Wolkite University **College of Natural and Computational Science**

Department of Biology

Ethnobotanical study of medicinal plants used for the treatment of human and livestock diseases in Kokir Gedebano Gutazer Welene Woreda, Gurage Zone, and Central Ethiopia

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Department of Biology

A Thesis Summited to Wolkite University, College of Natural and Computational Science, Department of Biology in partial fulfillment of the Requirement for the Degree of Masters of Science in Biology (Botanical Science)

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Wolkite, Ethiopia

APPROVAL SHEET

I hereby certify that all given comment by reviewer have considered, read and evaluated this Thesis titled **"The ethnobotanical study of medicinal plants used to treat livestock and human illnesses in Kokir Gedebano Gutazer Welene woreda, Gurage Zone, Central Ethiopia."** Prepared under our guidance by Tariku Melis Dode. we recommend that the Thesis shall be submitted as fulfilling the requirements for the award of a MSc. Degree in Biology (Botany).

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Examiner Approval Sheet

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As, member of Examiner of the Master of science Thesis open defense Examination , We have read and evaluated this prepared by Tariku Melis Dode, and Examined the candidate. We hereby certify that, the thesis is accepted for fulfilling the requirement for the award of the degree of Master of Science (MSc) in Biology (Botanical science).

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Final approval and acceptance of the thesis is contingent upon the submission of its final copy to the council of postgraduate program (CPGS) through the candidate's department or school graduate committee (DGS or SGC).

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ABBREVATION AND ACRONOMY

DA	Development Agent
EOC	Ethiopian Orthodox Church
FAO	Food Agriculture Organization
FGD	Focal Group Discussion
FL	Fidelity Level
KGGWW	Kokir Gedebano Gutazer Welene Woreda
ICF	Informant Consensus Factor
NI	Number of informant
NGO	Non Government Organization
NT	Number of Time
NUR	Number of Cite Use
SPSS	Statistical Package Social Science

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Abstract

In an ethnobotanical survey conducted designated rural and urban areas, randomly chosen sites were to find the most skilled practitioners who are familiar with treating human illnesses with traditional medicinal plants. This ethnobotanical study focuses on medicinal plants used for treating diseases in both humans and livestock in Kokir Gedebano Gutazer Welene Woreda, located in the Gurage Zone of Central Ethiopia. The study aimed to identify the diversity of medicinal plants and their applications in healthcare. Utilizing adescriptive research design, qualitative and quantitative methods were employed the study employed a combination of simple random sampling and purposive sampling techniques. Data collection methods included field visits, interviews, and participant observation. From the 34 kebeles in Kokir Gedebano Woreda, three kebeles were selected based on their agro-climatic zones: Ambelta Kebele lowland Tilamo Kebele midland, and Kentwat in highland. Research design descriptive research method was used because descriptive method used to describe research was qualitative and quantitative approaches *The majority of medicinal plants were found in cultivated areas, with fewer collected from natural environ in average the three kebele medicinal plants of cultivated land (77.43%) forest (22.53%). Regard to plant families, the highest species richness consisting of 6 (8.69%) family solanaceae, Fabaceae, Rutaceae decrease respectively and Lamiaceae 5 (5.79%) each families and next families Cucurbitaceae, Rosaceae and Asteraceae 4 (4.34%) each families.ments. Additionally market surveys, focus group discussions, and ethnobotanical data analysis. Preference ranking and informant consensus factors were assessed using the Informant to evaluate the effectiveness of the medicinal plants across various disease categories. The research area's medicinal plant variety was determined by collecting and identifying 71 species of medicinal plants from 64 genera and 40 families. The cultivated land was where the majority of the medicinal plants were gathered, 54 medicinal plant species gathered in the study area were used to cure human ailments, while 15 were used to treat cattle ailments, and 13 were used to treat both. Both official and informal education systems should incorporate tested and validated indigenous knowledge indigenous about the traditional uses of plants in general and therapeutic applications.*

Key words: *Ethnobotany, medicinal plant, ailments, ICF value.*

CHAPTER ONE
1. INTRODUCTION

1.1. Back ground of the study

The reliance of humans on plants to fulfill their basic needs since time of immemorial. Rich and complex botanical traditions are the outcome of the millennia-old reciprocal link between plants and the local population for a variety of life activities (Voeks, 2011). These trips served as a spring board for encountering significant plant use knowledge, which was followed by the transfer of beneficial plants and related use information to other nations (Mann, 2011). Human life on this planet would not be complete without a look at the role of plants, because plants have been an integral part of human society since the start of civilization. Plants have multiple uses to humans including food, dye, medicine, pesticides, to protect crops (Shah, 2005). The demand for medicinal plants is increasing in both developing and developed countries and the bulk of their material trade is still from wild harvested plants and safe, effective and inexpensive indigenous remedies are gaining popularity among the people especially in the developing countries, where modern health service is limited (Pareek and Trivedi, 2011). Eighty percent of the world's population relies on traditional medicine, which uses natural plant and animal products to meet their daily needs, according to the World Health Organization (WHO). Roughly (77000–78000 species, 17–18% of the world's flora are used medicinally in worldwide (Rao and Rajput, 2010); (Woldeab Woldemariam et al., 2018), other sources may give different figures, but many plants are still unidentified.

Approximately 3000 of these plant species are traded on global market places, although only 900 of them are cultivated, about 100 plant species have been utilized to make contemporary medications nonetheless. In an ethnobotanical survey conducted designated rural and urban areas, randomly chosen sites were to find the most skilled practitioners who are familiar with treating human illnesses with traditional medicinal plants (Schippmann *et al.,* 2018). Appropriate data was gathered from the informants through structured interviews, observation and questions about how the plants were administered throughout the study area, many medicinal plants from various families were employed to treat various ailments (Arihan O *et al.,* 2007). In the study area, traditional medicinal herbs are frequently utilized to cure illnesses. There is not enough information on the plants therapeutic properties to fully assess or suggest their use, Voeks (2011), asserts that the biological, economic and cultural environment we currently inhabit is a living legacy of past discoveries and exchanges of plant and related information. According to Okigbo and Mmeka (2006), traditional medicine

encompasses healing techniques that have been used for a long time before contemporary scientific medicine emerged and are still in use now with little proof of negative side effects. Development of traditional medicinal plants is indispensable in primary health care to save the foreign exchange, besides it is important to conserving our national heritage (Abiot Birhanu *et al.,* 2006). Only a small portion of the valuable medical plants, herbs and spices that are found in the wild are traded. According to Theuretzbacher (2012), the growing threat posed by drug-resistant microorganisms necessitates a global search for innovative remedies based on plant-based natural medicines chosen based on their established ethnomedicinal uses. In order to address the untapped useful knowledge of medicinal plants held by diverse ethno-linguistic groups, it is crucial to conduct as many ethnomedicinal studies as possible following this, targeted bioactivity testing studies should be conducted on the majority of plants that are agreed to have a curative role (Verpoorte *et al.,* 2005).

Although it has long been a part of African society, traditional medicine is not as well-organized as it is, say in China and India. Since Ethiopia is a country with a lot of vegetation and cattle, many Ethiopians used traditional medicine Friis (2009). Ethiopia mostly uses traditional medicine to manage veterinary diseases that affect its livestock population (FAO, 2011). In Ethiopia, almost 95% of traditional medical preparations have a plant origin, and 70% of human and 90% cattle populations rely on traditional medicines made from medicinal plants for their basic healthcare (Endashaw Bekele and Shigeta, 2008). Since Ethiopia has a variety of climatic and edaphic potentials, a number of alien and native species as well as plants that produce essential oils could flourish there and offer significant economic benefits (Endashaw Bekele, 2007). Ethiopia may harvest up to 56,000 tons of medicinal plants annually, which 42,260 tons (or 75%) are sold through various domestic marketing channels, according to Mander (2006). Ethiopia has conducted several studies on various facets of medicinal plants (Ermias Lulekal *et al.,* 2013); (Belayneh & Bussa 2014); (Kidane Giday *et al.,* 2014).

Nevertheless, comparable research on traditional medicinal plants in the Gurage zone has not yet been adequately described or comprehended. The majority of the therapeutic plants utilized by Ethiopian herbalists are gathered from the native vegetation. The usage of home-grown medicinal plants depends on weeds, crops and wild plants that thrive near human habitation. A recent study conducted in South East Ethiopia's Bale Mountains National Park found that in addition to being a hotspot for biodiversity, the region is also a hotspot for

medicinal plants, with 337 recognized medicinal species, 24 of which are endemic (Ermias Lulekal and Haile Yineger, 2005).

1.2. Statement of the problem.

Without examining the significance of plants, human life on our planet would not be complete, as they have always played a crucial role. Humans employ plants for a variety of purposes, such as food, medicine, dye, insecticides, and crop protection (Shah, 2005). Particularly in areas where access to contemporary public health services is restricted or non existent, communities rely on traditional medicine as their primary source of healthcare. People use their generation-long knowledge of plant medicine to cure human and animal illnesses in the study region. Because there is relatively little access to contemporary healthcare services for both humans and cattle in Kokir Gedebano Gutazer Welene Woreda, traditional medicine based on plants is a significant healthcare system. Small-scale medicinal plant cultivation in backyard gardens and natural forests is subject to human meddling, which causes deforestation. In Ethiopia the human pressure on natural resources is driving deforestation and forest degradation, resulting in potential local loss of plants of high traditional and potential values and loss of associated indigenous knowledge. Lack of interest in traditional medicines was observed among the youngest generation of Kokir Gedebano Gutazer Welene woreda due to factors related to modernization.

In addition, there is information that evaluates the study area's indigenous knowledge of the usage and management of medicinal plants as well as its resource potential quantitatively. Both the medicinal plants and the related indigenous knowledge of the people may permanently disappear if the current development activities in the areas where the local communities live cause cultural changes. As a result, Kokir Gedebano Gutazer Welene woreda has to prioritize urgent conservation, implement strategies to preserve the related indigenous medical knowledge, and develop and utilize its medicinal plant resources and the local community's indigenous knowledge must documented.

1.3. Research question

The following research questions was answered after the work of the research.

- What are the medicinal plants in kokir Gedebano Gutazer Welene woreda (KGGWW), and what ailments are they used to trat?
- Which medicinal plant species are utilized by indigenous people living in welene to treat various human and livestock ailments?

- How do local communities in (KGGWW) preapare, adiminster and determine the parts and dosage of these medicinal plants?
- What are the main threats to medicinal plants and the associated indigenous knowledge in (KGGWW)?
- How is traditional botanical knowledge distributed and transferred among different community members and social groups in (KGGWW)?

1.4. Hypotheses

The following theories were tried to be tested by the study.

- The most commonly used medicinal plants are expected from your study in (KGGWW).
- The community members prepare and administer the medicinal plants are expected from your study results.
- The Local ethnobotanical knowledge and medicinal plants are threats are expected from your study results.

1.5. Objective of the study

1.5.1. General objective

The overall goal of this research was:

To investigate and document the medicinal plants used for the treatment of human and livestock ailments and the associated traditional knowledge of the local communities in KGGWW Gurage Zone, Central, Ethiopia.

1.5.2. Specific objectives

- To analyze traditional knowledge gaps and threats to medicinal plants in Welwne woreda.
- To provide data on the parts used, growth habits, and dosages of medicinal plants utilized by local communities to treat human and livestock ailments.
- To describe the most commonly used traditional medicinal plants by Welene communities for threating human and livestock ailments.
- To document traditional medicinal plants used by the Welene people, along with their associated ethnobotanical knowledge.

1.6. Significance of the study

Recognizing and recording the significant medical plants, their value, the methods by which indigenous knowledge is transmitted, and the conservation techniques applied to the management of medicinal plants in the KGGWW. To promote medicinal plant to treat human and livestock ailments in the KGGWW and to intiate the protection of the ethnobotanical knowledge by the whole community, results may help traditional medicine become a part of the mainstream healthcare system.

1.7. Scope of the Study

Ethnobotanical investigation of therapeutic plants used to heal illnesses in humans and livestock research in the Gurage Zone Kokir Gedebano Gutazer Welene woreda, Central Ethiopia, specially to address medicinal plants to treat human and livestock ailments in welwne woreda.

CHAPTER TWO

2. REVIEW OF THE LITERATURE

2.1. Diversity Ethnobotanical plants

Studying the significance of plants would be crucial to comprehending human life on earth, since they have been an integral part of human culture since the beginning of civilization According to Shah (2005), people can use plants for a variety of purposes, such as food, medicine, dye, pesticides, and crop protection. From ancient times, mankind have relied on plants to meet their basic requirements. According to Voeks (2011), the rich and complex botanical traditions are the outcome of the millennia-old reciprocal link between plants and the local population for a variety of living activities. According to Mann (2011), these kinds of trips served as a spring board for encountering significant plant use knowledge, which was then followed by the transfer of beneficial plants and related use knowledge to other nations. The biological, economic, and cultural environment currently inhabit is a living legacy of past plant discoveries and related knowledge exchanges, claims Voeks (2011). Medical usage of plants dates back to the dawn of humanity. The study of traditional medicine heavily relies on ethnobotany (Pei, 2005). Many under developed nations lack adequate research, testing, and documentation on medicinal plants. According to Ensermu Kelbessa and Sebsebe Demissew (2014), Ethiopia's diverse rain, including steep and Rocky Mountains, flat-topped plateaus, deep gorges, incised river valleys, and rolling plains, makes it a significant regional for biological variety.

Traditional plant-based medicine is a major contributor to the development of contemporary scientific research and a foundation for the creation of new drug discovery techniques (Wright, 2005), because of "modernization"-related reasons, the younger generation of Ankober showed little interest in traditional therapies. Similar results were observed for additional Ethiopian cultural groups (Mirutse Giday *et al.,* 2009; Ermias Lulekal *et al.,* 2008); (Kebu Balemie et al., 2004). In terms of plant diversity, Ethiopia ranks fifth among major tropical African nations, behind South Africa, Tanzania, Cameroon, and Congo (Jadán et al., 2021).

2.2. Importance of ethnobotany

According to Morvin Yabesha *et al.,* (2006), ethnobotany is a unique field of natural science that integrates a number of different fields, including anthropology, archaeology, botany, ecology, systematics, religious studies, forestry, agroforestry, economics and medicine, and culture. In order for future generations to enjoy the priceless plants that are a true gift from

nature to humanity, it is imperative that the overharvested medicinal and wild food plants be preserved (Qureshi *et al.,* 2009). It is a joint endeavor by local residents and a variety of experts and scientists.

Nowadays, ethnobotanical knowledge is rapidly vanishing. Westernization, breakdown of traditional cultures and even the extinction of complete tribal groups are responsible. One chief goal of a study is to ensure that local natural history becomes a living tradition in communiti because of westernization, traditional civilizations are collapsing, and even entire tribal groups are going extinct. In communities local natural history has been passed down orally for many years, one of the main objectives of such a study is to guarantee that it becomes a living tradition. (Ketema Tolossa et al., 2013); (Wabe *et al.,* 2011); Girmay Zenebe (2012); Mirutse Giday et al. (2010); Nasir Tajure where it has been transmitted orally for many years. Mirutse Giday *et al.,* 2010; In contrast to the 85 different ethnolinguistic communities in the nation, the majority are primarily indigenous, these studies (Nasir Tajure; Wabe *et al.,* 2011; Girmay Zenebe, 2012; Ketema Tolossa *et al.,* 2013) focus on the traditional uses of medicinal plants and related knowledge in certain cultural groups, Since Ankober District, North Shewa Zone, Ethiopia, has never been investigated for its ethnomedicinal wealth, the current study attempts to close this knowledge gap by recording the abundance of indigenous knowledge and comprehending the corresponding drivers of this knowledge related to the utilization, management, and conservation of medicinal plants used to treat human and livestock ailments.

All societies have historically relied on plants for their basic requirements, such as food, housing, medicine, etc., and have learned various plant applications from their indigenous peoples (Pharmacotherapy Group, 2009). All societies have been studying plants and their applications for tens of thousands, if not hundreds of thousands, of years, it is one of the most important human concerns. Athough it was not called 'ethnobotany', according to Pei (2005), ethnobotany is the scientific study of a people's agricultural practices and plant lore. For instance, ethnobotany is essential to the study of traditional medicine. Indigenous peoples continue to be the best source for obtaining information about medicinal plants for practical use, especially in contemporary medicine, due to their vast understanding of these plants (Pharmacotherapy Group, 2009). Therefore, ethnobotany is a rapidly growing science that attracts people with widely varying academic background and interests. The purpose of this study is to evaluate the availability and use of traditional medicinal plants in Haro Limu

Woreda, East Wollega Zone, despite the fact that traditional knowledge of medicinal plants is extremely important for treating various diseases. No research has been done in this area as of yet (Hunde D *et al.,* 2004).

Every civilization has historically relied on plants for its basic requirements, such as food, shelter, medicine, etc., and has taught itself many uses for plants (Pharmacothera).py Group, 2009). Despite the fact that the study showed the present market potential for medical plants in Ankober, other cultural groups in the nation were found to engage in a comparatively larger domestic trade in certain Ethiopian medicinal plants (Mander *et al.,* 2006). The majority of medicinal plants are primarily used for other purposes, such as food or spice, farm equipment, and other purposes, rather than being traded extensively for their therapeutic properties (Damme *et al.,* 2013). The country is one of the top ten livestock-rich nations in the world, and Ethiopian traditional medicine is important in treating veterinary diseases that impact its livestock population (FAO, 2011). According to Berhanu Admassu (2011), until the introduction of modern veterinary care, which did not begin until 1908, country ethnoveterinary traditions were the sole means of treating cattle diseases.

2.3. Traditional medicinal plants

Traditional medicine is a complex medical system that is based on a community's culture, religion, beliefs, and natural environment. It is the sum total of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health, as well as in the prevention, diagnosis, enhancement or management of mental and physical disorders. Ethiopia is home to a wide variety of plants and animals since it is a tropical nation with a wide range of ecological and climatic circumstances. The dry land type, which features arid and semi-arid climatic conditions, makes up around 620,000 km^2 of the nation's various agro-ecological zones (Mulgeta Limenih and Demel Teketay, 2004). Undocumented indigenous knowledge about the usage of numerous medicinal plants necessitated a costly endeavor to document and apply this information. Most traditional medicines in underdeveloped nations have not undergone the same quality, safety, and efficacy evaluations as mainstream medications in industrialized nations. It took a lot of money to document and use the traditional knowledge about the usage of numerous medicinal plants because it was not previously documented. Plant biodiversity provides much of the food, medicines, and ecosystem services that humans depend on, including air purification, water body origin and replenishment, nitrogen fixation,

nutrient cycling, and many other products (Khanal, 2006). Plants provide drinking water, which is a component of food, according to Tigist Wondimu *et al.,* (2006). Compared to mainstream medications in industrialized nations, the quality, safety, and effectiveness of medications used in poor nations have not been assessed to the same standards.

2.4. **Contribution of ethnobotany in Ethiopia**

Ethnomedicine, which includes indigenous knowledge, is very important for biodiversity conservation in addition to researching the true medical benefits of plants. Research carried out in Ethiopia has revealed that certain cultural beliefs and customs are extremely important in supporting the preservation of biodiversity in general and medicinal plants in particular. As stated by Etana Tolosa (2007), for instance, enumerated the several cultural customs and local beliefs that are employed in Gimbi Wereda (Western Wellega) to preserve herbs. (Fisseha Mesfin *et al.,* 2009) also reported on the application of spiritual and cultural beliefs in Wonago Wereda (SNNPR) for medicinal plant conservation. According to Alemayehu Wassie (2008), the Ethiopian Orthodox Church (EOC) plays a significant role in biodiversity protection in northern Ethiopia. To identify a community's cultural identities and comprehend the connections to their history, land and plant use practices, and traditional environmental philosophy, it is essential to do scientific research on millennia-old community knowledge about plant usage (Cetinkaya, 2009). Furthermore, it aids in the development of people-centered natural resource management techniques, which are critical for the preservation of biodiversity (Lynam *et al.,* 2007).

Additionally, the new Global Strategy for Plant Conservation (GSPC) (2011–2020), aims to establish a preliminary assessment of all known plant species to guide conservation action, and documentation on historically valuable plant species helps achieve this goal (Sharrock, 2011). As stated by *Cos et al.,* (2006), the discovery of new lead chemicals that are employed in the creation of contemporary medications can be based on focused research, especially on people's traditional knowledge of medicinal plants. The worldwide spread of drug-resistant bacteria prompted researchers to turn to indigenous peoples' millennia-old ethnomedical expertise for answers.

2.5. Threats to Ethiopian Medicinal plants

According to Deriba Geleti (2006), the Ethiopian highlands, which are home to the majority of the country's massive mountain, are experiencing a significant loss of forest resources.

The provision of valued ecosystem products and services from forests is being significantly reduced as a result of deforestation and forest degradation, especially in developing nations. (Lawson *et al.,* 2019), the past 50 to 100 years have seen a sharp rise in the rate of deforestation in emerging nations, particularly Africa (Othow *et al.,* 2017). Deforestation also contributes to environmental degradation, which includes loss of biodiversity, depletion of water supplies, and deterioration of land, is the quick destruction of old, non-replicable native tree forests that serve a variety of ecological, cultural, medical, and economic functions. Most significantly, habitat disturbance and land degradation brought on by the loss of forest area occasionally result in decreased soil productivity and water availability (Danano *et al.,* 2018).

Despite being a nation with a wide range of cultures and therapeutic plant species, According to (Meza Giday *et al.,* 2015), the worrisome population expansion coupled with rising demand and consumption is diverting medicinal plant resources from their native environment. Human migration, agricultural development, forest fires, and drought are among the threats facing Ethiopia's medicinal plants (Kidane *et al.,* 2018); (Tefera and Kim 2019). Research and studies on ethnobotanical knowledge, including medicinal plant species, conservation, management, and cultivation are therefore desperately needed in this nation (Asnake et al. 2016); (Kassa *et al.,* 2020). According to Thomas (2008) evidenced by 'human progress environmental degradation, climate change, and globalization ethnobotany is a science in struggle with time research must work quickly to identify issues and find answers in order to preserve the rapid depleting resources of the field.

2.6. Conservation and management of medicinal plants

The depletion of resources in Ethiopia's highlands and lowlands has made the sustainable use of medicinal plants a pressing concern. The goal of ecosystem conservation was to preserve medicinal plants in their natural habitats so that sustainable harvesting techniques could be used to gather them. An example from South Africa might be crucial to create novel techniques for harvesting individual plants (Geldenhuys and Mitchell, 2006). Various nations practice the conservation of medicinal plants either ex situ (such as in fields, gene banks, and botanic gardens) or in situ (such as in parks and nature reserves that are their natural habitat). For example, Sri Lanka and other nations have enacted robust in situ and ex situ conservation policies. According to Silva and Wettasinghe (2004), in order to preserve certain valuable medicinal plants. Furthermore, compared to Ethiopia's multiethnic cultural variety and the extent of its unique flora, there aren't many studies on the country's traditional medicinal herbs (Fisseha Mesfin *et al.,* 2009). In situ conservation, or the

scientific and modern management of natural forests for the preservation and sustainable use of medicinal plants in their native habitat, is another area that requires focus. The country's reported anthropogenic pressures have caused thousands of hectares of woodland that contain beneficial WEPs to disappear. This defeat it was also noted that the loss of indigenous knowledge related to these plants and the limitations of the benefits derived from them are caused by the scientific and modern management of natural forests for the conservation and sustainable use of medicinal plants in their natural habitat (in situ conservation). Changes in the people's eating habits have also caused issues for the continuity of information regarding the usage of WEPs (Tilahun Teklehaymanot and (Mirutse Giday, 2010). Trading plants' reliance could be a constraint. Many thousands of hectares of forest that contain valuable WEPs have been lost as a result of the country's recognized human stressors. This decline conservation measures;- innovative solutions such as eco-agriculture, preserving traditional farming methods, and tying conservation to community use must be properly planned and executed both urban and rural home gardens can use degraded regions to establish medicinal plant plantations. Ethiopia has a wide variety of medicinal plants that may grown in various agro-ecological conditions and have good qualities for controlling erosion and restoring soil.

CHAPTER THREE

3. MATERIALS AND METHOD

3.1. Description of the study area

This study was carried out in the Gurage zone, which is situated in the Central Region of Ethiopia, in Kokir Gedebano Gutatazer Welene woredas (Figure 1). Gurage zone, which includes one administrative town, Wolkite, and ten (10) woredas. Kokir Gedebano Gutatazer Welene woredas, one of the Woreda in Gurage Zone. 34 kebeles belong to Welene woreda, and the adiminstrative town of the woreda is Mehal Amba which is 62 km far away from Wolkite (the administrative town of Gurage Zone) and 160 km from Addis Ababa (the capital city of Ethiopia. Kokir Gedebano Gutatazer Welene woredas bordered in the south by Muhir and Aklil woreda, in the north Oromia Region in the west Qebena special woreda and in the east by meskane woreda.

The Welene people speak Welengna, a Semitic language that is not written according to ethnology and is closely linked to the Silte, Gurage, Zay, and Harari peoples. The woreda had 95,266 residents, 93,408 of them belonged to the Welene ethnic group. Men made up 44,390 (46.59%) of them, women made up 49,018 (51.5%), and other ethnic groups made up the remainder 1858 (2.74%). About 953 (1%) Ethiopian Orthodox Christians and 94,313 (99%) Welene Muslims make up the population. As per the Central Statistical Agency (2007), Enset is a significant crop grown by the Welene people. The Mehal Amba, Achiber, Combel, Tifemo, Jimma Welene, and Enge are the local marketplaces to woredas. The Gurage zone, Kokir Gedebano Gutazer Welene, experiences a Bi-modal rainfall pattern, with short rainy seasons (March and April) and a long wet season (June to September), referred to as the Kirmit season locally. The woreda average monthly temperature and precipitation were at a maximum of 22.50°C and a minimum of 12.50°C, and at a maximum of 450mm and a minimum of 20mm, respectively.

3.1. Location of study area

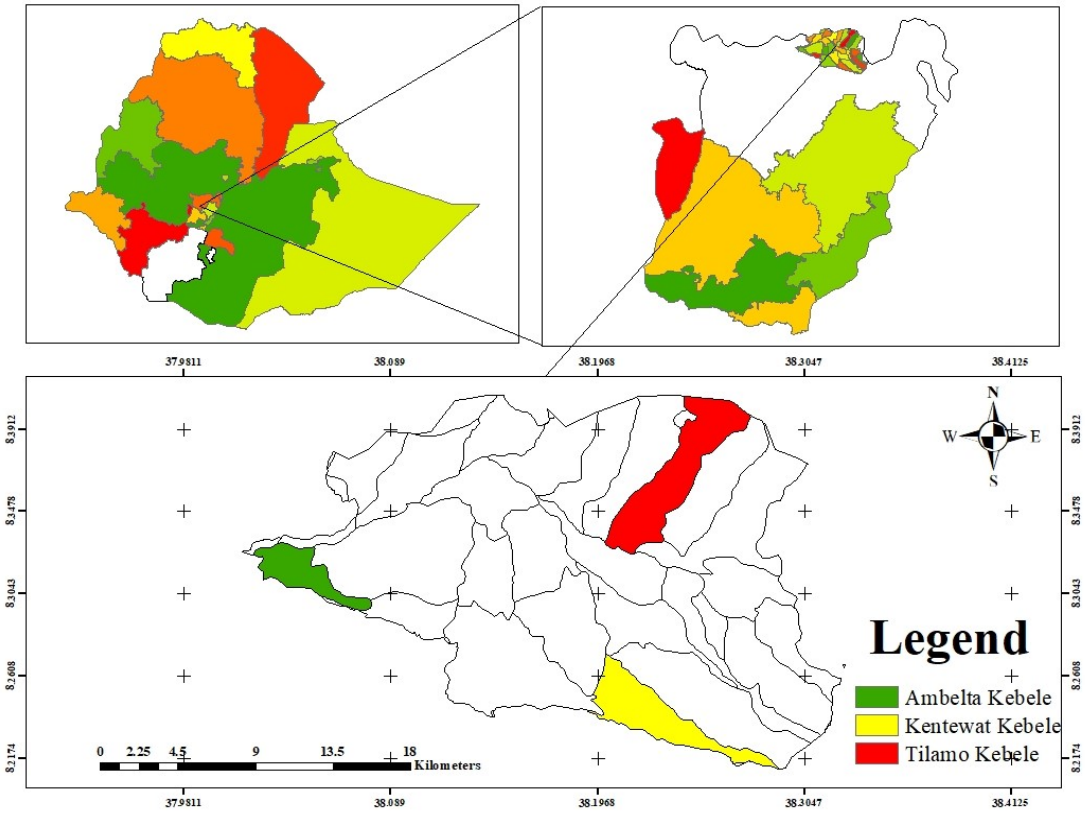

Figure 1: Map of study area

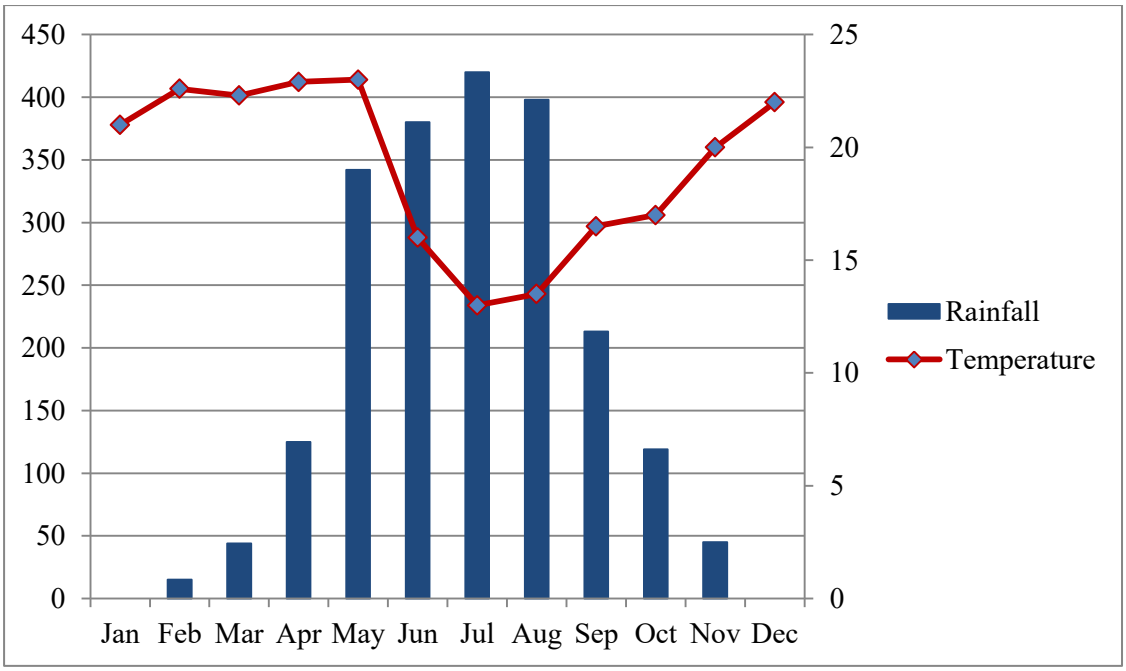

Figure 2: Average monthly Temperature and Rain fall of study area (source Arc GIS).

3.2. Ethical consideration

The administrative offices of woreda and kebele first granted permission to conduct the study by displaying official letters from the academic department and outlining the study's objectives. Additionally, in each chosen area, a conversation was held with the informants, who served as a gateway for the growth of constructive relationships with in the local population. This study's data was not shared with any other parties. Furthermore the participants informed agreement is acquired to guarantee their willingness.

3.3. Research design

To conduct this study was qualitative and quantitative approaches describe statistically questionnaire, interviews, taxonomic collecting and recording participant. The analyzed data was be used to summarize and make the collected data easy to understand particular problem.

3.4. Method of sampling techniques

It was conducted with a simple random approach and a purposive sampling procedure used.

3.4.1. Sample size determination

The sample size was determined following Cochran's sample size formula as indicated by Kotrlik and Higgins (2001) as follows:

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

where e, is the maximum variability or margin of error 5% (0.05), 1 is the likelihood that an event will occur, n is the sample size, and N is the total number of households in the Kebeles. The proportion of the three kebele's households was used to determine the sample size for each kebele. Therefore, the sample size of one of the kebeles was be same calculation used for the other study kebeles. A total of 311, household informants were selected from the three kebeles, by assign random numbers to the households (as lottery methods), from the total of 1,400 households (Ambelta kebele 415, Tilamo kebele 475, and 510 from Kentwat kebele). The total sample size was determined in this study, 311, household informants (from Ambelta kebele 95, Tilamo kebele, 105 and 111, from Kentwat kebele), random and purposive sampling techniques was employed to select general and key informants, respectively. Elderly people, religious leaders and members who had earlier been treated by the healers helped to identify the key informants.

3.4.2. Selection of kebele and informants

From a total of 1,400 houses (Ambelta kebele 415, Tilamo kebele 475, and 510 from Kentwat kebele), 311 household informants were chosen from the three kebeles by assigning random numbers to the households (as lottery methods). This study's overall sample size was calculated to be 311 households. Three (3) sampled kebeles were chosen from Kokir Gedebano Gutazer Welene Woreda's thirty-four kebeles in order to gather data on the community's variety of medicinal plants and traditional knowledge. Based on their respective agroclimatic zones, the three kebeles were chosen: Ambelta kebele from the lowlands, Kentwat kebele comes from the highlands of the woreda, while Tilamo kebele comes from the midlands. Key informants were specially selected for the medicinal plant survey with the help of kebele administrators, while general informants were selected at randomly from every home in the selected kebeles. Sampled informants were chosen during a random stroll around homes in the selected households. The key informants were specifically chosen based on peer recommendations from community members, elderly people, knowledgeable households, herbalists, and development agents (DAs). This was accomplished by tossing a coin and using the informant whenever the head of the coin is up if the informant volunteered to participate (as lottery methods).

3.5. Ethnobotanical Data collection

In ethnobotanical research, the primary focus is on data gathered from the local population in a study region or how people engage with the environment. Interviews and participant observation were used to gather ethnobotanical data inside Kokir Gedebano Gutazr Welene woreda's three kebeles, between 23 July 2023 and 20 January 2024. The questions was prepared with the following main components: personal data of the respondents including name, address, age, and gender), marketability of species, level of management abundance, parts used, condition of plant parts used (fresh or dried), methods of remedy preparation, remedy storage, dosage prescriptions, remedy administration routes, beliefs, and the names of plants used to treat human and animal ailments were all questions that informants were asked to respond to questions on plant usage and collecting, historic conservation methods, current threats, and other applications of medicinal plant species.

3.5.1 Market survey

Since markets are places where edible, decorative, medicinal, and other helpful resources are sold, they are excellent repositories of ethnobotanical knowledge. Locally beneficial plants

can be tracked by ethnobotanists from their growing locations to the central, regional, and local marketplaces where intermediary dealers and gatherers conduct business. ethnobotanists need to be able to recognize native plants. One can use the information from a market survey to describe the economic value of useful plants, and recommend those which need prior conservation and mass production efforts.

Figure 3: Vendor selling medicinal plants and group discussion Welene woreda (Photo taken byTariku melis, 2024).

3.5.2. Participant observation

Medicinal plants identified in the research area are collected and recorded, together field assistant and a translator, participant observation.

3.5.3. Focus group discussions

Information was cross-checked and verified using Focus Group Discussions (FGDs). To triangulate the ethnobotanical data gathered using different ethnobotanical techniques, group discussion data is crucial (Martin, 1995), there were talks about the dangers to medicinal plants, how to conserve them, and medicinal herbs and knowledge transferability among the community. To cross-check and verify the information, focus group discussions, or FGDs, were held. Comparing pairs of items should be placed in every possible configuration.

3.6. Ethnobotanical Data Analysis

The collected ethnobotanical data was entered into Microsoft excel spreadsheet 2016 and summarized using descriptive statistical methods. Statistical Package for Social Sciences (SPSS) Version 26.0 was used to analyze ethnobotanical data. Using preference ranking, informant consensus variables, and fidelity level as demonstrated by Martin (1995), ethnobotanical ranking methods were used to examine the plant use value of each species and the most favored medicinal plants to treat the frequent diseases occurring in the study area. The efficiency of a certain technique for accurately interpreting the data and identifying potential interrelationships among the variables under study determines which technique is chosen to be applied to the data (Hoft *et al.,* 1999).

3.6.1. Preference ranking

According to Martin (1995), this approach entails asking informants to list five to seven objects that are typically found in a category that is the subject of the study or a topic that is being discussed in the community. The provided items are ranked by each informant based on their individual preferences or perceived significance within the community. The set's most significant member is assigned the greatest number, with the number falling as the set's members become less significant. The lowest number, "1," is assigned to the least significant or preferred object. An aggregate rating of the objects by the sample group of respondents is obtained by adding together the provided numbers for each respondent. Lastly, the people who score the highest are regarded as the most significant or favored members of the community.

3.6.3. Informant Consensus Factor (ICF)

ICF is calculated in ethnomedical research to find potentially useful medicinal plant species in the relevant disease categories and to identify the most significant human and animal

ailment categories in a study area. The researcher first groups traditional remedies and corresponding diseases in to different categories, so as to compute ICF. ICF can be computed by using: **ICF= n_{ur}-n_t/n_{ur-1}**, where, **n_{ur}** the number of use citations in each ailment category, **n_t =** the number of times a species is used, In each category, Nur-1 is equal to the number of use citations less one (Heinrich, 1998). throughout all three kebele. The ICF value was determined by dividing Nur-Nt by Nur-1, which gave the Nur mean number of citations for each condition. The Nt mean number of species used by each condition ranged from 0 to 1, with 1 denoting the maximum level of informant agreements in terms of citations.

3.6. 4. Index of Fidelity Level (FL)

One of the commonly used methods in ethnomedicinal research. Helps to compare and determine relative healing potential of medicinal plants. Index of Fidelity level (FL) is computed by: **FL=Ip/IuX100,** where **Ip** is the number of informants who independently cite the importance of a species for treating a particular disease and **Iu** the total number of informants who reporte the plant for any given disease (Alexiades, 1996).

CHAPTER FOUR

4. RESULTS

4.1. Ethnomedicinal plant species used by local people

Informant selected a total of 311 informants (202 males and 109 females) Informants' ages ranged 21-80 years (142 were between 20-40, whereas 149 were 41 -60 years old and 20 were above 60 years old), were selected, randomly during random walk made to in the selected households. This was done by tossing a coin and using him/her as informant whenever head of the coin is up if he/she volunteered to participate (as lottery methods). In addition to the household interviews, information was collected from 18 key informants (12 males and 6 females) who participated as key respondents following Davis and Wagner (2003.

Table 1:List of kebeles with number of informant in study area

Kebele	***Total house hold***	**Total number of informants**			***Key informant***			**complete informant**		
		M	F	T	M	F	T	M	F	T
Kentwat	510	69	36	105	4	2	6	73	38	111
Tilamo	475	62	27	89	3	3	6	65	30	95
Ambelta	415	59	40	99	5	1	6	64	41	105
Total	1400	190	103	293	12	6	18	202	109	311

4.1.1. Diversity of medicinal plants

A total of 71 Species of medicinal plants from 40 families and 64 genera were identified in the study region. The numbers of the medicinal plants were collect species greater number about 53 (73.91%) species in cultivated area and from the forest 18 (26.08) species. In Tilamo kebele out of 51 medicinal plant species, 38 (74.5%), in cultivated land and 13 (25.49%) in forest. Regard to plant families, the highest species richness consisting of 6 (8.69%) family *solanaceae, Fabaceae, Rutaceae* decrease respectively and *Lamiaceae* 5 (5.79%) each families and next families *Cucurbitaceae, Rosaceae* and *Asteraceae* 4 (4.34%) each families.

4.1.2. Medicinal plant species used to treat human ailments

Three kebele were found to have 57 medicinal plant species, representing 51 genera and 32 families out of 21 (36.84%) of ethnomedically significant plant species used to treat human

illnesses. Out of 17 (29.82%) families, 19 genera and 14 families were reported from Tilamo, there were 16 genera and 13 families from Ambelta kebele, and 15 genera and 12 families (28.07%) from Kentwat kebele. Among the human medicinal plants found in the study area, 21 (36.84%), 17 (29.82%), and 16 (28.07%) were gathered from study kebele households.

4.1.3. Habit

As the result showed that the growth forms of the collected medicinal plants reveals that (37 species 52.11%) of the reported medicinal plants were herbs, followed by trees (20 species 28.16%), shrubs (12 species 16.90%) and climbers (2 species 2.8%).

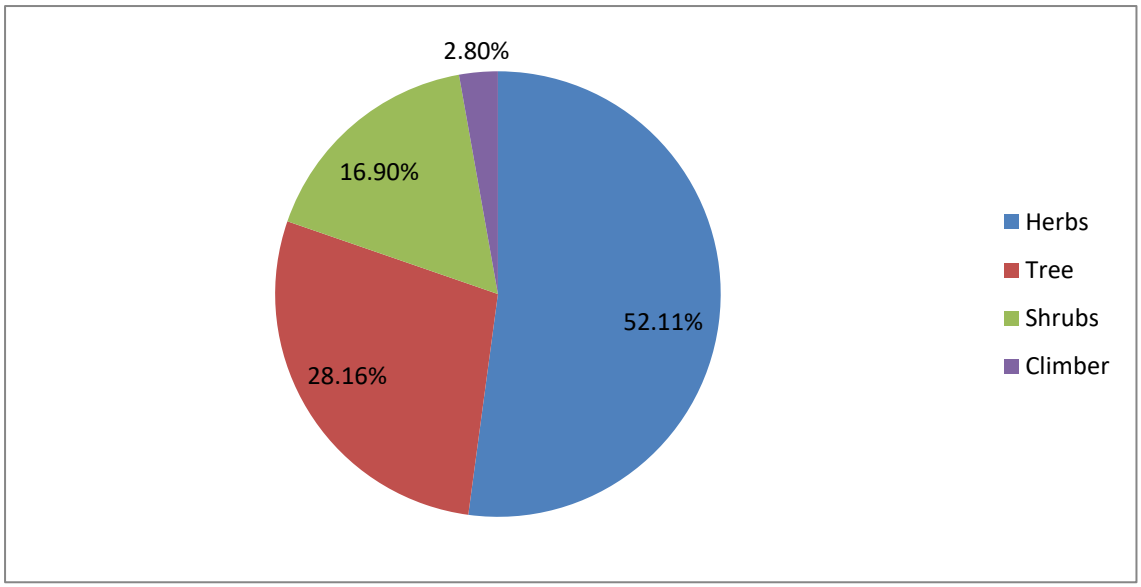

Figure 4:Habit of medicinal plant in study area

4.1.4. Major human ailments

There are 54 different types of human ailments these are; common cold, anthrax, wounds, bone break, knee and leg pain, anemia, leprosy, malaria, asthma, fever, apetite problem, kidney infection, retained placenta, liver complaint, tooth ache, evil eye, general malaise, abdominal pain, stomach ache, intestinal parasite, common cold, coughing, tonsilities, eye infection, dandruff, external parasite, headache, hypertation, nesir, skin rash, snake bite, diarrhea, dingetegna, tuber closis, constipation, itching, pus, foot bad smell, gastritis, sight problem, kintarot, ulcer, atlet foot, gonorrhea, amoebiasis, wuchir, cold cough, antimicrobial, epilepsy, depression, dorer, boost immunity and bad breath.

Table 2: List of medicinal plants collected from the study area used for the treatment of human ailments, family name, habit, part used, preparation and dosage.

Human illness	**The medicinal plant**	**Name of the family**	***L. name***	***Habit***	***Part used***	***Mode preparation***	***Dosage***
Evil eye	*Eucalyptus globulus,*	*Myrtaceae*	Nech-barzaf	Tree	Leaves	Boil and bath	Difference individal
	Tavernier a abyssinica,	*Fabaceae*	Dingetegna	Shrubs	Root	Crushed	Limited by minute
	Justicia schemperiana	*Acanthaceae*	Sensel	Shrubs	Leaves	Coocked	Ones in day
General malaise	*Allium sativum*	*Amaryllidaceae*	Tume	Herbs	Stem	Grind	Single spoon
	Echinops keberich o	*Asteraceae*	Kebericho	Herbs	Stem	Burn	Not limited
Abdominal pain	*Nigella sativa*	*Ranunculaceae*	Menzuta	Herbs	Seed	Infusion	Spoon or cup
	Ajuga integrifolia	*Lamiaceae*	Akembye	Herbs	Leaves	Extract juice	Cup
Stomach ache	*Aloe trichosantha*	*Asphodelaceae*	Yefuggedel	Herbs	Whole part	Extract juice	Differencce individual
	Sacharum	*Poaceae*	Shonkore	Shrubs	Stem	Chewed	Single stem

	Officinarum						
Intestinal parasite	*Hagenia abyssinica*	*Rosaceae*	Seto	Tree	Leaves	Extract juice	By cup
Common cold	*Zingiber officinale*	*Zingiberaceae*	Zingebel	Herbs	Corm	Boiled	Spoon
	Allium sativum	*Amaryllidace*	Tume	Herbs	Stem	Grind	Spoon
	Ruta graveolens	*Rutaceae*	Chirakuye	Herbs	Leaves	Decoction	Spoon
Cough or cold cough	*Piper nigrum*	*Piperaceae*	Kundo berbere	Herbs	Corm	Chewed	Difference Individal
	Solanum tuberosum	*Solanaceae*	Zereche	Herbs	Seed	Powder	Spoon
	Catha edulis	*Celastraceae*	Khat	Tree	Leaves	Chewed	Few leaves
Tonsilities	*Rhamnus prinoides*	*Rhamnaceae*	Geshe	Shrubs	Leaves	Chewed	Differene Individual
	Capsicum annuum	*Solanaceae*	Kare	Herbs	Seed	Crush	Difference individal
Tooth ache	*Allium sativum*	*Amaryllidaceae*	Tume	Herbs	Stem	Grind	By spoon
	Impatiens tinctoria	*Balsaminaceae*	Enshoshle	Shrubs	Root	Boiled	Not limited
Common wart	*Rumex nervosus*	*Polygonaceae*	Angago	Shrubs	Leaves	Crushed	Few leaves

	Croton macrostachyus	*Euphorbiaceae*	Daya	Tree	Leaves	Extract juice	Differene individual
Dandruff	*Persea Americana*	*Lauraceae*	Abocato	Tree	Fruit	Decoction	Single
External parasite	*Ajuga integrifolia*	*Lamiaceae*	Akembye	Herbs	Leaves	Extract juice	By spoon
Headache	*Lippia adoensis*	*Verbanaceae*	Tosgn	Herbs	Leaves	Infusion	Spoon
	Occimum lamiifolium	*Lamiaceae*	Damakessie	Shrubs	Leaves	Extract juice	Spoon
Hypertation	*Moringa oleifera*	*Moringnacea*	Shiferaw	Tree	Leaves	Crushed	Spoon
	Allium cepa	*Amaryllidaceae*	Shinkurt	Herbs	Stem	Grind	Spoon
Nisr	*Rosa rubiginosa*	*Rosaceae*	Tsegerede	Shrubs	Flower	Drops	Few leaves
	Cucumis ficifolius	*Cucurbitaceae*	Kinbibe	Shrubs	Fruit	Extract juice	Difference individal
Bone break	*Enset ventricosum*	*Musaceae*	Wese	Herbs	Corm stem	Coocked	Differene individual
Knee and leg pain	*Ajuga integrifolia*	*Lamiaceae*	Akembye	Herbs	Leaves	Extract juice	By spoon

Anthrax	*Prunus persica*	*Rosaceae*	Kuk	Tree	Leaves	Infusion	By cup
	Withania somnifera	*Solanaceae*	Gezawe	Herbs	Leaves	Boil	By cup
Wounds	*Psidium guajava*	*Myrtaceae*	Zeytune	Tree	Leaves	Crushed	Cup
	Pisum sativum	*Fabaceae*	Ksho	Climber	Seed	Coocked	Differene individual
Anemia	*Hypoestes triflora*	*Acanthaceae*	Yetay bedir	Herbs	Leaves	Coocked	Cup
	Beta vulgaris	*Amaranthaceae*	Keysir	Herbs	Corm	Coocked	Differene Individual
Leprosy	*Brucea antidysenterica*	*Simaroubaceae*	Hureta/ Abalo	Tree	Leaves	Pounding	Few leaves
Skin rash	*Citrus aurantifolia*	*Rutaceae*	Homtate	Tree	Fruit	Extract juice	Differene Individul
Asthma	*Allium sativum*	*Amaryllidaceae*	Tume	Herbs	Stem	Crushed	By spoon
Boost immunity	*Hypoestes triflora*	*Acanthaceae*	Yetay bedir	Herbs	Leaves	Boiled	Coocked
Malaria	*Withania somnifera*	*Solanaceae*	Gezawe	Herbs	Leaves	Boil	Few days
	Bruceae antidysenterica	*Simaroubaceae*	Hureta	Tree	Leaves	Pounding	Few leaves

Fever	*Tavenier a abyssini ca*	*Fabaceae*	Dingete gna	Herbs	Root	Crushed	Few minute
Bad breath	*Olea europae a*	*Oleaceae*	Weger	Tree	Leaves	Brushed	Single leaves
Gonorhe a	*Foenicul um vulgare*	*Apiaceae*	Anslal	Herbs	Leaves	Bath	Few leaves
Indigesti on	*Dovyalis abyssini ca*	*Flacourtiace ae*	Mutamu te koshim	Shrub s	Seed	Decoction	DifferenеI ndividul
Retained placenta	*Enset ventricos um*	*Musaceae*	Wese	Shrub s	Corm	Coocked	DifferenеI ndividul
	Hypostes Triflora	*Acanthaceae*	Yetay bedir	Herbs	Leaves	Coocked	Glass
Kidney pain	*Mellisa officiona lis*	*Lamiaceae*	Nana	Herbs	Leaves	Crushed	Spoon/cup
Liver pain	*Acacia albida*	*Fabaceae*	Wacho	Tree	Leaves	Pounding	Spoon
Gastritis	*Cynodon dactaylo n*	*Poaceae*	Debakul e	Herbs	Fruit	Grind	Differenei ndividual
Diarhea	*Guizotia abyssini ca*	*Asteraceae*	Seto	Herbs	Seed	Extract juice	Spoon
	Coffea Arabica	*Rubiaceae*	Buno	Tree	Seed	Decoction	Spoon
Sight problem	*Daucus carota*	*Apiacea*	Carrot	Herbs	Corm	Chewed	Difference individal

Athlet foot	*Euphorbia ampliphylla*	*Euphorbiaceae*	Kulkual	Shrubs	Root	Crushed	Difference individal
Epilepsy	*Vernonia amygdalina*	*Asteraceae*	Grawa	Herbs	Leaves	Crushed	Cup
Bad foot smell	*Citrus aurantiifolia*	*Rutaceae*	Lome	Tree	Fruit	Extract juice	Few second
Constipation	*Linnum witatissum*	*Linaceae*	kesenet	Herbs	Seed	Extracted	Spoon
	Brassica carinata	*Brassicaceae*	infusion	Herbs	Leaves	Decoction	Differennce Individual
Tuberclosis	*Allium sativum*	*Amaryllidaceae*	Tume	Herbs	Stem	Grind	Spoon
Dorer/Evil sprit	*Withania somnifera*	*Solanaceae*	Gezawe	Herbs	Leaves	Burn/boil	Few minute
Malaria	*Carica papaya*	*Caricaceae*	Papaye	Tree	Seed	Extract juice	Cup/ glass
Bone weakness	*Hordium vulgare*	*Poaceae*	Ehel	Herbs	Seed	Crushed	Cup/glass
Amoebiasis	*Coffea Arabica*	*Rubiaceae*	Buno	Tree	Seed	Decoction	Spoon
	Hypostes triflora	*Acantaceae*	Yetay bedir	Herbs	Leaves	Boilled	Cup

Apetite problem	*Lippia abyssinica*	*Verbenaceae*	Kesenet	Herbs	Leaves	Crushed	Spoon
Poisnous food	*Nicotiana tabacum*	*Solanaceae*	Tinbaho	Herbs	Leaves	Infusion	Spoon/cup
Finger disease	*Impatiens tinctoria*	*Balsaminaceae*	Tumuga	Shrub	Root	Extract juice	By spoon
Kintarot	*Enset ventricosum*	*Musaceae*	Wese	Herbs	Corm/stem	Coocked	Difference individual
Itching	*Cordia Africana*	*Boraginaceae*	Wanze	Tree	Root	Decoction	Spoon
	Citrus aurantiifolia	*Rutaceae*	Homtate	Tree	Fruit	Extract juice	Single
Anti microbial	*Thymus vulgaris*	*Lamiaceae*	Tsosgne	Herbs	Leaves	Crushed	Spoon
Pus	*Vicia faba*	*Fabaceae*	Bakela	Climber	Seed	Coocked	By glass
	Cicer arietinum	*Fabaceae*	Homtate	Herbs	Seed	Crushed	Difference individual
Depression	*Vicia faba*	*Fabaceae*	Bakela	Climber	Seed	Burn	Cup/glass
Snake bite	*Nicotiana tabacum*	*Solanaceae*	Tinbaho	Herbs	Leaves	Infusion	Spoon/cup

4.1.5. Frequency of ailments that affect human

The frequency of human illnesses in the research area is declining, dorer, fever, evil eye 19 (10.38 %), stomach ache, intestinal parasite diarrhea 18 (9.83%), bad breath, tooth ache, gastritis, bad foot smell 17 (9.28 %), asthma, cough, tonsilities, cold cough 15 (8.19 %), knee and leg pain, bone break, bone weakness, 15 (8.19 %), wounds, anthrax, pus 14 (7.65%), kintarot, hypertation, nisr, anemia 13 (7.10 %), leprosy, dandruff, athlete foot 12 (6.55%), itching, external parasite, common wort 11 (6.01%), finger disease, skin rash, kidney pain, liver pain 10 (5.46%), poisnous food, malaria, tuberculosis 9 (4.91%), constipation, abdomen pain 9 (4.91%), epilepsy, depression, gonorrhea 8 (4.37%), snake bite, anti microbial 7 (3.82%), boost immunity, sight problem 6 (3.27%%).

4.1.6. Frequency medicinal plants used to treat human ailments

Aloe trichosatha, Ruta graveolens, Enset ventricosum, and *Allium sativum* are used by the residents of Kentwat, Tilamo, and Ambelta kebele to treat the greatest number of treat general malaise, stomach ache, retained placenta, 19 (8.01%) of human ailments followed by *Solanum incanum, Taveniera abyssinica, Thymus vulgaris* to treat cough, fever, anti microbial, 17 (7.1%), *Withania somnifera, Eucalptus globulus, Zingiber officinale* treat, dorer, common cold, 15 (6.3%). The results indicated that each plant species treats a different number of disorders; nevertheless, *Nicotiana tabacum, Haegnia abyssinica*, and *Eucalptus globulus* were shown to treat the most illnesses, including intestinal parasites, evil eye, and poisoning food, (15 (6.3%), then by *Vernonia amygdalina, Citrus aurantium, Carica papaya* to treat skin rash, malaria, epilepsy, 15 (6.3%).

Table 3: Frequency medicinal plants used to treat human ailments

Plant species	**Human ailments**	**Three kebele of study area**					
		Tilamo		**Ambelta**		**Kentwat**	
Allium sativum, Aloe trichosatha and Enset ventricosum, Ruta graveolens	General malaise, Stomach ache, Retained placenta	7	2.95%	6	2.53%	6	2.53%
Solanum incanum, Taveniera abyssinica, Thymus vulgaris	Cough, fever, anti microbial	6	2.53%	6	2.53%	5	2.10%
Withania somnifera, Zingiber officinale, Echinopes kebericho	Dorer, common cold	4	1.68%	6	2.53%	5	2.10%
Nicotiana tabacum Haegnia abyssinica and Eucalptus globulus	Intestinal parasite, evil eye, poisnous food	5	2.10%	4	1.68%	6	2.53%

Vernonia amygdalina, Citrus aurantium, Carica papaya	Skin rash, malaria, epilepsy	7	2.95%	4	1.68%	4	1.68%
Citrus aurantifolia, Coffea Arabica, Nigella sativa	Skin rash, Amoebiasis abdominal pain	4	1.68%	5	2.10%	3	1.26%
Ocimum lamifolium, Ocimum basilicum, Moringa oleifera	Headache, hypertation,	4	1.68%	3	1.26%	5	2.10%
Melissa officinalis, Vicia faba, Pisuvem sativum	Kidney pain, pus, wounds	5	2.10%	4	1.68%	3	1.26%
Rumex abyssinicus, Maesa lanceolata, Lippia adoensis	Headache, common wart,	4	1.68%	3	1.26%	3	1.26%
Psidium guajava, Linum usitatissimum, Daucus carrota	Constipation, wounds	3	1.26%	4	1.68%	2	0.84%
Laggera siceraria, Ipomoea batatas, Impatiens tinctoria	Tooth ache, dandruff	3	1.26%	3	1.26%	3	1.26%
Justicia schiperiana, Juniperus procera, Hypostel triflora	Retained placenta, evil eye	3	1.26%	2	0.84%	5	2.10%
Hordeum vulgare, Guizotia abyssinica, Gladiolus abyssinicus	Diarhea, bone weakness	4	1.68%	3	1.26%	2	0.84%
Foniculum vulgare, Dovyalis abyssinica, Dodenea angustifolia	Indigestion, gonorrhea	4	1.68%	3	1.26%	2	0.84%
Datura stramonium, Cumis ficifolius, Croton macrostachys	Nisr, common wart	4	1.68%	2	0.84%	3	1.26%
Cynodon dactaylon, Clocasia esculenta, Clausena anisata	Gastritis, general malaise	3	1.26%	3	1.26%	3	1.26%
Citrus sinesis, Cicer arietinum, Cordia Africana	Gastritis, skin rash	2	0.84%	3	1.26%	3	1.68%
Catha edulis, Capsicum annum, Brassica oleraceae	Cold cough, tonsilities, Constipation	2	0.84%	2	0.84%	2	0.84%
Beta vulgaris, Ajuga integrifolia, Acacia albida	Knee and leg pain, Anemia	3	1.26%	2	0.84%	1	0.42%
Brucea antidysenterica, Acacia albida, Allium cepa	Leprosy, liver pain	2	0.84%	2	0.84%	2	0.84%
Olea europaea, Persea Americana, Piper nigrum	Dandruff, cough or cold cough	2	0.84%	1	0.42%	3	1.26%

Prunus persica, Rhamnus prinoides, Rosa rubigonosa	Nisr, anthrax	2	0.84%	2	0.84%	2	0.84%
Rumex nervosus, Solanum tuberosum, Soccharum officinarum.	Common wart, cough or cold cough	3	1.26%	1	0.42%	2	0.84%
Total		100%					

4.1.7. Medicinal plants used to treat livestock ailments

4.2.1. Modes of preparation of medicinal plants

Few remedies were reported to be made from different plant species, which were mixtures of two or more medicinal plants, while the majority of remedies in three kebele were made from a single plant species. The main methods used to prepare remedies were boiling and drinking the decoction 24 (22.85%) followed by crushing and homogenizing water 21 (20%).The main forms of preparation of plant medicines in extract the juice/oil/latex 18 (17.14%), afterward, boil and do steam bath15 (14.28%), followed by crush, heat/ burn or boil and inhale its smoke 15 (14.28%), then, after drinking the 9 (8.57%), the least common technique for preparing remedies is hold with teeth and ear 3 (2.85%).

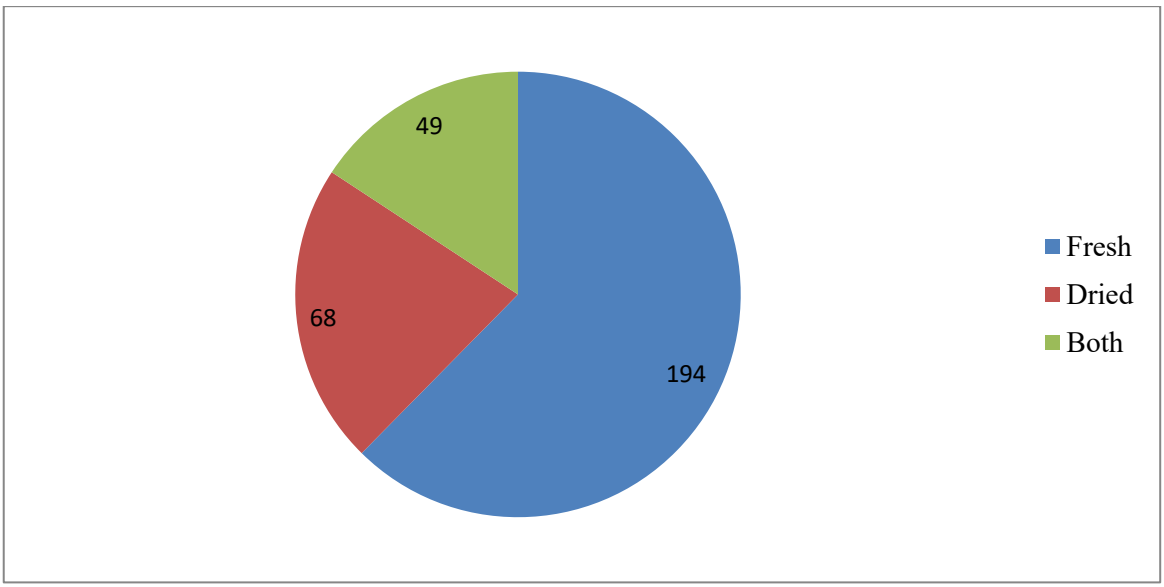

Figure 5: Condition of medicinal plant part used

4.2.2. Conditions of preparation human

According to the results of the plant part preparation conditions applied, 110 (49.5%) were utilized in their original form at the time 34 (15.31%) were stated to be utilized in both fresh and dried forms of preparation. were stated to be utilized in both fresh and dried forms of preparation. 26 (11.7%) in three kebele of welene wereda.

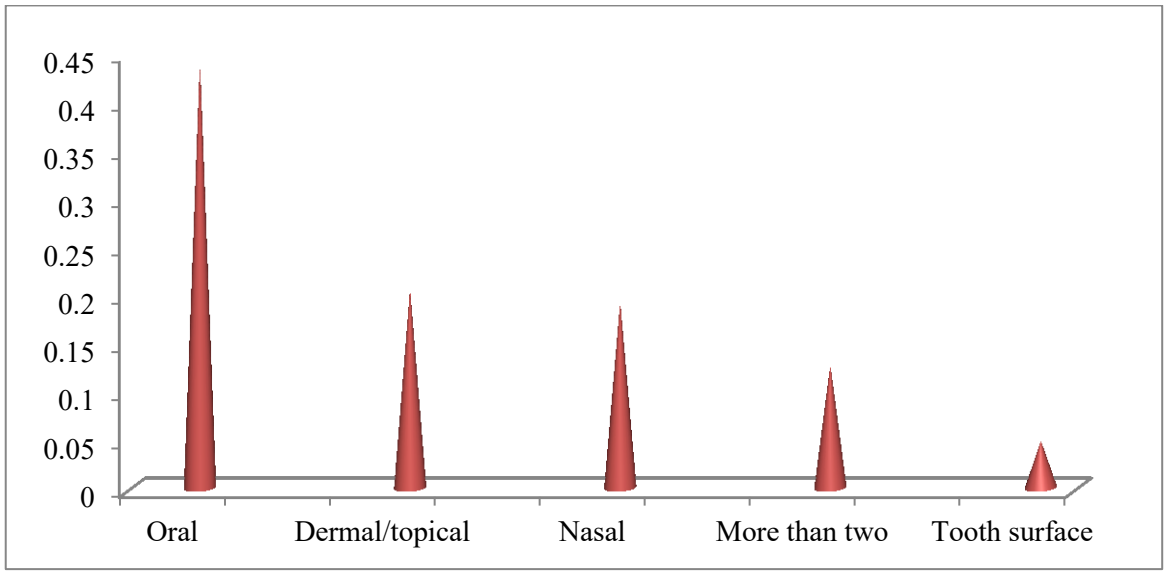

Figure 6: The routes of administration of human and livestock medicinal plants

4.2.3. Conditions of preparation livestock medicinal plant

Both fresh and in dried form of preparation, findings of the conditions under which plant parts were prepared showed that 28 (12.6%) were used in fresh form while 14 (6.3%) were reported to be used in dried form of preparation and fresh in both 10 (4.5%) in three kebele of Welene woreda.

4.2.4. Route of administration and dosage of traditional herbal remedies

Various methods were used to give medicinal plant mixtures. Oral administration was the most common method in the research location, 135 (43.40%) then dermal 63 (20.25%) with the nasal 59 (18.96%) followed by more than two routes, such as nasal and oral and dermal 39 (12.54%) with the following: 15 (4.82%) accompanied by Welene's three kebeles. The dosage changed depending on the patient's age and the healers' assessment of their capacity. except for classification by age, physical characteristics, pregnant woman, and medical conditions, the measurements used to calculate the dosages were not standardized, some traditional herbal remedy dosages are calculated using a spoon, cup, or glass.

4.3. Informant consensus

In order to prioritize medicinal plants for more research, informant consensus results may be helpful. According to the study's findings, some medicinal plants were more well-liked than others, and the greatest informant consensus went to *Allium sativum* 6 (8%), *Aloe trichosatha* 6 (8%) and Enset ventricosum 6 (8%), Solanum incanum 6 (8%), Taveniera abyssinica 6 (8%) *Thymus vulgaris* 6 (8%) and *Withania somnifera* 5 (6.66%), *Zingiber officinale* 5 (6.66%), and *Echinopes kebericho* 5 (6.66%), *Nicotiana tabacum* 5 (6.66%), *Haegnia abyssinica* 5 (6.66%), and *Eucalptus globulus* 5 (6.66%), *Vernonia amygdalina* 5 (6.66%),, *Citrus aurantium* 5 (6.66%), and *Carica papaya* 5 (6.66%), *Citrus aurantifolia* 4 (5.33%), *Coffea Arabica* 4 (5.33%), and *Nigella sativa* 4 (5.33%).

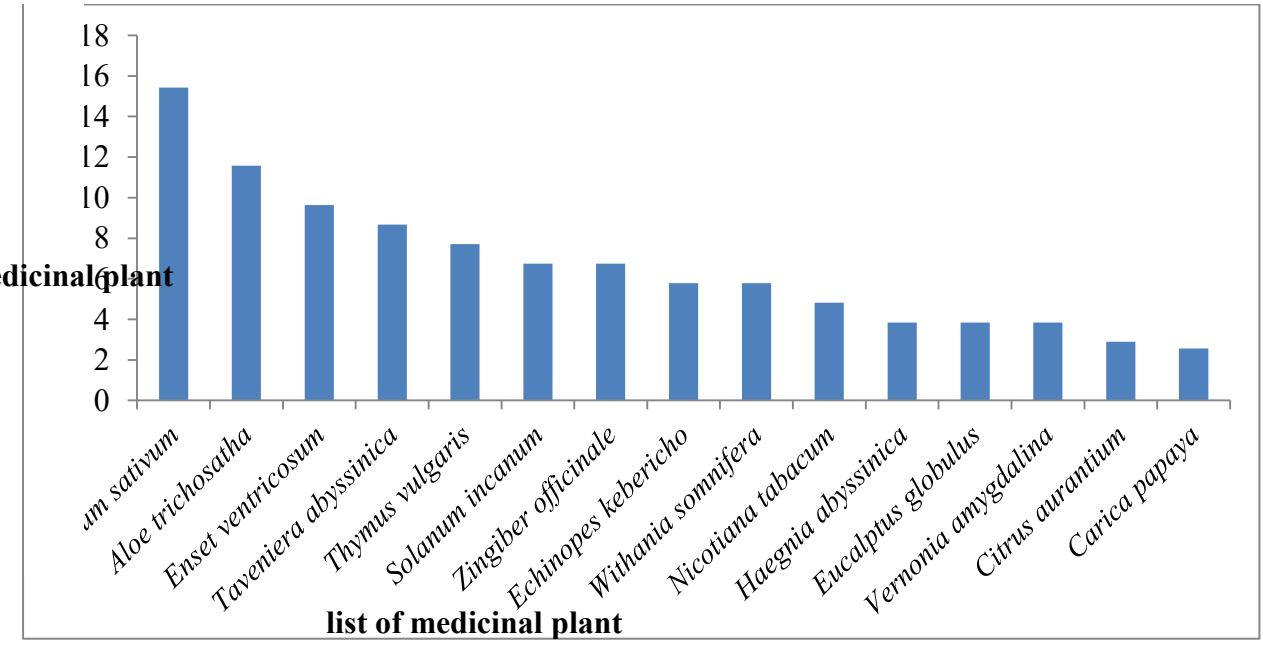

Figure 7:List of human medicinal plants with the relatively higher (Percentage ≥ 3) informant

4.4. Informant consensus factors

Diseases reported in the three kebele were grouped in to different categories based on the site of occurrence of the disease, condition of the disease as well as treatment resemblances. In this study, the informant consensus of medicinal plant usage resulted in ICF ranging from 0.82 to 0.45 per disease category for human health problems, the factor provides a range of 0 to 1, where a high value acts as a good indicator for a high rate of informant consensus.

4.4.1. Informant consensus factors for human health problems

About tewenty seven disease categories were identified from the total of 54 various human ailments reported amongst these categories with the high, the diseases that were reported in the three kebele were divided into various groups according to the disease's condition, location of incidence, and similarity in treatment. The study's informant consensus regarding the use of medicinal plants produced informant consensus factor (ICF), the values that were evil eye, general malaise, common cold, coughing and tonsilities, it received the highest score, (0.82), every illness category, which is followed by anemia, leprosy and asthma, that scored the second highest values (0.77), abdominal pain, stomach ache and intestinal parasite (0.75), scored the third headache, hypertation and nesir and the fourth-highest value (0.68) each illness. In this study, the lowest ICF value (0.45) was recorded for the category of diseases that belong to Common wart, dandruff and external parasite, within three kebeles of welene woreda are lowest value calculated by the ICF values.

Table 4: Desending order to informants consensus factor (ICF) for human health problems in study area

Disease category	**Three kebele of welene**		
	Species	Use citation	Icf
Evil eye and general malaise	11	59	0.82
Common cold, coughing and tonsilities	7	36	0.82
Anemia, leprosy, asthma	5	19	0.77
Abdominal pain, stomach ache and intestinal parasite	8	29	0.75
Headache, hypertation and deoxygenated blood	6	17	0.68
Tooth ache and eye infection	7	19	0.66
Anthrax and wounds	5	13	0.66
Retained placenta kidney and liver complaint	4	10	0.66
Bone break, knee and leg	6	13	0.58
Apetite problem and indigestion	5	9	0.5
Common wart, dandruff and external parasite	7	12	0.45

4.4. 2. Relative healing potential of medicinal plants used for treating human ailments

Allium sativum (Common cold, coughing and tonsilities), *Aloe trichosatha* (dandruff, wounds), *Taveniera abyssinica* (evil eye and general malaise), *Thymus vulgaris* (headache, hypertation) *Solanum incanum* (hypertation deoxygenated blood), *Zingiber officinale* (common cold, cough), *Withania somnifera* (anthrax general malaise), *Nicotiana tabacum* (general malaise), were three kebeles of welene woreda human medicinal plants that scored

the highest Fidelity Level (FL) values. In *Allium sativum* showed the highest fidelity level value (91.66%) for Common cold, coughing and tonsilities followed by *Aloe trichosatha* dandruff, wounds and *Taveniera abyssinica* evil eye and general malaise 83.3 % three Welene woreda kebele.

Table 5: Fidelity level values of medicinal plants cited by informants.

Medicinal plant	**Ailments**	**Ip**	**Iu**	**FL %**
Allium sativum	Common cold, coughing and tonsilities	*11*	*12*	*91.66*
Aloe trichosatha	Dandruff, wounds	*10*	*12*	*83.3*
Enset	Bone break,	*11*	*18*	*61.1*
Ventricosum	Retained placenta			
Taveniera abyssinica	Evil eye and general malaise	*10*	*12*	*83.3*
Thymus vulgaris	Headache, hypertation	*10*	*33*	*30.3*
Solanum incanum	hypertation deoxygenated	*8*	*18*	*44.4*
Zingiber officinale	Common cold, cough	9	12	75
Withania somnifera	Anthrax, general malaise	12	27	4.44
Nicotiana tabacum	General malaise	6	9	66.66

4.4.3. Preferences for human medicinal plants

The findings indicated that the research area's primary preference was for varieties of medicinal plants. Species *Taveniera abyssinica* (most favoured in Tilamo), *Allium sativum* (Ambelta), *Echinopes kebericho* (Tilamo), *Eucalptus globulus* (Kentwat), *Citrus aurantifolium* (Tilamo) were the most popular herbal remedies for treating generalized illness.

Table 6: Results preference ranking for medicinal plants used treating general malaise

Medicinal plants for general malaise	***Informants labelled A to K***													
	A	***B***	***C***	***D***	***E***	***F***	***G***	***H***	***I***	***J***	***K***	***L***	***Total score***	***Rank***
Taveniera abyssinica	5	3	4	3	6	6	4	4	3	4	3	1	46	1st
Allium sativum	4	4	3	5	3	4	4	3	4	4	3	2	43	2nd
Echinopes kebericho	4	2	3	2	2	3	3	3	4	4	3	3	36	3rd
Eucalptus globulus	4	2	2	3	3	2	2	3	2	3	3	2	31	4th
Citrus aurantifolia	3	2	2	3	1	2	1	3	4	3	2	0	26	5th
Withnia somnifera	2	2	1	1	2	3	2	2	2	2	1	2	22	6th
Vernonia amygdalina	1	2	1	3	2	1	2	1	2	1	2	2	20	7th

4.5. Marketability of medicinal plants

In three kebeles within the study region, surveys were conducted in one daily and three weekly local markets. Plants like as *Zingiber officionale, Taveneira abyssinica, Allium sativum, Persea Americana, Coffea Arabica, Catha edulis, Daucus carrota, Vicia faba, Carica papaya, Lippia adoensis, Black cumin, Lipedium sativum, Citrus aurantium, Pisum sativum, Cicer arietinum.* They are all medically significant, and market research shows that medications are offered in dry form. cup, kubaya, jog, single count like fruits. There are no restrictions on the sale or purchase of these medications in the neighborhood market center, and the medicinal plant is also purchased by the local community of the study area, including some traders on the boundary of kebeles and woreda.

Table 7:Marketability and number of survey recorded to medicinal plants

Markets name	**Number of survey date**	**Recorded medicinal plant**
Mehal amba	(2) days survey	*Zingiber officionale, Taveneira abyssinica, Allium sativum, Black cumin, Lipedium sativum, Citrus aurantium, Zingiber officinale, Pisum sativum, Persea Americana, Coffea Arabica, Catha edulis, Daucus carrota, Vicia faba, Carica papaya, Lippia adoensis*
Kombel	(2) days survey	*Ecchnopes kebericho, Daucus carrota, Vicia faba, Nigella sativa, Lippia adoensis, Black cumin*
Achiber	(1) days survey	*Pisum sativum, Persea Americana, Coffea Arabica*
Akebel	(1) days survey	*Zingiber officinale, Catha edulis, Carica papaya, Black cumin*

4.5.1. Indigenous knowledge transfer and medicinal plant collection

On average, 65% of interviewees agreed that self-prepared remedies were used to treat the majority of illnesses at the family level. When necessary, individuals could get advice from other experienced members of their local community at little or no cost. A record of 57 (60%) Ambelta, 68 (65%) in Tilamo and 78 (70%) in Kentwat kebeles of the research area, replying that they only share their knowledge of medicinal plants with their family members and that they do not share it with others. The knowledge owner in a family, who is typically a mother

or father, chooses one of their children typically a son who, in their opinion, meets their own set of requirements for the appropriate transfer. The chosen youngster begins training at the age of 12-15 and continues to be monitored on preserved property until the age of 18-24, at which point the knowledge transmission is anticipated to be partially finished. Few practitioners were able to exhibit all members of their family the medicinal plants and impart the indigenous medical knowledge.

4.6. Factors threatening medicinal plant in study area

The lack of modern agricultural expansion, firewood, charcoal production, timber production, and construction were the most frequently cited threats to the study area's medicinal plants, according to informants' responses. The respondents stated that the growth of contemporary healthcare facilities, educational institutions, the loss of local knowledge about medicinal plants was caused by a number of factors, including cultural and environmental changes. Traditional herbalists and authentic expertise in traditional therapy are declining as a result of the death of old people, healing people. This group included the following: *Ruta chalepensis, Withania somnifera, Zingiber officinale, Enset ventricosu, Citrus limon, Nicotiana tabaccum, Carica papaya, Aloe trichosatha, Allium sativum, Echinops kebericho, and Nicotiana tabaccum* ,are several causes that contribute to the scarcity of medicinal plants, including the spread of agriculture, over harvesting, overgrazing, fires, drought, disease and pests, modernity and the promotion of new types, and cultural changes.

CHAPTER FIVE
5. DISCUSSION

5.1. Discussion

5.1.1. Ethnomedicinal plant species used by people of welene woreda

Forty medicinal plant families and 71 species of medicinal plants were identified in the research area. The highest species richness was utilized by the Welene community, which included 6 (8.69%) solanaceae family, followed by *Fabaceae, Rutaceae and lamiaceae* 5 (5.79%) each families and *Cucurbitaceae, Rosaceae*, and *Asteraceae* 4 (4.34%) according to the findings of the medicinal plant analysis, and this may be explained by the species richness of these families. It demonstrated that, in comparison to plant families used to treat human illnesses, less were employed to treat issues affecting animals. The majority of medicinal plant species that were gathered and identified in these study areas were also utilized in other regions of the nation (Tesfaye Hailemariam *et al.,* 2009). Numerous reports of these plants being used by various social cultural groupings, which may support the ethnomedicinal plant species' therapeutic qualities. In particular, *Allium sativum*, because of the greater availability of medicinal plants in Ethiopia and, to some extent, their effectiveness, people across a wide geographic area tend to employ the same plants (Ermias Lulekal *et al.,* 2008).

Numerous research show that traditional medicinal are 92 plant species in Goma woreda, Jima Zone of Oromia Region, Ethiopia, utilized to treat around 70 different kinds of human ailments (Behailu Etana, 2010); in Farta, 75 plant species were used to treat about 40 different kinds of human maladies. In Ofla Wereda, Southern Zone of Tigray Region, Ethiopia (Nurya Abdurhman, 2010), 82 plant species heal around 55 different human ailments; in Debark, 88 plant species treat roughly 63 different human ailments (Nigussie Amsalu, 2010); and in woreda, South Gonder Zone of Amhara Region, Ethiopia According to Eskedare Abebe (2011), 54 plant species in Woreda, North Gondar Zone, Amhara Regional State, Ethiopia, and adjacent Kebeles, Sidama Zone, SNNP Region, Ethiopia, healed roughly 40 different human maladies (Sintayehu Tamene, 2011). The results are consistent with the overall trend of herbaceous species dominance observed in the majority of therapeutic plants.

The majority of the medicinal plants used by the Welene woreda population were collected from the cultivated land, but this is consistent with the findings of several studies carried out around the nation. Due to the fact that Bosat is a degraded dry land area where shrub elements predominate over herbs (Worku Abebe, 1984); (Gedif and Hahn, 2003), this result

was different from the report for the people of Bosat, Welenchiti area, who are said to use more shrubs than herbs (Debela *et al.,* 2004). The most common Families of medicinal plant study conducted in Welene woreda *Solanaceae, Rutaceae, Fabaceae, Lamiaceae, Musaceae, Asteraceae are Fabaceae, Asteraceae, Euphorbiaceae (*Mersha Ashagre, 2011), Guji Agro-pastorilists, Borana Zone, Blue Hora District, Oromia Region, Ethiopia. Debark Woreda, North Gondar Zone, Amhara Regional State, Ethiopia: Communities, *Asteraceae, Fabaceae, Lamiaceae, and Euphorbiaceae* (Eskedare Abebe, 2011).

5.1.2. Diversity of human and livestock medicinal plants

The study's findings indicated that, despite having 71 species of medicinal plants to treat human and livestock illnesses, Welene woreda had a low diversity of medicinal plants. Other regions of Ethiopia also employ the medicinal plant species that are utilized to cure human illnesses in the Welene area. In the study community, 57 Human medicinal plant species were distributed, collected, and identified. The next most utilized families in the area were *Rutaceae, Fabaceae,* and *Musaceae,* following *Solanaceae.* In total, 57 species (80.28%) were discovered to cure only human ailments, while 14 species (19.71%) were discovered to cure livestock ailments. 9 (12.6%) Both human and livestock illnesses are treated using species, in the study area, (Zeleke Assefa, 2019) found that the *Asteraceae* family of plants makes a greater contribution to the treatment of human ailments.

According to Endalew Amenu (2007), the ethnomedical wealth of the country's medicinal plant collection was evaluated; 188 plant species were identified among the indigenous peoples of Enjaji (Cheleya woreda). (Mirutse Giday *et al.,* 2009); and 95 kinds of medicinal plants 39 families of species, were identified in the Sheka zone (Ethiopia's Bench ethnic groups). Types of medicinal plant growth According to the current investigation, among the therapeutic plants gathered, the bulk of plants were herbs covering 35 (50.72%) species, followed by trees 20 (28.98%), followed by shrubs 12 (17.39%) and climber 2 (2.89%). This may have to do with the fact that trees and bushes that are easier to reach are frequently taken from the study area's farther-flung woodlands. This finding is in line with that of (Mirutse Giday *et al.,* 2009), who found that in a study carried out in southwestern Ethiopia, the most common growth types of medicinal species were herbs, followed by trees.

5.1.3. Conditions of medicine preparation

Of the local population in the study area, 194 (62.37%) use medicinal plant preparations in their fresh form, 68 (21.86%) use them in their dried form, and 49 (15.75%) use both. The

results connected in fresh and dried form, (Kefalew *et al.,* 2015), Ethiopia most usually, the local people prefer the fresh than the dried cure preparation.

5.1.4. Plant parts used for medicinal purposes

Leaves made up 66 (32.8%) of the plant parts most frequently used to prepare traditional medicine. 27 (13.4%) seeds, 18 (8.95%) stems, 18 (8.95%) fruits, 15 (7.46%) corms, 15 (7.46%) roots, 12 (5.97%) latex, and 9 (4.48%) barks. The parts of the plant with the fewest medicinal references were the root and leaf 6 (2.98%), seed and leaf 6 (2.98%), whole part 3 (1.49%), flower 3 (1.49%), and seed and fruit by 3 (1.49%) that had to do with roots, impacts of seeds, fruit, latex, bark, stems, or the entire plant are more dangerous to a plant's continuation than leaves are. Since leaves are the most commonly picked plant components in the area and have little bearing on mother plant survival, there is no reason to believe that medicinal plants constitute a severe hazard in this research area. Since leaves were the most commonly picked plant parts in the area, there is no reason to believe that medicinal plants constitute a substantial threat in this research area. According to numerous studies conducted in Ethiopia, leaves predominate in the creation of medicines, accounting for 111 species (46%) followed by roots 33 (14%) and seeds 25 (10%). This is consistent with the idea that leaves have minimal impact on the survival of the mother plant. Common components used to make herbal medicines Indigenous populations in Gurage Zone, Ethiopia, employ medicinal plants traditionally (Alemtshay Teka *et al.,* 2020). According to the study's findings, the Bench ethnic group in Ethiopia uses 72 types of medicinal herbs, according to an ethnobotanical study of these plants conducted by (Gidey, 2009) and the Gedeo community in Wonago Woreda, SNNPR, Ethiopia (Fisseha Mesfin *et al.,* 2009).

5.1.5. Modes of preparation of medicinal plants

The types of plants used to prepare traditional medicines varied. Parts of plants are employed to make treatments in the study region, and traditional healers make medicine from various plant parts. According to the results of traditional medicine, local medicines are made in the study area by crushing, pounding, grinding, powdering, heating, and juicing plants. This study shows that different methods of remedy, such as preparations utilizing one or more species, have varying percentages of plant species. About 45.45% came from crushing, which is a necessary step in making herbal medicines, and 27.27% came from powdering for therapeutic uses.

This study is in line with the findings of the Gozamin woreda, East Gojjam Zone (Amsalu et al., 2018) and the Minjar-Shenkora District, North Shewa Zone (Kassa Ashagre et al., 2020). Juice (10.9%), heating (10.9%), and pounding and grinding (9.09%) are comparable. The widespread use of medicinal plant decoctions for a variety of illnesses may be due to the preparations' demonstrated usefulness over many years of testing and the gathering of indigenous knowledge about their effectiveness.

5.1.6. Route of adiminstration and dosage

Oral administration was the most common route in the study region, with 129 (43.43%) preparation cutaneous 60 (20.20%) nasal 57 (19.19%) more than two 36 (12.12%) and tooth surface 15 (5.05%). Many ethnobotanical investigations conducted in Ethiopia and other countries, including those by (Mirutse Giday *et al.,*2003), (Haile Yinger *et al.,* 2008), (Fisseha Mesfin *et al.,* 2009), (Ketema Tolossa *et al.,* 2013), and (Patience *et al.,* 2016), have shown similar outcomes to these findings. The formulated medications can react physiologically with the pathogens more quickly through oral and topical routes, which enhances their therapeutic efficacy (Fisseha Mesfin *et al.,* 2009). Traditional healers in the Welene area of Kentwat, Tilamo, and Ambelta kebele had no set method for measuring dosages to cure different illnesses, as is the case across Ethiopia. Different dose measurements are used by healers, and these measurements were insufficiently precise to pinpoint the exact amount, other research revealed that the most popular and well-represented administration method was oral application, which accounted for 181 (55.01%), In Ankober District, North Shewa Zone, topical or dermal application came next with 81 (25%) (Ermias Lulekal *et al.,* 2013). Similar to the works of (Patience *et al.,* 2016), oral route supplied 61% of the total from other parts of the world (197).

Adiminsteration of species, followed by inhaling smoke (5%), massaging leaves on afflicted areas (14%), and taking a herbal bath (28%). Steam baths were the herbal delivery method that was utilized the least (2%). Both oral and cutaneous methods provide for a quick physiological response, prepared medicines with the pathogens and increase their curative power (Fisseha Mesfin *et al.,* 2009), Like in other parts of Ethiopia, traditional healers in Welene woreda Kentwat, Tilamo, and Ambelta kebeles have limited information about how to estimate dosages to cure different illnesses. The traditional healers employ varied measurements for dose; they typically use their finger lines to determine how much should be consumed. Glass cups and spoons are also prevalent for oral tea and coffee cures, however these metrics often insufficiently precise to ascertain exact amount. For instance, during a

group discussion, informants in Welene woreda Kebeles stated that different medicines were provided for the same type of health issues with different dosages, units of measurement, durations, and times.

5.1.7. Major human and livestock ailments and treatment

Compared to the dermatological and gastrointestinal ailment categories, comparatively more plants were reported to have been used to cure wounds and stomach aches, respectively. The residents of Welene woreda employ *Allium sativum* to treat the most human ailments, followed by *Taveneira abyssinica* and *Enset ventricosum* to treat animal ailments, and *Aloe tricosantha* to treat 15 livestock ailments that were documented in this study.

The greatest number of medicinal plants were utilized to cure general malaise and evil eye, just like in other regions of the nation (Getnet Chekole *et al.,* 2015). Eleven (11.95%) species of common cold and coughing were reported to treat intestinal parasites, stomach aches, and 12 (13.04%) types of abdominal pain, and tonsillitis by 11 (11.95%) species tooth ache and eye infection by 7 (7.61%) species each; common wart, dandruff and external parasite by 7 (7.61%) species headache, hyperbaton and deoxygenated blood by 7 (7.61%) species each. species followed by wounds and anthrax six (6.52%) of the species treated bone break, knee and leg pain; five (5.4%) treated leprosy and anemia; five (5.4%) treated malaria, five (5.4%) treated fever and asthma; four (4.34%) treated indigestion and appetite problems; four (4.34%) treated kidney infection, retained placenta, and liver complaint. These parallels show how widely medicinal plant species are used and how Ethiopian ethnic groups share related knowledge. A census of the plant species used as traditional remedies for human ailments revealed that they belong to 19 families and 30 genera. The most common family among these plants was *Asteraceae.* They are likely pharmacologically effective in different areas by different cultures, as evidenced by the fact that some of the plants that have been documented have similar applications elsewhere in the world (Tesfaye Hailemariam *et al.,* 2009). This study discovered that this community's healers employed comparable types of therapeutic plants, which were also used by healers in other regions of Ethiopia.

CHAPTER SIX
6. CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusions

The research area's medicinal plant variety was determined by collecting and identifying 71 species of medicinal plants from 64 genera and 40 families. The cultivated land was where the majority of the medicinal plants were gathered, 54 medicinal plant species gathered in the study area were used to cure human ailments, while 15 were used to treat cattle ailments, and 13 were used to treat both. Compared to people, less livestock illnesses and medicinal plant infections were documented. Regarding species richness at the family level, the Solanaceae had the most species, followed by the Lamiaceae, Rutaceae, and Fabaceae. The predominant growth forms were discovered to be herbs, the most prevalent health issues under the category of gastrointestinal diseases were the common cold, stomach ache, general malaise, wounds, and evil eye, whereas the most common health issues under the category of dermatological diseases were wounds. The most common plant used by the residents of Welene woreda to heal human problems is Allium sativum, which is followed by Taveneira abyssinica and Enset ventricosum for animal ailments, and finally Aloe tricosantha, the most frequently employed plant parts were leaves, in three kebeles of welene, the greater parts of remedies were prepared from single plant species and few were reported to be prepared from different plant species. Boiling, crushing, and homogenizing the decoction were the main methods of medicine production. The findings on the circumstances of the plant parts used showed that most of them were made fresh, oral administration dominated the research region, with dermal administration coming in second, from classifying the medicinal plants according to age, physical characteristics, and medical conditions, the measurements used to calculate dosages were not standardized some were measured using cups or spoons. Most interviewees said that they don't share their knowledge of medicinal plants, and that only family members can further share their information. The majority of the key informants from Welene communities were willing to share their expertise on use, while locals' desires to transfer and share their knowledge varied throughout the study area. There may be fewer female professional traditional practitioners because they give more traditional medicinal plants to their sons than to their daughters.

6.2. Recommendations

Priority species include plants with a wider variety of medicinal and food uses. It is advised that youth associations be formed to support the operations of plantations of food and medicinal plants in degraded and degrading environments. For the conservation of cultivated plants, and medicinal plants in particular, community-based forest priority areas (parks) in the Welene community must be clearly marked and adequately safeguarded.

Both official and informal education systems should incorporate tested and validated indigenous knowledge about the traditional uses of plants in general and therapeutic applications into their curricula in order to instill favorable attitudes in the next generation. Since the majority of traditional healers may not have paid much attention to the transfer of indigenous knowledge, woredal, Zonal offices, governmental agencies, and non-governmental organizations should provide training as part of awareness-raising initiatives aimed at healers in order to enhance knowledge capture and reduce its loss. To preserve the survival of rare medicinal plants, the community should train elders and model herbal medicine practitioners (farmers) in both in-situ and ex-situ conservation techniques.

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Appendix

The research endeavor used semi-structured interview questions.

1. The respondent's name
2. Sex of the respondent
3. Marital status of the respondent: Married/widowed/divorced/single (Underline)
4. Respondent's age
5. Educational status: Read and write? (Yes/No) Underline Indicate level/grade completed
6. Locality: Detailed description of locality (including Woreda/District and kebele)
7. What are the primary illnesses or health issues affecting people in your area? What are the main livestock health problems/diseases at your locality?
8. How do you identify each illness or health issue?
9. How do you manage or avoid illnesses or health issues?
10. How do you handle illnesses and health issues in people?
11. How do you handle illnesses or issues pertaining to livestock?
12. Which plant or plants do you employ to treat that specific illness or health issue? What are herbs used to treat livestock health problems?
13. Which traditional medicinal plants are used by the majority of livestock keepers?
14. What are the drawbacks of using traditional medicinal plants to treat liver disease?
15. The local name or names of the plant
16. The researcher must fill in the botanical name or names.
17. The researcher will need to complete the family name or names.
18. Growth form: aquatic, semi-parasite, liana, epiphyte, tree, shrub, herb, or parasite
19. The investigator or enumerator provides a brief description of the plant, mentioning its height, blossom color, mature fruit color, mature seed color, and other distinctive characteristics.
20. Habitat: Cultivated or wild; if wild, particular vegetation type and habitat

21. To what extent is the therapeutic plant or plants widely used? Simple to obtain from one's own garden, the neighborhood, or distant locations (how far? ___) or bought [if bought from a person at a home or market, specify the person or market location)
22. Plant parts utilized in medicine: leaves, short twigs with leaves, fruit, seeds, seeds, roots, stems, and stem bark (Underline). Others_____
23. Used as a mixture or decoction, by itself, or in combination with water or other substances
24. Use of plant parts: fresh only, dried only, or frozen (Underline).

    Other_____
25. Medical preparation: crushed, crushed and powdered, extracted with cold water, or boiled (latex/juice) (Underline).
26. Additional _____ Dose/amount
27. Does the dosage vary for men, women, kids, the elderly, and expectant mothers? Any noticeable adverse/side effect(s)
28. Do men, women, children, the elderly, and expectant mothers receive different dosages?
29. How is traditional medicine preserved?
30. Any prohibitions or taboos around the gathering of therapeutic herbs
31. Can medicinal plants used to treat human illnesses be sold?
32. Can medicinal plants used to cure animal diseases be sold?
33. Do you employ traditional medicinal plants for any other purposes?
34. Food, charcoal, firewood, building materials, fodder, etc.
35. Do the medicinal plants face any threats? Enumerate the primary dangers, beginning with the most pressing one.
36. Do the therapeutic herbs face any dangers? Start with the most significant threat and list the other major risks.
37. How are family members or the next generation taught about traditional medicine?
38. How does traditional medical knowledge get in the way of modernization?

Table 8: Medicinal palnts and treatments to human and livestocks in study area.

S/No.	*No Scientific name*	Family	Common name	Local name	Habit	Part used	Condition part used	Mode of preparation
1	*Allium cepa*	*Amarylli daceae*	Onion	Shinkurt	Herbs	Stem	Fresh	Crushed or grind
2	*Allium sativum*	*Amarylli daceae*	Garlic	Tume	Herbs	Stem	Fresh and dry	Crushed or grind,powdered, decoction
3	*Aloe trichosatha*	*Asphodelaceae*	Aloe	Yefuggedel	Herbs	Whole part	Fresh	Extract juice, eat part, latex paint warm, decoction
4	*Acacia albida*	*Fabaceae*	Apple ring acacia	Girar, wacho	Shrubs	Leaves	Fresh and dry	Pounding, mixing, decoction
5	*Ajuga integrifolia*	*Lamiaceae*	Bitter taste	Akembye	Herbs	Leaves	Fresh	Extract juice,chew part,paint the juice, decoction
6	*Beta vulgaris*	*Amarant haceae*	Beet root	keysir	Herbs	Stem, corm	Fresh	Eat simply, crushed and coocked
7	*Brucea antidysenterica*	*Simaroubaceae*	Wagnos	Hureta, abalo	Tree	Leaves	Fresh	planting ,grafting, cutting ,powder
8	*Brassica carinata*	*Brassicaceae*	Cabbage	Amelzer	Herbs	Seed	Dry	Decoction, crushed, powder
9	*Brassica oleraceae*	*Brassicaceae*	Cabbage	Amel	Herbs	Leaves and stem	Fresh	Crushed, Extract juice
10	*Capsicum annum*	*Solanaceae*	Pepper	Kare	Herbs	Seed	Fresh and dry	Crushed, powder
11	*Catha edulis*	*Celastraceae*	Khat	Khat	Tree	Leaves	Fresh and dry	Crushed, powder
12	*Carica papaya*	*Caricaceae*	Papaya	Papaye	Tree	Whole part	Fresh	Decoction, extract juice

13	*Coffea Arabica*	*Rubiaceae*	Coffea	Buno	Tree	Seed	Dry	Decoction, crushed, powder
14	*Cordia africana*	*Boraginaceae*	Wanza	Wanze	Tree	Root	Dry or fresh	Decoction, crushed, powder
15	*Cicer arietinum*	*Fabaceae*	Chick pea	Shnbure	Herbs	Seed	Fresh or dried	Powder, crushed
16	*Citrus aurantiifolia*	*Rutaceae*	Lemmon	Lomi	Tree	Fruit	Fresh	Extract juice, infusion
17	*Citrus aurantium*	*Rutaceae*	Bitter orange	Homtate	Tree	Fruit	Fresh	Extract juice
18	*Citrus sinesis*	*Rutaceae*	Orange	Birtukan	Tree	Fruit	Fresh	Extract juice, heat
19	*Clausena anisata*	*Rutaceae*	Horse wood	Limche	Tree	Leaves	Fresh	Boiled, infusion
20	*Clocasia esculenta*	*Araceae*	Taro or elephant ear	Godeliye	Herbs	Corm	Fresh and dry	Crushed, powder, decoction
21	*Cynodon dactaylon*	*Poaceae*	Pepo	Debakule	Herbs	Fruit, leaves	Fresh	Roast, grind
22	*Croton macrostachys*	*Euphorbiaceae*	Broad leaved croton	Daya or wanshehena	Tree	Fruit	Fresh	Coocked, washed
23	*Cucumis ficifolius*	*Cucurbitaceae*	Yemidir Embuay	Kinbibe	Shrubs	Leaves, fruit	Fresh	Crushed
24	*Datura stramonium*	*Solanaceae*	Thorn apple	Azaza	Herbs	Seed, leaves	Fresh	Burn smoke, pounded
25	*Daucus carrota*	*Apiaceae*	Carrot	Carrot	Herbs	Corm, root	Fresh	Creshed
26	*Dodenea angustifolia*	*Spidnaceae*	Sand olive	Kitkta	Tree	Leaves, twigs	Fresh	Crushed, extract juice
27	*Dovyalis abyssinica*	*Flacourtiaceae*	Abyssinian goose berry	Mutamute or koshm	Shrubs	seed	Fresh	Infusion/ Decoction

28	*Eucalptus globulus*	*Mytraceae*	Eucalptus tree	Nech-barzaf	Tree	Leaves	Fresh	Boil, heat, bath
29	*Echinopes kebericho*	*Asteraceae*	Kebericho	Kebericho	Herbs	Stem, root	Dried	Crushed, chewed
30	*Enset ventricosum*	*Musaceae*	False banana or Enset	Wese	Herbs	Corm, stem	Dried, fresh	Cocked, crushed
	Enset ventricosum	*Musaceae*	False banana or Enset	Wese	Herbs	Corm, stem	Dried, fresh	Cocked, crushed
	Enset ventricosum	*Musaceae*	False banana or Enset	Wese	Herbs	Corm, stem	Dried, fresh	Cocked, crushed
	Enset ventricosum	*Musaceae*	False banana or Enset	Wese	Herbs	Corm, stem	Dried, fresh	Cocked, crushed
	Enset ventricosum	*Musaceae*	False banana or Enset	Wese	Herbs	Corm, stem	Dried, fresh	Cocked, crushed
	Enset ventricosum	*Musaceae*	False banana or Enset	Wese	Herbs	Corm, stem	Dried, fresh	Cocked, crushed
31	*Euphorbia ampliphylla*	*Euphorbiaceae*	Spurge	Kulkual	Shrubs	Root	Fresh	Creshed
32	*Foeniculum vulgare*	*Apiaceae*	Funnel	Anslal	Herbs	Leaves	Fresh	Steam bath,
33	*Gladiolus abyssinicus*	*Iridaceae*	Lily	Inzerezyi	Herbs	Leaves	Fresh	Crushed/ chewed
34	*Guizotia abyssinica*	*Asteraceae*	Niger seed	Nugi	Herbs	Seed	Dry	powder, chewed
35	*Haegnia abyssinica*	*Rosaceae*	Kosso	Seto	Tree	Leaves	Fresh	Crushed, infusion
36	*Hordeum vulgare*	*Poaceae*	Barely	Ehel	Herbs	Seed	Dried	Crushed
37	*Hypoestes triflora*	*Acanthaceae*	Freckle face	Yetay bedir	Herbs	Leaves	Fresh	Boiled, cocked, decoction
38	*Juniperus procera*	*Cupressaceae*	African juniperus	Chidi	Tree	Leaves	Fresh, dried	Decoction

39	*Justicia schiperiana*	*Acatacea e*	Sensel	Sensel or Temuga	Shrubs	Leaves	Fresh	Crushed, cocked
40	*mpatiens tinctoria*	*Balsaminaceae*	Balsamine	Enshoshle	Shrubs	Leaves, root	Fresh	Crushed, boiled
41	*Ipomoea batatas*	*Convolvulaceae*	Sweet potato	Sikuar dinchew	Herbs	Corm	Fresh	Cocked
42	*Laggera siceraria*	*Cucurbitaceae*	Bottle gourd	Kile, qomet	Herbs	Fruit	Fresh	Crushed
43	*Lippia adoensis*	*Verbanaceae*	Kessie	Tosgne	Herbs	Leaves	Dried, fresh	Infusion, smoke
44	*Linum usitatissimum*	*Linaceae*	Linseed	Telbe	Herbs	Seed	Dried	Infusion
45	*Lippia abyssinica*	*Verbenaceae*	Koseret	Kesenet	Herbs	Leaves	Dried	Crushed, powder
46	*Maesa lanceolata*	*Primulaceae*	False assegai	Aguaj or Qelawa	Tree	Leaves	Fresh	Infusion
47	*Mellisa officionalis*	*Lamiaceae*	Nana	Nana	Herbs	Leaves	Fresh	Crushed
48	*Moringa oleifera*	*Moringaceae*	Shiferaw	Shiferaw	Tree	Leaves	Fresh	Crushed, Decoction
49	*Nigella sativa*	*Ranunculaceae*	Black cumin	Tikur azmud, menzuta	Herbs	Seed	Dried	Infusion
50	*Nicotiana tabacum*	*Solanaceae*	Timbaho	Tinbaho	Herbs	Leaves	Dried, fresh	Infusion
51	*Ocimum basilicum*	*Lamiaceae*	Basil	Yeshorb boshe or mesobla l	Herbs	Leaves	Fresh	Infusion
52	*Olea europaea*	*Oleaceae*	Olive or weyra	Weger	Tree	Stem, leaves	Fresh	Chewed
53	*Ocimum lamifolium*	*Lamiaceae*	Damakessie	Damakesie	Shrubs	Leaves	Fresh	Extract juice, Decoction
54	*Persea americana*	*Lauraceae*	Avocado	Abocato	Tree	Fruit, leaves	Fresh	Extract juice, Decoction
55	*Piper nigrum*	*Piperaceae*	Piper nigrum	Kundo berbere	Herbs	Seed	Dried	Powder
56	*Pisum sativum*	*Fabaceae*	Pea	Ksho	Climber	Seed	Dried	Crushed, powder

57	*Psidium guajava*	*Myrtaceae*	Zeytuna	Zeytune	Tree	Fruit, leaves	Fresh	Crushed, extract juice
58	*Prunus persica*	*Rosaceae*	Peach	Kuk	Tree	Leaves	Fresh	Infusion
59	*Rhamnus prinoides*	*Rhamnaceae*	Geshо	Geshe	Shrubs	Leaves	Fresh	Chewed
60	*Rosa rubigonosa*	*Rosaceae*	Sweet briar	Tsegerede	Shrubs	Flower	Fresh	Drop the juice
61	*Rumex nervosus*	*Polygonaceae*	Embuacho	Embuache, Angago	Shrubs	Leaves	Fresh	Crushed
62	*Ruta graveolens*	*Rutaceae*	Garden rue	Chirakuye	Shrubs	Leaves	Fresh	Chewed, crushed
63	*Solanum incanum*	*Solanaceae*	Embuay	Zereche	Shrubs	Root	Fresh	Infusion or Chewed, crushed
64	*Solanum tuberosum*	*Solanaceae*	Potato	Dinche	Herbs	Corm	Fresh	Chewed
65	*Soccharum officinarum*	*Poaceae*	Sugar cane	Shonkore	Shrubs	Stem	Fresh	Chewed
66	*Taveniera abyssinica*	*Fabaceae*	Dingetegna	Dingetegna	Herbs	Root	Dried	Heat, crushed
67	*Thymus vulgaris*	*Lamiaceae*	Thyme	Tsosgne	Herbs	Leaves	Fresh	Crushed, powder
68	*Vernonia amygdalina*	*Asteraceae*	Bitter leaf	Grawa	Herbs	Leaves	Fresh	Crushed
69	*Vicia faba*	*Fabaceae*	Broad bean	Bakele	Climber	Seed	Dried, fresh	Cocked, burns
70	*Withania somnifera*	*Solanaceae*	Ashwagandha	Gezawe	Herbs	Leaves	Fresh	Boil, burn
71	*Zingiber officinale*	*Zingiberaceae*	Ginger	Zingbel	Herbs	Corm	Fresh	Chewed, Boiled

S/No.	Route adiminstration	Additives	Disease treated	Dosage	Side effect and antidotes
1	Oral	Pepper, water,cabbage,lemmon	To treat hypertation to human	Full of spoon	Bad breath and brush teeth, limit dose
2	Tooth surface, nasal, oral,	water,honey,tea, zingible	To treat common cold ,TB, Cough, asthma,digetegna,tooth	Full of spoon	Continuous Sneezing burn

	hold with teeth		ache, Malaria to human, Abdominal pain, Defence disease both human and livestock		
3	Dermal,paint the latex, oral	water, salts	Curing anthrax to livestock, dandruff, wounds, stomach ache to human and apetite problem , General malaise (Mich),	difference individual to individual	Pain full to human when burn the wounds then burn or warm few seconds
4	Oral ,paint, throat,infusion	Water	Treatment of wounds to human, Liver complaint (Qoya) and Tonsilitis	Full of spoon	minimize digestion system, doing exercised
5	Dermal, oral, tooth surface	Water	To stop breast feed the early age of child, wound treatments to human external parts,knee and leg pain,Abdominal pain	By spoon Tea glass, cup	some times happened vomitinng then decrease doses of medication
7	Topica	Water	Prevent evil eye, leprosy, malaria to human	difference individual to individual	Vomitting then minimize dose
8	Dermal	Coffea, milk, water, tea	Treat abdomenal dryness, anthrax and wounds	difference individual to individual	No side effect
9	Oral	Water, oil, onion	Abdomen dryness to human beings and Livestock	difference individual to individual	No side effect but high dose discomfort in abdomen
10	Oral, hold with teeth	Pepper, water,cabbage,lemmon	Treatment of human tonsilities, common cold, Toothache	Difference individual to individual	Cause stomach ache, then decrease dose and use high water
11	Oral	Water, sugar	Treatments of stomach ache, coughing to human	difference individual to individual	Loss of apetite, affect teeth then minimize doze
12	Oral	Water,	Treaments of malaria , treatment of stomach ache human, wet livestock stomach	Difference individual to individual	No side effect to humans
13	Oral, nasal, dermal	Water, honey	Treatment of wounds to human and livestock,treatment of headache, curing diarhea mixing with honey to human	Full of spoon, cup	Stomach ache or pain then minimize dose
14	Dermal	Water, honey	Treatment of for curing itching via applying the powder of root on the area to human	Full of spoon	No side effect
15	Oral	water,coffea, enjera, bread, tea	Treatment of wounds to human specially increase or form pus	Difference individual to individual	Discomfort in stomach minimize dose
16	Oral ,dermal	Water, tea, coffea	Tonsillitis; Abdominal pain, Intestinal parasites, skin rash, abdominal ache, wounds, bad foot smell to	difference individual to individual	Burn damaged part minimize dose

			human		
17	Oral, dermal, nasal	orange,water,lemmon	Treatment of common cold to human, destroy external parasite to livestock	difference individual to individual	Incomfort stomach then use milk
18	Oral, nasal	Water, lemmon, sugar, bitter orange	Treatments of common cold, stomach ache to human	difference individual to individual	No side effect
19	Nasal,	Water	General malaise (michi), evil spirit (dorer, likift, buda) to human	One to seven day contineously	No side effect
20	Dermal	Water	To collect pus when treat anthrax or shme-tere,Wound Swelling to human and livestock	Difference individual to individual	Burn damaged part minimize time, dose
21	Oral	Water	Headache, Teniasis (Seto, Chima), treatments of gastrits to human	difference individual to individual	No side effect
22	Nasal, washed	water, damakessie, rue, grawa, gzawa	Evil eye treatment , dingetegna, Common wart, wound to human	Difference individual to individual	Etching skin then wash parts after used, minimize dose use in fresh
23	Nasal, dermal	Water	Deoxygenated blood bleeding to nose part or niser, wound healing to human	Difference individual to individual	No side effect
24	Inhale the smoke directly teeth	Butter	Tooth ache, Dandruff, Headache to human	Different individual to individual	No side effect
25	Oral	Onion, cabbage	Treat sight problems when see to human	Until eat decrease the effect	No side effect
26	Oral, smoke, nasal	water	Treat fever, treat diarhea and malaria to human	Different individual to individual	Symptoms of vomitting then minimize dose, time to use
27	Oral	Water	Treatments of indigestion to human	Different individual to individual	No side effect
28	Oral , Dermal, nasal	Water, moseret, grawa, gizawa, croton	To treat headache, general malaise or mich, dingetegna, or evil eye, common cold to human	Different individual to individual	No side effect
29	Oral, smoke, nasal	Sugar, kerosene	general malaise (michi), abdominal pain, evil eye, both livestock and human	Limited by minutes	Symptoms of vomitting,noisy then minimize dose, minute to use
30	Oral	Milk, meat, salt, cabbage, butter	To treat bone break, body repairments, placenta retained , to human and livestock	Different individual to individual	Decrease rate of digestive system

	Oral	Milk, meat, salt, cabbage, butter	Development of bone, strong muscle, and joint strength	Different individual to individual	No side effect
	Oral	Milk, meat, salt, cabbage, butter	Fracture bone, back bone to human	Different individual to individual	No side effect
	Oral	Milk, meat, salt, cabbage, butter	bone break, strength bone	Different individual to individual	No side effect
	Oral	Milk, meat, salt, cabbage, butter	Treat kintarot, and ulcer	Different individual to individual	No side effect
	Oral	Milk, meat, salt, cabbage, butter	Broken bone and cure cough	Different individual to individual	No side effect
31	Oral	Milk, citrus, water	Treatment of athlet foot, wart to human	Difference individual to individual	No side effect
32	Oral, nasal drop	Water, coffea, tea	Evil spirit (dorer, likift, buda), general malaise(mich), gonorrhoea, abdominalpain to human	Ristricted by minutes	Bitter taste in the use parts
33	Hold with teeth	Water	Toothache, Anthrax (Shem itere) to human	Limited dose in each individuals	Sour taste in mouth then use limited minute
34	Oral , drink the decoction	tea, coffea, rice, wheat	Coughing, Common cold, diarhea to human	Different individual to individual	Loss of apetite and digestive system then minimize dose
35	Oral	Water	Treatment of tape worm'Seto, loss of apetite, Abdominal pain, Diarrhea, placenta retained to human,	Limited by age	Vomitting then decrease dose, use milk
36	Oral	Water,tea, coffee	Treatment bone break both livestock and humans body repairment	Cup of glass	No side effect
37	Oral	Water, sugar, butter	Anemia, Amoebiasis, Anthrax (Shem-itere), Retained placenta, improve strength and boost immunity of infants), to human	Cup of glass, cup	No side effect
38	Oral	water,honey	Treatment of wounds, ring worms to human	By thumb	No side effect
39	Nasal, dermal,	Croton, Rue, damakesie, water	Treatment of Malaria; general malaise (michi), evil eye to human	By liter of water one to seven day	Noisy then wash few minute
40	Eye, nasal, topical	water	Eye infection (wucher), mich, foot and finger disease to human	Simply brush by coton	Burn parts then use ones minute
41	Oral	Water	Treatments of anemia, and common cold to human	Difference individual to	No side effect

				individual	
42	Topical	Water	Dandruff, wound to human	Brush by thumb	No side effect
43	nasal	Water	Headacche, General malaise (michi) to human	Cup	No side effect
44	Oral	Water, coffea, Tea	Constipation, Amoebiasis, Abdominal pain to human	Cup	Loss of apetite then minimize dose
45	Oral	Butter,ergo , cheese	Treatment of appetite problem to human	Full of spoon	No side effect
46	Oral	Water	Malaria, Intestinal parasites to human	Cup	Discomfort in the stomach
47	Oral	Water, coffea, Tea	Kidney pain or infection to human	By spoon, cup	No side effect
48	Oral	Water, coffea, Tea	Hypertension, Malaria to human	Spoon, cup	No side effect
49	Oral	Coffea, Tea	Headache, Abdominal pain, General malaise to human	Spoon, cup	Burn stomach then use drink water
50	Oral, nasal, infusion, topical	Coffea, tea, water	Stomach ache, headache, external parasite to livestocks and poisnous food, snake bite to human and livestock	Spoon, cup	Cause diarhea in livestock the poisen foods absorbed
51	Oral	Coffea,tea	Treatment abdominal bloating to human	Cup	No side effect
52	Hold with teeth		Treatment toothache, and bad breath to human		No side effect
53	squeeze, nasal	Coffea, Tea, water,	Common cold, coughing, general malaise(Michi), Headache to human	Spoon, cup	Burn, sour then use water
54	Oral, topical	Water, coffea, Tea	Dandruff, Anemia to human	Cup	Bad smell in hair then wash after few times
55	Oral	Water, wet	Improvements of apetite problem, cold cough to human	Spoon	Burnthen use water and decrease dose
56	Oral	Water, salt, coffea, tea, kocho	Treatments of musle illness and bone break, wound treatments both livestock and human	Cup, glass	No side effect
57	Oral, Topical	Water	Wound, Dandruff, Constipation to human	Cup	No side effect
58	Oral	Water	dingetegna or General malaise both human and livestock , anthrax or Shem-itere to livestock	Cup, glass	No side effect
59	Oral	Water	Treatments of tonsilities to human	Single leave	Sour then minimize dose and chewed minute
60	Nasal, eye	Water	Treatments of deoxygenated blood to nose (nisr)	Few leaves	No side effect, and treatments of eye infection wucher
61	Topical	Water	common wart to human	Leaves	No side effect
62	Oral, nasal	Coffea, water, tea	Common cold, abdomen pain, Constipation, general malaise	Spoon, cup	No side effect
63	Topical	Water	Anthrax (Shem-itere), Dandruff, Wound livestock and human Tonsillitis	Leaves, fruit	No side effect
64	Infusion	Water,	Treatment of common cold,	Difference	No side effect

		coffea, Tea, milk	increase body temprature or cold to human	individual to individual	
65	Oral		Treatments of stomach ache, tooth brush, and sour to human	Single stem	In active the teeth chewed food then minize dose
66	Smoke, nasal	Sugar	Treatment of General malaise (michi), evil eye, to human and livestock, fever to human	Smoke few minute	Noisy then wash few seccnds
67	Infusion	Water	Hypertension,respiratory conditions cough, antimicrobial to human and livestock to cough	Spoon, cup	No side effect
68	Oral, nasal, topical	Water, gezawa, damakesie	To treatments of epilepsy, mich, evil spirit (dorer, likift, buda), general malaise (michi) to human	Cup, glass	No side effect
69	Oral, infusion	Water, salt, coffea, tea	To treatments push pus in wounds disease anthrax, depression, to human	Cup, glass	No side effect
70	Topical	Water, damakesie, rue, grawa	Evil spirit (dorer, likift, buda), general malaise (michi), treating malaria, anthrax or shimetere to human	Cup, wash ones aday	Noisy to infants wash minimum time
71	Decoction, crushed or chewed	Tea, water	Tonsillitis, abdominal pain, toothache, common cold, coughing to human	Spoon , cup	Burn gastrities then use water

S/No.	Route adiminstration	Additives	Disease treated	Dosage	Side effcet and antidtoes
1	Oral	Pepper, water,cabbage,lemmon	To treat hypertation to human	Full of spoon	Bad breath and brush teeth, limit dose
2	Tooth surface, nasal, oral, hold with teeth	water,honey, tea, zingible	To treat common cold ,TB, Cough, asthma,digetegna,tooth ache, Malaria to human, Abdominal pain, Defence disease both human and livestock	Full of spoon	
3	Dermal,paint the latex, oral	water, salts	Curing anthrax to livestock, dandruff, wounds, stomach ache to human and apetite problem , General malaise (Mich),	difference individual to individual	Pain full to human when burn the wounds then burn or warm few seconds

4	Oral ,paint, throat,infusion	Water	Treatment of wounds to human, Liver complaint (Qoya) and Tonsilitis	Full of spoon	minimize digestion system, doing exercised
5	Dermal, oral, tooth surface	Water	To stop breast feed the early age of child, wound treatments to human external parts,knee and leg pain,Abdominal pain	By spoon Tea glass, cup	some times happened vomitinng then decrease doses of medication
7	Topica	Water	Prevent evil eye, leprosy, malaria to human	difference individual to individual	Vomitting then minimize dose
8	Dermal	Coffea, milk, water, tea	Treat abdomenal dryness, anthrax and wounds	difference individual to individual	No side effect
9	Oral	Water, oil, onion	Abdomen dryness to human beings and Livestock	difference individual to individual	No side effect but high dose discomfort in abdomen
10	Oral, hold with teeth	Pepper, water,cabbage,lemmon	Treatment of human tonsilities, common cold, Toothache	Difference individual to individual	Cause stomach ache, then decrease dose and use high water
11	Oral	Water, sugar	Treatments of stomach ache, coughing to human	difference individual to individual	Loss of apetite, affect teeth then minimize doze
12	Oral	Water,	Treaments of malaria , treatment of stomach ache human, wet livestock stomach	Difference individual to individual	No side effect to humans
13	Oral, nasal, dermal	Water, honey	Treatment of wounds to human and livestock,treatment of headache, curing diarhea mixing with honey to human	Full of spoon, cup	Stomach ache or pain then minimize dose
14	Dermal	Water, honey	Treatment of for curing itching via applying the powder of root on the area to human	Full of spoon	No side effect
15	Oral	water,coffea, enjera, bread, tea	Treatment of wounds to human specially increase or form pus	Difference individual to individual	Discomfort in stomach minimize dose
16	Oral ,dermal	Water, tea, coffea	Tonsillitis; Abdominal pain, Intestinal parasites, skin rash, abdominal ache, wounds, bad foot smell to human	difference individual to individual	Burn damaged part minimize dose
17	Oral, dermal, nasal	orange,water ,lemmon	Treatment of common cold to human, destroy external parasite to livestock	difference individual to individual	Incomfort stomach then use milk
18	Oral, nasal	Water, lemmon, sugar, bitter orange	Treatments of common cold, stomach ache to human	difference individual to individual	No side effect
19	Nasal,	Water	General malaise (michi), evil spirit	One to seven day	No side effect

			(dorer, likift, buda) to human	contineously	
20	Dermal	Water	To collect pus when treat anthrax or shme-tere,Wound Swelling to human and livestock	Difference individual to individual	Burn damaged part minimize time, dose
21	Oral	Water	Headache, Teniasis (Seto, Chima), treatments of gastrits to human	difference individual to individual	No side effect
22	Nasal, washed	water, damakessie, rue, grawa, gzawa	Evil eye treatment , dingetegna, Common wart, wound to human	Difference individual to individual	Etching skin then wash parts after used, minimize dose use in fresh
23	Nasal, dermal	Water	Deoxygenated blood bleeding to nose part or niser, wound healing to human	Difference individual to individual	No side effect
24	Inhale the smoke directly teeth	Butter	Tooth ache, Dandruff, Headache to human	Different individual to individual	No side effect
25	Oral	Onion, cabbage	Treat sight problems when see to human	Until eat decrease the effect	No side effect
26	Oral, smoke, nasal	water	Treat fever, treat diarhea and malaria to human	Different individual to individual	Symptoms of vomitting then minimize dose, time to use
27	Oral	Water	Treatments of indigestion to human	Different individual to individual	No side effect
28	Oral , Dermal, nasal	Water, moseret, grawa, gizawa, croton	To treat headache, general malaise or mich, dingetegna, or evil eye, common cold to human	Different individual to individual	No side effect
29	Oral, smoke, nasal	Sugar, kerosene	general malaise (michi), abdominal pain, evil eye, both livestock and human	Limited by minutes	Symptoms of vomitting,noisy then minimize dose, minute to use
30	Oral	Milk, meat, salt, cabbage, butter	To treat bone break, body repairments, placenta retained , to human and livestock	Different individual to individual	Decrease rate of digestive system
	Oral	Milk, meat, salt, cabbage, butter	Development of bone, strong muscle, and joint strength	Different individual to individual	No side effect
	Oral	Milk, meat, salt, cabbage, butter	Fracture bone, back bone to human	Different individual to individual	No side effect
	Oral	Milk, meat, salt, cabbage, butter	bone break, strength bone	Different individual to individual	No side effect
	Oral	Milk, meat, salt,	Treat kintarot, and ulcer	Different individual to	No side effect

		cabbage, butter		individual	
	Oral	Milk, meat, salt, cabbage, butter	Broken bone and cure cough	Different individual to individual	No side effect
31	Oral	Milk, citrus, water	Treatment of athlet foot, wart to human	Difference individual to individual	No side effect
32	Oral, nasal drop	Water, coffea, tea	Evil spirit (dorer, likift, buda), general malaise(mich), gonorrhoea, abdominalpain to human	Ristricted by minutes	Bitter taste in the use parts
33	Hold with teeth	Water	Toothache, Anthrax (Shem itere) to human	Limited dose in each individuals	Sour taste in mouth then use limited minute
34	Oral , drink the decoctio n	tea, coffea, rice, wheat	Coughing, Common cold, diarhea to human	Different individual to individual	Loss of apetite and digestive system then minimize dose
35	Oral	Water	Treatment of tape worm'Seto, loss of apetite, Abdominal pain, Diarrhea, placenta retained to human,	Limited by age	Vomitting then decrease dose, use milk
36	Oral	Water,tea, coffee	Treatment bone break both livestock and humans body repairment	Cup of glass	No side effect
37	Oral	Water, sugar, butter	Anemia, Amoebiasis, Anthrax (Shem-itere), Retained placenta, improve strength and boost immunity of infants), to human	Cup of glass, cup	No side effect
38	Oral	water,honey	Treatment of wounds, ring worms to human	By thumb	No side effect
39	Nasal, dermal,	Croton, Rue, damakesie, water	Treatment of Malaria; general malaise (michi), evil eye to human	By liter of water one to seven day	Noisy then wash few minute
40	Eye, nasal, topical	water	Eye infection (wucher), mich, foot and finger disease to human	Simply brush by coton	Burn parts then use ones minute
41	Oral	Water	Treatments of anemia, and common cold to human	Difference individual to individual	No side effect
42	Topical	Water	Dandruff, wound to human	Brush by thumb	No side effect
43	nasal	Water	Headacche, General malaise (michi) to human	Cup	No side effect
44	Oral	Water, coffea, Tea	Constipation, Amoebiasis,	Cup	Loss of apetite then minimize dose

			Abdominal pain to human		
45	Oral	Butter,ergo, cheese	Treatment of appetite problem to human	Full of spoon	No side effect
46	Oral	Water	Malaria, Intestinal parasites to human	Cup	Discomfort in the stomach
47	Oral	Water, coffea, Tea	Kidney pain or infection to human	By spoon, cup	No side effect
48	Oral	Water, coffea, Tea	Hypertension, Malaria to human	Spoon, cup	No side effect
49	Oral	Coffea, Tea	Headache, Abdominal pain, General malaise to human	Spoon, cup	Burn stomach then use drink water
50	Oral, nasal, infusion, topical	Coffea, tea, water	Stomach ache, headache, external parasite to livestocks and poisnous food, snake bite to human and livestock	Spoon, cup	Cause diarhea in livestock the poisen foods absorbed
51	Oral	Coffea,tea	Treatment abdominal bloating to human	Cup	No side effect
52	Hold with teeth		Treatment toothache, and bad breath to human		No side effect
53	squeeze, nasal	Coffea, Tea, water,	Common cold, coughing, general malaise(Michi), Headache to human	Spoon, cup	Burn, sour then use water
54	Oral, topical	Water, coffea, Tea	Dandruff, Anemia to human	Cup	Bad smell in hair then wash after few times
55	Oral	Water, wet	Improvements of apetite problem, cold cough to human	Spoon	Burnthen use water and decrease dose
56	Oral	Water, salt, coffea, tea, kocho	Treatments of musle illness and bone break, wound treatments both livestock and human	Cup, glass	No side effect
57	Oral, Topical	Water	Wound, Dandruff, Constipation to human	Cup	No side effect
58	Oral	Water	dingetegna or General malaise both human and livestock , anthrax or Shem-itere to livestock	Cup, glass	No side effect
59	Oral	Water	Treatments of tonsilities to human	Single leave	Sour then minimize dose and chewed minute
60	Nasal, eye	Water	Treatments of deoxygenated blood to nose (nisr)	Few leaves	No side effect, and treatments of eye infection wucher
61	Topical	Water	common wart to human	Leaves	No side effect
62	Oral, nasal	Coffea, water, tea	Common cold, abdomen pain, Constipation, general malaise	Spoon, cup	No side effect
63	Topical	Water	Anthrax (Shem-itere), Dandruff, Wound livestock and human Tonsillitis	Leaves, fruit	No side effect

64	Infusion	Water, coffea, Tea, milk	Treatment of common cold, increase body temprature or cold to human	Difference individual to individual	No side effect
65	Oral		Treatments of stomach ache, tooth brush, and sour to human	Single stem	In active the teeth chewed food then minize dose
66	Smoke, nasal	Sugar	Treatment of General malaise (michi), evil eye, to human and livestock, fever to human	Smoke few minute	Noisy then wash few seccnds
67	Infusion	Water	Hypertension,respiratory conditions cough, antimicrobial to human and livestock to cough	Spoon, cup	No side effect
68	Oral, nasal, topical	Water, gezawa, damakesie	To treatments of epilepsy, mich, evil spirit (dorer, likift, buda), general malaise (michi) to human	Cup, glass	No side effect
69	Oral, infusion	Water, salt, coffea, tea	To treatments push pus in wounds disease anthrax, depression, to human	Cup, glass	No side effect
70	Topical	Water, damakesie, rue, grawa	Evil spirit (dorer, likift, buda), general malaise (michi), treating malaria, anthrax or shimetere to human	Cup, wash ones aday	Noisy to infants wash minimum time
71	Decoction, crushed or chewed	Tea, water	Tonsillitis, abdominal pain, toothache, common cold, coughing to human	Spoon , cup	Burn gastrities then use water