5	7	7	6	5	36	4.5	4th
Moringa stenopetala	4	4	6	5	4	7	30	3.8	5th
Adhatoda schimperiana	5	4	6	1	1	2	19	2.4	6th
Carica papaya	2	1	3	2	1	5	14	1.8	7th
Clutha abyssinica	1	2	2	3	4	1	13	1.6	8th

4.10. Direct matrix ranking of most utilized medicinal plant in the study area

In Guangua district, medicinal plant species were utilized for various purposes apart from medicinal value such as forage, fencing, furniture, firewood, charcoal making, construction and food. For this reason, multiple use categories of medicinal plants were identified by using direct matrix rank analysis. Accordingly, eleven multi-purpose species were selected out of the total medicinal plants and eight (8) use-categories were listed for eight selected key informants to assign use values to each species. Finally, the average use-value for each category was calculated and then mean value of each use-category was summed up all eleven-plant species and ranks them accordingly. In this study, analysis showed that *Cordia africana* was found to be highly used by local community for multiple purposes, followed by *Ziziphus spina-christi, Eucalyptus globules, Juniperus procera* and likes (Table 22).

Therefore, the result indicates that medicinal plants species was used for various purposes other than medicinal values. In addition, analysis also shown that special focus should give for conservation of these plants since they were being widely exploited for other purposes, other than their medicinal value. For example, *Cordia africana* was not easily accessible in study area and true for *Ziziphus spina-christ.* However, species like *Eucalyptus globulus* was relatively abundant owing to re-plantation of species every year at rainy season. The less and least used plants was chance to be conserve because of lower potential and low utilize for various uses.

Table22: Direct matrix analysis of selected medicinal plants based on a general use-value

(Key: vey highly used=5, highly used=4, good=3, less used=2, least used=1 & not used=0) (Appendix 2)

Species	**Use-category**									
	Medicine	Food	Fencing	Forage	Firewood	Charcoal	Construction	Furniture	Total	Rank
Cordia africana	4	2	3	3	3	3	4	5	27	1st
Ziziphus spina-christi L.Desf.	4	2	3	2	4	3	4	4	26	2nd
Eucalyptus globules Lobill.	4	0	3	1	5	3	5	3	24	3rd
Juniperus procera Hochst.	4	0	4	1	4	1	4	4	22	4th
Ficus carica L.	4	0	3	3	3	2	3	2	20	5th
Carissa edulis vahl.	3	4	3	2	3	3	1	0	19	6th
Croton macrostachyus Hochst.	4	0	2	1	3	2	2	3	17	7th
Piper nigrum L.	3	0	3	1	3	0	3	3	16	8th
Pterolobium stellatum Forssk	3	0	4	2	3	1	1	0	14	9th
Acacia nigra	4	0	2	1	3	1	1	0	12	10th
Ocimum lamiifolium Hochst.ex.Benth	4	0	1	1	3	1	1	0	11	11th

4.11. Fidelity level index

Analysis of percentage of informants claiming the uses of species for the same major purposes was not taken as the only criteria in proving the efficacious of plant species. Furthermore, fidelity level index could calculate to see the medicinal use values of species. In this study, *Carica papaya* and *Clutia sp.* was high medicinal value against malaria and diarrhea, respectively, though they have low value of informant consensus (Table 23). Hence, informant consensus was not taken as the measure of the potential efficacy of any medicinal plants in fidelity level index analysis. As an example, *Allium sativum*, being reported by 54% of informants, with fidelity level (FL) value of 0.59 is found to be 2nd species, next to *Carica papaya* (FL=0.80), used in the treatment of malaria. In the contrary, Endalew Amenu (2007) were reported *Allium sativum* to be the prior plant species used for treating malaria in Ejaji area.

Table 23: Fidelity level index for plant species used to treat malaria and diarrhea

(Hint: Np= number of informants that claim a use of plant species to treat the same disease, N= number of informants that claim a use of plant species to treat any disease)

Ailment	Percentage (%)of informants	Species	Np	N	Fidelity index(Np/N)
Malaria	54	*Allium sativum*	20	34	0.59
	9	*Carica papaya*	4	5	0.80
	5	*Clutia abyssinica*	1	4	0.25
	6	*Adhatoda schimperiana*	1	5	0.20
Diarrhea	37	*Ocimum lamiifolium*	11	26	0.42
	9	*Clutia sp.*	3	6	0.50
	6	*Carica papaya*	1	5	0.20

4.12. Threats and conservation practices of medicinal plants in study area

In Guangua wereda, there are many factors was considered as main threats for medicinal plants. These factors were documented through interviewing made with informants and direct field observation. In study area, major factors reported by informants respectively were deforestation, agricultural encorchment, over exploitation, and over grazing (Table 24). Therefore, these factors are taken their own share in decrement of abundance and diversity of medicinal plants from study area. Similarly, the factors were also reported by other researchers to be frequent threats in other part of Ethiopia. For instance, Ermias Lulekal *et al*., (2008) showed that deforestation and agriculture expansion are the most threatening factors in Mana Angetu district.

In general, the factors are ranking by five key informants **(** Table 24) based on their frequency of occurrence and the strength of the devastating effects they impose in process of erosion of medicinal plants. Therefore, in study area from all threatening factor deforestation was the major threat to medicinal plants followed by agricultural expansion.

Table 24: Ranks of threats based on their frequency of occurrence and strength

(Hint: very highly common=5, highly common=4, common =3, less common=2, least common=1 & not occurred=0)

Respondents	Threats			
	Deforestation	Agriculture encroachment	Over exploitation	Over grazing
R2	5	2	2	3
R15	4	4	3	2
R21	5	3	3	3
R30	4	3	2	2
R46	4	4	3	1
TOTAL	22	16	13	11
MEAN	4	3	3	2
RANK	1st	2nd	3rd	4th

The efforts made towards conserving medicinal plants were found to be good. Some indigenous people have trends of conserving some very important plant species *ex-situ*, which especially used in treatment of disease incidents in the locality. The professional practitioners in particular were managed some medicinal plants in their home garden. Moreover, same families, which were used for medicine and food consumptions, are cultivated and conserved in home garden and farmlands. However, the conservation efforts do not fully trade off medicinal plants to threatening them. Of course, there were seedling plantation program and some indigenous species at every year at the start of rainy season on plains and mountainous lands area of the district like *Eucalyptus globule*.

5. CONCLUSION AND RECOMMENDATION

5.1. Conclusions

The results of this study indicates that there is high diversity of medicinal plants species as well as traditional medicinal knowledge of both human and livestock ailment concerning the use, preparation, and application, which is still maintained among local people in Guangua district. Utilization of more herbs than trees and shrubs for medicinal purpose may showed as pressures due to harvesting medicines are minimum on plant diversity in the study area. The local communities in the study area mostly prepare the remedy from leaves and utilization of more leaves than other plant parts indicated that reduces medicinal plants pressure as compared with using of root or whole plants because of mostly use parts roots and brake kill the mather plant.

Large numbers of medicinal plants are collected from wild, this shows, highly threatened due to lack of conserving medicinal plants in home gardens as well as farmland by local people of the study area even local healers goes long distance to harvest medicinal plants when the need takes place.

Knowledge of medicinal plants in the study area varies among age but insignificant between education level as well as gender indicates that in study district female participate together with men in preparation of traditional medicine. Traditional medicinal plants knowledge transfer across generation orally as well as there is no documented traditional plant and associated knowledge additionally most of local people in study area developed knowledge from their parents. However, all medicinal plants have not equally importance as there were medicinal plants mostly preferred by local people of the study area for treatment of the same disease they acquire the knowledge through long experience and able to differentiate the most efficacies medicinal plants for treatment human and livestock ailments.

In addition, the result of the study also mentioned that many wild species of medicinal plants are threatened from various man made factors. On the other hand, disinterest of young generation on traditional medicine; future continuity of traditional medicinal knowledge of district is under question. Since young generation, show lack of interest to use or know medicinal plants from elders, the knowledge of traditional medicine might eliminated in the near future unless proper documentation made. Moreover, making of awareness on young generation about medicinal plant uses and how elders used traditional medicine in the absence of modern drugs to maintain

human and livestock ailments is very important so that the young generation could appreciate and use traditional medicine.

Generally, in Guangua district deforestation is seriously threatened factor medicinal plants species. Due to these, indigenous plants are lost before documented. Thus, awareness were needed to rise among local people on sustainable utilization and management of plant resources, as well as conservation measure as *Ex-situ* and *in-situ*. If not the traditional medicinal plan and associated medicinal knowledge in the future is under question in study area as well as in country general.

5.2. Recommendations

Based on the results of the study, the following recommendations are given:-

- Give awareness about the benefit of traditional medicine to young and educated people.
- Giving recognitions and intellectual property rights for traditional healers, through either licensing or certification or organizing them at community or wereda level, which popularizes and scale up their indigenous knowledge and medicinal plants value.
- Give awareness to traditional healers to transfer indigenous knowledge for local people.
- Encourage traditional practitioner to increase or participate in indigenous knowledge of livestock ailment.
- Create awareness to local people documenting traditional medicinal plant and associated knowledge for feature generation as well as anyone who knows indigenous knowledge.
- Give awareness to traditional healers to establishing dosage and production of the efficacious of traditional medicine extracts whether in tablet, powder, liquid or other forms and use amount measuring materials like cup, spoon, glass etc.
- Encourage the local communities to produce medicinal plants around home garden and farmland.
- Encouraging people to protect and enclose distribution of medicinal plants in wild or natural forests in the locality.
- Creating awareness to the local communities to take give attention during harvesting multi-use traditional medicinal plant species in the locality.

- The future existence of highly threatened plant species is under question unless the entire stockholder takes an appropriate measurement like giving awareness to local communities.
- Encouraged, *In-situ* and *Ex-situ* conservation activities should practice in the study district through training to ensure the continuity of threatened medicinal plants.
- Encourage the local people to increase seedling plantation in the local area.

6. REFRANCES

Alexiades, M. (1996). Collecting ethnobotanical data. In: Alexiades, M.N and Sheldon,J.W. (eds), *Selected Guideline for Ethnobotanical Research: A* field manual. the new York Botanicalgarden, Bronex, New York, USA. Pp. 40-102.

Anokbonggo,W.W.(1992). The role of African traditional medicine in Healthcare delivery alongside modern medicine. In :*proceeding of plant used in African traditional medicine as practiced in Ethiopia and Uganda.Botany2000,East and central Africa* (Edwards,S.andZemedeAsfaw.,eds*),monograph series* No5APRECA,AAU,Ethiopia.

Asfaw Debela.Dawit Abebe and Kelbessa Urga(1999) An overview of traditional medicine. In Ethiopia: Prospective and Development Efforts. In:*Ethiopia pharmaceutical Association. Silver Jubilee Anniversary, Special Issue* (TamiraEjigu,ed.).*Ethio.Pharma.Association.* Addis Ababa,Ethiopia.

Balcha Abera (2003) Medicinal plants used in traditional medicine in Jimma Zone, Oromia, Southwest Ethiopia. *Ethiop.J.Health sci.*,13(2):85-94.

Balick,M.J.and Cox,P.A.R.(1996).*plants, people and culture: the science of ethnobotany*. Scientific America libarary, New York,USA.

Belachew Addis, Dawit Abebe, Timotewos Genebo and Kelbessa Urga (2002). Perception and practices of modern and traditional health practitioners about traditional medicine in Shirka District, Arsi Zone, Ethiopia. *Ethiop.J.Health Dev.*, 16(1):19-29.

Chinsembu, K.(2010). An ethnobotanical survey of plants.*Used to manageHIV/ADI opportunistic infections*. In Katima Muliol.Caprivi region, Namibia.J.Ethnobiol. Ethnomed.6:25.

Cunningham,A.B.(1994). Management of medicinal plants resources. AETFA,Malawie. *An African overview proc.XIIIth plentary meeting,* 1:173-189.

Cunningham,A.B.(1996). People, and plant use recommendations for multiple use zones and development alternatives around Bwindi, Uganda; UNESCO, Paris. *People and plant working paper*(Walter, M. and Hoft, R.,eds.),4: 18-23.

Dawit Abebe (2001). The role of medicinal plants in Health care Coverage of Ethiopia,the the possible benefits of integration. In: (Medhin Zewdu and Abebe Demissie(eds.)). (eds.)). *Conservation and Sustainable Use of Medicinal plants in Ethiopia*.: Proceeding of the National workshop on Biodiversity Conservation and 63 Sustainable use of medicinal

plants in Ethiopia,28 April-01 May 1998,pp 107-118.IBCR.Addis Ababa, Ethiopia.

Dawit Abebe,Asfaw Debella and Kelbessa URGA (2003). *Medicinal plants and other useful plant of Ethiopia:* Addis Ababa, Ethiopia.

Debela Hunde (2001). Use and Management of Traditional Medicinal Plants by Indigenous people of Bosat Woreda, Wolenchiti area: *An ethnobotanical approach*.M.Sc.Thesis. Addis Ababa.

Debela Hunde,Zemede Asfaw and Ensermu Kelbessa (2004). Use and Management of ethnoveternary medicinal plants used by indigenous people in (Boosat),Welenchiti area.*Ethiop.J.Biol*.,3 (2):113-132.

Debela Hunde, Zemede Asfaw and Ensermu Kelbessa(2006). Use of traditional medicinal plants by people of (Boosat) sub-district, central Eastern Ethiopia.*Ethiop.J.Healyh Sci.*,16(2):141-154.

Department of Drug Research (1997).*Research and Development program of Herbal Remedies in Ethiopia*. Program of the Department. Addis Ababa, Ethiopia.

Dery,B.B.,Ofsynia, R. and Ngatigwa,C.(1999). *Indigenous knowledge of medicinal trees and setting priorities for their domestication in shinyanga region*. Tanzania, Nairobi, Kenya: International center for research in Agroforestry.

Dyubeni, L.(2012). *An ethnobotanical study of plants used for the treatment of ear,nose and throat infection*. In Nkonkobe Municipaity, south Africa.JMPR.6:2721-2726.

Edwards,S. and Zemede Asfaw(1992). Plants used in Africa traditional medicine a practiced in Ethiopia and Uganda. *Botany 2000, East and central Africa Monograph series number* 5, NAPRECA.Addis A baba Universty, Addis Ababa, Ethiopia.

Elujoba,A.A.,Odeleye, O.M.and Ogunyemi,C.M.(2005). Traditional Medical Development for Medical and dental primary healthcare delivery system in Africa: Afr.*J.Traditional, Complementary and Alternate Med*.,2(1):46-61.

Endalew Amenu (2007). Use and management of medicinal plants by indigenous people of Ejaji area (chelya woreda), west shoa, Ethiopia:*An ethnobotanical approach*: Msc thesis.Addis Ababa University, Ethiopia.

Ermias Lulekal, Ensermu Kelbessa, Tamrat Bekele & Haile Yineger (2008). An ethnobotanical Study of medicinal plants in Manna Angetu District, southeastern Ethiopia:*Journal of Ethnobiolog and Ethnomedicine: 4:10.*

Etana Tolasa(2007). Use and conservation of traditional medicinal plants by indigenous people in Gimbi woreda,west wellga, Ethiopia, Msc thesis, Addis Ababa University, Ethiopia.

Fassil Kebebew(2001).The status and availability of oral and written knowledge on traditional health care in Ethiopia. In: *preceding of the National workshop on biodiversity conservation and sustainable use of medicinal plants in Ethiopia*:28 April-01 May 1998(Medhin Zewdu and Abebe Demissie,eds.),IBCR, Addis Ababa, Ethiopia.

Farnsworth, N.(1994). Ethnobotany and the search for new drugs, Ciba Foundation *Symposium 185. Chichester,* Uk Prance GT: John Wiley and Sons: *Ethnopharmacology and drug Development*: pp. 42–59.

Fisseha Mesfin (2007). An Ethno botanical study of medicinal plants in Wonago woreda, SNNPR, Ethiopia. MSc thesis, Addis Ababa University, Ethiopia.

Gerique,A.(2006). *Integrative assessment and planning methods for sustainable agro forestry in humid and semiarid regions.* An introduction to ethnobotany and ethnoecology the theory and methods. University of Giessen, Senckenbergstr.

Getachew Addis,Dawit Abebe and Kelbessa Urga (2001). Asurvey of traditional medicinal plant in Shirka District,Arsi Zone,Ethiopia:*Ethiop.pharm.J.*: 19:30-47.

GWARDO (2014). Guangua wereda agriculture and rural development office. Annual report. Unpublished report. Chagni, Ethiopia.

GWFEO(2014).Guangua wereda finance and economy development main office .statistics journal.Unpublished report. Chagni, Ethiopia.

GWHO (2014). Guangua wereda health office. Annual report. Unpublished report. Chagni ,Ethiopia.

Haile Yineger and Delenasaw Yewhalaw (2007). Traditional medicinal plants knowledge and used by local healers in Sekoru District Jimma Zone, southwest: *Ethiop.J.Ethnobilo. and Ethnomed*: 3(24):licensee biomed central ltd.

Harborne,J.B. and Baxter,H. (1993). Phytochemical dictionary. Taylor and Francis Ltd. London.Hedberg,I. and Edwards,S.and Sileshi Nemomissa(eds.)(2003).Flora of Ethiopia and Eritrea, vol4(2) *Apiaceae to Dipsaceae*.The National Herbarium, Addis Ababa University, Addis Ababa and Uppsala.

IUCN (2005). *Medicinal plants in North Africa*: Livelihoods. Malaga, 18 April, 2005 press Release. IUCN Center for Mediterranean Corporation.

Izuakor,T.M.(2005). Bi-resources conservation: *The role of Agroforestry*: Heritage printer,Nigeria.

Jahn, A. (1991). "The Traditional Domestication of a Multipurpose Tree *Moringa stenopetala* (Bak.f.) Cuf. in the Ethiopian Rift Valley". *Ambio* **20** (6): 244–247

Johnson,M.(1992). *Lore: Capturing Traditional Environmental knowledge*. Ottawa: Dene Cultural Institute.

Kebu Balemie,Ensermu Kelbessa and Zemede Asfaw (2004). Indigenous medicinal plants utilization management and threats in Fentalle area, eastern shewa:*Ethiop.J. Biol.sci:* 3(1):37-58.

King,S.R.(1992). *Conservation and Tropical medicinal research*. Shaman pharmaceutical incorporated.

Kokwaro.J.O.(1993). Current status of Utilization and conservation of medicinal plants in Africa, south of the sahara.Acta.,Hort.,332:121-130.

Laird, S.A.(1999). The botanical medicine industry. In: Tenkate K, editor. *The commercial use of biodiversity*: access to genetic resources and benefit-sharing Earthscan;. Pp.78–116.

Martin, G.J. (1995). *Ethnobotany: A method manual.* Royal botanical garden, Chapman and Hall, Kew, London.

Mc Corkel,C.M.(1995). Back to the future lessons from ethnoveterinary research, development extension for studding and applying knowledge :*J. Agri., Food and Human values Society*: 22(2):52-80.

Masfin Tadesse, Debela Hunde and Yehewnew Getachew (2005). Survey of medicinal plants used to treat human diseases in Seka chekorsa,Jimma Zone:*Ethiop.J.Health sci*:, 15(2).89-106.

Mirgisa Kaba(1998).Utilization of plant medicine for the treatment of health problems. The case of Oromo of chora district in Illubabor Zone, western Ethiopia: *Ethiop.J. Health Dev:* 10(3) 161-166.

Mirutse Giday (1999). An Ethnobotanical study of Medicinal plants used by Zay people in Ethiopia.MSc thesis, Uppsala, Sweden.

Misra,B.and Bharaprakasha Nighantu(1989).*Traditional use of a Zingiber officinale*,5th ed. India.

NDA (2008). Natural Data base for Africa. Softwer

Nair,M. and Nathan,G.(1998). Medicinal plants: *cure for the 21th century; Biodiversity,*

conservation and utilization of medicinal plants: Proceeding of the seminar UPM, Serdang, Malaysia.

Okigbo,R.N., Anuagas,C.L. and Amadi,J.E. (2009). Advances in selected medicinal and aromatic plants indigenous to Africa :*J.Med. plants research:*,3(2):86-95.

Okigbo,R.N.,Eme,U.E. and Ogbogu,S.(2008). Biodiversity and conservation of medicinal and aromatic plants in Africa: *Biotechnology and molecular biology reviews:*3(6):127-134.

Okwu,D.E.(2005). Phytochemicals,vitamin and Mineral contents of two Nigeria medicinal plants :*Int.J.Med.Adv.Sci*:1(4):375-381.

Pankhurst, R.(1990). *An introduction to the medicinal history of Ethiopia*.Trenton, New Jersev: the red sea press,INC.

Pistorius,R.and Van wiik,J.(1993). Biodiversity prospecting: *Commercializing Genetic Resources.Biodiversity and Development Monitor:*15:12-15.

Redhead, J.F. and Boelen, M.(1990). Utilization of tropical foods:roots and tubers. FAO of the UnitedNations Food policy and nutrition division.

Robert,H.and John,B.(1983) *Traditional medicines and healthcare coverage*.WHO/Geneva.

Savarimuthu, I.(2011). Ethnobotanica survey of medicinal palnt. *Commonly used by Kanti tribals in Tirunclueli hills of western Ghats.*India.J.Ethno pharmacol 134:851-864.

Shrestha,K.K.,Jha,P.K.,Rajbandary,S. and Joshi,M.(1997). Ethnobotany for conservation and community development. *Ethnobotanical society of Nepal*.

Sofowora,A.(1993). *Medicinal plants and Traditional medicines in Africa.2nd edition*. Spectrum Books, Ibadan, Nigeria.

Stevenson,D.(2008). Cyphostema lanigerum. Botanical garden, Ruhr University, Bochun.

Studley,J.(1998). Dominant knowledge systems and local knowledge. Mtn-Forum on-line library document.

Tafesse Mesfin and Mekonnen Lemma (2001).The role of traditional veterinary herbal medicine and its constraints in animal health care system in Ethiopia. In: *Proceeding of the National workshop on Biodiversity conservation and sustainable use of medicinal plants in Ethiopia:* 28 April-01 May 1998 Addis Ababa , Ethiopia.

Tasfay Seifu, Kaleabs and Tsige Gebremariam (2006). Ethnobotanical and Ethno pharmaceutical studies on medicinal plants of Chifra district,Afar Region,Northeast Ethiopia: *Ethiop. pharm*:,24:41-58.

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

Tilahun Teklehymanot and Mirute Giday (2007). Ethnobotanical survey of medicinal plants used by people in Zegie peninsula, Northwest Ethiopia: *J. Ethnobiol. And ethnomed:*,3(2). ALIP, Addis Ababa University, Addis Ababa, Ethiopia.

Tyler,V.E. (1999). Pyhtomedicines: back to the futrer.*J.Nat.Prod.:*,62:1589-1592.

Vongo,R.(1999) .Local production and dispensing of herbal anti-malarias: *A report from the frist International meeting of the Research Initiative on Traditional Anti-malaria:*,Moshi, Tanzania

Waleter (1985) National Metrological Agency. Bahir Dar, Ethiopia.

WCMC (1992). *Global Biodiversity status of the Earth's living resources:* WCMC. Chapman and Hall. London and New York.

WHO (1998). *Regulatory situation of Herbal medicines*: A worldwide review, 98(1): 1-9. WHO Geneva.

WHO (2000). *Traditional medicine in the African region. An initial situation analysis* :(1998-1999), Harare, WHO regional office for Africa.

WHO (2001). *Legal status of Traditional medicine and complementary/alternative medicine.* Document WHO/EDM/TRM/2001.2,WHO/Geneva.

WHO (2002). *First global strategy on traditional and complementary/alternative medicine,* WHO 38, Geneva.

WHO (2003) .Traditional medicine. *Fact sheet* No 134.

WHO (2009) .*Traditional medicine* (Campana,A.,ed).The mandate of a specialized agency of the UN.CH3 part III, WHO/Geneva.

Zemede Asfaw(2001). The role of Home garden in production and conservation of medicinal plants.In: (Medhin Zewdu and Abeb Demissie). *proceeding of the National workshop on conservation and sustainable use of medicinalplants in Ethiopia:*,28 April-01 May 1998,pp76-91.IBCR, Addis Ababa, Ethiopia.

7. APPENDACIES

Appendix 1: Documented ethnomedicinal plants in the study area

Descriptions plant parts used, Method of preparations, Route of administrations, Dosage, Management strategy. (Note BU=bush land, HG=home garden, FL=farm land, FO=forest area, GL=grass land, Old fall = old fallow, New fall=new fallow, Ro= rocky area, Rib=river and wet lands, Her=herb, She=shrub, Tr=tree and Mang= Management; the local name is listed in Awi languge) (unknown'-')

N.o	Medicinal plant documented Name									
	Local in Awi languag e	English	Scientific	Hab it	Habitat & mang.	Human disease(injuri es)healing	Plant part used	Method of preparation	Rout of administration	Dosag e
1	Luntsey	-	*Clausena anisata* (Rutaceae)	Shr	-Bu -HG *Wild	Fire injuries Eczema	Leaf	-Pounded	Covering the wound (Bandaged wound)	-
2	Chocha Mukla	-	*Jasminum abyssinicum Hochst* (Oleaceae)	Shr	-Bu -Fo *Wild	Eczema Herpes zoster	-leaf	-Pounded being mixed with leaf of *V.sinaiticum*, (concoction)	Covering wound (Bandage wound)	-
3	Baber	Green papa	*Capsicum annuum* (Solanaceae)	Her	-FL -HG *cultivated	Herpes zoster	Leaf	-Pounded being mixed with leaf of*V.sinaiticum* (concoction)	Covering wound (Bandage wound)	-
4	Jinjibely	-	*Zingiber officinal Rose*. (Zingiberaceae)	Her	- HG -FL *cultivated	common cold	Stem or rhizo me	-Pounding & boiling (decoction)	- Drink (oral)	2 cup of tea
						Stomach complaint	Stem or	-Pounding &boiling (decoction)	Drink (oral)	-

							rhizo me	-Pounding being mixed with *R.chalepensis,& N.sativa* (concoction)	-Eat (ingestion)	
5	Fuchy Shngrec hy	Garlic	*Allium sativum L.*(Liliaceae)	Her	HG -FL *cultivated	Stomach complaint	Stem	-Pounding or simply chewing	-Eat (ingestion)	1-2 spoon
						Headache	Stem	-Pounding	-Eat (ingestion)	-
						Malaria	Stem	Mixed with *Cicer arietinum* one day (concoction)	Drink (oral)	1-2 cup of tea
						Boil(hotness)	Stem	-Pounding /beating/	Cover(Bandage on the swelling part)	-
6	Fetseu	Pepper grass	*Lepidium sativum L.* (Cruciferae)	Her	HG -FL *cultivated	Stomach complaint	Seed	-Grinded and mixed with water	-Eat (drink)	1-2 cup of tea
7	Kamana Kana	-	*Ocimum satuve Willd* (Labiatae)	Shr	-Fo -Bu -HG *Both wild and cultivated	Febrile with high fever Common cold	Leaf	leaves squeezed and separate fluids	Inserting in to ear Apply on body as brushing	1 cup of tea
								The leaf mixed leave of *Zehueria scabra and* boiled *(*decoction)	Nasal steam inhalation	-
8	Tentass y	-	*Premna schimperi Engl*. (Verbenaceae)	Shr	-Fo -Bu *wild	Eczema	Leaf	-Pounding	Bandage (tie) on the wound	-
						Toothache (pain)	Leaf	-Crushing	Chewed (oral)	-
9	Aregras a	-	*Zehneria scabra (L.f.) Sonder*. (Cucurbitaceae)	Cli mbi ng Her	-Bu -Fo -HG *both wild& cultivated	Febrile with high fever	Leaf	-Boiled in water (decoction)	Nasal/oral inhalation of steam	-
								-boiled being mixed with *O.sauve* (decoction)	Nasal/oral inhalation of steam	
								Leaves squeezed	Put in to ear /brush on body	-
1 0	Aseyesy	-	*Croton macrostachyus Hochst*. (Euphorbiacae)	Tr	- Bu -Fo -HG *wild/ cultivated	Ringworm	Leaf	isolate the fluid secretion	Drop on infected skin	A drop
						Face fungus	Leaf	- the fluid mixed with *A.sativum* (concoction)	Drop on infected skin	A drop

11	Fuchy Barzaf	Blue gum	*Eucalyptus globules lobill*. (Myrtaeceae)	-Tr	-Fo -HG *cultivated	common clod	Leaf	The leaf boiled mixed with *O.satuve* (decoction)	Nasal/oral inhalation of steam	-
12	Tsearky Absuda	Black cumin	*Nigella sativa L.* (Ranunculaceae)	Her	-FL -HG *cultivated	Stomach complaint/ache	Seed	-Pounding being mixed with *R.chalepensis*, (concoction)	-Eat (oral)	2 spoonful
						Headache	seed	Mixed with honey (concoction)	-Eat (oral)	-
13	Chaha Kampa	-	*Cucumis ficifolius A.Rich* (Cucurbitaceae)	Her	-HG Old/new fal -GL *wild	Athlete's foot	Fruit / seed	Squeezed seed/fruit	Brushing infected leg	-
						Wound sore	Leaf	Boil the leaf	Attach the wound(Bandaging)	-
						Erectile dysfunction (male sexual injury)	Root	-Pounding being mixed fruit of *Solanum indicum* . (concoction)	Drinking (oral)	1-2 tea glass
14	Sevety	Endod	*Phytolacca dodecandra* (phyolaceae)	Shr	-BU -HG *wild	Miscarry(abortion of un wanted pregnancy)	Fruit & leaf	-Pounding & squeezed and mixed with water	Drinking (oral)	1-2 glass of tea
15	Amely	Abyssinian cabbage	*Brassica carinata A.Braun* (Cruciferae)	Her	-FL -HG *cultivated	Eczema	Seed	-Pounding being mixed with butter (concoction)	Cover the wound(Bandage)	-
						Placental retention/ wait	Seed	Seed heat &grind mixed with leaf fluid of *Ziziphus spina-christi* in boild water(concoction)	Drink/oral o/ put in to vagina	-
16	Papie	Papye	*Carica papaya L.* (Caricaceae)	Her	-FL -HG *cultivated	Swelling	Fruit / seed	Separate fruit and seed	Cover the swelling(bandage)	-
						Malaria Hepatitis	Leaf & root	Boiled being mixed with water(decoction)	Drinking (oral)	1-2 glass
						Diarrhea	Leaf & seed	-Dry& squeezed mixed with water	Drinking/oral	-

17	Muhey	-	*Rumex nervosus Vahl*. (Polygonaceae)	Shr	- Bu -FL -GL *wild	Bleeding after injury/hemorrhoid	Leaf	Pounding	Cover the wound(Bandage)	-
						Eye disease	Leaf	-Pounding & squeezing	Put in to eye	
						Hepatitis	Root	-Pounding &boiling (decoction)	Drinking (oral)	1cup
18	Dugeny	-	*Ficus carica* L. (Moraceae)	Shr	-BU -FL -Ri *wild	Ringworm (poris)	Leaf	Squeezing leaf get the fluid	Put on the in faceted skin	-
19	Kawan Seveta	Sweet pigweed	*Chenopodium ambrosoides* (Chenopodiaceae)	Her	- Bu -GL -HG *wild	swelling	Leaf	-Pounding being mixed with *D.stramonium& Kalanchoe petitiana* (Crassulaceae) (concoction)	Cover(bandage) on the swelling	-
						a fungal hair loss	Leaf	Squeezing	Pore on infected part	
20	Enariqy	Herb of grace	*Ruta chalepensis L.*(Rutaceae)	Her	-HG *cultivated	Stroke/rub (syncope)or cerebral hypoxia	Leaf or seed	-Pounding or grinding	Drinking /oral	1-4 cup
						Stomachache	Leaf, steam or seed	Crushing or pounded	Eat /oral	-
21	Quachy	-	*Trigonella foenum-graecum L.* (Leguminosae)	Her	-FL -GH *cultivated	Rheumatic /sore/nerve problem on leg	Seed	Dried, grinded & mixed with water	Eat or drink	A spoonful
						Broken parts	Seed	grinding and boiled in water	Bandage /cover/ broken parts	-
22	Mengeji e	-	*Sida tenuicarpa vollesen* (Malvaceae)	Shr	- Bu -GL -HG -FL *wild	Erectile dysfunction	Root	- boiled being mixed with *N.sativa* (decoction)	Eat /oral	A Spoonful

23	Qulquly	-	*Euphorba abyssinia Rousch*. (Euphorbiaceae)	Shr	-Bu -HG *wild or cultivated	Thorn inside body as expellant Wart	The fluid of stem	Secretion the fluid	Put the fluid affected part of thorn	-
24	Chatu Yengy	Mistletoe	*Viscum sp.* (Loranthaceae)	Shrbby Epipphyt	Para or on branch of Catha edulis *Wild	Rheumatic/nerve problem on leg	Leaf	boiled &mixed with honey (decoction)	Drink/oral	1-2cup of tea
						Evil eye	Leaf	- boiled being mixed with *Viscum sp*. of *C.macrostachyus*	Nasal or oral inhalation of steam	-
25	Tsemedy	Buck thorn/dog wood	*Rhamnus prinoides L'Herit*(Rhamnaceae)	Shr	-FL -HG *cultivated	Wound sore	seed	-Pounding & squeezing	Applied on the infected skin	-
						Tonsillitis	Seed	-Pounding being mixed with *Artemisia rehan* then squeezed	Drinking (oral)	-
26	Semptpty	-	*Bidens pilosa L.* (Compositae)	Her	-GL -Bu -Old fal *wild	Wound sore	Leaf	-Pounding & squeezing	Put/applied on infected skin	-
						Wound sore	Leaf	Grinded being (concoction)	Cover(bandage) sore	-
27	ZeraDgny	-	*Achyranthes asper L*. (Amaranthaceae)	Her	- Bu -HG -FL *wild	Bleeding after injury hemorrhoid	Leaf	-Pounding & squeezing	Bandage (tie) on the wound	-
						Placental retention (wite)	Leaf or stem	-Pounding & squeezing	Put in to vagina or bandaging it	-
						Snake biting	Leaf	-Pounding & squeezing	Pour on the bitten part	-
28	Shimbry	Chick pea	*Cicer arietinum L*. (Leguminosae)	Shr	-FL *cultivated	Malaria	Seed	mixed with *A.sativa* in water (concoction)	Eat /oral	1-2 cup
29	Filela Dgny	-	*Clutia abyssinica Joub.*and *spach* (Euphorbiaceae)	Shr	-Bu in highland area *wild	Gonorrhea Malaria Hepatitis	Root	Crushed and boiled (decoction)	Drinking (oral)	½-1 cup of tea
						Erectile dysfunction	Root	- boiled being mixed with *N.sativa,A.sativum* (decoction)	-Eat(oral)	-

30	Keberchu	Globe thistle	*Echinops kebercho* Mesfin (Copositae)	Her	Bu cold area *wild	Stomach distention	Root	- Pounding being mixed with coffee (concoction)	Eat or drink	-
						Evil eye	Root	heated/roasted	Fumigate /sterilize/smell/nasal	-
31	Tirngu	Citric	*Citrus medica (L.)Burm.f.* (Rutaceae)	Tr	-FL -HG *cultivated	Evil eye	Leaf	- boiled being mixed with ,*E. globules&O.sauve* (decoction)	Nasal or oral inhalation of steam	-
32	Ehwy Shngurcha	-	*Crinum abyssinicum Hochst.ex.A.Rich*(Amaryllidaceae)	Her	-BU -HG *wild	Wound sore	Root	Root crushed	Put on the infected skin	
33	Bugtsey	-	*Cordia africana* (Boraginaceae)	Tr	- Bu -FL -Fo - HG *wild/cultivated	Hepatitis	Leaf	- leaf heated with maize (decoction)	Drinking (oral)	-
34	Tsearky Tseatsey	-	*Acacia nigra (*Fabaceae)	Tr	-BU -Fo *wild	Allergic	Leaf	Crushed or squeezed	Applied on allergic skin	-
						Herpes zoster / Eczema	Leaf	Crushed or squeezed	Cover(bandage) on wound	-
35	Empapy	-	*Solanum marginatum L.f* (Solanaceae)	Shr	- Bu -Old fal *wild	Stomach complaints	Root	-dig up root, wash and squeezed	Drink(oral)	½-1 spoon
36	Gorry	-	*Capparis tomentosa lam.*(Capparidaceae)	Shr	-Fo -BU *wild	Evil eye	Root	-parts boiled in water (decoction)	Nasal or oral breathing/ inhalation of steam	-
37	Atsery	-	*Carissa edulis vahl.*(Apocynaceae)	Shr	-BU *wild	Evil eye	leaf	- boiled being mixed with root of C.*macrostachyus (*decoction)	Nasal or oral breathing /inhalation of steam	-
						Snake biting	Leaf	Pounded/crushed (concoction)	Drinking (oral)	-
38	Gemssy	Abyssinian	*Rosa abyssinica* (Rosaceae)	Shr	BU *wild	Evil eye	Root	Crushed and heated for sterilize	Oral and nasal inhalation	-

		wildrose								
39	Hangug a	Deadhead apple	*Zizphus spina-christi (L.)Desf* .(Rhamnaceae)	Tr	-Fo -BU *wild	Evil eye	young leaf	Pounded and squeezed	Drinking (oral)	-
40	Yentsey Ahara	-	*Stephania abyssinica Dill. &Rich.Walp* (Menispermaceae)	Climbing herb	-Bu *wild	Face fungus	Leaf	- Pounding being mixed with, *R. abyssinica* (concoction)	Put on infected skin	-
41	Fuchy Katana / Katna	Worm wood	*Artemisia rehan Chiov.* (Compositae)	Her	-HG *cultivated	Tonsillitis	Leaf	Pound mixed with leaf of *R. prinoides* & squeezed(concoction)	Drinking (oral)	A cup
42	Erem	-	*Aloe sp.* (Liliaceae)	Her	- Bu -Ro *wild or cultivated	Stomach complaints	Root	- Pounding being mixed with *C. abyssininica* then stay for few days (concoction)	Drinking /oral	1-2 cup of tea
43	Lumny	Lemon	*Citrus limon L.*(Rutaceae)	Tr	-FL -HG *cultivated	Stomachache Common cold	Fruit	juice mixed with *N.sativa, R. chalepensis & A.sativum* (concoction)	Drinking (oral)	A cup
44	Werry	-	*Olea europea sub sp. cuspidate* (Oleaceae)	Tr	- Bu -Fo - HG *wild or cultivated	Hepatitis	Bark / wood	Heated mixed with salt and isolate residue (decoction)	-Eating(oral)	A cup
						Tonsillitis	Young leaf	Squeezed and pound	Eat(oral)	-
45	Kawan Tseda	Juniper	*Juniperus procera Hochst (*Cupressaceae)	Tr	- Bu -Fo - HG *cultivated	Cough	Wood	Crushed or grinded	Smoke fumigation	-
46	Winy	Grape tree	*Vitis sp.* (Vitaceae)	Shr	-FL -HG *cultivated	Eye disease	Leaf	Pounded and squeezed	Put near to the eye	
47	Mimi Kana	Neem	*Melia azedarach L.*(Meliaceae)	Tr	HG(desert plant) *cultivated	Malaria Diarrhea	Leaf	Pounded and squeezed	Drinking (oral)	A cup

48	Sindy & Afentsei	wheat & Ota	*Triticum aestivum L.*(Poaceae)	Her	-Fl *cultivated	Postural(skin disease	Seed	- Pounding & mixed with juice of *D.stramonium* (concoction)	Put on the wound	-
49	Bune	Arabica coffee	*Coffea arabica L.*(Rubiaceae)	Shr	-FL -HG *cultivated	Wound sore	Seed	- Pounding & powdering	Put on the wound	-
50	Lenguhei	-	*Guizotia abyssinica* (Asteraceae)	Her	-FL *cultivated	Postural arthritis /skin disease	Seed	- Pounded and roasted	Heat (dermal)	-
51	Kawan berbera	Balck pepper	*Piper nigrum L.* (Piperaceae)	Shr	-HG *cultivated	Stomach complaints	seed	-Pounding being mixed with *N.sativa,Z.officinalis ,R.chalepensis,* & *A.sativum* (concoction)	Eat (oral)	A Spoon full
52	Demy Shegurechy	Onine	*Allium cepa L.* (Liliaceae)	Her	-FL -HG *cultivated	Stomach complaints Cough	Stem	-Pounding mixed with *A.sativum* (concoction)	Eat at every morning	½-1 spoon of cup
53	Denkfy	-	*Bersama abyssinica* Fresen (Melianthaceae)	Shr	-BU *wild	Ascaris	Leaf	Pounded & squeezed	Drink (oral)	-
54	Kany Semptpta	Cockle bur	*Xanthium strumarium L.*(Copositae)	Her	- FL Old/new fal *wild	Wound sore and broken parts	Leaf	Pounded & squeezed	put on infected part	-
55	Bessy/ Gramty	-	*Cyperus rigidifolius Steud (*Cyperaceae)	Her	-FL -Ri *wild	Evil eye	Bulb	-Pounded	oral or dermal	
						Fauves/sore	Bulb	Crushed/powdered	Bandage on wound	-
56	Senqy Ahara	-	*Clematis hirsute Guill. & Perr.* (Ranunculaceae)	Climbing herb	-BU *wild	Dermal/postural	Leaf	Squeezed the leaf	Apply on the infected skin	-

57	Lely	-	*Adhatoda schimperiana (*Acanthaceae)	Shr	- Bu - HG *wild or cultivated	Stomach complaints with diarrhea	Root	Crushed being mixed with *N.sativa,Z.officinalis, C.macrostachyus.&A.sativum* (concoction)	Drinking (oral)	1-2 cup of tea
						Hepatitis	leaf	- boiled with milk (decoction)	Drinking (oral)	1-2 cup of tea
						Malaria	Leaf	Pounded & squeezed	Drinking (oral)	-
58	Nechly Kana	-	*Thunbergia sp.(*Acanthaceae	Shr	-BU *wild	Headache	Leaf	Pounded& squeezed	Drinking or put in to ear	-
59	Shumby	Maize	*Zea mays (*Poaceae)	Her	-FL - HG *cultivated	Swelling leg during pregnancy	Female reproductive organ	-boiling with tea (decoction)	Drinking (oral)	1-2 glass
60	Muzy	Banana	*Musa sapientum* (Musaceae)	Her	-FL -HG *cultivated	Break of leg or arm	Leaf	Broken part of leg or arm bandage on leaf of banana	Bandage on broken part	-
61	Taffy	Teff	*Eragrostis teff /(*Poaceae)	Her	-BU -FL *cultivated	Ascaris	Seed	Powder is mixed with boiled water & bake	- Eat(oral)	-
62	Patu		*Cucurbita maxima*(Curcrpitaceae)	Her	-BU -FL *cultivated	Ascaris	Seed	Heat and roasted being added salt	-Eat (oral)	-
63	Endadvy		*Coriandrum sativum* (Apiaceae)	Hre	-FL -HG *cultivated or wild	Stomachache	Seed or fruit	Bounded/crushed	-Eat(oral)	
64	Dondaru	-	*Hagenia abyssinica (*Rosaceae)	shr	-BU -Fo *wild	Ascaris or tap warm	Seed or fruit	Powder fruit/seed mixed with water / seed mixed with ethanol /milk	Drinking (oral)	-
65	Enqoqu	-	*Embelia schimperi (*Myrsinaceae)	Shr ortree	-BU -Fo -Ri *wild	Ascaris	Seed	-crashed and mixed with water or seed mixed with ethanol	Drinking (oral)	-

66	Kushemy	-	*Ocimum lamiifolium Hochst.ex* Benth (Labiatae)	Shr	-HG -Bu -Fo *wild or cultivated	Febrile with symptom of fever	Leaf	-squeezed and juice isolated	Drinking (oral) Apply in to ear or cream on body	Full of palm
						Diarrhea	Leaf	-boiled being mixed with *Z.scabra* (decoction)	Nasal/oral inhalation of steam	-
								-squeezed and juice isolated	Drinking (oral)	A cup
67	Mury ka	-	*Clutia sp*. (Euphorbiaceae)	Shr	-HG -FL Bu *wild/cultivated	Ascaris Stomach ache Diarrhea	Leaf	-Pounded adding little water & squeezed	Drinking (oral)	1-2 tea glass
						Stomachache		- Pounded (Concoction)	Eat/oral/ ingestion	A cup
68	Meshka/ Yerywagaie	-	*Rumex steudelii Hochst.ex A.rich* (Polygonaceae)	Her	-FL -Ri -wet GL *wild	Abortion of unwanted pregnancy	Root	-Pounded with water & squeezed	Drinking (oral)	1-2 cup
								-Peel out the bark of the root	Attach with womb	-
						Bleeding after injury &hemorrhoid	Leaf	Bandage on the wounded part	Pounding	-
69	Qurtebie	-	*Taraxacum sp*. (Compositae)	Her	-Wet GL *wild	Stomachache with diarrhea	Root	Up root and wash it well	Chewing & swallowing the juice	-
70	Hangury	-	*Pterolobium stellatum* Forssk (Fabaceae)	Shr	-HG as a fence -Bu *Cultivated or wild	Evil eye	Leaf & root	-Pounded mixed with *R.chalepensis & A.sativum* (Concoction)	-Eat (oral)	-
71	Bushnty	-	*Kolanchoepetitiana* (Crassulaceae)	Her	-Ro -GL -Old fat. *Cultivated	Swelling /broken bone	Leaf	Heated	-Put on the swelling or broken leg or hand	-
72	Buzy Empapy	-	*Solanum indicum L*. (Solanaceae)	Shr	-BU -Old fat. *wild	Erectile dysfunction	Leaf	-Pounded being mixed with root of *C.focifolius & Tragia sp*. (Concoction)	Drinking (oral)	-
73	Zagry Kantsea	-	*Hesperaloe sp*. (Agavaceae)	Her	-HG -Bu *cultivated	Ear disease cause deafness	Stem / leaf	-Pounded & squeezed	Put in to ear	½ spoon

					or wild					
74	Bety Empapy	-	*Alchemilla sp.* (Rosaceae)	Her	Old/ new fat. -FL *wild	Hemorrhoid	Leaf	pounded	Bandage	-
						Placental delay (wit)	Leaf/ root	-Pounded & squeezed	Drinking (oral)	½ cup of tea
75	Shefraw	Moringa	-*Moringa stenopetala* (Moringaceae)	Tre	-HG -Bu -FL *cultivated	Epilepsy, Diarrhea, Common cold	Root	Pounded	Smelling/inhalation	-
						Blood pressure/hypertension, stomachache, asthma, diabetes, leprosy, Itching	Leaf	-Boiled leaf with tea	Drinking (oral)	A cup of tea
76	Gutcha/ Betbabra	Paracress	*Spilanthes uliginosa Sw.* (Copositae)	Her	-Wet -GL Old or New fal. *wild	Toothache	The whole plant	-Crushed and chewed	Chewed through teeth under pain ,but not swallowed	-
						Tonsillitis	Leaf& flower	-Crushed and chewed	Chewed during pain but not swallowed	-
77	Kawan Kushma	-	*Thymus serruatus Hochst. ex.Benth* (Labiatae)	Her (Shrub by)	GL&/or cold highland area *wild	Cough	The whole plant	-Boiled in water (Decoction)	Drinking (oral)	-

Appendix 2: Lists of informants involved in ethnobotanical study.

(Randomly selected from the 8 kebels (20 Gots)(Note: G=grade & *marked key informants G0=illiterate))

No.	Name	Kebele/village	Age	Sex	Marital status	Educational status(grade)
1	Denkensh Embiale Kebed	01/Hayat	45	F	Married	Diploma
2	Embiale Okejera Tolssa *	01/Hayat	65	M	Married	Irregular education
3	Ayshashem Kassa Nigusie	01/Gigy	52	M	Married	Irregular education
4	Ayahush Tilahune Yaniew	01/Hayat	32	F	Single	G3rd complete
5	Tessema Gashie Ayana*	01/Gigy	80	M	Married	G0
6	Kassie Wandem Marso	02/Kaneha	55	M	Married	G0
7	Webedar Yohannes Yemame	02/kaneha	48	F	Single	G0
8	Mokonen Agajie Jember	02/kaneha	79	M	Married	G0
9	Ganate Mokene Adale*	02/kaneha	55	F	Married	G0
10	Zaweditu Tarakgn Mulatu	02/kaneha	25	F	single	G4th complete
11	Bakele Mokonen Mashu	02/kaneha	54	M	Married	G0
12	Belay Mokonen Agajie	01/Gigy	28	M	Married	G9th complete
13	Semaneh Wandie Zeleke	Ababa/Bedo	60	M	Married	G0
14	Abebe Tefera Gemberie	Ababa /Bedo	70	M	Married	G0
15	Tesfie Wandie Zeleke*	Ababa/Bezoha	70	M	Married	G0
16	Gananaw Zaryhun Semaneh	Ababa/Bezoha	54	M	married	G4th complete
17	Tabajie Fanta Wandem	Ababa/Bezoha	65	M	Married	G0
18	Waldie Assfaw Erteban	Dane/Waykele	40	M	Single	2nd complete
19	Waldamlak Wandifraw Asmare	Dane/Waykela	45	M	Married	5th complete
20	Semahgn Getahun Dagnaw	Malka/Waykela	50	M	Married	G4th complete
21	Addimas Bayene Ayele*	Malka/Waykela	65	M	Married	G7th complete
22	Aseres Dasta Shiferaw	Ambiky/Ambiky ketema	75	M	Married	G0
23	Margeta Lewel Bogale Aynie*	Ambiky/Ambiky ketma	60	M	Married	Irregular education
24	Alemayhu Beza Workeneh	Ambiky/Ambiky ketema	65	M	Married	G0
25	Engeda Addimas Bitew	Ambiky/Ambiky ketema	25	M	Married	G10th complete
26	Getachew Tessema Bayna	Ambiky/Ambiky ketema	22	M	Married	G11th complete
27	Meherate Aynalem Mabratu	Ambiky/Ambiky ketema	30	M	Married	G0
28	Semaneh Amesal Aynie	Ambiky/Barate	35	M	Married	G5th complete
29	Muhamed Ahemed Bashier	Mantauha/Sefer1	40	M	married	GO
30	Muhamed Mawded Yasufe*	Mantauha/sefer 1	50	M	married	G4th complete

31	Malese Asefaw Swagegn	Mantauha/sefer 1	35	M	married	G3rd complete
32	Embago Ayalew Berhanu	Mantauha/sefer 2	30	M	married	G2th complete
33	Ayahush Muluneh Kaflew*	Dawer/Yemaliy	50	F	married	Irregular education
34	Agagnahush Meheret Gadihun	Dawer/Ymaliy	22	F	single	G10th complete
35	Melakue Tekelie Tassefie	Dawer/Yimaly	25	M	single	G11th complete
36	Mineleke Alemu Wasihun	Fucha Yemaliy/matelya	38	M	married	G11th complete
37	Manamnush Kindie Bezuayehu	Teruberhan/Mocha	39	F	married	Irregular education
38	Asmamaw Agagnahu Jember	Fucha/Yemaliy	29	M	single	G7th complete
39	Almayhu Berhanu Alem	Lamba/Yemaliy	24	M	single	G10th complete
40	Bossena Zaru Gatahun	Lamba/Yemaliy	40	F	married	Irregular education
41	Rahel Addisu Almayhu	Kantsen/Yemaliy	23	F	single	Degree
42	Dilnessa Getahun Gazahgn	Kantsen/Yimaly	42	M	married	8th complete
43	Yashy Menayehu Mashesha	Ambiky/Bart	55	F	single	2nd complete
44	Messelach Assefa Bogale	Mantuh/safar3	25	F	single	Diploma
45	Ababa Warkneh Tsega	Mantuh/safer2	23	F	single	G10th complete
46	Mohamed Bashier Yiemer*	Mantauh/safer2	55	M	married	G0
47	Alemayehu Mulugeta Kasahun	Ambiky/Bart	60	M	married	G0
48	Momena Hassen Yiesufe	Mantuh/safer3	44	F	married	G0
49	Bertukan Alemayhu Warkue	Ambiky/Bart	35	F	married	G9th complete
50	Agalu Wandem Gataneh*	Teruberhan/Mocha	39	M	married	G11th complete
51	Saied Bashier Mestofa	Kantsen/Yemaliy	55	M	married	G0
52	Aberach Agalu Mangesha	Sigady/Amedguba	29	F	married	G9th complete
53	Yinsaw Menalu Tilahun	Sigady/ Amedguba	45	M	married	Irregular education
54	Tilaahun Alie Jamber*	Sigady/ Amedguba	65	M	married	G0
55	Asersach Mola Tadasse	Sigady/Kelage	68	F	married	G0
56	Mhemade Hussien Endrise	Fatan/Ymaliy	40	M	married	Degree
57	Aliema Mohamed Husaine	Fatan/Ymaliy	55	F	married	G0
58	Alene Alameraw Mangest	Sigady/Kelage	44	M	married	G11th complete
59	Kess Tsegayie Berhanu Abebe	Sigady/Kelage	55	M	married	Irregular education
60	Emabate Mokene Zagyie	Teruberhan/Mocha	65	F	married	G0
61	Fantahun Aligase Eretiban	Teruberhan/Mocha	70	M	married	G0
62	Kess Berehan Moges Ayale	Teruberhan/ Mocha	55	M	married	Irregular education
63	Bawket Agaje Jember	Teruberhan/Adacha	77	M	married	G0
64	Kess Habtmaryame Seyume Dafersha	Teruberhan/ Adacha	80	M	married	Irregular education
65	Wbayahu Adimasu Lekenie	Teruberhan/ Adacha	60	F	married	G0

Appendix 3: Documented ethnovternary medicinal plants in the study area

Descriptions plant part used Method of preparations, Route of administrations, Dosage and Management strategy. (Hint BU=bush land, HG=home garden, FL=farm land, FO=forest area, GL=grass land, Old fal = old fallow, New fal=new fallow, Ro= rocky area, Ri=river and wet lands, Her=herb, Shr=shrub Tr=tree and Mang= Management, The common name is listed in Awi language)(Unknown-)

No.	Medicinal plants documented									
	Name									
	Local	English	Scientific	Habit	Habitat& Mngt	Livestock disease healing	Plant part used	Method of preparation	Rout of administration	Dosage
1	Empapy	-	*Solanum marginatum L.f* (Solanaceae)	Shr	- Bu -Old fal *wild	Eye disease	Fruit	-Pounding being mixed with leaf of *P.dedecondra* (concoction)	Put near in to eye	-
2	Tsemdy	Buckthorn/dog wood	*Rhamnus prinoides L'Herit* (Rhamnaceae)	Shr	-GL -FL *culitivated	break body parts	Leaf	-Pounding being mixed with*A.sativum*,and *L.sativum* (concoction)	Put on break prats	-
3	Sevety	Endod	*Phytolacca dodecandra* (phyolaceae)	Shr	-Bu -HG *wild	Eye disease	Leaf	-Pounded with butter (concoction)	Apply in to eye	-
4	Sumaya	-	*Dodonaea angustifolia L.f* (Sapindaceae)	Shr	-Bu *wild	Diarrhea Thinning /thin disease	Bark	-Pounding being mixed with leaf of *E.capensis* water in (concoction)	-Feed (oral)	2-4 cup of tea
5	Emburdedy	-	*Cyphostema sp.* (Vitaceae)	Her	-Bu *wild	-Stomach swelling disease -Anthrax	Root	-Pounding being mixed with leaf *A.sativum* and salt (concoction)	-Feed drink (oral or nasal)	½ -1 cup of tea
6	Chakmy	Castro oil plant	*Ricinus communisL.* (Euphorbiaceae)	Shr	-GL *culitivated / wild	-Lack of appetite	Leaf	-Pounding being mixed with *C.macrostachyus* and squeezed	- oral or nasal	1-2 cup of tea

								(concoction)		
7	Bune	Arabicc offee	*Coffea arabia L* (Rubiaceae)	Shr	-GL -FL *culitivate d	castration	Seed	pounded and boiled (decoction)	drink (oral)	A cup
8	Dandury	Devil's fig	*Argemone mexicana L.* (Compositae)	Her	Old/New fal -GL *wild	-Exotic disease or foreign disease break e out	Root	-Pounded with water	drink (oral or nasal)	-
9	Chaha Kampa	-	*Cucumis ficifolius A.Rich* (Cucurbitaceae)	Climbi ng herb	Old/New fal -GL *wild	hair erectile & fever Lack of appetite and to fatten cattle	Root	Pounded or crushed adding water	drink (oral)	1-2 cup of tea
10	Yentsey Mesha	Poison berry	*Solanum nigrum L.*(Solanaceae)	Her	Old/ New fal -GL *wild	Long disease with symptom of high breathing rate	Leaf	Pounding (concoction)	eat /drink (oral or nasal)	1-2 cup of tea
11	Bushent y	-	*Kalanchoe petitiana*(Crassu laceae)	Her	-Ro -GL -Old fat. *culitivate d	-Lack of appetite	Root	-Crush or pounded adding water	Drink (oral)	1-3 cup of tea

Appendix 4 : Documented taxonomic distribution of traditional medicinal plants in study area.

Species	Family	Species	Family	Species	Family
Solanum nigrum L.	Solanaceae	*Dodonaea angustifolia*	Sapindaceae	*Bersama abyssinica*	Melianthaceae
Cucumis ficifolius	Cucurbitaceae	*Phytolacca dodecandra*	Phyolaceae	*Allium cepa*	Liliaceae
Argemone mexicanaL	Compositae	*Rhamnus prinoides*	Rhamnaceae	*Piper nigrum*	Piperaceae
Coffea Arabia	Rubiaceae	*Solanum marginatum*	Solanaceae	*Guizotia abyssinica*	Asteraceae
Ricinus communis	Euphorbiaceae	*Adhatoda schimperiana*	Acanthaceae	*Triticum aestivum*	Poaceae
Cyphostema sp.	Vitaceae	*Cyperusrigidifolius Steud*	Cyperaceae	*Vitis sp*	Vitaceae
Clematis hirsute	Ranunculaceae	*Xanthium strumarium*	Compositae	*Melia azedarach*	Meliaceae
Juniperus procera	Cupressaceae	*Olea europea*	Oleaceae	*Citrus limon*	Rutaceae
Aloe sp.	Liliaceae	*Artemisia rehan*	Compositae	*Stephania abyssinica*	Menispermaceae
Zizphus spina-christi	Rhamnaceae	*Rosa abyssinica*	Rosaceae	*Carissa edulis*	Apocynaceae
Capparis tomentosa	Capparidaceae	*Acacia nigra*	Fabaceae	*Cordia africana*	Boraginaceae
Crinum abyssinicum	Amaryllidaceae	*Citrus medica*	Rutaceae	*Echinops kebercho*	Compositae
Clutia abyssinica	Euphorbiaceae	*Cicer arietinum*	Leguminosae	*Achyranthes aspera*	Amaranthaceae
Bidens pilosa	Compositae	*Rhamnus prinoides*	Rhamnaceae	*Viscum sp.*	Loranthaceae
Euphorbia abyssinica	Euphorbiaceae	*Sida tenuicarpa*	Malvaceae	*Trigonella foenum-graecum*	Leguminosae
Ruta chalepensis	Rutaceae	*Chenopodium ambrosoides*	Chenopodiaceae	*Ficus carica*	Moraceae
Rumex nervosus	Polygonaceae	*Carica papaya*	Caricaceae	*Brassica carinata*	Cruciferae
Nigella sativa	Ranunculaceae	*Eucalyptus globules*	Myrtaeceae	*Croton macrostachyus*	Euphorbiacae
Zehneria scabra	Cucurbitaceae	*Ocimum sauve*	Labiatae	*Thymus serrulatus*	Labiatae
Lepidium sativum	Cruciferae	*Allium sativum*	Liliaceae	*Capsicum annuum*	Solanaceae
Zingiber officinal	Zingiberaceae	*Jasminum abyssinicum*	Oleaceae	*Clausena anisata*	Rutaceae
Thunbergia sp.	Acanthaceae	*Ocimum lamiifolium*	Labiatae	*Zea mays*	Poaceae
Musa sapientum	Musaceae	*Eragrostis teff*	Poaceae	*Clutia sp.*	Euphorbiaceae
Rumex steudelii	Polygonaceae	*Taraxacum sp.*	Compositae	*Pterolbiumstellatum*	Fabaceae
Kolanchoe petitiana	Crassulaceae	*Solanum indicum*	Solanaceae	*Hesperaloe sp.*	Agavaceae
Alchemilla sp.	Rosaceae	*Moringa stenopetala*	Moringaceae	*Cucurbita maxima*	Cucurbitaceae
Coriandrum sativum	Apiaceae	*Hagenia abyssinica*	Rosaceae	*Embelia schimperi*	Myrsinaceae
Spilanthes uliginosa Sw.	Copositae	*Premna schimperi* Engl.	Verbenaceae	-	-

Appendix 5: Informants code of reporting and collection numbers of ethnovternary medicinal plants

(Note. Local name was listed in Awi language).

No.	Medicinal plants documented			Code of informants reporting	Collection number (#)
	Name				
	Local(Awi)	English	Scientific		
1	Empapy	-	*Solanum marginatum* L.f (Solanaceae)	9,17,63	
2	Tsemedy	Buckthorn/dog wood	*Rhamnus prinoides* L'Herit (Rhamnaceae)	28,45	
3	Sevety	Endod	*Phytolacca dodecandra* (phyolaceae)	22,29	
4	Sumaya	-	*Dodonaea angustifolia* L.f (Sapindaceae)	1,,23,45	
5	Emburdedy	-	*Cyphostema sp.*(Vitaceae)	12,28,51	
6	Chakmy	Castro oil plant	*Ricinus communis* L.(Euphorbiaceae)	55	No.12
7	Bune	Arabi caffee	*Coffea Arabia* L.(Rubiaceae)	5	
8	Dandury	Devil's fig	*Argemone Mexicana* L. (Compositae)	18,65	No.7
9	Chaha Kampa	-	*Cucumis ficifolius* A.Rich (Cucurbitaceae)	2,24	
10	Yentsey Mesha	Poison berry	*Solanum nigrum* L. (Solanaceae)	8,13	
11	Bushenty	-	*Kalanchoe petitiana* (Crassulaceae)	33	

Appendix 6: Informants code of reporting and collection numbers of ethnomedicinal plants

(Note. Local name was listed in Awi language)

No.	Medicinal plants documented			Code of informants reporting	Collection number
	Name				
	Local	English	Scientific		
1	Luntsey	-	*Clausena anisata* (Rutaceae)	11,33,58	No.8
2	Choch Mukula	-	*Jasminum abyssinicum* Hochst(Oleaceae)	19,63	
3	Barbare	Green paper	*Capsicum annuum* (Solanaceae)	8,12,36,57	

4	Ginjibily	-	*Zingiber officinal* Rose. (Zingiberaceae)	1,2,3,4,10,11,12,13,14,15,19, 20,25,27,28,29,39,40,45,49,55,61,62	No.5
5	Fuchy Shegrchy	Garlic	*Allium sativum* L.(Liliaceae)	1,4,7,10,13,18,20,22,24,25,29,30,33,42,45,49,5 458,59,60,63,65	No.32
6	Fetseu	Peper grass	*Lepidium sativum* L.(Cruciferae)	5,7,8,9,16,19,22,25,31,36,39,40,55,59,61	
7	Kushemy	-	*Thymus serrulatus* Hochst.ex .Benth(Labiatae)	23,39,45	No.26
8	Kamana Kana	-	*Ocimum sauve* Willd. (Labiatae)	1,2,7,8,9,10,12,16,19,20,29,33,38,45,49,55,59,6 0,62,64,65	No.27
9	Aaregressa	-	*Zehneria scabra* (L.f.) Sonder. (Cucurbitaceae)	3,4,5,6,8,11,13,14,21,28,30,31,35,39,40,47,52,5 6,65	No.29
10	Asessy	-	*Croton macrostachyus* Hochst. (Euphorbiacae)	1,2,7,11,16,23,29,45,52	No.43
11	Fuchy Barzaf	Blu gum	*Eucalyptus globules* lobill.(Myrtaeceae)	7,12,25,29,37,45,56,60	No.38
12	Tseaky Abssuda	Black commin	*Nigella sativa* L. (Ranunculaceae)	1,4,7,10,15,23,27,32,37,41,47,52,54,56,62,63,6 4	
13	Chaha kampa	-	*Cucumis ficifolius* A.Rich (Cucurbitaceae)	2,5,11,25,34,45,49,59,60,65	No.36
14	Sevety	Endod	*Phytolacca dodecandra* (phyolaceae)	10,19,22,31,36,49,50,	No.6
15	Amely	Abyssia cabbage	*Brassica carinata* A.Braun (Cruciferae)	1,9,19,21,33,46,56	No.25
16	Papaie	papaye	*Carica papaya (*Caricaceae)	29,42,49,55,58,64,45	No.44
17	Embuacho	-	- Rumex nervosus Vahl. (Polygonaceae)	3,10,28,29,37,49,52,59,61	
18	Dugeny	-	*Ficus carica* L. (Moraceae)	33,58,65	
19	Kawanu Sevety	Sweet pig weed	Chenopodium ambrosoides (Chenopodiaceae)	1,8,25,54,63	
20	Enarquy	Herbofgrace	*Ruta chalepensis* L. (Rutaceae)	3,5,7,8,11,19,27,40,49,55,60,65	No.3
21	Quachy	-	*Trigonella foenum-graecum* L.(Leguminosae)	1,3,4,9,15,20,33,39,47,53,63	
22	Mengjie	-	*Sida tenuicarpa* Vollesen(Malvaceae)	59,60	
23	Qulquly	-	*Euphorba abyssinia* Rousch. (Euphorbiaceae)	3,9,17,56	
24	Chatu Yengy	Mistelteo	*Viscum sp*.(Loranthaceae)	12,38,59,61	No.20

25	Tsemdy	Bouckthorn/ doog wood	*Rhamnus prinoides* L'Herit(Rhamnaceae)	10,14,19,42,45,49,50,54,59,61	No.13
26	Septpty	-	*Bidens pilosa* L.(Compositae)	27,38,43	
27	Zera Degnwy	-	*Achyranthes asper* L. (Amaranthaceae)	22,34,35,37,45,50,52,58,60,62,	
28	Shimbry	Chickpea	*Cicer arietinum* L. (Leguminosae)	33,56,61,64	
29	Fiyela Degny	-	*Clutia abyssinica* Joub.&spach(Euphorbiaceae)	4,9	
30	Keberchu	- Globe thistle	*Echinops kebercho* Mesfin(Copositae)	11,19,59,64	
31	Tirngu	Citrus	*Citrus medica* (L.)Burm.f. (Rutaceae)	5,7	No.40
32	Ehuewy Shegucha	-	*Crinum abyssinicum* Hochst.ex.A.Rich (Amaryllidaceae)	13,33,47	No.31
33	Bugtsey	-	*Cordia africana* (Boraginaceae)	18,23,38,49	No.1
34	Tareky Tsea tsey	-	*Acacia nigra* (Fabaceae)	63,64	
35	Empapy	-	*Solanum marginatum* L.f (Solanaceae)	7,13,27	No.29
36	Gorry	-	*Capparis tomentosa* lam. (Capparidaceae)	8,12,23,29,39,44,51,57	No.11
37	Atsery	-	*Carissa edulis* vahl. (Apocynaceae)	15,19,23,34,49,50,55,60,63,64	No.4
38	Gemssy	Abyissinia wild roas	*Rosa abyssinica* (Rosaceae)	22,45,53	
39	Hanguga	Desert apple	*Zizphus spina-christi* (L.)Desf. (Rhamnaceae)	15,19	
40	Yentsey Ahara	-	*Stephania abyssinica* Dill.&Rich.Walp(Menispermaceae)	36,43	No.37
41	Fuchy Ketana	Worm wood	*Artemisia rehan* Chiov. (Compositae)	33,40,55,59	
42	Erem	-	*Aloe sp.* (Liliaceae)	1,8,11	
43	Lomieny	Lemon	*Citrus limon* L.(Rutaceae)	8,15,19,27,33,39,41,	No.41
44	Werey	-	*Olea europea* subsp cuspidate(Oleaceae)	7,13,24	No.17
45	Kawan Tseda	Juniper	*Juniperus procera* Hochst(Cupressaceae)	29,31,43	No.42
46	Mimy Kana	Neem	*Melia azedarach* L.(Meliaceae)	15,45,48,59	No.18
47	Weiny	Grape tree	*Vitis sp.*(Vitaceae)	10,18,21	

48	Sindi&Afentsey	Wheat&Ota	*Triticum aestivum* L.(Poaceae)	39,42,	
49	Bune	Arabic coffee	*Coffea arabica* L.(Rubiaceae)	32,45,46	No.16
50	Lengehy	-	*Guizotia abyssinica* (Asteraceae)	2,51,	No.34
51	Kawan Berbere	Black peper	*Piper nigrum* L.(Piperaceae)	5,11,22,49,50,64	
52	Demy Shengrchy	Onoin	*Allium cepa* L.(Liliaceae)	1,23,45,53,59	
53	Denkefy	-	*Bersama abyssinica* Fresen(Melianthaceae)	6,29,41,57	No.14
54	Kany Sempetpta	Cocklebur	*Xanthium strumarium* L.(Copositae)	64,65	
55	Senquy Aahara	-	*Clematis hirsute* Guill.&Perr. (Ranunculaceae)	23,33	No.39
56	Bessy/Gramty	-	*Cyperus rigidifolius* Steud (Cyperaceae)	12,58	No.28
57	Lely	-	*Adhatoda schimperiana* (Acanthaceae)	2,4,7,11,17,20,29, 36, 44,45,49, 56,59,61	No.23
58	Nechly Kana	-	*Thunbergia sp*.(Acanthaceae)	63,65	
59	Shumby	Meize	*Zea mays*	23,33,39	No.35
60	Muzy	Banana	*Musa sapientum*	1,17,23,58	No.9
61	Taffey	Teff	*Eragrostis teff*	58,62	
62	Patu	-	*Cucurbita maxima*	22,42	No.33
63	Endadvy	-	*Coriandrum sativum* (Myrsinaceae)	5,9,12,56,60,64	
64	Donderu	-	*Hagenia abyssinica* (Rosaceae)	7,12,22	
65	Enqoqu	-	*Embelia schimperi*(Apiaceae)	18,19,35,56,62	
66	Kushemy	-	*Ocimum lamiifolium*	6,7,10,11,17,21,28,34,39,42,49,54,59	
67	Mury ka	-	*Clutia sp.*	1,11,17,35,44,53,57,62	
68	Meshy ka/Yeriwagy	-	*Rumex steudelii*	2,10,23,29,39,41,52,61,63	No.24
69	Qurteby	-	*Taraxacum sp*.	10,14,17,28,33,43,50,55,60	
70	Hangury	-	*Pterolbium stellatum*	22,29	No.15
71	Bushenty	-	*Kolanchoe petitiana*	33,45,58,60	
72	Buzy Empapy	-	*Solanum indicum*	10,21,35	No.2
73	Zagery Kantsea	-	*Hesperaloe sp*.	25,33,45,	
74	Bety Empapa	-	*Alchemilla sp.*	25,59,61	
75	Shefraw	Moringa	*Moringa stenopetala*	1,5,6,10,18,22,29,35,37,39,47,49,50,52	No. 41
76	Gutcha/Betbeber	Paracress	*Spilanthes uliginosa* Sw.	4,7,25	No.30
77	Tentassy	-	*Premna schimperi* Engl.	11, 23, 45,55,63,65	No.10

Appendix 7: Images of ethnomedicinal and ethnnovternary medicinl plants in Guangua district

(Local name was listed in Awi languge)

 Botanical name:*Cucuimis ficifolius* A.Rich (Cucurbitaceae) Local name:Chaha campa	 Botanical name*: Musa sapientum* (Musaceae) Local name : Muzy	 Botnical name:*Coriandrum sativum* (Apiaceae) Local name:Endadvey
 Botanical name:*Cucurbita maxima* (Cucurbitaceae) Local name:Patu	 Botanical name: *Nigella sative* (Myrsinaceae) Local name:Tsearky Absuda	 Botanicalname*: Embelia schimperi* L. (Ranunculaceae) Local name: Enqoqu
 Botanical name: *Cyphostemma sp* (Vitaceae Local name:Emburdedy	 Botanical name*: Allium sativum*(Liliaceae) Local name:Nach Fuchy Shengrchy	 Botanical name: *Zingiber officnale* Rose (Zingiberaceae) Local name Gngebly

 Botanical name: *Ocimum sauve* wild(Labitacea) Local name:Kamana Kana	 Botanical name: *Rumex nervosus* Vahl. (Polygoaceae) Local name: Muhy	 Botanical name:*Carica papaya* L. (Caricaceae) Local name:Papaie
 Botanical name: *Chenopdium ambrosoides* (Chenopodiaceae) Local name:Kawanu Sevety	 Botanical name : *Ficus carica* L.(Moraceae) Local name:Dugeny	 Botanicalname:*Capsicum annuun*(Solanaceae) Local name:Baber
 Botanical name: *Jasminum abyssinicum* Hochst. (Oleaceae) Local name:Chocha Mukela	 Botanical name: *Allium capa* L (Liliaceae) Local name:Demy Shngrchy	 Botanicalname:*Moringa stenopetala*(Mringaceae) Local name:Shifraw

 Botanical name: *Hesperaloe sp*. (Agavaceae) Localname:Zagry Kantsea	 Botanicalname: *Thunbergia sp.* (Acanthaceae) Local name: Nechly Kana	 *B*otanicalname:*Guizotia abyssinica* (Astaraceae) Local name:Lenguhy
 Botanical name: *Kolanchoe petitiana* (Crassulaceae) Local name:Bushenty	 Botanical name: *Xanthium strumarium* L Local name:Kany Septpta	 Botanical name: *Clutia sp*. (Euphorbiaceae) Local name:Mury ka
 Botanical name: *Alchemilla sp*. (Agavaceae) Local name:Bety Empapa	 Botanical name:*Vitis sp* (Vitaceae) Local name:Waynie	 Botanical name:*Piper nigrum* (Piperaceae) Local name:Kawan Bebara
 Botanical name:*Lepidium sativum* L.(Cruciferaceae) Local name:Fetseu	 Botanical name: *Trigonella foenum-graaecumL*(Leguminosee Local name:Quachy	 Botanicalname:*Euphorba abyssinica* Rousch (Euphuorbiaceae)

		Local name:Kulkuly
 Botanical name:*Aloe sp*.(Liliaceae) Local name: Erem	 Botanical name:*Triticum aestivum* L(Poaceae) Local name:Sendie	 Botanical name:*Achyranthes asper* L(Amaranthaceae) Local name:Zeradgnie
 Botanical name: *Zizphus Spinachristi* L.Desf Rhamnaceae) Local name: Hanguga	 Botanical name: *Artemisia rehan* Chivo. (Compositae) Local name:Fuchy Ketana	 Botanial name:*Citrus medica* L.Burm.f(Rutaceae) Local name:Terngu
 Botanical name: *Rosa abyssinica* (Rosaceae) Local name: Gemssy	 Botanial name: *Clutia abyssinica* Joub.and spach(Euphorbiaceae) Local name: Feya Dagne	 Botanical name: *Cicer arietinum* L(Leguminosae) Local name:shimbry
 Botanical name:*Rumex steudelii* Hochst ex.A.rich (Poygonaceae)	 Botanical name: *Pterolobium stellatum* (Fabaceae)	 Botanical name:*Hagenia abyssinica*(Rosaceae) Local name: Dondaru

Loccal name: Meshy ka	Local name: Hangury	
 Botanical name:*Echinops kebercho mestin* (Compositae) Local name: Kaberchu	 Botanical name:*Zea mays* (Poaceae) Local name:Shumby	 Botanical name:*Adhetoda schimperiana*(Acanthaceae) Local: Lely
 Botanical name:*Eragrostis teff* (Poaceae) Local name:Taffey	 Botanical name:*Cyparus rigidifolius* stuecd (Cyperaceae) Local name: Sebsy	 Botanical name:*Solanum nigrum* L.(Solanaceae) Local name:Yentsey Mesha
 Botanical name:*Clematis hirsute* Guill&per (Ranunculaceae) Local name:Senqie Ahara	 Botanical name:*Coffea arbia* L.(Rubiaceae) Local name:Bune	 Botanical name:*Dodonaea angustifolia* L.f(Sapindaceae) Local name:Sumaya
		

Botanical name: *Phytolacca dodecandra* (Phyolaceae) Local name:Sevety	Botanical name:*Premna schimperi* Engl. (Verbanaceae Local name:Tentasy	Botanical name:*Cordia Africana* (Boraginaceae) Local name :Bugtsey
 Botanical name:*Acacia nigra* (Fabaceae) Local name:Tserky Tseatsey	 Botanical name:*Croton macrostachyus* Euphorbiaceae) Local name:Asessy	 Botanical name:*Eucalyptus globules* lobill(Myrtaceae*)* Local name:Fuchy Barzaf
 Botanical name: *Crinum abyssinicum* Hochst.ex. (Amaryllidaceae) Local name:Ehuewew shengrcha	 Botanical name:*Bidens pilosa* L.(Compositae) Local name:Semptpty	 Botanical name:*Ruta chalepensis* L.(Rutaceae) Local name:Enarquie
 Botanical name: *Viscum sp*. (Loranthaceae) Local name:Chatu Yengy	 Botanical name: *Brassica carinata*(Cruciferaceae) Local name:Amly	 Botanical name:*Solanum marginatum* L f(Solanaceae) Local name:Empapy

 Botanical name:*Clausena anisata* (Rutaceae) Local name:Luntsey	 Botanical name:*Carissa edulis* Vahl. (Apocyanaceae) Local name:Atsery	 Botanical name:*Ricinus communis* L.(Euphorbiaceae) Local name:Chakmay
 Botanical name: *Copparis tomentosa* lam. (Capparidaceae) Local name: Gurry	 Botanical name: *Rhamnus prinoides* L.Herit (Rhamnaceae) Local name: Tsemdy	 Botanical name:*Zehneria scabra L.f* sonder (Cucurbitaceae) Local name: Aaregrassa
 Botanical name: *Taraxacum sp*. (Compositae) Local name: Qurteby	 Botanical name:*Sida tenuicarpa* Vollesen. (Malveceae) Local name: Mengjie	 Botanical name:*Juniperus procera* Hochst(Cupressaceae) Local name: Kawan Tseda

 Botanical name:*Olea europea*(Oleaceae) Local name:Wery	 Botanical name:*Melia azedarach* L.(Meliaceae) Local name:Memy Kana	 Botanical name:*Aremone mexicana* L.(Compostae) Local name:Dandury
 Botanical name: *Citrus limon* L(Rutaceae) Local name:Lumeny	 Botanical name:*Bersama abyssinica* Fresen (Melianthaceae) Local name:Denkefy	 Botanical name:*Ocimum lamiifolium* Hochst ex.benth (Labitatae) Local name:kushemy
 Botanical name: *Stephania abyssinica* Dill& Rich Walp (Menispermaceae) Local name:Yentseahra	 Botanical name:*Spilanths uliginosa* sw.(Astraceae) Local name:Gutcha/Bet bebra	 Botanical name:*Solanum indicum* L.(Solanaceae) Local name:Buzy Empapy

Appendix 8: Checklist items for ethnobotanical data collection

በአማርኛ የቀረበ የዳሰሳ ጥያቄዎች

በባህር ዳር ዩኒቨርሲቲ የባዮሎጅ የትምህርት ክፍል የዕፅዋት ሳይንስ

1.**የጥናቱ መግለጫ ፎርም**

እኔ በላይነህ ተሰማ የባህር ዳር ዩኒቨርስቲ የባዮሎጅ የትምህርት ክፍል በዕፅዋት ሳይንስ አማክኝነት በጓንጓ ወረዳ ለሚካሄደው ጥናት መረጃ ሰብሳቢ ሆኜ የመጣሁ ሲሆን

የጥናቱ ዓላማ፡_ በወረዳው ውስጥ የሚገኙ የባህል መዳህኒት አዋቂዎች ምን ምን እፅዋቶችን ለባህል መዳህኒት ቅመማ እንደሚጠቀሙ እንዴት እንደሚያዘጋጁ ምን አይነት የእፅዋት ክፍሎችን እንደሚጠቀሙ የተጠቀሙትን መድሀኒት ለእንስሳትና ለሰዎች በሽተኞች እንዴት እንደሚሰጡ

ህብረተሰቡ ስለባህላዊ መዳህኒት ያላቸው አመለካከት እንዴት እንደሆነ የህብረተሰቡን እውቀትና የእፅዋት አይነት መረጃ ለይቶ መያዝ ነው። ከዚህም በተጨማሪ በእፅዋት አጠቃቀም ያሉት ችግሮችና ችግሮችን ለመፍታት ህብረተሰቡ ምን ምን እየሰራ እንዳለ መረጃ መያዝ ይሆናል።

የጥናቱ መረጃ በወረዳው ካሉ ቀበሌዎች ውስጥ ከተመረጡ 8 ቀበሌዎች እና 20 ጎጦች ወይም ሰፈሮች ይሆናል። መረጃውን ለመመላት እድሜያቸው ከ20-85 ዓመት የሞላቸው ወንድ 45 ሴት 20 በድምሩ 65 ሰዎች የተመረጡ ሲሆን መረጃው የሚሞላው በአብዛኛው በቃለ መጠይቅ፣በጉብኝት እና በጋር ውይይት ይሆናል።

በቅድሚያ መረጃውን ስመሙላት ፍቃደኛ በመሆንዎ በጣም አድርጌ አመሰግንዎታለሁ።

የጥናቱን መረጃ ስመሙላት ፈቃደኛ ነዎት ----------ይቀጥሉ

ፈቃደኛ አይደለሁም--------ያቁሙ

ክፍል አንድ:የተጠያቂው/ዋ/ የግል መረጃ

ሙሉ ስም----------አድሚ----------ፃታ----------

የሚከተሉት ዘይማኖት ----------የጋብቻ ሁኔታ----------

የትምህርት ደረጃ----------የሚኖርበት ቀበሌ---------- ሰፈር----------

ክፍል ሁለት:- ስጥናቱ መረጃ ስመሰብሰብ የቀረቡ ጥያቄዎች

1.በሚኖሩበት አካባቢ የባህል መዳህኒት አዋቂዎች ያሙቃሉ?

ሀ/አዎ ለ/አይደለም ሐ/መልስ የለኝም

2.በተራቁጥር አንድ መልስዎ አዎ ከሆነ በአካባቢያችሁ የሚገኙ የባህል መዳህኒት አዋቂዎች በምን በምን ዘርፍ ሳይ የተሰማሩ ናቸው?

ሁሉንም ይጥቀሱ----------

3. እርስዎ የባህል መዳህኒት አዋቂ ነዎት? ሀ/ አዎ ለ/ አይደለም ሐ/ መ/የለም

4.በተራቁጥር ሶስት ሳይ መልሱ አዎ ከሆነ በምን አይነት የባህል መዳህኒት ቀመማ ዘርፍ የተሰማሩ ነዎት ይጥቀሱ----------

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5.ስሰውና ስእንስሳት ስባህል መዳህኒትነት ቀመማ አገልግሎት የሚውል የሰፅዋት አይነቶችን ያሙቃሉ? ሀ/ አዎ ለ/ አይደለም ሐ/ መልስ የለኝም

6. በተራቁጥር አምስት ሳይ መልሱ አዎ ከሆነ ስሰውና ስእንስሳት ቀመማ አገልግሎት የሚውሉ ሁሉንም የእፅዋቶች አይነቶች በሰንጠረዥ ይሙሉ።

ሀ/ ስሰው ስባህል መዳህኒትነት የሚውሉ እፅዋቶች

የእፅዋት ስም	የሚፈውሰው የበሽታ አይነት	የእፅዋቱ አይነት	የሚገኝበት አካባቢ/ስርጭት	የሚያገለግለው የእፅዋት ክፍል	አዘገጃጀት	መጠን	የመዳህኒቱ አሰጣጥ

ለ/ ስእንስሳት ስባህል መዳህኒት የሚውሉ የእፅዋት አይነቶች

የእፅዋት ስም	የሚፈውሰው የበሽታ አይነት	የእፅዋቱ አይነት	የሚገኝበት አካባቢ/ስርጭት	የሚያገለግለው የእፅዋት ክፍል	አዘገጃጀት	መጠን	የመዳህኒቱ አሰጣጥ

7.በአካባቢዎ የሚሰጠው የባህል መዳህኒት ለሴት፣ለወንድ፣ለነፍሰ ጡሮች፣ለህፃናትና ለአዋቂዎች መጠኑ ይለያያል ወይ? ሀ/ አዎ ለ/ አይደለም ሐ/ መልስ የለኝም

8. ከላይ በተራቁጥር 7ላይ መልስዎ አዎ ከሆነ ምክንያቱን ይዘርዝሩ----------

9.የባህል መዳህኒት እንዴት እንደሚዘጋጅና ምን ምን እፅዋት ለመዳህኒትነት እንደሚውሉ እውቀቱን እንዴት ወይም ከማን አገኙ ሀ/ ከቤተሰብ ለ/ ከጎረቤት ወይም ከጓደኛ

ሐ/ በራስ ጥረት መ/ ከሀይማኖት መፅሀፍት

10. የባህል መዳህኒት ቅመማ እውቀትዎ ለህብረተሰቡ ለማካፈል ፍቃደኛ ነዎት?

ሀ/ አዎ ለ/ አይደለም ሐ/ መልስ የለኝም

11.በተራ ቁጥር 10 መልስዎ አይደለም ከሆነ ምክንያቱን ይዘርዝሩ----------

12. ለባህላዊ መዳህኒትነት የሚያገለግሉ ዕፅዋቶችን ከየት ወይም እንዴት ያገኛሉ ይጥቀሱ------

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13. በአካባያችሁ ለባህል መዳህኒትነት የሚውሉ እፅዋቶችን በበቂ ሁኔታ ያገኛሉ ዎይ?

ሀ/ አዎ ለ/ አይደለም ሐ/ መልስ የለኝም

14. በተራቁጥር 13 ላይ መልስዎ አይደለም ከሆነ ለእፅዋት መጥፋት ምክንያት የሆኑትን በሰንጠረዡ ይሙሉ

ተ.ቁ	ለእፅዋቱ መጥፋት ምክንያቶች	በጣም ከፍተኛ(4)	ከፍተኛ(3)	መካከለኛ(2)	ዝቅተኛ(1)
1	የደኖች መጨፍጨፉ				
2	የእርሻ መሬት መስፋት				
3.	የከብቶች የግጦሽ መስፋት				
4	የመሬት ወረራ				

15. በአካባቢያችሁ የእፅዋትን መጥፋት ለመከላከል እየተሰሩ ያሉ ስራዎች አሉ? ካሉ ተግባራትን ይዘርዝሩ ----------

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16. በአካባቢያችሁ ህብረተሰቡ የባህል መዳህኒቶችን በስፋት ይጠቀማሉ/ይቀበላል?

ሀ/ አዎ ለ/ አይደለም ሐ/ መልስ የለኝም

17. በተራቁጥር 16 ላይ መልስዎ አዎ ከሆነ ምክንያቱን ይዘርዝሩ----------

መልስዎ አይደለም ከሆነ ምክንያቱን ይዘርዝሩ ----------

18. በአካባቢዎ ህብረተሰቡ በአብዛኛው የሚጠቀመው የመዳህኒት አይነት ሀ/ ባህላዊ ለ/ዘመናዊ

19. በተራቁጥር 18 ላይ መልስዎ ባህላዊ ከሆነ ምክንያቱን ይጥቀሱ----------

ዘመናዊ ከሆነ ምክንያቱን ይጥቀሱ----------

20.በአካባቢዎ ሰውንና እንስሳን የሚያጠቁ በሽታዎችን ያውቃሉ?

ሀ/ አዎ ለ/አይደለም ሐ/ መልስ የለኝም

21. በተራቁጥር 20 ላይ መልስዎ አዎ ከሆነ የበሽታውን አይነት በሰንጠረዡ ይሙሉ

ተ.ቁ	ሰዎችን የሚያጠቁ በሽታዎች	እንስሳትን የሚያጠቁ በሽታዎች	ምርመራ

22. ለባህል መዳህኒትነት የሚውሉ እፅዋቶችን ከሌላ እፅዋቶች በምን አይነት መልኩ እንደሚለዩ ያውቃሉ? ሀ/አዎ ለ/አይደለም ሐ/ መልስ የለኝም

23. በተራቁጥር 22 ላይ መልሱ አዎ ከሆነ የመለያ ዘዴዎችን ይጥቀሱ ----------

24.በአካባቢዎ የባህል መዳህኒት በምን አይነት መልኩ ለበሽተኞች እንደሚሰጣው ምላሹን በሰንጠረዥ ይሙሉ

በአፍ	በአፍንጫ	በአይን	በቆዳ	በጆሮ

25.መንግስት የባህል መዳህኒት እንዲስፋፋ ጥረት ያደርጋል ዎይ? ሀ/አዎ ለ/አይደለም ሐ/መ/የለኝም

26. ከላይ በተራ ቁጥር 25 ላይ መልስዎ አዎ ከሆነ መንግስት የባህል መዳህኒት እንዲስፋፋ የሚያደርገውን ጥረት ይዘርዝሩ----------

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መልስዎ አይደለም ከሆነ ያሉ ችግሮቹን ይዘርዝሩ----------

27.በአካባያችሁ ለመዳህኒትነት የሚውሉ እፅዋቶች ከመዳህኒትነት ውጭ በተጨማሪ ለምን ለምን አገልግሎት እንደሚውሉ ይዘርዝሩ----

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28. እርስዎ በባህል መዳህኒት ቀማሚነት ለመማር /ለማዘጋጀት ያነሳሳዎ ምክንያትዎን ይዘርዝሩ

29.በቀጣይነት ባህላዊ መዳህኒትን ለማስፋፋት ምን መደረግ እንዳለበት ይጥቀሱ?

መረጃው የተሞላበት ቀበሌ---------- ጎጥ----------ቀን----------ስዓት----------

<u>መረጃውን ለሞሙላት ስለተባበሩኝ አመሰግናለሁ !!</u>