



WALLAGA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES
DEPARTMENT OF BIOLOGY

**ETHNOBOTANICAL INVESTIGATION OF MEDICINAL PLANTS USED
FOR HUMAN AND LIVESTOCK AILMENTS UTILIZED BY
INDIGENOUS COMMUNITIES OF JIMMA HORRO DISTRICT, QELLEM
WALLAGA ZONE, OROMIA NATIONAL REGIONAL STATE, WESTERN
ETHIOPIA**

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November 2025
Nekemte, Ethiopia



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ETHIOPIA**

**A Thesis Submitted to the College of Natural and Computational Sciences
Department of Biology in Partial Fulfillment of the Requirements for the
Degree of Master of Science in Ecology and Conservation Biology**

By:

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APPROVAL SHEET FOR SUBMITTING FINAL THESIS

As members of the Board of Examining of the Final M.A. /M.Sc. thesis open defense, we certify that we have read and evaluated the thesis prepared by Mahammud Abdullahi Lata under the title **“Ethnobotanical Investigation of Medicinal Plants Used for Human and Livestock Ailments Utilized by Indigenous Communities of Jimma Horro District Qellem Wallaga Zone, Oromia National Regional State, Western Ethiopia”** and recommend that the thesis be accepted as fulfilling the thesis requirement for the **Degree of Master of Science in Ecology and Conservation Biology**.

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Certification of the Final Thesis

I hereby certify that all the correction and recommendation suggested by the board of examiners are incorporated into the final thesis entitled **“Ethnobotanical Investigation of Medicinal Plants Used for Human and Livestock Ailments Utilized by Indigenous Communities of Jimma Horro District Qellem Wallaga Zone, Oromia National Regional State, and Western Ethiopia”** by Mahammud Abdullahi Lata.

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ABBREVIATIONS AND ACRONYMS

JHD	Jimma Horro District
HH	House Holds
KIs	Key informants
MP	Medicinal Plants
GPS	Gravitational Position System
WUH	Wallaga University Herbarium
SPSS	Statistical Package for the Social Science
ICF	Informant Consensus Factor
FL	Fidelity level
USD	United states of American Dollar
TM	Traditional Medicine
TMP	Traditional medicinal plants

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ABSTRACT

*This study aimed to investigate ethnobotanical knowledge on the use and management of medicinal plants by indigenous communities in the Jimma Horro district of Kellem Wallaga Zone, Oromia, and Western Ethiopia. It also sought to document and organize information on the traditional use, management, and conservation of medicinal plants in the district. The study contributes to improved understanding of medicinal plant use for human and livestock health and informs local communities, health practitioners, policy makers, and future research. The study employed semi-structured interviews, guided field walks, direct observation, group discussions, preference ranking, paired comparison, direct matrix ranking, and fidelity level index analysis. Four (4) study sites (kebeles) and ten (10) key informants were selected purposively and fifty-six (56) regular informants were selected randomly, generally, sixty-six (66) informants were selected to participate in data collection, including identifying medicinal plant species from wild habits and home gardens and documenting their use in treating human and livestock ailments. The study identified 95 medicinal plant species grouped into 84 genera and 47 families. Most of them those thirty-two (32) species were trees, followed by thirteen (30) species were herbs and thirteen (30) species were shrubs, and the least three (3) species were climbers. From identified species; Thirty-nine (39) species were used for humans and livestock, Forty-three (43) species for humans, and thirteen (13) species for livestock disease treatment. The identified used parts of medicinal plants based on prepared remedy parts were mostly leaves 41 (30.8%) usable parts followed by roots 21(15.8%), bark 19(14.3%), seeds 19(14.3%) and the least are above ground parts, all parts, leaf with branch and Rhizome are those with 1(0.8%). In addition to their medicinal value, the study also identified other uses of medicinal plants, such as: for fuel, timber, charcoal, shade, construction, fence, edible (food) to identify multi purpose uses of them in direct matrix ranking. Accordingly, *Cordia africana* L. was the most usable multi purpose species. Due to anthropogenic activities medicinal plants, especially multipurpose plant species were highly threatened and special care must be given to conserve them.*

Key Words/Phrases: Human ailments; indigenous knowledge; Jimma Horro district; livestock ailments; medicinal plants.

1. INTRODUCTION

1.1. Background of the Study

Ethnobotany is the study of the relationships between plants and people with particular emphasis on traditional cultures (Asmera Amde *et al.*, 2020). Ethnobotany is also defined as local people's interaction with their natural environment: how they classify, manage and use plants available around them (Asmera Amde *et al.*, 2020). People in many parts of the world use medicinal plants as traditional treatments for various human ailments (Behailu Assefa *et al.*, 2021). Plant-based drugs have been developed as a result of some of the findings from worldwide research to confirm their effectiveness (Moa Megersa *et al.*, 2023).

Globally, about 64% of the total world population is reliant on traditional medicine for their healthcare needs (Vellingiri *et al.*, 2020). After fulfilling primary needs like food and shelter, man has sought a suitable remedy among plants for curing various diseases (Tilahun Tolossa Jima & Moa Megersa, 2018). The primary means of treating diseases and fighting infections have been based on the use of medicinal plants (Khadka *et al.*, 2021). According to (Balick & Cox, 2020), traditional medicine has been used for thousands of years, with great contributions made by practitioners to human health.

Modern health care has never been and probably never will provide adequate and equitable health services anywhere in Africa, particularly in Ethiopia (Azevedo & Azevedo, 2017). Thus, medicinal plants continue to be in high demand in the health care system as compared to modern medicine (Rasool *et al.*, 2020; Ahad *et al.*, 2021; Qadir & Raja, 2021). Developing countries around the world have been using mostly traditional medicinal plants for the treatment of human and livestock ailments (Kamatchi & Parvathi, 2020).

Ethiopia possesses more than 6,000 species of vascular plants, which are composed of a rich diversity of medicinal plants, including over 1,000 species used in traditional herbal medicine practices, which could be due to its different topography and climatic conditions (Fikadu Yirga *et al.*, 2019).

According to Sintayehu Tamene Wondo (2020); Yihenew Simegniew Birhan (2023) and Abenezer Wendimu *et al.* (2023), about 80% of the human population and 90% of livestock rely on traditional medicine in Ethiopia.

The study done by (Tamirat Alemu1 *et al.*, 2024) Native population in western parts of Ethiopia great engaged plant support customary tablets to get cured from different ailments. In addition, the study done by (Firaol Bekele Bayecha *et al.*, 2017) in Dale Sadi Districts, Kellem Wallaga, Oromia Regional State of Western Ethiopia showed that the local communities of the district depends on medicinal plants for the treatment livestock ailments. Even though there is a wealth of indigenous knowledge transfer is declining from generation to generation as a result of oral transmission, there is the wide use of medicinal plants in Hawa Galan and Sayo District in meeting the primary healthcare needs of the community (Debela Abdeta *et al.*, 2020).

1.2. Statement of the Problem

The transfer of traditional medicinal plant knowledge from one generation to another, often orally and with some knowledge being kept secretive, has led to a gradual erosion of this invaluable knowledge worldwide (Hedges *et al.*, 2020). Factors such as urbanization, deforestation, and cultural assimilation have accelerated this decline, contributing to the extinction of traditional knowledge systems (Nadeau, 2020; Hernandez, 2022). Consequently, vital information regarding plant usage, preparation techniques, and other aspects of traditional medicine values are being lost (Moa Megersa *et al.*, 2023).

The conservation and transmission of indigenous knowledge face threats, particularly due to the depletion of locally available medicinal plants. The study area experiences extensive environmental degradation resulting from agricultural expansion, overutilization, and overgrazing. Additionally, reluctance of the younger to accept the knowledge compounded by modernization influences further hampers knowledge transmission.

Furthermore, as time progresses, indigenous knowledge of medicinal plants continues to diminish as elders pass away without passing on their knowledge. In many societies, some healers have a prevalent tendency to withhold knowledge, even from family members, let alone

outsiders that decreases the knowledge as time goes forward from generation to the next generation. Notably, there is a dearth /absence/ of research regarding the indigenous knowledge of traditional medicinal plants in the study area, highlighting the need for this study to serve as foundational material for future research endeavors. Documenting the indigenous knowledge of local communities on traditional medicinal plants in the study area is crucial for preserving this heritage.

Comparison with existing literature reveals gaps in research contexts and focus areas. Studies such as that conducted by Tolera Fufa Feyissa *et al.* (2017) focused on ethnoveterinary plants in Dale Sadi district, Kellem Wallaga Zone, Western Ethiopia, whereas this research delves into medicinal plants used by indigenous people of Jimma Horro district, Kellem Wallaga zone. Similarly, Yibrah Tekle (2015) focused on ethnoveterinary practices in Bensa Woreda, Southern Ethiopia, whereas this research concentrates on the medicinal plants used in Jimma Horro district. Thus, this study seeks to address the ethnobotanical study of traditionally used medicinal plants for human and livestock ailments in Jimma Horro district, filling crucial gaps in knowledge within the region.

1.3. Research Questions

1. Which species of traditional medicinal plants are employed in the treatment of both human and livestock ailments?
2. Which specific parts of traditional medicinal plants are used to treat both human and livestock ailments?
3. What methods of preparation and routes of administration are utilized for medicinal plants in treating both human and livestock ailments?
4. How does indigenous knowledge transfer between generations?

1.4. Objectives

1.4.1 General objective

To investigate ethnobotanical study of traditional medicinal plants used by indigenous people of Jimma Horro district of Kellem Wallaga zone, Western Ethiopia.

1.4.2 Specific objectives

1. To record the species of traditional medicinal plants used for the treatment of human and livestock ailments.
2. To investigate the parts of traditional medicinal plants used for the treatment of human and livestock ailments.
3. To access and identify methods of preparation and routes of administration utilized for medicinal plants in treating both human and livestock ailments.
4. To investigate how indigenous knowledge is transferred from traditional healers and the local community to the next generation.

1.5. Significance of the Study

This study is significant in documenting and enhancing understanding of medicinal plant species used in traditional medicine, emphasizing their biodiversity and ethnobotanical value. By identifying the specific plant parts utilized in traditional treatments, it provides insight into local healing practices and indigenous knowledge systems, supporting sustainable harvesting and guiding efforts toward the cultivation of medicinal plants for community and commercial use. The study also examines traditional methods of preparation and routes of administration, contributing to a clearer understanding of practices that influence the efficacy and safety of medicinal plants in treating both human and livestock ailments. In addition, it explores the transmission of indigenous medicinal knowledge from traditional healers to younger generations, which is essential for preserving cultural heritage and ensuring the continuity of traditional healing practices. Documenting this endogenous knowledge can inform educational initiatives, community outreach programs, and intergenerational knowledge-sharing efforts. Overall, the study has important implications for sustainable development and intercultural dialogue and contributes valuable insights for local communities, healthcare practitioners, policy makers and future researchers.

2. LITERATURE REVIEW

2.1. Indigenous Local Community Knowledge

Indigenous knowledge encompasses the cumulative body of understanding held by local communities regarding norms, practices, skills, and world views (Lam *et al.*, 2020). Due to their close and sustained interaction with natural resources, local populations have developed knowledge systems that enable adaptation and survival within their environments (Acosta *et al.*, 2021). This knowledge is culturally specific and underpins diverse activities, including health care, agriculture, food, and environmental conservation (Scherrer, 2022). The depth and quality of indigenous knowledge vary according to factors such as age, gender, social status, occupation, and intellectual capacity (McKay *et al.*, 2021). Traditional medicine is one of the most widely practiced indigenous knowledge systems globally (Mohd Salim *et al.*, 2023).

Ethnomedicinal knowledge includes traditional methods of diagnosis, collection of medicinal materials, preparation of remedies, and prescription to patients (Mikias Teshome *et al.*, 2023). In many countries, including Ethiopia, this knowledge is transmitted orally from generation to generation (Gadisa Demie *et al.*, 2018).

However, such informal transmission exposes ethnomedicinal knowledge to loss and distortion, highlighting the need for systematic documentation through ethnobotanical research (Machi Dida Boru (2023).

2.2. Overview of Ethnobotany

Although animal- and mineral-based products contribute to human welfare, plants are fundamental to human well-being, particularly in meeting basic needs (Tegegn Dilbato *et al.*, 2023). Plants have long served as essential sources of traditional medicines for both humans and livestock, used in disease prevention and treatment (Sileshi Dubale *et al.*, 2023). Since ancient times, traditional medicine practices in many countries have been closely linked to indigenous knowledge systems (Mathewos Agize *et al.*, 2022).

Observations of animal behavior further support the medicinal value of plants; for example, chimpanzees are known to use specific plant species for self-medication (Berhanu Shewangizaw Tefera, 2023).

Ethnobotany focuses on documenting the cultural relationships between people and plants (Merrouni *et al.*, 2021). According to Basharat Ahmad Malik *et al.* (2021), comprehensive and accurate ethnobotanical research requires interdisciplinary collaboration among linguists, economic botanists, pharmacologists, taxonomists, ecologists, anthropologists, and related specialists. Studies by Nair *et al.*, (2023), Vargas-Carpintero *et al.*, (2023), and Vallejo *et al.*, (2024) demonstrate that such multidisciplinary approaches enable ethnobotany to systematically document indigenous botanical knowledge, cultural practices, plant use and management, and the benefits derived from plant resources.

2.3. Plant- Based Medicines for Humans and Livestock Ailments

Plants have been used for centuries in traditional medicine systems (e.g., Ayurveda, Traditional Chinese Medicine) to treat both human and animal diseases (Jaiswal *et al.*, 2016). Today, many modern pharmaceuticals are either directly extracted from plants or inspired by plant compounds (Chaachouay & Zidane, 2024). Examples in Human Medicine are: - Aspirin – Derived from salicin in willow bark (*Salix* spp.), Morphine & Codeine – From the opium poppy (*Papaver somniferum*), Artemisinin – From sweet wormwood (*Artemisia annua*) used to treat malaria, Digoxin – From foxglove (*Digitalis purpurea*), used for heart conditions, Paclitaxel (Taxol) – From Pacific yew tree (*Taxus brevifolia*), used in cancer chemotherapy (Van Wyk, 2024).

Plant-based remedies are increasingly explored in veterinary medicine, especially with rising concerns about antibiotic resistance and organic farming demands (AlSheikh *et al.*, 2020). Examples in Livestock Medicine are: - Neem (*Azadirachta indica*) used as an antiparasitic (against ticks, lice, mites), antimicrobial and wound-healing properties, Garlic (*Allium sativum*) used for natural dewormer and immune booster in poultry and ruminants, Turmeric (*Curcuma longa*) used for Anti-inflammatory and antioxidant; used to support joint health and digestion in livestock, *Aloe vera* used for Applied topically for skin wounds or

internally for gut health, Eucalyptus & Thyme oils used in respiratory treatments for cattle and poultry due to antimicrobial effects (Singh et al., 2021).

Ethnoveterinary medicine refers to the traditional knowledge and practices used for animal health care, including herbal remedies, surgical procedures, and manipulative techniques (Titus, 2022). Across Africa, including Ethiopia, many traditional veterinary practices remain undocumented despite their crucial role in livestock health management (Engida Kasa Boru, 2023). Ethiopia possesses one of the least developed formal veterinary systems, even though livestock production significantly contributes to livelihoods and animal health initiatives (Nyokabi *et al.*, 2023). Consequently, livestock owners rely heavily on indigenous knowledge to manage common animal diseases (Abenezer Wendimu *et al.*, 2023).

Farmers and pastoralists have developed locally adapted strategies to maintain animal health and productivity (Alders *et al.*, 2021). Collectively, these beliefs and practices constitute ethnoveterinary medicine, representing an important component of traditional animal health care systems (Mekides Tesfaye & Mosissa Geleta Erena, 2020).

2.4. Role of Traditional Medicinal Plants in Health Care Systems

In much of Africa, including Ethiopia, a large proportion of the population lacks adequate access to modern health care services; where services exist, quality and affordability are often limited (Mustefa Bushura Kore, 2023). This situation has intensified the reliance on traditional medicinal plants for treating various ailments (Barr, 2023). Ethiopians have long history of using medicinal plants to manage diverse health problems (Mathewos Agize *et al.*, 2022). Both rural and urban communities commonly utilize locally available plants, such as *Ruta chalepensis* for multiple ailments and *Hagenia abyssinica* for the treatment of tapeworm infections (Anbo, 2023). Beyond accessibility, economic and cultural factors strongly influence continued dependence on herbal medicine alongside modern medicinal practices (Odubo *et al.*, 2023). Furthermore, the high cost of modern health care has increased public acceptance and use of traditional herbal remedies (Rosenberg, 2023).

2.5. Benefits of Using Herbal Medicine

Medicinal herbalists emphasize the use of whole plants in their natural form rather than chemically synthesized alternatives (Qadir & Raja, 2021). Several factors contribute to the preference for herbal medicine over western medical systems.

2.5.1. Legal and Regulatory Sspects

The development and approval of modern pharmaceuticals involve stringent regulations, high costs, and lengthy procedures (RH, 2015). In contrast, training and practice in traditional medicine are relatively straightforward and less regulated (Jakobsson et al., 2022).

2.5.2. Safety and Ethical Considerations

Herbal medicine generally operates outside strict intellectual property frameworks (Hui & Wei, 2021). Ethical practice in herbalism emphasizes transparency, trust, and community benefit (Idris and Thompson, 2023).

2.5.3. Consultation and Patient Interaction

Herbal treatments are often more personalized, allowing practitioners to devote greater attention to individual patient needs compared to convetional medical settings (Ahmad Jamal, 2023).

2.5.4. Prescription and Formulation

Herbal remedies are typically prepared during a consultation and can be customized to suit individual conditions (Stewart, 2021). In contrast, western medicines are produced using standardized formulations and manufacturing processes (Sahoo *et al.*, 2009).

2.5.5. Affordable and Accessibility

Traditional medicine remains the most accessible and affordable form of primary health care for low-income populations (James *et al.*, 2018). In Ethiopia, the widespread availability and

biological effectiveness of medicinal plants have sustained high levels of interest and use (Zewdie Kassa *et al.* (2020).

2.6. Traditional Herbal Medicines and Drug Development

Ethnobotanical approaches significantly enhance the likelihood of identifying biologically active compounds compared to random plant screening (Birhan Amsalu, 2020). For example, Balick & Cox (2020) reported that approximately twenty five percent (25%) of central American medicinal plant species identified by traditional healers demonstrated in anti- HIV activity. Another effective strategy involves phytochemical screening of plant species closely related to those known to produce bioactive compounds (Greilhuber, 2008). Over all, ethnobotanical methods are considered among the most productive approaches for discovering new therapeutic agents, as evidenced by the historical success of plant-based drug development (Porras *et al.*, 2020).

2.7. Threats to and Conservation of Traditional Medicinal Plants

Globally, wild plant species are extensively used for food, medicine, fuel, construction, income generation, and cultural and spiritual practices Around (Antonelli *et al.*, 2020).

Traditional medicine systems in Ethiopia, as in manyb African countries, face challenges related to sustainability and continuity (Eyayu Kasseye Bayu, 2019). Despite their importance in treating human and animal diseases, medicinal plants are increasingly threatened (Garcia, 2020). The primary causes of this decline include habitat destruction, overharvesting, loss of medicinal plant taxa, and erosion of indigenous knowledge (Volenzo and Odiyo, 2020). Additional human induced pressures include population growth, deforestation, agricultural expansion, urbanization, fuelwood collection, invasive species, commercialization, and environmental degradation (Terefe Argaw, 2021). Since most medicinal plants in Ethiopian are harvested from wild habitats, the extinction risk of both plant species and associated traditional knowledge is accelerating (Mathewos Agize *et al.*, 2022).

Conservation involves the sustainable use of biological resources and management of biological resources. Destructive harvesting practices, particularly of roots and bark, are major

contributors to the depletion of medicinal plant populations (Volenzo & Odiyo, 2020). Extensive reliance on plant roots for medicinal purposes threatens long-term availability when alternative plant parts are not utilized (Mahanty *et al.*, 2017).

Traditionally, conserved sites for medicinal plants include religious areas such as churches, mosques, and graveyards, as well as riverbanks, farm boundaries, roadside areas, and live fences (Myint, 2023). Ex situ conservation methods, including gene banks and botanical gardens, also play a vital role in preserving medicinal plant diversity (Kadam & Pawar, 2020). Home gardens represent an effective in situ conservation strategy for cultivation, conservation, and enhancing medicinal plant species (Fajinmi *et al.*, 2023). Strengthened conservation initiatives by governmental and non-governmental organizations are essential to reduce threats to remaining medicinal plant resources (Mathela *et al.*, 2020).

2.8. Medicinal Plant use and Ethnobotanical Studies in Ethiopia

An estimated 6000 species of higher plants, 10% of which are endemic, make up the Ethiopian flora (Temesgen Tafesse and Desalegn Amenu, 2022). Ethiopia is one of the most ethnically diverse countries in East Africa with the majority of its citizens living in rural areas and thus with limited access to modern healthcare services that has made the people blessed with rich traditional knowledge and practices on the use of medicinal plants, remedy preparations and administrations as well as illness diagnoses (Geritu Bedasso Nuro *et al.*, 2024). Even though the majority of the populations in Ethiopia heavily depend on medicinal plants for their primary healthcare needs, very limited work has so far been done to record and analyze the associated knowledge, and validate the therapeutic values of the claimed plants (Geritu Bedasso Nuro *et al.*, 2024). The study conducted by (Yonas Derebe Derso *et al.*, 2024) have shown that, the indigenous knowledge and utilization of medicinal plants in Ethiopia have been gradually eroding over time due to various natural and human-made factors. Some medicinal plant species are endangered due to overharvesting for marketing, leading to their depletion and eventual local extinction. Moreover, the traditional use methods and knowledge of medicinal flora are diminishing as healers, shamans, and tribal elders grow older and die, and their knowledge goes uncollected.

Ethnobotanical studies have been conducted by various scholars worldwide. According to recent evaluations, the number of published ethnobotanical studies is increasing annually including Ethiopia (Moa Megersa et al., 2023). A number of ethnobotanical studies conducted in different parts of Ethiopia have reported the common uses of medicinal plants (Geritu Bedasso Nuro et al., 2024). However, the studies conducted on the traditional medicinal plants in Ethiopia are very limited when compared with the multiethnic cultural diversity and the diverse flora of Ethiopia (Temesgen Tafesse and Desalegn Amenu, 2022). Even though traditional knowledge of medicinal plants is very crucial to treat different diseases, there is no study conducted in the study area, hence, thus this study is conducted to assess the availability and utilization of traditional medicinal plant in Jimma Horro district, Kellem Wallaga, Oromia, Western Ethiopia.

3. MATERIALS AND METHODS

3.1. Study Area Description

The study was carried out in Jimma Horro district of Kellem Wallaga zone of the Oromia National Regional State of Western Ethiopia (Figure 1). The district is located between 8°52'34"N and 9°10'28"N latitudes and 34°40'45"E to 34°50'55"E longitudes. Nunu is the administrative town of the district and is located at 665 kilometers to the west of Addis Ababa, which is the capital city of Ethiopia. The district is bordered by Begi and Kundala districts in the north, Gawo Kebe district in the east, Yamalogi Wolel district in the south, and Gidame district in the west. There are twenty-one rural and one urban kebele, which are generally 22 kebeles in the district. Dati Wolel National Park, parts of Wolel Mountain forest and Garjeda Forest define the district's topography. Suphe, Burar, and Kumbabe are the district's three principal rivers found in the district.

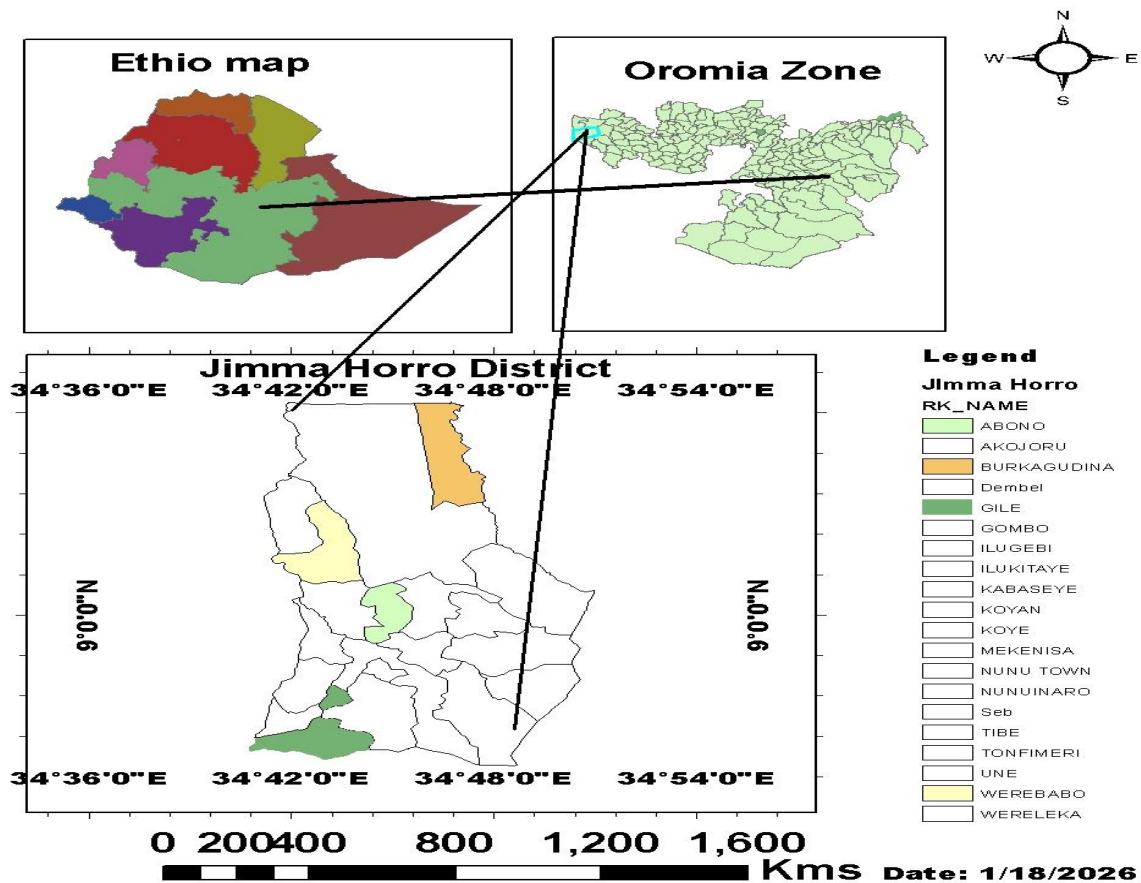


Figure 1: Map of the study area

The district's altitudinal range spans altitudes of 1400–2400 meters above sea level. The district climate varies between the long summer rainy season (June to August), the short spring rainy season (March to May), the autumn simple rainy season (September to November), and the winter dry season (December to February). The daily temperature ranges from 10 to 34.3°C, while the minimum and maximum annual precipitation falls between 800 mm and 1800 mm, respectively. The district's weather conditions are characterized by Kola (31.8%), Wayne Dega (48.5%), and Dega (19.7%).

Jima Horo (1850 m)
2014-24
20.5C
2015 mm

The climograph for Jima Horo (1850 m) for the period 2014-24 shows the following monthly data (approximate values):

Month	Temperature (C)	Precipitation (mm)	Secondary Temp (C)
J	10.0	100	10.0
F	8.0	100	10.0
M	15.0	150	15.0
A	25.0	300	25.0
M	22.0	350	22.0
J	20.0	380	20.0
J	19.0	380	19.0
A	19.0	350	19.0
S	20.0	380	20.0
O	19.0	350	19.0
N	18.0	100	18.0
D	10.0	100	10.0

Figure 2: Climate diagram of the study area

3.1.2. Seasonal classification

Indigenous people classify seasons in to Four (4) main categories based on climatic condition or amount of rain (Table 1).

Table 1: Seasonal classification of the study area

Emic category	Etic category	Seasonal Condition
Birraa	Autumn (September, October and November)	Simple rainy
Bona	Winter (December, January and February)	Dry
Arfaasaa	Spring (March, April and May)	Short rainy
Ganna	Summer (June, July and August)	Rainy

3.1.3. Land use and Vegetation

According to Soressa Shuma *et al.* (2022), and also evidence gained from (Jimma Horro Agriculture and Land Management office, 2025), the whole territory of the district was mostly composed of agricultural land followed by forest land.

About 50,176 hectares make up the study area; of this, 23,472.5 hectares were used for crop production, 1679.347 hectares were available for production, 902.5 hectares were used for irrigation, 1,977 hectares were used for animal grazing, 13,730 hectares were used for livestock, and 2113.76 hectares were used for building. There was no agricultural usage on the remaining 6300 hectares.

According to (Friis *et al.*, 2010), the study areas location contributed the support for moist evergreen montane forest vegetation which is found between (1500m-2600m) or according to the study area, (1500m-2400m) and Acacia-Commiphora woodland vegetation which is found between (900-1900m) or according to the study area, (1400-1500). The areas that were found in lower elevations supported woodland vegetation such as Acacia and Terminal species. The areas that were found with in higher elevations support conifers such as Podocarpus and Juniperus species. However, these plants vegetation have been threatened by coffee plantations, human settlement, and agriculture.

3.1.4. Major food crops grown in the study area

Jimma Horro district has an ideal agro-ecology for agriculture such as crop production, livestock rearing and cultivating different annual and perennial plants. The major food crops grown in the area are given in (Table 2 and appendix 7.5).

Table 2: Major crops cultivated in the study area

Crop category	Scientific name	English name	Local name
Cereals	<i>Zea maize</i> <i>Eragrostis tef</i> <i>Hordeum vulgare</i> <i>Triticum aestivum</i> <i>Sorghum vulgare</i>	Maize Teff Barely Wheat Sorghum	Boqqolloo Xaafii Garbuu Qamadii Bisingaa
Vegetables	<i>Capsicum frutescns</i> <i>Allium cepa</i> <i>Cucurbita pepo</i> <i>Allium sativum</i> <i>Brassica oleracea</i> <i>Daucus carota</i> <i>Solanum tuberosum</i>	Chili Shallot Pumpkin Garlic Cabbage Carrot Potato	Barbaree Shunkurtii Buqqee nyaataa Qulluubbiiadii Raafuu Kaarotii Dinnicha
Fruits	<i>Citrus aurantium</i> <i>Citrus lemon</i> <i>Musca x paradisiaca</i> <i>Mangifera indica</i> <i>Carica papaya</i> <i>Persea amercana</i>	Orange Lemon Banana Mango Papaya Avocado	Burtukaana Loomii Muuzii Maangoo Paappayyaa Avokaadoo
Pulses	<i>Pisum sativum</i> <i>Visa faba</i> <i>Phaseolus vulgaris</i>	Pea Bean Haricot beans Organic bean seeds	Atara Baaqelaa Lojoo/ Boloqqee Abbaa Bonaa/ cooomaa
Cash crops	<i>Coffea Arabica</i> <i>Catha edulis</i> <i>Nicotiana tabacum</i>	Coffee Khat Tobacco	Buna Caatii Tamboo
Oil crops	<i>Guizotia abyssinica</i> <i>Linum usitatissimum</i> <i>Brassica napus</i>	Niger seed Lin seed Kale seed	Nuugii Talbaa Sanyii raafuu
Root crops	<i>Ipomoea batatas</i> <i>Solanum tuberosum</i> <i>Coccinia abyssinica</i> <i>Ensete ventricosum</i>	Sweet potato Potato Anchote Enset	Albaanbee Dinnicha Ancootee Warqee

(Source: Jimma Horro Agriculture and Land Management office).

3.1.5. The district's human and Livestock population

According to (Ethiopia_ Administrative Division (Regions and Districts) - Population Statistics), total population of Jimma Horro district for the year 2022 was 66,075. Among them, males were 33,171 and females were 32,904.

The populations of livestock such as cattle, horses, mules, donkeys, sheep, goats, and fowls of the study area were indicated in (Table 3 and Appendix 7.6).

Table 3:- Livestock population in the study area

No	Animals name	Number of animals
1	Cattle	178643
2	Horse	305
3	Mule	10078
4	Donkey	42162
5	Sheep	84517
6	Goat	66175
7	Fowl	215016

(Source: Jimma Horro Agriculture and Land Management office).

3.1.6. Top Ten Human Diseases of the Jimma Horro

The traditional names and clinical explanations of the top ten most cited human health problems are indicated in Table 4 & Appendix 1. (Taken from 2027 EFY Nunu Health Center).

Table 4 :- Top ten Human diseases of Jimma Horro district

No.	Human disease name	Rank
1	Acute fibril illness	3
2	AURTI	5
3	Constipation	8
4	Helminthiasis	6
5	Joint pain	10
6	LBI	7
7	Malaria	1
8	Pneumonia	2
9	Tonsillitis	9
10	Typhoid fever	4

(Source: 2017 EFY Nunu Health center, Jimma Horro district)

3.2. Methodologies

3.2.1. Analytical Framework of the Study

The analytical framework of the study (Figure 3) illustrates the relationships among illness beliefs, healthcare options, and socioeconomic, cultural, and physical accessibility, as well as how these factors influence the utilization and practices of indigenous medicine and their contribution to primary healthcare in the study area. The framework clarifies the study objectives by identifying the key factors that affect the use and practice of indigenous medicine and its linkage to primary healthcare services.

Arrow I represents the influence of illness beliefs and perceived disease etiology on the choice of healthcare options. Arrow II shows the interaction between beliefs and perceptions and socioeconomic, cultural, and physical accessibility. Arrows III, IV, and V depict the effects of these factors on the utilization and practices of indigenous medicine, healthcare decision-making, and the broader socioeconomic and cultural context of healthcare. Arrows II, IV, and V further indicate how the combined effects of these components enhance the use and practice of indigenous medicine, while Arrow VI demonstrates their overall contribution to primary healthcare.

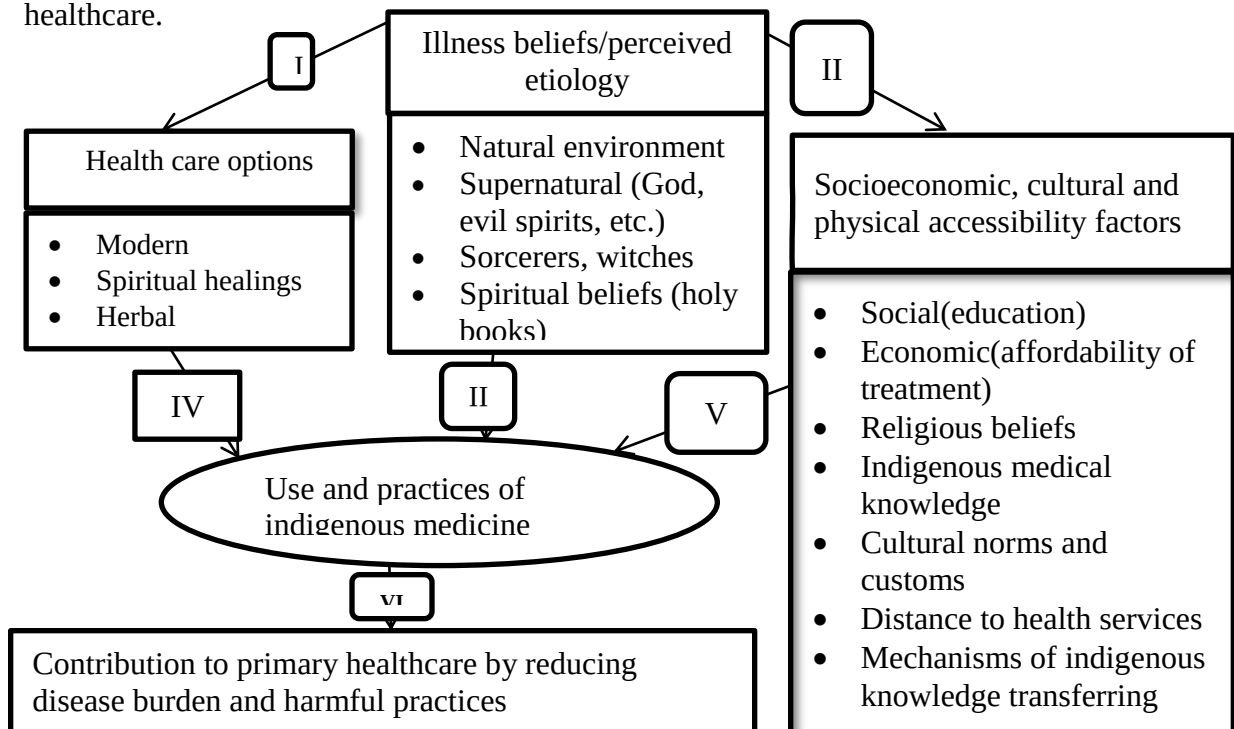


Figure 3: Analytical frame work of the study

3.2.2. Reconnaissance survey

Initially, a reconnaissance survey was carried out from May 27 to May 31, 2024, to gain a mental image of the research area. Briefly, it was carried out to gather information about medicinal plants, gain a broad grasp of the research area's characteristics, and identify the district's kebeles. General district information was gathered during the survey.

During this process, identification of medicinal plant diversity, identifying distribution and habitat, prioritizing areas for further study, engaging with local communities, assessing data collection Processes and informing cultivation and domestication efforts were applied. This optimized research effort was used to ensure the most critical aspects of medicinal plant diversity and utilization.

3.2.3. Selection of sample study sites

Jimma Horro district has a total of 22 kebeles (Sub-districts). From the whole sub-districts of the district, based on agro-ecological conditions, availability of traditional practitioner healers, vegetation cover, and distances from the administrative center of Jimma Horro district, Nunu town, four (4) sub-districts (study sites) were selected Purposively for the collection of ethnobotanical medicinal plants data. The four selected study sites were Gile, Warra Babo, Abono, and Burqa Gudina (Table 5).

Table 5: Location of the selected sub-districts of the study site

No.	The selected sub-districts of the district	Ecological zone of sampled sub-districts	The X,Y Gps taken point		
			X (Easting)	Y (Northing)	Altitude (meter asl.)
1	Abono	Badda daree/ Wayne dega	34°44'45.324"E	8°59'15.744" N	1670
2	Burqa Gudina	Gammoojjii/ Kola	34°46'23.439"E	9°7'10.613"N	1415
3	Gile	Baddaa/ Dega	34°43'3.471"E	8°53'32.441" N	2400
4	Warra Babo	Gammoojjii/ Kola	34°43'1.263"E	9°2'56.039"N	1500

(Source: Jimma Horro selected sampled kebeles taken by the researcher).

3.2.4. Sample size determination and informant selection

A) To determine the informant sample size according to the methodology, the researcher used (Kothari, (2004, pp175), formula for sample size determination. Accordingly, the sample size

(n) was calculated using the formula $n = \frac{Z^2 \cdot N \cdot p \cdot q}{e^2 (N-1) + Z^2 \cdot p \cdot q}$ Where;

$P + q = 1$, this means, $p = 1 - q$ or $q = 1 - p$. Let $p = q$, this is if and only if $p = 0.5$.

Now the Sample size determination formula would be $n = \frac{Z^2 \cdot N \cdot p^2}{e^2 (N-1) + Z^2 \cdot p^2}$, since $p = q$, where:

n = sample size required to be used for the research,

N = total number of households (HH) in all sub district

e = maximum variability or margin of error 5% (0.05),

Z = standard variate at a given confidence level. $Z = 1.960$ for 95% confidence,

P = standard deviation of the population, which is equal to 0.5 in the research, and

1 = the probability of the event occurring.

B) To establish the number of households to be interviewed within each kebele (sub-districts), the following proportion formula was applied: $A = \frac{B \cdot X \cdot n}{N}$, Where;

A = sample size to be used in a given kebele,

B = total number of households (HH) found in a given kebele,

n = total sample size to be used for this research, and

N = total number of households (HH) in all sub-districts.

Based on the purposefully selected Sub- districts/ kebeles and the above sample size determination formula, the informant sample size and the number of households to be interviewed were determined as follows:

Step 1: There were 13,500 households in the district. Then, the sample size of households in the district would be: $n = \frac{Z^2 \cdot N \cdot p^2}{e^2(N-1) + Z^2 \cdot p^2}$, Where;

n = sample size to be used for this research,

N = total number of households (HH) in all sub districts,

e = maximum variability or margin of error 5% (0.05),

1 = the probability of the event occurring.

Then, using the above formula: $n = \frac{Z^2 \cdot N \cdot p^2}{e^2(N-1) + Z^2 \cdot p^2}$,

$$N = \frac{(1.96)^2 13500 (0.5)^2}{(0.05)^2 (13500-1) + (1.96)^2 (0.5)^2} = \frac{3.8416 \cdot 13500 \cdot 0.25}{(0.0025 \cdot 13499) + (3.8416 \cdot 0.25)} = \frac{12965.4}{(33.7475) + (0.9604)} = \frac{12965.4}{34.7079} \approx 374 \text{ households.}$$

These 374 households represent samples needed from the whole 22 sub-districts of the study area. Deu to lack of budget, time and resource needed to reach all of them; the researcher used again sampling sub-districts needed from the whole 22 districts and selected informants from selected sub-districts based on the formula under this sub-topic (B)

Then, the number of households to represent informants was calculated as: $A = \frac{B \cdot n}{N}$, where:-

A = sample size to be used in a given kebele,

B = total number of households (HH) found in a given kebele,

n = total sample size to be used for this research, and

N = total number of households (HH) in all sub-districts.

Then, $A = B \cdot n / N = (2371 \times 374) / 13500 = 66$

Then, 66 (sixty six) number of informants were needed for the study from the four (4) selected sampled sub-districts (Table 6).

Depending on the obtained result of number of informants, informants were selected randomly and key informants who were healers, elders, and knowledgeable people were selected purposively.

From the four selected kebeles, 56 (fifty six) regular informants were selected using a stratified random sampling approach from the total households, while 10 (ten) key informants who were traditional healers and knowledgeable persons were selected purposively based on the recommendations of local authorities, elders, religious leaders, and knowledgeable persons. Generally, 66 informants were selected for the study (Table 6).

To obtain trustworthy information, key informants were treated kindly twice.

Table 6:- Demography of sampled sub-districts (kebele) informants

No .	Name of kebeles	No. of house hold	Gender of house holds		Key informants			Informants without Key informants			Total informants		
			M	F	M	F	Sum	M	F	Sum	M	F	Sum
1	Abono	610	533	77	2	1	3	10	4	14	12	5	17
2	Burqa Gudina	600	561	39	2	0	2	9	6	15	11	6	17
3	Gile	576	483	93	2	0	2	9	5	14	11	5	16
4	Werra Babo	585	525	60	2	1	3	7	6	13	9	7	16
	Total	2371	2102	269	8	2	10	35	21	56	43	23	66

Note: M=Male, F=Female

Based on the data, homes with more women than men participated. This occurred as a result of community participation: women were more readily available and willing to take part in the study, which increased their representation in comparison to expectations. Furthermore, several men were reluctant to take part. The researcher substituted women for males when such circumstances arose. Additionally, because men's families traveled farther for work, there were instances where they were absent from data gathering. Therefore, replacing female households would be the only option. In these situations, the number of females climbed more than expected.

3.2.5. Informant characteristics

Informant characteristics were recorded crucially to provide reliable and accurate information for the study of traditional medicinal plants. Additionally, the researcher believed it was necessary to identify the characteristics of the informants to gain a deeper understanding of which parts of the informants possess higher knowledge of traditional medicinal plants. Some attributes of informants in ethnobotanical studies that were identified during the data collection process from selected informants were explained as follows:-

3.2.5.1. Indigenous or local knowledge

Informants were typically members of the local community or indigenous groups who had accumulated traditional knowledge about the medicinal uses of plants through generations of experience and oral traditions.

3.2.5.2. Age and experience

Older informants, especially elders or traditional healers, were often preferred as they have had more extensive exposure to and experience with the conventional use of medicinal plants.

3.2.5.3. Gender

The gender of informants could be an important factor, as traditional knowledge may be divided along gender lines, with certain plant uses or practices being more associated with either men or women. The recorded informant's data primarily focused on their gender information.

3.2.5.4. Social status and role

The information provided by the informants, particularly the key informants, was also focused on their particular social roles or positions within the community, such as traditional healer /herbalists/, or spiritual leaders, which provide them specialized expertise and authority on the issue.

3.2.5.5. Willingness to share knowledge

Informants were informed of the researcher willingness to share their traditional knowledge, with the researchers, which could be influenced by factors such as trust, cultural norms, and the perceived benefits of the study.

3.2.5.6. Accessibility and availability

The researcher was able to identify and access informants who possess the relevant knowledge, which can be challenging in remote or isolated communities.

3.2.5.7. Reliability and consistency

Informants provided consistent and reliable information, which was verified through cross-checking with other informants or secondary sources.

The careful selection and engagement of informants with these characteristics were crucial for obtaining high-quality, comprehensive, and culturally relevant data in ethnobotanical studies of traditional medicinal plants. The informants' characteristics were explained in (Appendix 7.7).

3.3. Data Collection Materials and Methods

3.3.1. Data Collection tools/ Materials

The materials used to collect medicinal plant data and samples were: Interviews, questionnaires, Observation, pruning shears and scissors, trowel or small shovel, knife and scalpel, collecting bags, gloves, plant press, GPS, note book and pencil, and Photography and video as shown in Table 7.

Table 7 :- Medicinal plant data and sample collection tools/materials.

No.	Collection tools	Used to
1	Interviews	One-to-one verbal communication with the respondent used to ask interviewer knowledge of medicinal plants & others used for the study.
2	Questionnaires	Collect and record information from informants in a consistent way by using questions in written down format forms.
3	Observation	Seeing things such as objects, processes, relationships, events and formally recording the information.
4	<i>Pruning shears and scissors</i>	Cut and harvest the desired parts of the plants, such as leaves, flowers, and stems, without damaging the plant.
5	<i>Trowel or small shovel</i>	Carefully dig up and extract the roots or rhizomes of the medicinal plant, ensuring the entire root system is collected.
6	<i>Knife and scalpel</i>	Slice and harvest specific parts of the plant, such as the bark or sap.
7	<i>Collecting bags</i>	Store and transport the collected plant materials, keeping them fresh and undamaged.
8	<i>Gloves</i>	Avoid skin irritation or exposure to any potentially harmful plant compounds.
9	<i>Plant press</i>	Dry and preserve collected plant specimens for further identification and study.
10	<i>GPS</i>	Locate and mark the collection site, especially for rare or hard-to-find medicinal plants.
11	<i>Field notebook and pencil</i>	Record important information about the collected plants, such as the location, habitat, physical characteristics, and any other relevant observations.
12	<i>Photography and video</i>	To capture Photographs and videos show or moving images.

3.3.2. Data Collection Methods/ Techniques

Data collection methods are techniques and procedures for gathering data for the research purpose. Ethnobotanical data were collected from July 2024 to November 2024. The researcher used data collection methods to collect both qualitative and quantitative data through field observation, ethnobotanical surveys, Voucher specimen collection, photographic documentation, focus group discussion and market suveys.

3.3.2.1. *Field observations*

Direct observation of plants in their natural habitats, including their growth characteristics, ecological conditions, and traditional harvesting practices, was identified. Notes on the plant's appearance, habitat, and any associated traditional knowledge were recorded.

By selecting the field site and participants to be led through the study area, the researcher points out and identifies the various medicinal plants. The participants shared information about the local names, traditional uses, preparation methods, and any cultural significance associated with plants.

Field observation allowed the researcher to: directly observe and document the traditional knowledge and practices related to medicinal plants in their natural settings; facilitated the identification and collection of plant specimens; ensured accurate botanical identification; built rapport and trust with the local community, which can lead to more in-depth and meaningful data collection; and exchanged knowledge between the researcher and the local experts, fostering a collaborative approach to the research.

3.3.2.2. *Ethnobotanical surveys*

Interviews were carried out with general informants, and key informants to gather information about the use of medicinal plants, their local names, parts used, preparation methods, and conventional applications using structured and semi-structured interviews. The interview questions for both had similarities on some points and differences on other points. These happened due to additional questions were needed to ask key informants to identify clarities of some given information data of the study.

3.3.2.3. *Voucher specimen collection*

The collection of plant specimens, including: leaves, flowers, roots, and other relevant parts, was done to preserve and deposit them in a herbarium for identification and future reference. Detailed information about the collection site, date, collector's name, and plant characteristics was also recorded.

3.3.2.4. Photographic documentation

Capturing high-quality photographs of the medicinal plants and their traditional uses to create a visual record was done during the sample data collection process for the identification and documentation of the medicinal plants.

3.3.2.5. Focus Group Discussion

Local communities, traditional healers, and other stakeholders were involved in the data collection process to ensure the accuracy and cultural relevance of the information that helped to build trust and facilitate the sharing of traditional knowledge.

3.3.2.6. Literature Review and Historical Analysis

Its purpose was to compare traditional knowledge with documented ethnobotanical researches. Consultation of existing literature, such as ethnobotanical studies, scientific publications, and traditional medicine manuals was conducted to gather information on the known medicinal uses of the plants. This helped to cross-reference and validate the data collected through the field surveys.

3.3.2.7. Market survey

Market surveys were conducted to document the medicinal plants available in the local markets of the study area and gather insights into the market values of these plants. This method proved instrumental in investigating the availability, pricing, and unit measurement of marketable medicinal plants, aiding the preservation of high-value medicinal plant species. To this end, three local markets, namely Gabaa Jimmaa, Gabaa Tibbee, and Gabaa Warra Baabboo were visited, and semi-structured interviews were conducted with vendors of medicinal plants' drugs at the markets. A total of 13 informants (9 vendors and 4 users of MPs) were interviewed, with 5 men and 8 women, representing participants from all three local market areas of the study. The 13 informants were the actual participants in the market survey and are not part of the original 66 informants, since 66 respondents were predetermined before the survey.

These interviews aimed to gather general information on the multipurpose roles and marketability of medicinal plant species as well as the plant-derived products sold on markets, which were also recorded.

Generally, using the above data collection tools and procedures, the study was carried as follows: semi-structured interviews conducted with the assistance of pre-prepared questions in the English language and were translated into the local area community language, Afaan Oromoo.

The interview items were based on the demographic characteristics of the informants, including gender, age, occupation, educational level, religion, and category (either healers or general informants). Data was also focused on the uses of medicinal plants, which include local names, diseases treated, parts used, preparation methods, administration route(s), dosage, habits, and habitats.

The medicinal plant's conservation practices, adverse effects (if any), taboos (if any), additional uses as wild food and livestock medicines (if any), and indigenous knowledge transfer systems were also included.

Individual interviews were conducted with each key informant for the preference ranking exercise, following the methods used by previous researchers. Data were also collected through demonstrations (plant interviews) with some eardly females and males informants in their homes, using previously collected plant specimens from the field. This was done because of aged female and male informants had a minimal chance to move to faraway places to show medicinal plant specimens and their practices.

Other informants also have shown their medicinal plant practices in their homes and in the fields. Once or twice, focus group discussions were conducted in each sampled kebele with governmental officials, key informants, and other individuals, using general interview questions.

Guided field walks were conducted with interviewed informants and other local indigenous people to search for additional medicinal plants in the wild and to collect voucher specimens of medicinal plants.

All interviewees were asked in Afaan Oromoo, the language of the inhabitants of the study area, and the collected data were then translated into English with the help of experts. The contact time and place were selected based on the interests of the informants.

The information about traditional medicinal plant specimens was consequently recorded in the notebook, and the plants were pressed with a plant press and dried properly. The scientific names of identified traditional medicinal plants were identified using published volumes of the Flora of Ethiopia and Eritrea and must be cross-referenced with Plants of the World Online website plant database /<https://powo.science.kew.org/>.

3.4. Data Analysis

The techniques used to analyze the ethnobotanical data on traditional plants in the study were: qualitative data analysis, quantitative data analysis, ethnobotanical indices, taxonomic and botanical analysis and ecological and conservation analysis.

These provided a comprehensive understanding of the ethnobotanical knowledge, utilization, and conservation status of medicinal plants, which informed the sustainable development and commercialization of traditional herbal medicines in the study area. The following are the techniques that were used to analyze the research data.

3.4.1. Descriptive statistics

Descriptive statistics analysis techniques used were: frequency and diversity analysis, plant part utilization, preparation and administration methods, ailment categories, and therapeutic uses; while inferential analysis employed were: use-value and informant consensus, and utilization patterns, and socio-economic and environmental factors that influence their use and conservation.

Descriptive and inferential statistical approaches were employed to assess and analyze the data collected on medicinal plants, associated knowledge, management strategies, usage, and conservation. Applying statistical analysis and pertinent software to its fullest potential provided the most advantageous applications, preparation methods, delivery systems, diseases addressed, dosages, and usage patterns. According to Alexiades (1996), the ethnobotanical method proposed will be developed by using statistical aspects of Statistical Package for the Social Package for Social Science (SPSS) for surveys and analytical tools. Data were organized and analyzed using Microsoft Office Excel 2010 and SPSS version 22. In this work, SPSS software was used.

3.4.2. Informant consensus factor (ICF)

The informants all agreed on the kinds and applications of plants used in ethnomedicine. In this instance, informants were asked to confirm that the accuracy of the information had been confirmed at least twice during the process.

Alexiades (1996) was the source of this technique. ICF was calculated and interpreted by comparing the number of use citations for each plant species against the total number of use reports for all plants and ailments using the formula:

$ICF = (Nur - Nt) / Nur - 1$; where:

“Nur” is the number of use reports for a particular plant-ailment category and

“Nt” is the number of taxa (Plant species) used for that category.

Then, after calculation, the interpretation could be as follows:

The informant consensus factor ranges from 0 to 1. A higher value indicates a high level of consensus among informants regarding the use of specific plants for a particular ailment or condition. In contrast, lower ICF values closer to 0 suggest a lower level of agreement among informants. The higher informant consensus factor indicates a strong agreement among informants regarding the effectiveness of certain plants in treating specific health issues.

3.4.3. Preference Ranking

Using a few selected key informants, a preference ranking was conducted for the most significant medicinal plants based on their effectiveness in treating various ailments. As a result, key informants selected medicinal plants to be ranked preferentially based on their ability to cure the disease they were employed for.

Ranking values were then assigned based on the plants' relative healing powers, ranging from the most effective plant for treatment to the least effective.

3.4.4. Direct matrix Ranking

Ranking with a direct matrix is a system used for multifunctional medicinal plants, accounting for the relative benefits of each plant (Cotton, 1996). Multipurpose plant species were selected from among all medical plants based on data gathered from informants, and key informants were specifically chosen to provide utilization ratings for each feature (e.g., 5 = best, 4 = very good, 3 = good, 2 = less utilized, 1 = least used, and 0 = not used).

These plant species were selected based on their uses for building, furniture production, fencing, firewood, charcoal, medicines, and spices in food preparation

Using the information that was gathered from informants, the average value of each species' usage diversity was calculated. The values of all the species were then combined and ranked.

3.4.5. The Fidelity level (FL)

Fidelity level (FL) was computed to determine the FL values of the most frequently used plant species for treating a particular ailment. The formula calculated it:

$$FL = \frac{N_p}{N}, \text{ where;}$$

“ N_p ” stands for the number of use reports cited for a given species for a particular ailment, & “ N ” refers to the total number of use reports cited for any given traditional medicinal plant species.

Each species of medicinal plant that was collected from the study area had its own FL values that were determined for it. Medicinal plants with the highest FL values are considered to have

good therapeutic potential and are frequently utilised (Ramalingum *et al.*, 2014). Canner *et al.* (1986) employed a method intended to identify species that warrant additional biomedical investigation and have the potential to heal for particular, significant goals.

In other words, in addition to the above-given formula, the formula for calculating FL was also used to take the ratio of informants who were recommended to use a species for the same major purpose (Ip) to all informants who mentioned the plant for any purpose (IU). In the study, the FL was employed to measure a species' significance for a particular objective.

A value of FL near 100% indicated that many individuals utilize the species, whereas a value near 1% indicated that respondents disputed the species' suitability for use in treating illnesses (Singh *et al.*, 2023).

3.5. Ethical Consideration

Initially, a clearance letter that was sent to Jimma Horro District administrator's office had been received from Wallaga University's postgraduate studies department.

Every research participant received explicit information stating that the data collection results would not affect them personally, and they were urged not to put their actual name on the questionnaire that was given to them.

Informed consent: done to obtain the informed consent of the local communities, traditional healers, and individual participants to ensure the communities understand the purpose, methods, and potential benefits and risks of the research.

Respect for traditional knowledge: Traditional medicinal knowledge is considered the intellectual property of indigenous communities and traditional healers. Thus, respecting the ownership and confidentiality of this knowledge, and ensuring that it is not exploited or used without the consent and fair benefit sharing of the knowledge holders.

Cultural sensitivity and preservation: determination of cultural context and traditions of the use of traditional medicinal plants, and ensuring the research activities do not disrupt or undermine these cultural practices, efforts should be made to preserve and document the traditional knowledge and practices related to traditional medicinal plants.

Environmental sustainability: ensuring the harvesting practices do not lead to the depletion or degradation of natural resources and working with communities to promote sustainable harvesting and cultivation practices.

Capacity building and knowledge exchange, ethical review, and approval are some of the key ethical issues that were considered to conduct the study.

4. RESULTS AND DISCUSSION

4.1. Results

4.1.1. Demographic characteristics of respondents

During data collection processes, had been going from informants, informations that show informants characteristics like age, years of experience, source of their knowledge, educational status, marital status, and religious status were also asked and identified by the researcher based on the respondents' response. The obtained result showed that 65.15% male and 34.85% female respondents were involved in the data collection. From the total respondents, 27.27% male and 13.63% female; totally 40.91% respondents were found between the age ranges 41 to 70 followed by 22.72 male and 12.12 female; totally (34.85%) respondents were above 71 years' age, while the remaining, 15.15% male and 9.09% female; totally 24.24 % respondents were found between the age ranges 18 to 40, which was the least compared to the other age groups. The educational status of respondents was (57.57 %) were Illiterates, followed by (27.27%) had religious education, and (15.16 %) of them had modern education. The minority of the respondents (78.8%) had no experience followed by (12.1%) had above 11 years of experience and least of them (9.1%) had less than 10 years experience in the treatment of health problems. The most common source of knowledge of medicinal plants in the study area was family, which is 51.51 %, followed by friends (28.79%). The marital status of respondents was: 65.15% married, 16.67% widowed, followed by 10.60% divorced and 7.58% single. The Religious status of respondents showed that; majority of the respondents (69.69%) were Muslim, followed by 30.31% Christian (Appendix 7.7).

4.1.2. Medicinal plant species diversity in the study area

A total 95 medicinal plant species (Appendix 7.8) belonging to 84 genera and 47 botanical families (Appendix 7.10 and Figure 4) were reported to be used for treating human and livestock's ailments in Jimma Horro District. From the identified plant species, families Asteraceae and Euphorbiaceae were represented by the highest number of species (6 species, 6.3% each of them) followed by Brassicaceae, Fabaceae and Solanaceae (5 species, 5.3% each of them) and Lamiaceae and Moraceae (4 species, 4.2% each of them). Cucurbitaceae,

Malvaceae, Poaceae, Polygonaceae, Rosaceae, and Rutaceae each contributed (3 species, 3.2 % of the total). Acanthaceae, Amaranthaceae, Amaryllidaceae, Asparagaceae, Boraginaceae, Ranunculaceae, Rubiaceae, and Sapotaceae each represented with (2 species, 2.1 % of the total). The remaining 26 families were those of each contributed with (1 species, 1.1% of the total) (Appendix table 7.10, and Figure 4).

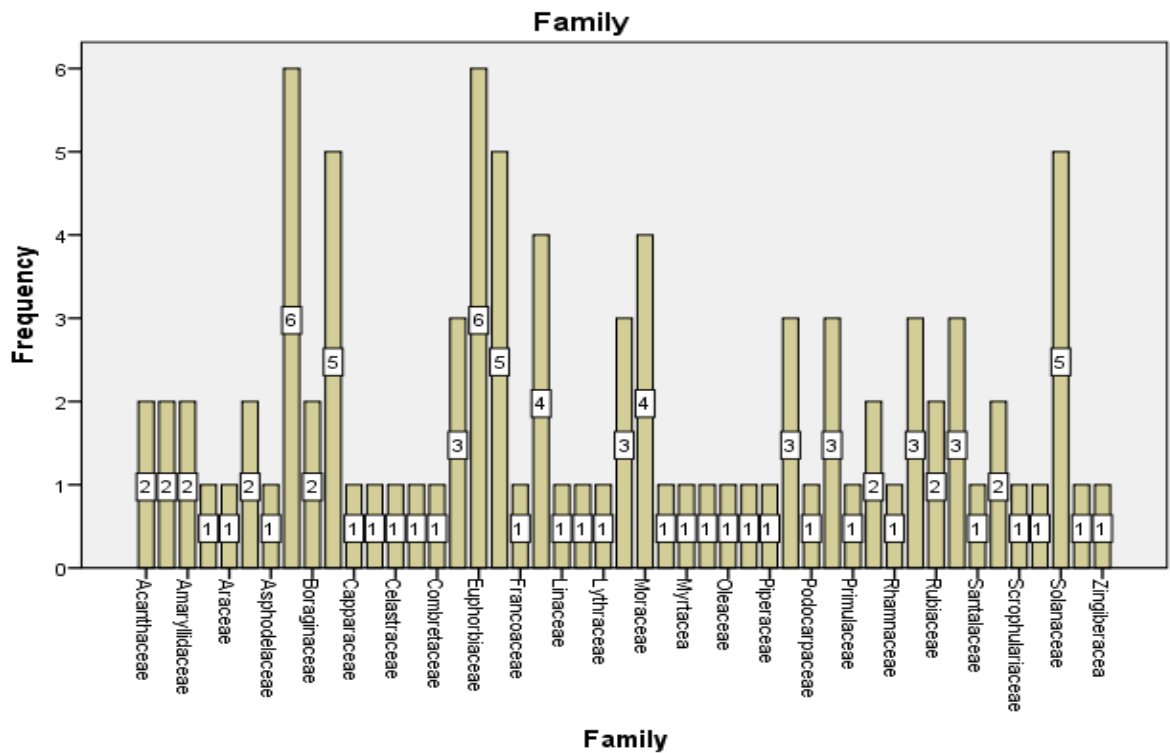


Figure 4:- Distribution of reported medicinal plant species into different families

In case of their genera, *Ficus* have largest number of species which is 4(4.2%) species, followed by *Allium*, *Grewia*, *Gymnanthemum*, *Lepidium*, *Ocimum*, *Ricinus*, *Rumex*, and *Solanum* those each of them have 2(2.1%) of species. The other remaining each genus contains 1(1.1%) species (Appendex 7.11 & Figure 5).

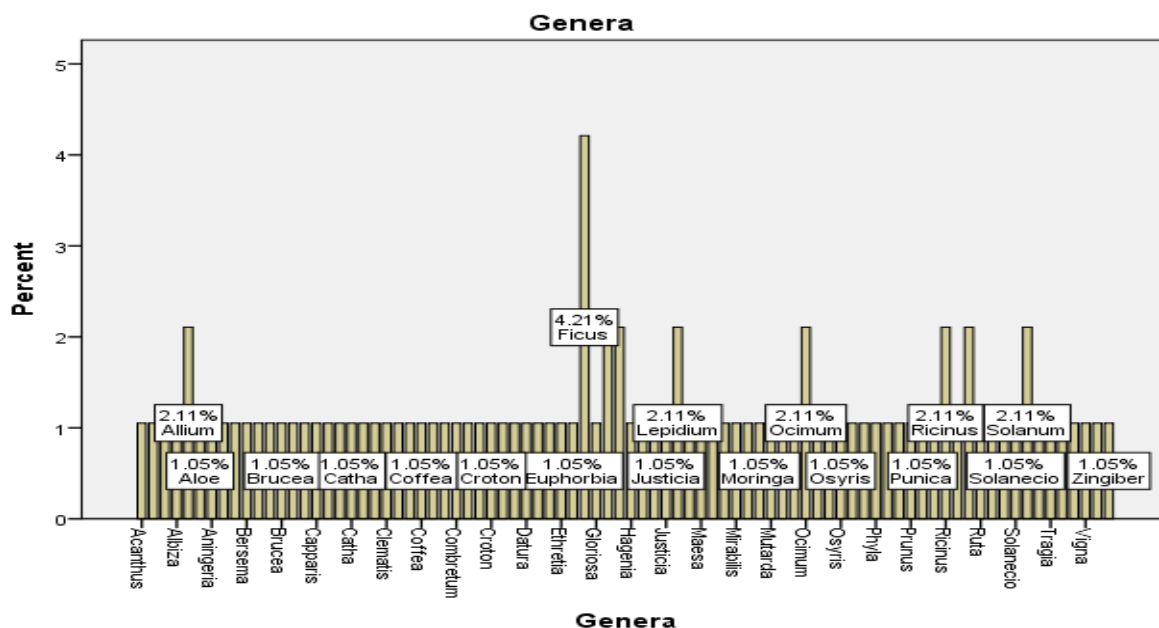


Figure 5:- Percentage of Genus species

The identified plant species were also classified based on their habit and habitat.

4.1.2.1. Habit classification of medicinal plants

Of these plants, herbs took the highest proportion 36 (37.89%) species; whereas climbers took the least proportion 2 (2.1%) species (Figure 6).

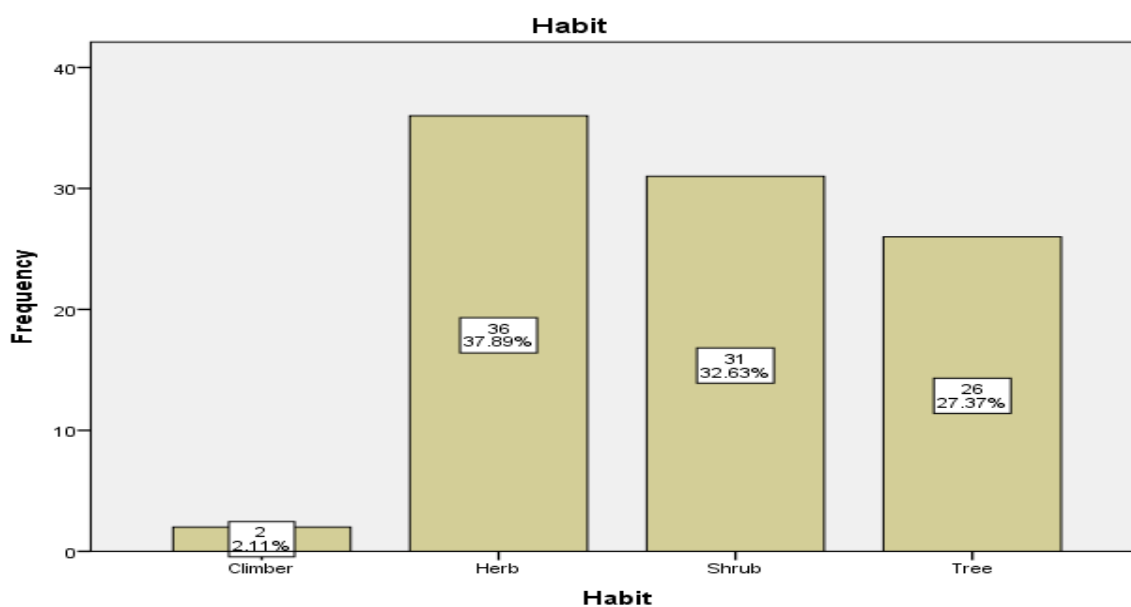


Figure 6: Habit classification of medicinal plants

4.1.2.2. Habitat classification of medicinal plants

The study depended on the habitat of plants as Agricultural, Agricultural & Home garden, agricultural Crop, Home garden, Home garden and wild and wild classifications. The study identified 11 (11.6%) species as Agricultural, 2 (2.1%) species as Agricultural & Home garden, 4 (4.2%) species as Agricultural Crop, 10 (10.5%) Species as Home garden, 4 (4.2%) species as Home garden & Wild, and 64 (67.4%) species as Wild species of medicinal plants. The resulted indicated that local communities depended highly on wild medicinal plant species (Figure 7).

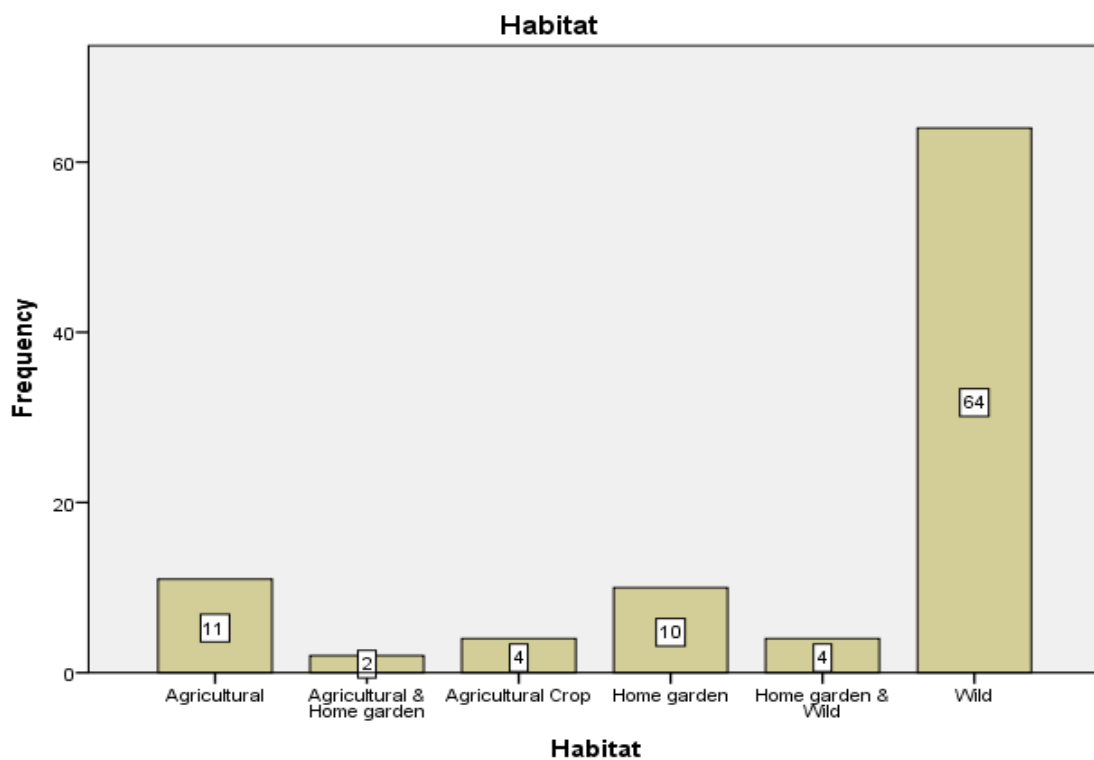


Figure 7: Habitat classification of identified Jimma Horro district medicinal plants

4.1.2.3. Diversity of identified medicinal plant species in the selected semi-districts

A vast range of plants data collected from the study area had been indicated that 95 plant species grouped into 84 genera and 47 families were showed that 67 medicinal plants species data were from wara babo, followed by Gile 65 medicinal plants species, 51 medicinal plant

species data from Abono and least 41 medicinal plants species data from Burka Gudina (Appendix 7. 12).

4.1.3. Medicinal plants Use to Treat Human and Livestock diseases

The study showed that from 95 species of identified medicinal plants in the Jimma Horro district, 39 (41.1%) species were used to treat both human and livestock diseases, 43 (45.3%) species were used to treat Human diseases, and the remaining 13 (13.7%) species were used to treat Livestock diseases (Table 8).

Table 8 : Medicinal plants Use to Treat Human, Livestock and Both diseases

Use to treat		Frequency	Percent	Valid Percent
Valid	Both	39	41.1	41.1
	Human	43	45.3	45.3
	Livestock	13	13.7	13.7
	Total	95	100.0	100.0

4.1.4. Disease types, modes of remedy preparation and application

4.1.4.1. Disease types (Human ailments and Livestock ailments)

Approximately 64 (sixty-four) human health problems and 39(thirty-nine) Livestock diseases, and 20(twenty) both humans and livestock common diseases were reported in Jimma Horro District for which the local people reported being treated with medicinal plants (Appendex7.13). Evil spirits, Evil eye, and wound were the most commonly reported human diseases (13% of the total human ailment reports), whereas bloat, retained placenta, and wound were most frequently reported under the animal health problems (9.6% of the total livestock diseases).

4.1.4.2. Modes of remedy preparations

The major modes of remedy preparation were: crushing 101 (45.1 %%), followed by Cutting 30 (13.4%), Powdering 29 (12.9%), and Expressed juice 14 (6.3%) which were accounted for a total of 77.7% of the whole methods of preparation and others methods of preparations were used (Table 9).

Table 9: Modes of Remedy preparations

Frequency	Percent	Valid Percent	Cumulative Percent
Crushing	101	45.1	45.1
Cutting	30	13.4	13.4
Powdering	29	12.9	12.9
Expressed Juice	14	6.3	6.3
Squeezing	13	5.8	5.8
Chewing	9	4.0	4.0
Decoction	6	2.7	2.7
Poultice	6	2.7	2.7
Removing its outer cover	3	1.3	1.3
Seed for Swallowing	3	1.3	1.3
Teeth picks	3	1.3	1.3
Infusion	2	0.9	0.9
Preparing its bark	2	0.9	0.9
Fumigating	1	0.4	0.4
Leaf collection	1	0.4	0.4
Oil Extraction	1	0.4	0.4
Total	224	100	100

In the process of modes of remedy preparation, the study showed that, there were chances of using two or more modes for a species.

4.1.4.3. Modes of application

The most used modes of application by local communities was Oral application which was accounted as 157(70.1%), followed by topical application 33(14.7%) of remedy prepared and other methods Ear drops, Eye drops, Nasal, Oral, Oral Cavity, spiritual, Topical applications were used (Figure 8).

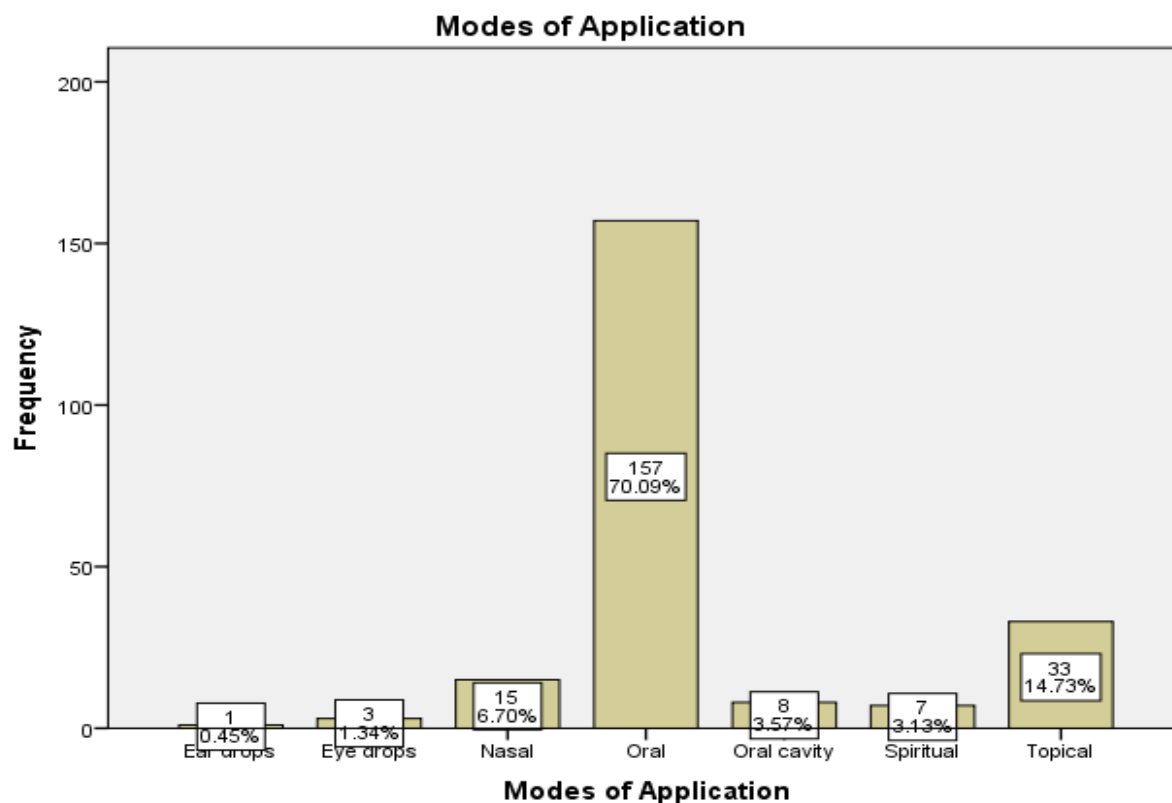


Figure 8: Modes of remedy Applications

4.1.5. Top Ten Human Diseases of the Jimma Horro district

The traditional names and clinical explanations of the top ten most cited human health problems taken from 2027 EFY Nunu Health Center indicated in (Table 4 & Appendix 1). The research result identified medicinal plants those used traditionally to treat these identified top ten diseases (Table 10).

Table 10 :- Top ten human diseases of Jimma Horro district with their medicinal plants

No.	Top 10 diseases of the district	Medicinal plants used to treat the diseases	Number of species
1.	Malaria	<i>Ocimum grattissimum</i> L., <i>Buddleja polystachya</i> Fresen., <i>Rumex nepalensis</i> Spreng., & <i>Clutia abyssinica</i> Jaub. &- Spach.	4
2.	Pneumonia	<i>Catha edulis</i> (Vahl) Forssk ex Endl., <i>Combretum collinum</i> Fresen., <i>Afrocarpus falcatus</i> (Thunb.)C.N., & <i>Allium sativum</i> L.	4
3.	Acute fibril illness	<i>Ocimum grattissimum</i> L., <i>Buddleja polystachya</i> Fresen., <i>Rumex nepalensis</i> Spreng, <i>Clutia abyssinica</i> Jaub. &- Spach, <i>Ocimum lamifolium</i> Hochst. Ex Benth, & <i>Gymnanthemum amygdalinum</i> (Delile) Sch.Bip.	6
4.	Typhoid fever	<i>Ocimum lamifolium</i> Hochst. Ex Benth.	1
5.	AURTI	<i>Allium cepa</i> L., <i>Carica papaya</i> L., <i>Coccinia abyssinica</i> (Lam.) Cogn., <i>Securidaca Longepedunculata</i> Fresen., <i>Brucea antidysernterica</i> J.F.Mill., & <i>Gloriosa simplex</i> L.	6
6.	Helminthiasis	<i>Gymnanthemum amygdalinum</i> (Delile) Sch.Bip. , <i>Securidaca Longepedunculata</i> Fresen., <i>Brucea antidysernterica</i> J.F.Mill., <i>Solanum adoense</i> Hochst. Ex A. Rich., <i>Clutia abyssinica</i> Jaub. &- Spach., <i>Hagenia abyssinica</i> (Bruce) J.F.Gmel., <i>Datura strumanium</i> L., <i>Achyranthes aspera</i> L., <i>Momordica foetida</i> Schumach., <i>Echinops kebericho</i> Mesfin, & <i>Clematis simensis</i> Fresen	11
7.	LBI	<i>Senna septemtrionalis</i> (Viv.) Irwin& Barneby, <i>Coleus abyssinicus</i> (Fresen.) A.J.Paton, <i>Orbivestus unionis</i> (Sch.Bip. ex Walp.) H.Rob., & <i>Nigella sativa</i> L.	4
8.	Constipation	<i>Grewia bicolor</i> Juss., <i>Piper capense</i> L. f.,& <i>Linum usitatissimum</i> L.	3
9.	Tonsillitis	<i>Mutarda carinata</i> (A.Braun) D.A.German, <i>Solanum adoense</i> Hochst. Ex A. Rich., <i>Phyla nodiflora</i> (L.) Greene, <i>Rhamnus prinoides</i> L.Herit., & <i>Nigella sativa</i> L.	5
10.	Joint pain	<i>Grewia bicolor</i> A.Juss. , <i>Solanum linnaeanum</i> Hepper & P.-M.L.Jaeger, <i>Hymenodictyon floribundum</i> (Hochst. & Steud.) B.L.Rob.	3

4.1.6. Plant parts and conditions used for remedy preparation

4.1.6.1. Plant parts used for remedy preparation

Plant parts used for remedy preparation indicated that Leaf 64 (28.6%) were the widely used plant parts, followed by Bark 45 (20.1%), Seed 37 (16.5%), Root 31 (13.8%) parts of remedy preparations and others were used (Table 11).

Table 11: - Plant parts used for Remedy preparations

Plant parts used	Frequency	Percent	Valid Percent
Leaf	64	28.6	28.6
Bark	45	20.1	20.1
Seed	37	16.5	16.5
Root	31	13.8	13.8
Bulb	11	4.9	4.9
Rhizome	7	3.1	3.1
Stem	6	2.7	2.7
Latex	5	2.2	2.2
Fruit	4	1.8	1.8
Flower	2	0.9	0.9
Leaf & Bark	2	0.9	0.9
Seed & Leaf	2	0.9	0.9
Stem / Branch	2	0.9	0.9
Above ground parts	1	0.4	0.4
All parts	1	0.4	0.4
Branch	1	0.4	0.4
Leaf & bulb	1	0.4	0.4
Leaf with branch	1	0.4	0.4
Stem, Brach & Bark	1	0.4	0.4
Total	224	100	100

The study showed that, there might be chances of more than one or all parts of medicinal plant species used in remedy preparation.

4.1.6.2. Plant parts conditions used for remedy preparation

The local people of the study area reported employing plant materials under different conditions. The fresh plant parts were the dominant ones, accounting for 168 (75.0%) used in remedy preparation followed by Dry 33 (14.7%) and Both Fresh and dry conditions of plant parts 23 (10.3%) were used in remedy preparation (Figure 9).

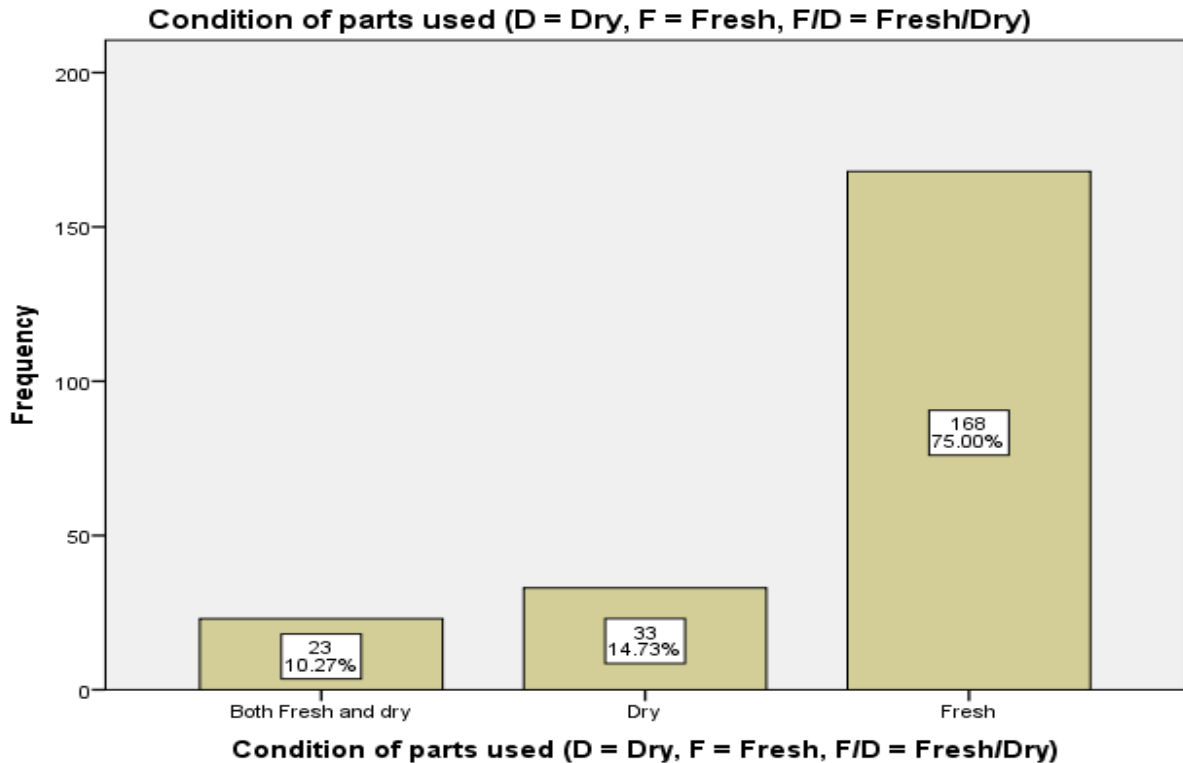


Figure 9:- plant parts conditions used for remedy preparation

The study showed that, there might be chances of more than one or all parts of a species used in remedy preparation in fresh, dry, and fresh/dry conditions.

4.1.6.3. Physical states of prepared remedy

The physical states of prepared remedies administration in the study area were reported to be Liquid 135 (60.3%) prepared remedies, solid 85 (37.9%) prepared remedies, and each of gasoues and both Both solid and Liquid were 2 (0.9%) prepared remedies (Table 12).

Table 12 :- Physical states of prepared remedies

Physical States of remedies	Frequency	Percent	Valid Percent
Liquid phase	135	60.3	60.3
Solid phase	85	37.9	37.9
Both solid and Liquid	2	0.9	0.9
Gas	2	0.9	0.9
Total	224	100	100

4.1.7. Sources of Traditional Medicinal Knowledge

A total of 56 (fifty-six) regular informants and 10 (ten) key informants, generally, 66 (sixty-six) general informants of the study, who had participated in the interviews, claimed that they acquired knowledge of medicinal plants from different sources, including family members, 34 (51.51%), especially their father and grandparents, in a very private way.

The remaining 19 (28.81%) picked up knowledge of medicinal plants from friends, and 13 (19.70%) of them acquired the knowledge from exercise (Appendix 7.7).

4.1.8. Marketability of medicinal plants

Among the reported medicinal plants in the study area, 46 (48.4%) species were reported as marketable (Table 13) and only 6 (6.3%) (Table 14) species which are “Arramaandawaa” (*Gloriosa simplex* L., Cilaaddamii (*Ruta chalepensis* L.), Qarabichoo (*Echinops kebericho* Mesfin), Gurraattii (*Nigella sativa* L.), Shinfaa (*Lepidium sativum* L.), and Xabanaahii (*Securidaca longepedunculata* Fresen.) were found in the local markets, sold and purchased entirely for their medicinal applications

Table 13 :- Marketability of medicinal plants

Marketability (Yes/No)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	49	51.6	51.6	51.6
	Yes	46	48.4	48.4	100.0
	Total	95	100.0	100.0	

4.1.8.1. Marketability Purpose of Medicinal Plants

The majority of reportedly marketable medicinal plants 40, (42.10%) of species were mainly sold for their nonmedical uses, but occasionally applied as medicine when the need arises (Table 14).

Table 14: Marketability Purpose of medicinal plants

	Purposes	Frequency	Percent	Valid Percent
Non-marketable	Non-marketable	49	51.6	51.6
Marketable Medicinal Plants	Addiction	1	1.1	1.1
	Beverage	1	1.1	1.1
	Cash crop	2	2.1	2.1
	Crop	2	2.1	2.1
	Food	12	12.6	12.6
	Medicine	6	6.3	6.3
	Rope	1	1.1	1.1
	Spice	4	4.2	4.2
	Wood	16	16.8	16.8
	Wood & Timber	1	1.1	1.1
	Total	95	100.0	100.0

The 6 (six) marketable medicinal plants sold in markets for their medicinal values as told by market respondents were: - *Gloriosa simplex* L., *Ruta chalepsis* L., *Echinops kerebicho* Mesfin., *Nigella sativum* L., *Lepidium sativum* L., and *Securidaca longepedunculata* Fresen. The average price Crushed a handheld *Echinops kebericho* Mesfin (Kerebicho) stem at the Jimma Horro local market was 30 Birr (around 0.2 USD), whereas for 1coffee cup of *Nigella sativum* L. (Gurraattii) was 50 Birr (around 0.3 USD); and the price was 30 Birr (around 0.2

USD) for a coffee cup (100– 150 gm) of *Lapidium sativum* L. (shinfaa) seed at Gabaa Jimmaa (Jimma local market).



Figure 10 : -Pictures of Medicinal plants sold at Jimma Horro Local Markets

4.1.9. Data Analysis

4.1.9.1. Informant consensus factor (ICF)

The informant consensus factor was calculated to investigate the degree of homogeneity among informants, for the plants to be used in each ailment category. The ICF values vary from zero to one, with a high ICF achieved when one or a few plant species were reported to treat a certain condition by a large proportion of informants.

The ICF for the study had been conducted for human ailments. Based on disease characteristics and treatment resemblances, fourteen (14) disease categories were identified from the selected 61 human ailments among identified 64 human ailments reported in the study areas (Appendix 9). Among these, the categories with the highest average ICF values among ethnic groups diseases were External parasitic diseases, Urogenital tract diseases and Osteogenesis imperfect (Bone fracture) with (1) each of them, followed by Other diseases of Average ICF (0.98) and the last with least Average ICF of (0.75) was Cardio vascular diseases (Table 15 and Appendix 9).

Table 15:-Disease Categories and Av. ICF of Human Ailments

No.	Disease Category	Numbers of Ailments Concentrated in the category	User report as ailments respectively	Number of species respectively	ICF for ailments respectively	Av. ICF for disease category	Rank
1	Zoonotic & Vector-Borne Diseases	6	25,66,9,3,19,15	2,3,1,1,1,3	0.96,0.97,1,1,1,0.8	0.955	9
2	Spiritual diseases	3	64,64,65	1,9,8	1,0.9,0.9	0.933	12
3	Cardiovascular Disease	Anemia	3,3	2,1	0.5,1	0.75	14
4	Dermatosis	8	25,28,66,65,5,3,7,41	1,2,1,3,2,1,1,8	1,0.96,1,0.97,0.75,1,1,0.825	0.94	11
5	Ectoparasites	2	4,12	1,1	1,1	1	1
6	Acute Febrile Illness	2	59,54	4,4	0.95,0.94	0.95	10
7	Gastrointestinal diseases	8	19,58,63,14,7,66,19,22	1,2,3,2,1,8,1,3	1,0.98, 0.97, 0.92, 1, 0.89,1, 0.90	0.96	6
8	Urogenital Tract Disease	2	7, 2	1, 1	1,1	1	1
9	Endoparasites	Internal parasites	66	6	0.92	0.92	13
10	Osteogenesis imperfecta / Bone fracture/	Bone weakness	13,4,6	1,1,1	1,1,1	1	1
11	Organ diseases	6	6,22,66,23,5,38	1,1,3,2,1,8	1,1,0.97,0.95,1,0.81	0.96	6
12	Others diseases	6	61,50,5,11,8,6	2,2,1,2,1,1	0.98,0.98,1,0.9,1,1	0.98	4
13	Reproductive diseases	5	5,17,5,21,22	1,2,1,3,1	1,0.94,1,0.9,1	0.97	5
14	Throat and Respiratory Diseases	6	66,18,66,52,43,7	3,1,2,4,6,1	0.97,1,0.98,0.94,0.88,1	0.96	6

4.1.9.2. Preference ranking

The preference ranking method was based on the total scores given by the key informants (KI–K10) for each medicinal plant. The ratings provided by the key informants are based on the effectiveness of the medicinal plant in treating evil spirits.

A score of 10 indicates the highest efficacy/treatability, while a score of 1 reflects the lowest efficacy / treatability. The rankings are determined based on the success rate of the treatment.

Eleven multipurpose plant species commonly reported by informants were selected from total useful plants collected, and the diverse use of these plants was listed for key informants to order them by considering several attributes at a time. Ten key informants were selected to rank eleven selected medicinal plants used as traditional medicine in the Jimma Horro district to compare the multipurpose use of these plants. Accordingly, *Croton macrostachys* Del. received the highest overall score of 86, making it the most preferred medicinal plant among others used for the treatment of evil spirits. *Solanum linnaeanum* Hepper & P.-M.L.Jaeger., ranked second with a score of 74, followed by *Brucea antidysenterica* J.F. Mill., with a score of 63, and *Phragmenthera regularis* (Sprague) M. Gilbert ranked 11th (Table 16).

Table 16 :- Preference Ranking 11 MP Species Based on Evil Sprits treatment

No.	Scientific and vernacular names of MPs	Respondents (K1-K10)										Tot	Rank
		K1	K2	K3	K4	K5	K6	K7	K8	K9	K10		
1	<i>Croton macrostachyus</i> Del./ Makkanniisa/	10	8	8	9	9	8	9	7	9	9	86	1
2	<i>Solanum linnaeanum</i> Hepper & P.- M.L.Jaeger/ Hiddii waraabessaa/	8	8	6	10	10	5	6	8	7	6	74	2
3	<i>Brucea antidysenterica</i> J.F.Mill./ Qomonyoo/	6	7	6	7	8	5	4	5	7	8	63	3
4	<i>Orbivestus unionis</i> (Sch.Bip. ex Walp.) H.Rob./ Sooyyama dhoraa/	7	8	5	6	4	4	5	6	8	7	60	4
5	<i>Echinops kebericho</i> Mesfin /Qarabichoo/	3	4	4	7	8	5	7	8	4	8	58	5
6	<i>Securidaca Longepedunculata</i> Fresen./ Xabanaaahii /	7	8	4	3	4	5	7	8	5	4	55	6
7	<i>Solanecio gigas</i> (Vatke) C. Jeffrey/ Fooricaa/	4	7	8	1	3	5	8	7	5	4	52	7
8	<i>Rothea myricoides</i> (Hochst.) Steane & Mabb / Maraachisaa/	4	1	8	7	5	5	3	1	4	8	46	8
9	<i>Bersema abyssinica</i> Fresen./ Lolchiisaa/	4	5	5	4	1	4	6	7	3	5	44	9
10	<i>Osyris lanceolata</i> Hochst. & Steud/ Waattoo/	3	4	4	3	3	5	7	6	4	4	43	10
11	<i>Phragmanthera regularis</i> (Steud. ex Sprague) M.G.Gilbert/ Dheertuu makkanniisaa/	3	4	4	1	2	4	6	5	3	4	36	11

4.1.9.3. Ranking with direct matrix

Direct matrix ranking was conducted considering multiple uses of medicinal plants, such as ;their use as fuel wood, Timber production, charcoal, Shade, Construction, Fence, medicine, and edible as fruit oil or food/forage. The set of ten useful plants was presented to those randomly selected 10 key informants to rank according to their multiple uses. Then, each chosen key informant was requested to assign use values as (5=most valuable, 4=very good, 3=good, 2=less used, 1=least valuable, and 0=not used). Then the average values give/n by key informants were calculated and recorded for each species. The average values of each species were summed up and ranked. Accordingly, *Cordia africana* L. was ranked first multipurpose,

followed by *Acokanthera schimperia* (A. DC.) Schweinf, *Acacia abyssinica* (Hochst. ex Benth) Kyal. & Boatwr. ranked 3rd, as having multipurpose by the key informants (Table 17).

Table 17:- Direct matrix ranking of 10 medicinal plants of the study area

Species name	Species use categories									
	FW	TP	Ch	Sh	C	F	M	Ed	Tot	Rank
<i>Afrocarpus falcatus</i> (Thunb.)C.N.	3	0	2	2	3	1	3	0	14	9
<i>Vernonia amygdalina</i> L.	4	0	1	3	1.5	3.5	4.8	3	20.8	6
<i>Olea europaea</i> subsp. <i>cuspidata</i> (Wall. Ex G. Don) Cif.	4	0	3	4	0	3.8	4	0	18.8	7
<i>Prunus africana</i> (Hook. f.) Kalkm.	5	0	3.5	2	2.4	3	2	0	17.9	8
<i>Acacia abyssinica</i> (Hochst. ex Benth) Kyal. & Boatwr.	5	1	5	4.5	4	2.5	1.5	0	23.5	3
<i>Croton macrostachys</i> Del.	4.5	1	3.5	3	1.5	2.5	5	0	21	5
<i>Ficus capensis</i> L.	4	0	4	5	1	3	2	2.5	21.5	4
<i>Vernonia rueppellii</i> Sch. Bip. ex Walp.	5	0	0	2	0	3	2	0	12	10
<i>Acokanthera schimperia</i> (A. DC.) Schweinf	4.5	5	5	4	4	1	3	0	26.5	2
<i>Cordia africana</i> L.	4	5	5	3.5	4.5	2.5	4	2	30.5	1

Note: - FW=Fuel Wood, TP=Timber production, Ch=Charcoal, Sh=Shade, C=Construction, F=Fence, M=Medicine, Ed=Edible, To=Total, Ra=Rank.

4.1.9.4. The fidelity level (FL)

The relative healing potential of medicinal plants was calculated for plants at least cited by three or more informants against particular ailments, and the FLs values ranged from 21 to 100% (Table 23). Among thirteen plant species, those that were identified across ethnic groups, nine plant species were identified as the most preferred plants, those their FL >50% (Table 23). *Ruta chalepensis* L., *Allium sativum* L. and *Acacia abyssinica* (Hochst. ex Benth) Kyal. & Boatwr. Scored (100%), the highest FLs, for Common cold, Malaria and Bat urine human ailments respectively, while *Rumex nepalensis* Spreng, obtained (21.43%), the least FL value, for spider poison among the species of medicinal plants identified in the study area (Table 18).

Table 18:-The most curative medicinal plant species based on their FL

No	Medicinal plant species	Human ailments	N P	N	FL (%)	Rank
1	<i>Allium sativum</i> L. Qullubbii adii	Asthma	57	66	86.36	3
2	<i>Securidaca Longepedunculata</i> (Xabanaaahii A/O)	Breathing problem	7	18	38.89	10
3	<i>Ruta chalepensis</i> L. (Cilaaddamii A/O)	Common cold	66	66	100	1
4	<i>Linum usitatissimum</i> L. (Talbaa A/O)	Cough	17	58	29.31	12
5	<i>Ruta chalepensis</i> L. (Cilaaddamii A/O)	Tonsillitis	43	66	65.15	9
6	<i>Gloriosa superba</i> L. (Aramaandawaa /Ancootee gaaraa A/O)	Tuberculosis	5	17	29.41	11
7	<i>Acacia abyssinica</i> (Hochst. ex Benth) Kyal. & Boatwr. (Laaftoo A/O)	Bat urine	19	19	100	1
8	<i>Carica papaya</i> L. (Paapayyaa A/O)	Malaria	9	11	81.82	5
9	<i>Clusia abyssinica</i> Jaub. &- Spach. (Ulee foonii A/O)	Rabies	6	9	66.67	8
10	<i>Acokanthera schimperia</i> (A. DC.) Schweinf (Qararoo A/O)	Scabies "Fincooftuu"	5	7	71.43	6
11	<i>Clausena anisata</i> (Wild.) Benth (Ulmaayyii A/O)	Snake bite	13	19	68.42	7
12	<i>Rumex nepalensis</i> Spreng. (Timijjii A/O)	spider poison	3	14	21.43	13
13	<i>Croton macrostachys</i> Del. (Makkanniisa A/O)	Evil spirit	54	65	83.08	4
14	<i>Echinops kebericho</i> Mesfin (Qarabichoo A/O)	Evil eye	58	64	90.63	2
15	<i>Allium sativum</i> L. (Qullubbii adii A/O)	Malaria	66	66	100	1

4.1.10. Threats and Conservation practices of Traditional Medicinal Plants

The informants from Jimma Horro District identified several opportunities for improving the promotion, regulation, and sustainable utilization of traditional medicinal plants (TMPs). They emphasized the importance of raising community awareness about traditional medicine and strengthening forest management practices. Informants also highlighted the need to enhance research and development activities to improve the effective utilization of TMPs. In addition, they expressed that scaling up traditional medicine could be achieved through research-based support and institutional inputs.

Participants further recognized the importance of supporting traditional healers through training and material assistance, noting that such initiatives are currently lacking. Continuous supervision and technical support from the Ministry of Health and other relevant institutions were viewed as key opportunities for ensuring effective implementation and sustainability of traditional medicine practices in the district.

Despite these opportunities, medicinal plant resources and the associated indigenous knowledge in the study area are under varying degrees of threat. Most informants and key informants agreed that anthropogenic activities are the primary causes of the decline of medicinal plants in Jimma Horro District. The major threats identified include agricultural expansion, coffee plantation development, overgrazing, firewood collection, forest fires, human settlement expansion, and overharvesting. Among these, agricultural expansion was reported as the most significant factor contributing to the reduction in medicinal plant availability.



Figure 11:-Deforestation picture taken from Gare forest, Garjeda forest for coffee Plantation

All traditional healers, community leaders, and agricultural development experts confirmed that medicinal plant resources have declined markedly in the study area. As a result, healers are often forced to travel long distances, sometimes across district boundaries, to obtain the plants they require. In some cases, medicinal plants that were once readily available near their homes can no longer be found.

Despite these challenges, during data collection period, the researcher had seen some healers cultivated wild medicinal plants such as *Baccharoides adoensis* (Sch.Bip. ex Walp.) H.Rob., *Conomitra linearis* Fenzl, *Echinops kebericho* Mesfin, *Gloriosa simplex* L., *Ricinus communis* L. var., *Solanecio gigas* (Vatke) C. Jeffrey, around their home to use the if needed without wasting their time for finding it go further distance.

In addition, field observations revealed encouraging conservation practices, particularly the cultivation of certain medicinal plants for food and spices and other purposes such as fence and medicine in home gardens and use it when needs arise for medicine. Species such as *Allium sativum* L., *Mirabilis jalapa* L., *Aloe pubescens* Reynolds, *Cucurbita pepo* L., *Dracaena afromontana* Mildbr., *Punica granatum*, *Ricinus communis* L., *Ruta chalepensis* L., *Syzygium aromaticum*, and *Zingiber officinale* were commonly grown by local households within the study district. Some of these species are also cultivated for non-medicinal purposes, including *Allium sativum*, *Mirabilis jalapa*, *Cucurbita pepo*, and *Zingiber officinale*, which likely reflects the community's recognition of their medicinal value. However, the majorities of medicinal plant species reported in the study are still collected from natural forests and receive limited conservation attention. Therefore, urgent in situ conservation measures are required to protect these species in their natural habitats before further losses occur.

4.1.11. Loss of Indigenous Knowledge

Data obtained from informants revealed that most traditional healers are reluctant to share their medicinal plant knowledge. Approximately 42.2% of healers reported not sharing their knowledge with anyone. Others indicated that they transfer knowledge selectively, mainly to trusted family members, including the eldest son (24.2%), wife (15.2%), eldest daughter (9.1%), or all family members (9.1%). In many cases, knowledge is shared only in old age with the individual considered most trustworthy. Consequently, some healers pass away without transferring their knowledge, leading to irreversible loss.

The secrecy surrounding medicinal plant knowledge is largely driven by its role as a source of income for healers. This secrecy, combined with the declining interest of younger generations and the influence of modern education, has contributed significantly to the erosion of

indigenous knowledge. Respondents consistently reported that younger community members are generally unwilling to learn traditional medicinal practices.

As a result of most knowledgeable healers are elderly, and the transmission of medicinal plant knowledge to younger generations is limited, indigenous knowledge related to medicinal plant use is steadily declining.

The study also revealed that reliance on traditional medicinal plants for treating human and livestock ailments is decreasing due to the increasing availability of modern health facilities in the study area. It is recommended further expanding health centers in the study area. But as more people turn to modern health services, traditional practices are gradually neglected. In addition, misconceptions and negative perceptions about traditional medicine, particularly among the younger generation, have further contributed to its decline.

Traditional medicinal knowledge in the study area is primarily transmitted orally from one generation to the next, without written documentation. Consequently, no formal records or documented archives of medicinal plants and their associated indigenous knowledge exist in the district, further increasing the risk of knowledge loss.

4.2. Discussion

4.2.1. Medicinal Plants of the Study Area.

A total of 95 medicinal plants belonging to 84 genera and 47 botanical families were reported to be used for the treatment of human and livestock's ailments by local informants in the study area. The number of medicinal plants reported and their use by the local population of the area shows the depth of local indigenous knowledge of medicinal plants and their uses. The knowledge and practice of a large number of medicinal plants used by the people of the Jimma Horro district shows that the indigenous people of the study area still rely on traditional medicines derived from plants. From these plants species, herbs took the highest proportion 36(37.89%), followed by Shrub 31(32.63%), tree 26(27.37%) of species, and climbers took the least proportion 2(2.11%) plant of species.

Similar studies conducted in other parts of Ethiopia have shown similar results with this study. The studies done by (Tariku Berihun, *et al*, 2024) indicated that among the identified 109 medicinal plant species, herbs and shrubs comprised the majority of the identified species, with herbs accounting for 35.7% and shrubs accounting for 33.94%. Trees constituted 21.1% of the species, while climbers comprised 9.4% of the total which is similar to this study.

Also the study done by (Mulugeta Alemu *et al.*, 2024) indicated that herbs took the highest proportion (36%) whereas climbers took the least proportion. From above both studies climbers took the least proportion comparing to others similar to the result gained in this study. The obtained result in the study was deuto local communities knowledge more depends on herbal medicinal plants than others and highly found of herbal medicinal plant species in the study area district.

Families Asteraceae and Euphorbiaceae were represented by the highest number of species (6 species, 6.3% each of them) followed by Brassicaceae, Fabaceae and Solanaceae (5 species, 5.3% each of them) and Lamiaceae and Moraceae (4 species, 4.2% each of them). Cucurbitaceae, Malvaceae, Poaceae, Polygonaceae, Rosaceae and Rutaceae were (each contributed with 3 species, 3.2 % of the total). Acanthaceae, Amaranthaceae, Amaryllidaceae, Asparagaceae, Boraginaceae, Ranunculaceae, Rubiaceae and Sapotaceae each represented with (2 species, 2.1 % of the total). The remaining others 26 families were those of each contributed with (1 species, 1.1% of the total). Many studies done in other parts of Ethiopia also indicated Asteraceae family is the most dominant used in medicinal value. As an example, the studies done by (Tariku Berihun, 2024) and (Merera Teso & Mesfin Woldearegay, 2023) indicated that the family Asteraceae were represented by highest representation of plant species which is similar with the result gained in this study. This is dueto Asteracea is the most diverse and significant families having many medicinal plant species that local communities depend on it and flourished highly in the the study area.

4.2.2. Habitat of Medicinal Plants in the Study Area

The study depended on the habitat of plants as Agricultural, Agricultural & Home garden, Agricultural Crop, Home garden, Home garden & Wild, and Wild. The study identified 11 species (11.6%) as Agricultural, 2 species (2.1%) as Agricultural & Home garden, 4 species (4.2%) as Agricultural Crop, 10 Species (10.5%) as Home garden, 4 species (4.2%) as Home garden & Wild, and 64 species (67.4%) as Wild species of medicinal plants. The obtained result showed that most of the medicinal plants obtained from wild species.

Similar to this study many studies like (Merera Teso & Mesfin Woldearegay, 2023) and (Tamasgen Tadesse & Alemtshay Teka, 2023) showed that most of medicinal plants obtained from wild plant species. The obtained results may have been due to many medicinal plants were not domesticated and extracted from forest plants.

4.2.3. Medicinal Plants Use to Treat Human and Livestock Diseases

The study showed that from 95 species of identified medicinal plants in the Jimma Horro district 43 (45.3%) species were used to treat Human diseases, 39 (41.1%) species were used to treat both human and livestock diseases, and the remaining 13 (13.7%) species were used to treat Livestock diseases. From the obtained result, most of the identified medicinal plant species were used to treat human diseases followed by both human and livestock's diseases treating species and the least species were used in treating only livestock's diseases.

Other studies done by (Merera Teso & Mesfin Woldearegay, 2023) indicated that, among the collected 112 medicinal plants, 80 species (71. 43%) were used to treat human diseases which is similar result with this study. Both studies indicated that most of the identified medicinal plant species were used to treat only human diseases comparing to both human and livestock and livestock diseases.

Other studies done by (Amante Regassa & Mesfin Woldearegay, 2023) indicated that among the collected 87 medicinal plants, 70 species (80%) were used to treat human diseases, 11 species (12.6 %) help to treat both human and livestock ailments and 6 species (6.9 %) to treat livestock ailments which similar result with this study. From the obtained and improved result,

due to human beings selfishness and findings primarily for their own ailments rather than livestock's, they might have got many medicinal plants for their ailments.

4.2.4. Modes of Remedy Preparation and Application

The local community use different forms of remedy preparations and practical use to treat human and livestock diseases. The preparations also vary based on the type of disease treated and the actual site of the ailment. The study showed that the highest common forms of preparation were crushing (45.1%), cutting (13.4%), powdering (12.9%), expressed juice (6.3%), squeezing (5.8%), Chewing (4.0%), Decoction (2.7%), poultice (2.7%), and others remaining methods of remedy preparations for 224 prepared remedies in the study. The result showed that the most method of preparation was crushing.

The result agrees with similar studies elsewhere in Ethiopia done by (Tamasgen Tadesse & Alemtshay Teka, 2023); (Amante Regassa & Mesfin Woldearegay, 2023); (Merera Teso & Woldearegay, 2023) and (Berihun, 2024).

4.2.5. Plant Parts and Conditions Used for Remedy Preparations

Plant parts used for remedy preparation indicated that leaves 64 (28.5%) were the widely used plant parts followed by bark 45 (20.1%), seed 37 (16.5%), root 31 (13.8%), Bulb, Rhizome, stem, latex, fruit, and flower were 11 (4.9%), 7 (3.1%), 6 (2.7%), 5 (2.2%), 4 (1.8%) and 2 (0.9%) respectively; Leaf and bark, seed and leaf, and Stem and branch each contained 2 (0.9%) remedy preparations. Above ground parts, all parts, bark and flower, all parts, branch, leaf and bulb, leaf with branch, and Stem/branch and bark were each contained 1 (0.4%) of remedy prepared. The obtained result indicated that the most plant parts for remedy preparations is leaves followed by bark and seeds. Similar results were indicated by the study done by (Amante Regassa & Mesfin Woldearegay, 2023) and (Berihun, 2024) that showed leaves were the most frequently utilized medicinal plant parts for preparing remedies.

The fresh plant parts were the dominant ones accounting for 168 (75%) used in remedy preparation where as both dry parts were used in 33 (14.73%) of remedy preparation; the remaining 23 (10.27%) remedies were reported to be prepared from both fresh and dried parts

of medicinal plant species. From the obtained result it could be concluded that the majority of the remedies were prepared using fresh parts of medicinal plants. The study conducted by (Regassa & Woldearegay, 2023) agrees with this study, which showed that using fresh materials for different health problems is more preferable than dry materials.

4.2.6. Human and Livestock Diseases Treated by Traditional Medicinal Plants

Approximately 64 human health problems and 39 Livestock diseases and 20 both human and livestock common diseases were reported in Jimma Horro District for which the local people reported being treated with medicinal plants.

In the cases of Sources of Traditional Medicinal Knowledge / Traditional medicinal knowledge transferring mechanisms: the study result indicated that from the total 66 informants of this study, who had participated in the interviews, claimed that they acquired knowledge of medicinal plants from different sources including family members 34 (51.51%), especially their father and grandparents, in a very private way, 19 (28.79%) picked up knowledge of medicinal plants from friends, and 13(19.7%) from exercise. The result indicated traditional medicinal knowledge transferred highly from family members to family members. Others studies conducted in different parts of Ethiopia indicated that knowledge of traditional medicine transfer through family members orally in a secret way. The study conducted by (Bogale et al., 2023) showed that, in Ethiopia, the traditional medical knowledge is transferred from one generation to the other through verbal communication to family members particularly to sons which agrees with this study. And also, the study conducted by (State, 2022) showed that knowledge transferred orally to the most selected family member with great secrecy from generation to generation and it may disappear because of rapid socioeconomic, environmental and technological changes and as a result of the loss of cultural heritage under the guise of civilization.

4.2.7. Marketability of Medicinal Plants

Among the reported medicinal plants in the study area, 46 (48.4%) species were reported as marketable and only six (6.3%) species (*Gloriosa simplex* L., *Ruta chalepensis* L., *Echinops kebericho* Mesfin, *Nigella sativum* L., *Lepidium sativum* L., *Securidaca Longepedunculata* Fresen.) were sold in the local markets and purchased entirely for their medicinal applications. From the marketable medicinal plants the majority of them about 40 (around 87%) species were mainly sold for their non-medical uses but occasionally applied as medicine when the need arises. This result agrees with the study conducted by (Mulugeta Alemu et al., 2024) which showed that from the majority of reportedly marketable medicinal plants (82%) were mainly sold for their non- medicinal uses but occasionally applied as medicine when the need arises. In addition to this, the study also conducted by (Megersa et al., 2023) showed that medicinal plants marketed on the open market as a spice for non- medicinal purposes *A. sativum*, *A. cepa*, *Artemisia abyssinica* Sch.Bip., *Capsicum annuum* L., *Coriandrum sativum* L., *Lepidium sativum* L., *Nigella sativa* L., *O. basilicum*, *Trigonella foenum-graecum* L., and *Zingiber officinale* Roscoe, food (*Brassica carinata* A.Braun, *B. nigra* (L.) K.Koch, *Cucurbita pepo* L. and *L. usitatissimum*, *C. papaya* and *Citrus limon* (L.) Osbeck). So, this study result summited with others studies conducted in different parts of Ethiopia.

4.2.8. Modes/Roots of Remedy Application

The major routes of administration in the study area were reported to be oral application (157 preparations, 70.1%) followed by topical application (33 preparations, 14.7%). Similar study done by (Amante Regassa & Mesfin Woldearegay, 2023) showed that Oral route of application is the most efficient for better physiological reaction to the disease which agrees with this study.

4.2.9. Threats to Medicinal Plants

The majority of informants and key informants agreed that anthropogenic activities were responsible for deteriorating medicinal plants in Jimma Horro District. The most common reported threats included agricultural expansion, Coffee plantation, overgrazing, firewood collection, forest fires, human settlements, and overharvesting.

These factors, particularly agricultural expansion, have led to a decline in the availability of medicinal plant species due to forests rich of medicinal plants cleared. Other studies conducted in different parts of Ethiopia like (Regassa & Woldearegay, 2023) showed that, most of the causes for the threats to medicinal plants and the associated indigenous knowledge are the anthropogenic factors such as deforestation, agricultural land expansion, fire, construction, overgrazing, overpopulation, charcoal production, furniture production, urbanization and over harvesting of known medicinal plants which agrees with this study.

According to (Megersa et al., 2023), agricultural expansion, charcoal production, construction, and firewood collection were common threats to medicinal plants. The results of this study showed that the source of threats to medicinal plants especially human influences was a great impact on them. Similar findings were reported elsewhere in the country (Assefa et al., 2021) ; (Human et al., 2021) and (Tafesse & Amenu, 2023) showed that anthropogenic activities like agricultural expansion, deforestation, overgrazing and over utilization are major threats to general plants which also have major impacts on medicinal plants.

Thus, anthropogenic factors like the need for agricultural expansion for farm land and overgrazing, over harvesting and other factors threatened plant species in general and medicinal plants in study area.

4.2.10. Loss of Indigenous Knowledge

The information data gathered from the informants showed that majority of the traditional healers did not show and share the medicinal plants and their traditional knowledge to anybody. Those who didn't tell to any one count (42.2%), to trust eldest son which is (24.2%), eldest daughter (9.1%), and wife (15.2%) all member of the family (9.1%). In some cases, they share to their family member who they trust most when they become older and older. Because of this, some healers even die without transferring their knowledge. They keep their knowledge in secret because the knowledge of medicinal plant is means of income generating for them. This leads to loss of the knowledge over time. The other reason is establishment of knowledge on medicinal plants become lost due to its secrecy, unwillingness of young generation to gain the knowledge, and influence of modern education.

In addition, respondents explained that, the youngsters are not willing to acquire the knowledge. The other factor that threatens traditional knowledge is age of healers. This shows that traditional healers who have knowledge are becoming very old. Therefore; the indigenous medicinal plants use knowledge was declining among the younger generation due to low interest of the younger generation and secrecy of the knowledge by healers.

Local communities were preferring treating by modern health system and currently have being forgotten about the traditional medicinal knowledge. In addition, there is misunderstanding of values of traditional medicinal knowledge and practices especially by the young generation. Additionally, traditional medicinal knowledge in the study area is transferred mostly to the family members because to keep it secretly. That knowledge transferred secretly from generation to generation is orally without writing it in document form. These and other effects had been decreasing traditional medicinal knowledge from day to next day and from generation to next generation. Due to this, the study revealed that there is no documented file about medicinal plants and their indigenous knowledge.

Therefore, awareness should be created for the healers to transfer their knowledge for youngsters and there should be support by peoples whom work with the community in health system.

5. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

This ethnobotanical study documents traditional medicinal plants used by the indigenous people of Jimma Horro District, Kellem Wollega Zone, and Western Ethiopia, highlighting their importance in primary healthcare for both humans and livestock. A total of 95 medicinal plant species belonging to 84 genera and 47 botanical families were identified. Most of the medicinal plants were herbs followed by shrubs, trees and climbers. Among them, most of them used to treat human ailments followed by both human and livestock's ailments and least species for treating only livestock's diseases. The most method of preparation was crushing followed by cutting and powdering and others. The most plant parts for remedy preparations are leaves followed by bark, seeds and root. In the cases of human and livestock ailments reported being treated with medicinal plants, approximately 64 human health problems and 39 Livestock diseases and 20 both human and livestock common diseases were reported from the study area. Among the identified 95 medicinal plants species; 49 species were not sold at market and 46 species were marketable and 6 of the species were sold for their medicinal values at the local markets of the district.

Traditional medicine knowledge systems are handed down orally from generation to generation and it may disappear because of rapid socioeconomic, environmental, technological changes and as a result of loss of indigenous knowledge and cultural heritage under the guise of civilization. So documentation is the primary need in case of systematic studies to be conducted for conservation of this valuable heritage.

As this is the first ethnobotanical study of traditional medicinal plants conducted in the district, the documentation serves as a baseline reference for future research and supports potential pharmaceutical, phytochemical, and conservation efforts. The findings underscore the urgent need to conserve medicinal plant resources and safeguard associated indigenous knowledge to ensure their sustainable use and continuity for future generations, while reinforcing the close relationship between local communities and their natural environment.

5.2. Recommendations

Traditional healers and local communities in Jimma Horro District should receive support from the education sector, targeted training, and financial assistance to enhance their knowledge of medicinal plant conservation and promote sustainable use. As this study provides baseline information on traditional medicinal plants in the area, further in-depth research is strongly recommended. Traditional healers should be encouraged to openly transmit their knowledge to younger generations rather than keeping it secret, and district authorities and relevant stakeholders should advise and motivate them to ensure knowledge continuity.

Educated individuals and adults, who are currently less involved in acquiring traditional medicinal knowledge, should be made aware that traditional medicine forms the foundation of modern medicine and should actively engage in learning from elders and traditional healers. Concerned institutions should strengthen community participation and raise awareness through training and education on the sustainable use and management of plant resources. Local communities and traditional healers are also encouraged to cultivate medicinal plants in home gardens to reduce time and effort spent collecting plants from distant areas.

The Jimma Horro administration should promote youth and community involvement in forest conservation, reforestation, and home-garden cultivation of medicinal plants as alternatives for conserving species found in natural forests. Finally, as natural forests rich in medicinal plants are being cleared for agriculture, coffee plantations, and other uses, responsible bodies should take action by providing guidance and awareness to prevent further deforestation.

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7. APPENDIX

7.1. Top Ten Human Disease Of The District 2017 E.C.

Nunu Heath Center Top ten disease of 2017 EFY

1. Malaria
2. pneumomia
3. Accute fibril illness
4. Typhoid fever
5. AURTI
6. Helmentiasis
7. LBI
8. Constipation
9. Tonsillitis
10. Joint pain



7.2. Medicinal Plants' Photographs Taken During Sample Collection



Mirabilis jalapa /Abaaboo
diimaa



Datura stramonium /
Ashaangira/



Phytolacca dodecandra /
Andoodee/



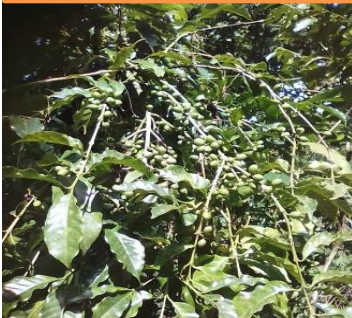
Buddleja polystachya
/Anfaarree/



Catha edulis /Caatii/



Cucurbita pepo / Buqqee
nyaataa



Coffea arabica /Buna/



Mutarda carinata /Raafuu ykn
goommana/



Rumex abyssinicus
/Dhangaggoo/



Ruta chalepensis
/Cilaaddamii/



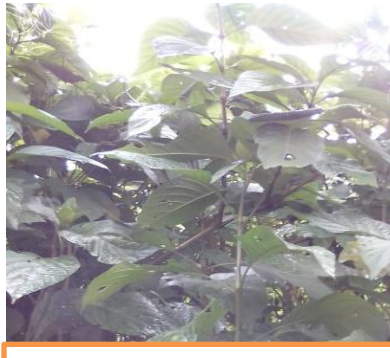
Phragmanthera regularis
/Dheertuu Makkanniisaa/



Ocimum lamiifolium
/Damakasee/



Grewia ferruginea / Dhoqonuu/



Justicia schimperiana
/Dhummuugaa/



Solanecio gigas /Fooricaa/



Rhamnus prinoides L.Herit.



Colocasia esculenta (L.) Schott



Mutarda carinata /Ija
goommanaa/



Ocimum gratissimum
/Hancabbii/



Vign Mutarda carinata /Gurra
hantuutaa/



Vign Mutarda carinata /Gurra
hantuutaa/



Ocimum gratissimum
/Hancabbii/



Clematis simensis /Hidda
fiitii



Solanum adoense /Hiddii saree/



Solanum linnaeanum /Hiddii
waraabessaa/



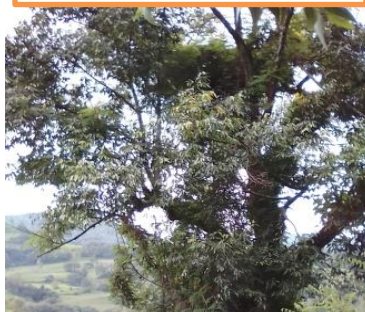
Solanum adoense /Hiddii
saree



Solanum linnaeanum /Hiddii
waraabessaa/



Pavonia urens /Hincinnii/



Prunus africana /Hoomii/



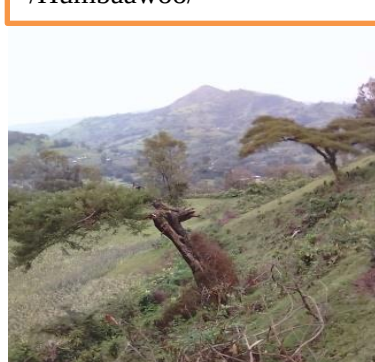
Momordica foetida
/Humbaawoo/



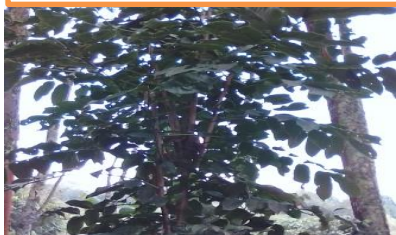
Acanthus polystachyus
/Kosorruu/



Vachellia abyssinica
/Laaftoo/



Vachellia abyssinica
/Laaftoo



Bersama abyssinica /Lolchiisaa/



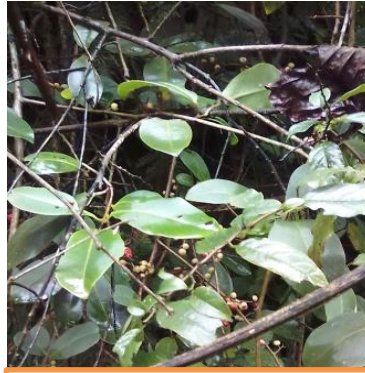
Citrus limon /Loomii/



Citrus limon /Loomii/



Croton macrostachyus
/Makkanniisa/



Hagenia abyssinica /Muka
koosoo/



Capsicum frutescens Mixmixa/



Ficus vasta /Qilxuu/



Albizia gummifera /Mukarbaa/



Ricinus communis
/Qobboo/



Conomitra linearis /Ribuu
quruphee/



Ricinus communis /Qobboo
baarii/



Brucea antidysenterica
/Qomonyoo/



Allium cepa /Qullubbii/



Brassica oleracea /Raafuu maraa/



Vernonia rueppellii /Reejjiii/



Mutarda nigra /Sinaafica/



Senna septemtrionalis /
Sanaamakii/



Allium sativum /Shunkurtii/



Baccharoides adoensis
/Sooyyam qalleettii/



Orbivestus unionis /Sooyyama
dhoraa/



Nicotiana tabacum
/Tamboo mukaa/



*Hymenodictyon
floribundum* /Takka dhahaa/



Linum usitatissimum /Talbaa/



Rumex nepalensis /Timijjii/



Clusia abyssinica /Ulee foonii/



Ehretia cymosa /Ulaagaa/



Clausena anisata /Ulmaayyii/



Osyris lanceolata /Waatoo/



Coleus abyssinicus /Yeroo/



Cordia African /Waddeessa/



Dracaena afromontana
/Afanfartuu/



Cynodon dactylon /Coqorsa/



Euphorbia ampliphylla
/Adaamii/



Malus sylvestris /Appilii/



Afrocarpus falcatus /Birbirs/



Moringa stenopetala
/Mooringaa/

7.3. Waraqaa gaaffii qorannoo Afaan Oromootiin

I) Maqaa _____ Saala: A) Dhiira B) Dubara

II) Umurii _____ III) Sabummaa _____ IV) Amantii _____ V) Haala maatii: A) kan hin fuudhin/ hin eerumin B) kan fuudhan C) Kan wal hiikan D) Dubartoota abbaan manaa irraa du'e

☀ Aanaa Jimmaa Horroo kana keessa waggaa meeqaaf jiraattanii? _____

VI) Yaala aadaa keessatti gaheesaanii A) Ogeessa dhaabbataa B) Darbee darbeen yaala C) Yaalii kennee hin beeku/Gahee hin qabu

VII) Ogummaa kanaan waggaa meeqaaf tajaajilaa jirtuu? _____

1. Uwwisni bosona naannoo keessanii waggoota (30yrs, 10-20yrs, fi 10yrs) dura akkam ture?

2. Yeroo ammaa (2024) kana uwwisni bosonaa maal fakkaata?

3. Uwwisni bosonaa kan duraa wajjin wal bira qabdanii yoo ilaaltan ni dabale moo ni hir'atee?

A/ Baay'inni mukkeen kebele (locality) keessan keessa jiranii: Hir'ate / Dabale

Sababa: _____

B/ Baay'inni mukkeen lafa hawaasaa irratti: Hir'ate / Dabale

Sababa: _____

C/ Baay'inni mukkeen lafa dheedichaa irratti: Hir'ate / Dabale

Sababa: _____

D/ Baay'ina mukkeen lafa misoome (qonnaa) irratti: Hir'ate / Dabale

Sababa: _____

E/ Ammeentaan lafa bosonaa akka waliigalaatti: Hir'ate / Dabale

Sababa: _____

4. Jijjiirama haguuggii kanaaf sababa waliigalaa kamiyyuu yaada kennuu dandeessu?

5. Bosona hafe kunuunsuu fi naannoo bosonni cirame deebisuuf furmaata akkamii yaada kennitu?

6. Seerotni mukeen kebele keessa jiran ilaallatan maalfaadha?

Seerri kun lafa gosa akkamii irratti raawwattiinsa qaba? Seerotni kun seera mootummaa idilee moo dambii ittiin bulmaataa kebeleetii fi yoom irraa eegalee?

7. Biqiltoota bosona (mukeen, shrub/ herbs) naannoo keessanitti qorichaaf oolu beektu?

A) Eeyyee B) Lakkii

8. Biqiltoota bosonaa nyaata, hookaa, dawaa fi kkf naannoo keessanitti argamanitti fayyadamtuu? A. eeyyee B. Lakkii

B) Beekumsa hirmaattonni qorannoo waa'ee qoricha aadaa hawaasa aanaa Jimmaa Horroo, Zoonii Kellem Wallaga, Lixa Ethiopia, 2024.

Jijjiiramoota Amaloota

Deebii

-
- 9) Waa'ee qoricha/dawaa/ aadaa dhageessanii beektuu? A) Eeyyee B) Lakkii
- 10) Qorichootni aadaa hawaasa keessatti baasii madaalawaadhaan ni dhaqqabamaa? A) Eeyyee B) Lakkii
- 11) Barnoonni fayyaa waa'ee balaa fi faayidaa qorichoota aadaa barbaachisaadhaa? A) Eeyyee B) Lakkii
- 12) Qorichoota aadaa sterile hin taane utuu lilmoodhaan kennamee miidhaa qabaa? A) Eeyyee B) Lakkii
- 13) Qorichootni aadaa tajaajila fayyaa ammayyaa caalaa bu'a qabeessaa fi nageenya qabuu? A) Eeyyee B) Lakkii
- 14) Qorichootni aadaa qorichoota ammayyaa waliin wal bira qabamee yoo ilaalamu miidhaa irra xiqqaa argamsiisuu? A) Eeyyee B) Lakkii
- * Beekumsa waliigalaa hirmaattotaa... (**Dhuma irratti ni shallagama & mata duree marii irratti ni mari'atama**)
-

C) Ilaalchaa fi shaakala hirmaattonni qo'annoo qoricha aadaa irratti hawaasa aanaa Jimmaa Horroo, Zoonii Kellem Wallaga, Lixa Ethiopia, 2024.

- 14) Hawaasa keessatti qoricha aadaa fayyadamuu ni gorsitaa? A) Eeyyee B) Lakki
- 15) Qorichootni aadaa ammallee hawaasa keessatti fudhatama kan qabuu fi baasii madaalawaa ta'een kan argamu ta'uu ni amantaa? A) Eeyyee B) Lakki
- 16) Iccitii qorichoota aadaa cabsuun bu'a qabeessummaa isaa dhabuu danda'a jettanii amantuu? A) Eeyyee B) Lakki
- 17) Uwwisa eegumsa fayyaa fooyyessuuf qoricha ammayyaa qoricha aadaa waliin walitti makamuu ni deeggartuu? A) Eeyyee B) Lakki
- 18) Qorichootni aadaa dhukkuboota qorichoota ammayyaan yaalamuu hin dandeenye tokko tokko fayyisuu danda'a jettanii amantuu? A) Eeyyee B) Lakki
- 19) Qorichootni aadaa bifa doosii/ammeentaa ammayyaatiin yoo qophaa'e dhukkuboota doosiin/ammeentaanii fi karaa sirrii ta'een yaaluuf gaarii ta'a jettanii yaaddu? A) Eeyyee B) Lakkii
- 20) Gara fuulduraatti TM fayyadamuuf karoora qabduu? A) Eeyyee B) Lakki
-

21) Gocha itti fayyadamaa fi kunuunsa biqiltoota qorichaaf oolan aanichaa wajjin walqabatee beekumsi dhalootaa bifa akkamiitu jira?

22) Qajeelfamni itti fayyadama biqiltoota qorichaaf oolan ni jiraa? Yoo jiraate, qajeelfamoota akkamiifaatu jiraa?

23) Farri qorichaa (antidote) biqiltoota qoricha aadaa wajjin fayyadamanii maalfaadha?

24) Adeemsi beekumsaa ogeeyyii fayyaa aadaa irraa gara dhaloota itti aanutti dabarsuu akkamiin jira?

25) Biqiltoota qorichaaf ta'anii fi beekumsa dhalootaan walqabatee naannoo sana jiruuf sababoonni balaa guddaa geessisan maali?

26) Hojiiwwan kunuunsa biqiltoota qorichaas ta'e beekumsa qoricha aadaa hawaasni hojiirra oolchu maalifaadha?

27) Yeroo fi sa'aatii addaa, akkanumas, guyyoota kam/ kam keessatti qajeeltoowwan sochii meeshaalee biqiltootaa galma ga'uu danda'u?

28) Meeshaaleen safartuu doosii/ ammeentaa/ hamma biqiltoota qoricha aadaa ganda keessatti argaman safaruuf/tilmaamuuf gargaaran maali? A) Dheerinni qubaa B) Piich c) spoon D) kooppii bunaa E) kooppii shaayii F) kooppii geejjibaa G) kanneen biroo?

Isaan ibsi

29) Qorichi kun miidhaa hamaa qabaa? Eeyyee/Lakki; Yoo eeyyee ta'e miidhaa akkamiifaa qaba?

30) Miidhaa qoricha aadaan dhufu hir'isuuf ykn furuuf itti dabalataan wantootni fayyaduuf barbaachisan maalfaadha?

31) Gosoota biqiltoota qorichaaf ta'an tokko tokkoof yeroo qophii qoricha aadaa fi wal'aansa dhukkubsattootaaf dhiheessuun dhorkaa (Fkn. Walqunnamtii saalaa) itti ta'u yeroo akkamii fi maalfaadha?

32) Dhukkubsattoonnis yeroo qoricha aadaa fayyadamaa jiranitti wantootni dhorkaman jiruu? Yoo jiraatan maalfaadha?

33) Madda beekumsa biqiltoota qoricha aadaa keessanii natti himuu dandeessuu?

34) Dhukkuboota namaa fi beeyladaa biqiltoota qoricha aadaatiin yaalamuu danda'an natti himuu dandeessuu? Gabatee harmaan gadii keessatti guutama!

Lakk.	Dhukkuboota namaa biqiltoota qoricha aadaatiin yaalamuu danda'an	Dhukkuboota beeyladaa biqiltoota qoricha aadaatiin yaalamuu danda'an
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22		

7.4. Checklist/Questionary papers in English language

A) Respondent name_____ **Sex: A) Male B) Female**

Age_____ **Ethnicity**_____ **Religion**_____ **Family Status: A) Single B) married C) Divorced D) Widows**

1. What was the forest cover of your locality before years (30yrs, 10-20yrs, and 10yrs)?

2. What is the forest cover nowadays?

3. Is the forest cover increased or decreased as you compare it with the one before?

A/ Number of trees in your kebele (locality): Reduced / Increased

Reason: _____

B/ Number of trees on communal land: Reduced / Increased

Reason: _____

C/ Number of trees on grazing land: Reduced / Increased

Reason: _____

D/ Number of trees on cultivated (farm) land): Reduced / Increased

Reason: _____

E/ Amount of forest land in general: Reduced / Increased

Reason: _____

4. Can you suggest any general cause for the cover change?

5. What solutions do you suggest to conserve the remaining forests and to recover the deforested area?

6. What are the rules concerning trees in the kebele?

To what type of land do these rules apply? Are these rules normal governmental rules or kebele by-laws and since when?

7. What wild plants (trees/shrubs/herbs) do you know in your locality used for medicinal purposes?

8. Do you use the wild plants for food, fodder, medicine, etc. found in your locality? a. yes b. No

B) Knowledge of study participants about traditional medicines in the communities of Jimma Horro district, Kellem Wallaga Zone, Western Ethiopia, 2024.

Variables	Attributes	Response
9) Have you ever heard of TM?	Yes/No.....	
10) Are traditional medicines accessible with affordable cost in the community?	Yes/No.....	
11) Is health education about risks and benefits of TMs important?	Yes/No...	
12) Are non-sterile TMs harmful when given by injection?	Yes/No...	
13) Are traditional medicines more effective and safer than modern health services?	Yes/No...	
14) Do traditional medicines produce less adverse effect compared to MM?	Yes/No...	

C) Attitude and practice of study participants on traditional medicines in the communities of Jimma Horro district, Kellem Wallaga Zone, Western Ethiopia, 2024.

14) Do you recommend the use of TM in the community? A) Yes B) No

15) Do you believe that TMs are still accepted and available with an affordable cost in the community? A) Yes B) No

16) Do you believe that breaking secrecy of TMs may lead to loss of its effectiveness? A) Yes B) No

17) Do you support integration of MM with TM to improve healthcare coverage? A) Yes B) No

18) Do you believe that TMs can cure some diseases that cannot be treated by MM? A) Yes B) No

19) Do you think that if TMs are formulated in a modern dosage form, it will be good enough to treat diseases with an appropriate dose and route? A) Yes B) No

20) Do you have plans to use TM in the future? A) Yes B) No

21) What forms of indigenous knowledge is available pertinent to the utilization and conservation practice of medicinal plants in the district?

22) Do there are instructions for the use of the medicinal plants? If so, what are the instructions?

23) What are antidotes used with traditional medicinal plants?

24) How was the trend of knowledge transfer from traditional healers to the next generation?

25) What are the main threatening factors to medicinal plants and associated indigenous knowledge in the area?

26) What are the conservation practices implemented by the community?

27) In What/ which specific season and time of the day active principles of plant materials would be attainable?

28) What are the dosage measuring tools used to measure/estimate amounts of traditional medicinal plants in the village? A) Length of finger B) Pitch c) spoon D) coffee cup E) tea cup F) glass cup G) others? Explain them

29) Does the medicine have adverse side effects? Yes/No; If yes, notify them:

30) What additives are necessary to be used for the adverse side effects?

31) What are taboos (Ex. Sexual intercourse) for some medicinal plant species for healers during traditional medicinal preparation and offering for patients?

32) Is there any things that patients are also prohibited during they are using traditional medicines? If so, what are them?

33) Could you tell me the sources of your traditional medicinal plants knowledge?

34) Can you tell me Humans and live stocks ailments those can be treated by traditional medicinal plants?

No.	Human ailments that can be treated by traditional medicinal plants	Livestock ailments that can be treated by traditional medicinal plants
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7.5. Data source of Major Crops cultivated in the study area

Lakk _____
Guyyaa 21/12/2017

Waajjira Qonnaa fi Bulchiinsa Lafaa Aanaa Jimmaa Horroo fi

Nuunnuu

Dhimmissaa:-Haala Iti Fayyadamo Lafaa Fi Oomishanee Midhaanii Aanaa Jimmaa Horroo Keessatti Oomishaman Kan Ilalu ta'a.

Olitti ibsuuf akkuma yaulame, Aanaa Jimmaa Horroo lafifsee harku caalaan lafa qonnaaf oolu yammuu ta'u, itti aansuun ammoo lafa bosonaan uwwifamee argamu kan qabduudha. Kunis parsantaan yammuu ilaalumu, bal'ina lafaa aanichi qabu hektaara 50,176 keessaa. lafii hektaarii 23,472.5 ta'u oomisha midhaaniif kan oolu, lafii hektaarii 1679,347 ta'u oomishaaf oolu kan danda'u, lafii hektaarii 902.5 oomisha jallisiif kan oolu, lafii hektaarii 15707 bakka dheedumsa beeladootaaf kan oolu fi lafii hektaarii 2113.76 ta'u ammoo ijaarsaaf kan oolee jiruudha. Kanarraa kan hafe lafii hektaara 6300 ol ta'u lafa oomisha qonnaatiif hin fayyadneedha.

Haala oomisha midhaanii aanaa Jimmaa Horroo keessatti oomishamanii ilaalchisuun ammoo gabatee hamaan gadii keessatti waraqa fuula lama (2) irratti guutamuun kanneen mul'ataniidha.

T/Lakk	Gosa midhaan oomishamuu	Maqaa naannoo midhaanichaa
1	Midhaan nyaataa	Boqqolloo
		Xaafii
		Garbuu
		Qamadii
		Bisingaa
2	Kuduraa	Barbaree
		Shunkurtii
		Buqqee nyaataa
		Qulluubbiidii
		Raafuu
		Kaarotii
		Dinnicha

3	Fuduraa	Burtukaana
		Loomii
		Muuzii
		Maangoo
		Paappayyaa
		Avokaadoo
4	Midhaan itoo	Atara
		Baaqelaa
		Lojoo/Boloqqee
5	Midhaan gurguraa	Buna
		Caatii
		Tamboo
6	Midhaan zayitaa	Nuugii
		Talbaa
		Ija goommanaa

Nagaa Wajjin!

7.6. Data Source of Major Livestock found in the Study Area

Lakk. _____

Guyyaa 21/12/2017

Waajjira Qonnaa fi Bulchiinsa Lafaa Aanaa Jimmaa Horroo fi

Nuunnuu

Dhimmissaa:-Horsiisa beeyladoo aanaa Jimmaa Horroo kan ilaalu ta'a.

Olitti ibsuuf akkuma yaalame aanaan keenya horsiisa beeyladoo bal'inaan kan geggeesitu yammuu taatu, gosaa fi baay'inni beeyladoo kunis gabatee harmaan gadii keessatti guutamuun kan mul'atudha.

T/Lakk.	Gosa beeyladaan	Maqaa naannoo	Baay'ina
1	Horii gaanfaa / maalaa	Loon	178643
2	Kotte duudaa	Farda	305
		Gaangee	10078
		Harree	42162
3	Bushaayee	Hoolaa	84517
		Re'ee	66175
4	Horii koochoo / baallee	Lukkuu	215016



7.7. Demographic characteristics of informants

Variables	Characteristics	Sex/gender	No. of respondents	Frequency	Percentage
Age	18-40	M	10	10	15.15
		F	6	6	9.1
	41-70	M	18	18	27.27
		F	9	9	13.64
	Above 71	M	15	15	22.73
		F	8	8	12.12
Years of experience	None	M	32	32	48.5
		F	20	20	30.3
	Less than 10	M	5	5	7.6
		F	1	1	1.5
	Above10	M	6	6	9.1
		F	2	2	3
Source of knowledge	Family	M	24	24	36.36
		F	10	10	15.15
	Friends	M	10	10	15.15
		F	9	9	13.64
	Exercise	M	9	9	13.64
		F	4	4	6.06
Educational Status	Illiterates	M	24	24	36.36
		F	14	14	21.21
	Modern education	M	7	7	10.61
		F	3	3	4.55
	Religious education	M	12	12	18.18
		F	6	6	9.1
Marital status	Single	M	5	5	7.58
		F	-	-	-
	Married	M	30	30	45.45
		F	13	13	19.70
	Divorced	M	4	4	6.06
		F	3	3	4.54
	Widowed	M	4	4	6.06
		F	7	7	10.61
Religious status	Christians	M	13	13	19.70
		F	7	7	10.61
	Muslims	M	30	30	45.45
		F	16	16	24.24

7.8. Lists of Medicinal Plants' Collected from the study area.

No.	Scientific Name	Genera	Family	Local Name	Habit	Parts Used	Voucher No.
1	<i>Acanthus polystachyus</i> Delile	Acanthus	Acanthaceae	Kosorruu	Shrub	Leaf and root	21M
2	<i>Achyranthes aspera</i> L.	Achyranthes	Amaranthaceae	Derguu	Herb	Root	11M
3	<i>Afrocarpus falcatus</i> (Thunb.) C.N. Page	Afrocarpus	Podocarpaceae	Birbirsa	Tree	Bark, branch, leaf	74M
4	<i>Albizia gummifera</i> (J.F.Gmel.) C.A.Sm.	Albiza	Fabaceae	Mukarbaa	Tree	Bark	44M
5	<i>Allium cepa</i> L.	Allium	Amaryllidaceae	Shunkurtii	Herb	Bulb	59M
6	<i>Allium sativum</i> L.	Allium	Amaryllidaceae	Qullubbii	Herb	bulb and leaf	58M
7	<i>Aloe pubescens</i> Reynolds	Aloe	Asphodelaceae	Hargiisa	Herb	leaf latex	73M
8	<i>Aningeria adolfi-friederici</i> (Engl.) Robyns & Gilbert	Aningeria	Sapotaceae	Qararoo	Tree	Leaf	–
9	<i>Asparagus africanus</i> Lam.	Asparagus	Asparagaceae	Sariitii	Shrub	Root	–
10	<i>Baccharoides adoensis</i> (Sch.Bip. ex Walp.) H.Rob.	Baccharoides	Asteraceae	Sooyyam qalleettii	Shrub	Flower	69M
11	<i>Bersama abyssinica</i> Fresen.	Bersema	Francoaceae	Lolchiisaa	Tree	leaf and stem	31M
12	<i>Beta vulgaris</i> L.	Beta	Amaranthaceae	Hundee diimaa	Herb	Root	–
13	<i>Brassica oleracea</i> L.	Brassica	Brassicaceae	Raafuu maraa	Herb	Leaf	48M

14	<i>Brucea antidysernterica</i> J.F.Mill.	Brucea	Simaroubaceae	Qomonyoo	Shrub	leaf, seed, and branch	34M
15	<i>Buddleja polystachya</i> Fresen.	Buddleja	Scrophulariaceae	Anfaarree / Qayyisa	Shrub	Leaf	43M
16	<i>Calpurnia aurea</i> (Aiton) Benth.	Calpurnia	Fabaceae	Cekkaa	Shrub	Leaf	—
17	<i>Capparis tomentosa</i> Lam.	Capparis	Capparaceae	Arangamaa gurraacha	Shrub	Root bark	70M
18	<i>Capsicum frutescens</i> L.	Capsicum	Solanaceae	Mixmixa	Herb	Seed	57M
19	<i>Carica papaya</i> L.	Carica	Caricaceae	Paapayyaa	Tree	Fruit, leaf and latex from leaf	23M
20	<i>Catha edulis</i> (Vahl) Forssk ex Endl.	Catha	Celastraceae	Caatii	Shrub	Leaf	39M
21	<i>Citrus × limon</i> (L.) Osbeck	Citrus	Rutaceae	Loomii	Shrub	Fruit	20M
22	<i>Clausena anisata</i> (Willd.) Hook.f. ex Benth.	Clausena	Rutaceae	Ulmaayyii	Shrub	Leaf	42M
23	<i>Clematis simensis</i> Fresen	Clematis	Ranunculaceae	Hidda fiitii	Climber	Root and leaf	35M
24	<i>Clutia abyssinica</i> Jaub. & Spach	Clutia	Euphorbiaceae	Ulee foonii	Shrub	Root and leaf	46M
25	<i>Coccinia abyssinica</i> (Lam.) Cogn.	Coccinia	Cucurbitaceae	Hancootee gaaraa	Herb	Bulb	—
26	<i>Coffea arabica</i> L.	Coffea	Rubiaceae	Buna	Shrub	Seed	64M
27	<i>Coleus abyssinicus</i> (Fresen.) A.J.Paton	Coleus	Lamiaceae	Yeroo	Shrub	Leaf	65M
28	<i>Colocasia esculenta</i> (L.) Schott	Colocasia	Araceae	Goodarree	Herb	bulb and leaf	18M

29	<i>Combretum collinum</i> Fresen.	Combretum	Combretaceae	Unuunuu	Shrub	Bark	–
30	<i>Conomitra linearis</i> Fenzl	Conomitra	Apocynaceae	Ribuu quruphee / Aannannoo	Herb	latex from leaf	–
31	<i>Cordia africana</i> Lam.	Cordia	Boraginaceae	Waddeessa	Tree	Bark	12M
32	<i>Croton macrostachyus</i> Hochst. ex Delile	Croton	Euphorbiaceae	Makkanniisa	Tree	leaf, bark, stem and branch	47M
33	<i>Cucurbita pepo</i> L.	Cucurbita	Cucurbitaceae	Buqqee nyaataa	Herb	Bulb and Root	37M
34	<i>Cynodon dactylon</i> (L.) Pers.	Cynodon	Poaceae	Coqorsa	Herb	above ground parts	61M
35	<i>Datura stramonium</i> L.	Datura	Solanaceae	Asaangira	Herb	seed and leaf	56M
36	<i>Dracaena afromontana</i> Mildbr.	Dracaena	Asparagaceae	Afanfartuu	Tree	Bark	09M
37	<i>Echinops kebericho</i> Mesfin	Echinops	Asteraceae	Qarabichoo	Herb	Root	–
38	<i>Ehretia cymosa</i> Thonn.	Ehretia	Boraginaceae	Ulaagaa	Tree	Bark	51M
39	<i>Euphorbia ampliphylla</i> Pax	Euphorbia	Euphorbiaceae	Adaamii	Tree	Root	77M
40	<i>Ficus sur</i> Forssk	Ficus	Moraceae	Harbuu	Tree	Leaf	29M
41	<i>Ficus sycomorus</i> L.	Ficus	Moraceae	Odaa	Tree	Bark	–
42	<i>Ficus thonningii</i> Blume	Ficus	Moraceae	Danbii	Tree	Bark and root	–
43	<i>Ficus vasta</i> Forssk.	Ficus	Moraceae	Qilxuu	Tree	Latex	67M

44	<i>Gloriosa simplex</i> L.	Gloriosa	Colchicaceae	Aramaanda waa /Ancootee	Herb	Bulb	–
45	<i>Grewia bicolor</i> Juss.	Grewia	Malvaceae	Harooressa	Tree	Bark	–
46	<i>Grewia ferruginea</i> Hochst. ex A. Rich.	Grewia	Malvaceae	Dhoqonuu	Shrub	Bark	30M
47	<i>Gymnanthemum amygdalinum</i> (Delile) Sch.Bip.	Gymnanthemum	Asteraceae	Eebicha	Shrub	Leaf	10M
48	<i>Gymnanthemum rueppellii</i> (Sch.Bip. ex Walp.) H. Rob.	Gymnanthemum	Asteraceae	Reejjii	Shrub	Leaf	33M
49	<i>Hagenia abyssinica</i> (Bruce) J.F. Gmel.	Hagenia	Rosaceae	Muka miinnii/Ha anquu/Koo soo	Tree	seed and leaf	52M
50	<i>Hordeum vulgare</i> L.	Hordeum	Poaceae	Garbuu	Herb	Seed	–
51	<i>Hymenodictyon floribundum</i> (Hochst. & Steud.) B.L. Rob.	Hymenodictyon	Rubiaceae	Takka dhahaa	Shrub	Leaf, seed and bark	55M
52	<i>Justicia schimperiana</i> (Hochst. ex Nees) T. Anderson	Justicia	Acanthaceae	Dhummuu gaa	Shrub	Leaf	25M
53	<i>Lepidium didymum</i> L.	Lepidium	Brassicaceae	Suruma leencaa	Herb	Leaf	07M
54	<i>Lepidium sativum</i> L.	Lepidium	Brassicaceae	Shinfaa	Herb	Seed	–
55	<i>Linum usitatissimum</i> L.	Linum	Linaceae	Talbaa	Herb	Seed	15M
56	<i>Maesa lanceolata</i> var. <i>golungensis</i> Hieron	Maesa	Primulaceae	Abbayyii	Tree	Leaf and bark	68M

57	<i>Malus sylvestris</i> (L.) Mill.	Malus	Rosaceae	Aple	Tree	Fruit	76M
58	<i>Mirabilis jalapa</i> L.	Mirabilis	Nyctaginaceae	Abaaboo diimaa	Herb	Root	53M
59	<i>Momordica foetida</i> Schumach.	Momordica	Cucurbitaceae	Humbaawo	Climber	Root	06M
60	<i>Moringa stenopetala</i> (Bak.f.)Cufod.	Moringa	Moringaceae	Mooringaa /Shifarraa	Tree	Leaf	75M
61	<i>Mutarda carinata</i> (A.Braun) D.A.German	Mutarda	Brassicaceae	Goommana	Herb	Seed	36M
62	<i>Mutarda nigra</i> (L.) Bernh.	Mutarda	Brassicaceae	Sinaafica	Herb	Seed	16M
63	<i>Nicotiana tabacum</i> L.	Nicotiana	Solanaceae	Tamboo	Herb	Leaf	27M
64	<i>Nigella sativa</i> L.	Nigella	Ranunculaceae	Gurraattii/ Habasuuda	Herb	Seed	–
65	<i>Ocimum gratissimum</i> L.	Ocimum	Lamiaceae	Hancabbii	Herb	Leaf	05M
66	<i>Ocimum lamiifolium</i> Hochst. Ex Benth	Ocimum	Lamiaceae	Damakasee /Qorichamichii	Herb	Leaf	22M
67	<i>Olea europaea</i> L.	Olea	Oleaceae	Ejersa	Tree	Bark to extract its oil	63M
68	<i>Orbivestus unionis</i> (Sch.Bip. ex Walp.) H.Rob.	Orbivestus	Asteraceae	Sooyyama dhora	Shrub	Leaf	41M
69	<i>Osyris lanceolata</i> Hochst. & Steud	Osyris	Santalaceae	Waattoo	Tree	Stem, branch and bark	66M
70	<i>Pavonia urens</i> Cav.	Pavonia	Malvaceae	Hincinnii	Shrub	Root	26M

71	<i>Phragmanthera regularis</i> (Steud. ex Sprague) M.G.Gilbert	Phragmanthera	Loranthaceae	Dheertuu makkanniisaa	Shrub	all parts	49M
72	<i>Phyla nodiflora</i> (L.) Greene	Phyla	Verbenaceae	Yaattoo	Herb	Flower	–
73	<i>Phytolacca dodecandra</i> L ‘Her.	Phytolacca	Phytolaccaceae	Andoodee	Shrub	Rhizome	50M
74	<i>Piper capense</i> L. f.	Piper	Piperaceae	Tunjoo	Herb	Seed	72M
75	<i>Prunus africana</i> (Hook.f.) Kalkman	Prunus	Rosaceae	Hoomii	Tree	Bark	62M
76	<i>Punica granatum</i> L.	Punica	Lythraceae	Roomaanii	Tree	Bark, branch, and leaf	–
77	<i>Rhamnus prinoides</i> L.Herit.	Rhamnus	Rhamnaceae	Geeshoo	Shrub	Leaf	28M
78	<i>Ricinus communis</i> L.	Ricinus	Euphorbiaceae	Qobboodiimaa	Shrub	Root, stem, and seed	24M
79	<i>Ricinus communis</i> L. var.	Ricinus	Euphorbiaceae	Qobboobaarii	Shrub	Seed	71M
80	<i>Rothea myricoides</i> (Hochst.) Steane & Mabb.	Rothea	Lamiaceae	Maraachisa/ Gursadee	Shrub	leaf, stem, and root	08M
81	<i>Rumex abyssinicus</i> Jacq	Rumex	Polygonaceae	Dhangaggo	Herb	Leaf	01M
82	<i>Rumex nepalensis</i> Spreng.	Rumex	Polygonaceae	Timijjii	Herb	Rhizome	54M
83	<i>Ruta chalepensis</i> L.	Ruta	Rutaceae	Cilaaddami	Herb	Leaf	38M
84	<i>Securidaca Longepedunculata</i> Fresen.	Securidaca	Polygonaceae	Xabanaaahii	Shrub	Root bark	–
85	<i>Senna septemtrionalis</i>	Senna	Fabaceae	Sanaamakii	Shrub	Seed	03M

	(Viv.) H.S.Irwin & Barneby						
86	<i>Solanecio gigas</i> (Vatke) C. Jeffrey	Solanecio	Asteraceae	Fooricaa	Tree	Leaf and bark	02M
87	<i>Solanum adoense</i> Hochst. ex A. Rich.	Solanum	Solanaceae	Hiddii saree	Shrub	root and leaf	60M
88	<i>Solanum linnaeanum</i> Hepper & P.-M.L.Jaeger	Solanum	Solanaceae	Hiddii waraabessa	Shrub	root and seed	32M
89	<i>Syzygium aromaticum</i> (L.) Merr. & L.M.Perry	Syzygium	Myrtaceae	Qulunfunyi	Herb	Stem	–
90	<i>Tragia gallabatensis</i> Prain	Tragia	Euphorbiaceae	Doobbii	Herb	Root	14M
91	<i>Triticum aestivum</i> L.	Triticum	Poaceae	Qamadii	Herb	Seed	–
92	<i>Vachellia abyssinica</i> (Hochst. ex Benth.) Kyal. & Boatwr.	Vachellia	Fabaceae	Laaftoo	Tree	Leaf	45M
93	<i>Vigna vexillata</i> (L.) A. Rich.	Vigna	Fabaceae	Gurra hantuutaa	Herb	Leaf	19M
94	<i>Vitellaria paradoxa</i> C.F.Gaertn.	Vitellaria	Sapotaceae	Botoroo	Tree	Bark and leaf	17M
95	<i>Zingiber officinale</i> Roscoe	Zingiber	Zingiberaceae	Zijinbila	Herb	Rhizome	40M

7.9. Disease Categories and Av. ICF of Human Ailments

No.	Disease Category	Ailment	Species	User report	Number of species	ICF for ailments	Av. ICF for disease	Rank
1	Zoonotic & Vector-Borne Diseases	Bat urine	<i>Vigna vexillata</i> (L.) A. Rich., <i>Acacia abyssinica</i> (Hochst. ex Benth) Kyal. & Boatwr.	25	2	0.96		
		Malaria	<i>Carica papaya</i> L., <i>Allium sativum</i> L., <i>Brassica nigra</i> (L.) Koch	66	3	0.97		
		Rabies	<i>Clutia abyssinica</i> Jaub. & Spach.	9	1	1		
		Scabies "Fincooftu u"	<i>Acokanthera schimperia</i> (A. DC.) Schweinf	3	1	1		
		Snake bite	<i>Clausena anisata</i> (Wild.) Benth	19	1	1		
		spider poison	<i>Acokanthera schimperia</i> (A. DC.) Schweinf, <i>Conomitra linearis</i> Fenzl, <i>Rumex nepalensis</i> Spreng.	15	3	0.8	0.955	9
2		devils problems	<i>Echinops kebericho</i> Mesfin	64	1	1		
		Evil eye	<i>Afrocarpus falcatus</i> (Thunb.) C.N., <i>Steeospermum kunthianun</i> Cham., <i>Clerodendrum myricoides</i> (Hochst.) Vatke, <i>Echinops kebericho</i> Mesfin, <i>Ricinus communis</i> L., <i>Asparagus africanus</i> Lam., <i>Osyris quadripartita</i> Salzm. ex Decne, <i>Securidaca Longepedunculata</i> , <i>Osyris quadripartita</i> Salzm. ex Decne	64	9	0.9		
		Evil sprit	<i>Solanum adoens</i> Hochst. ex A. Rich., <i>Bersema abyssinica</i> Fresen., <i>Croton macrostachys</i>	65	8	0.9	0.933	12

			Del., <i>Clerodendrum myricoides</i> (Hochst.) Vatke, <i>Brucea antidysenterica</i> J.F. Mill., <i>Osyris quadripartita</i> Salzm. ex Decne, <i>Securidaca Longepedunculata</i> , <i>Echinops kebericho</i> Mesfin					
3	Cardiovascular Disease (CVD)	Anemia	<i>Brassica carinata</i> A. Br., <i>Beta vulgaris</i> L.	3	2	0.5		
		Blood pressure	<i>Moringa stenopetala</i> (Bak.f.) Cufod	5	1	1	0.75	14
4	Dermatosis	Athletes foot	<i>Rumex abyssinicus</i> Jacq	25	1	1		
		Common Wart	<i>Solanum adoens</i> Hochst. ex A. Rich., <i>Conomitra linearis</i> Fenzl	28	2	0.96		
		Fire burn	<i>Aloe pubescens</i> Reynolds	66	1	1		
		Pitriasis Versicolor "Baarollee"	<i>Solanum adoens</i> Hochst. ex A. Rich., <i>Croton macrostachys</i> Del., <i>Conomitra linearis</i> Fenzl	65	3	0.97		
		Ring worm	<i>Ficus sur</i> Forssk, <i>Maesa lanceolata</i> Forssk.	5	2	0.75		
		Skin infection	<i>Triticum aestivum</i> L.	3	1	1		
		Smell of foot	<i>Cordia africana</i> L.	7	1	1		
5	Ectoparasites	Egg of lice	<i>Calpurnia aurea</i> (Ait.) Benth.	4	1	1		
		Leech	<i>Colocasia esculenta</i> (L.) Schott	12	1	1	1	1

6	Acute Febrile Illness (AFI)	Febrile illness	<i>Ocimum lamifolium</i> Hochst. Ex Benth, <i>Ocimum grattissimum</i> L., <i>Buddleja polystachya</i> Fresen., <i>Clutia abyssinica</i> Jaub. &- Spach.	59	4	0.95		
		Headache	<i>Nigella sativa</i> L., <i>Senna septemtrionalis</i> (Viv.) Irwin & Barneby, <i>Vernonia unionis</i> Sch. Rip. ex Wa/p., <i>Pycnostachys abyssinica</i> Fresen.	54	4	0.94	0.95	10
7	Gastrointestinal diseases	Back bone pain	<i>Hymenodictyon floribundum</i> (Hochst. & Steud.) Robinson.	19	1	1		
		Constipation	<i>Linum usitatissimum</i> L., <i>Piper capense</i> L. f.	58	2	0.98		
		diarrhea	<i>Ocimum lamifolium</i> Hochst. Ex Benth, <i>Pavonia urens</i> Cav, <i>Linum usitatissimum</i> L	63	3	0.97		
		Gastritis	<i>Hordeum vulgare</i> L., <i>Rumex nepalensis</i> Spreng.	14	2	0.92		
		indigestion	<i>Securidaca Longepedunculata</i>	7	1	1		
		stomach pain	<i>Ruta chalepensis</i> L., <i>Solanum giganteum</i> Jacq., <i>Solanum giganteum</i> Jacq., <i>Momordica foetida</i> Schumach., <i>Echinops kebericho</i> Mesfin, <i>Brucea antidysenterica</i> J.F.Mill., <i>Securidaca Longepedunculata</i> , <i>Datura stramonium</i> L.	66	8	0.89		
		typhoid	<i>Ocimum lamifolium</i> Hochst. Ex Benth	19	1	1		
		Vomiting	<i>Ficus thonningii</i> Blume, <i>Croton macrostachys</i> Del., <i>Securidaca Longepedunculata</i>	22	3	0.90	0.96	6
8	Urogenital Tract Disease	Kidney problem	<i>Gloriosa superba</i> L.	7	1	1		

		Urine retaintion	<i>Moringa stenopetala</i> (Bak.f.)Cufod	2	1	1	1	1
9	Endopar asites	Internal parasites	<i>Hagenia abyssinica</i> (Bruce) J.F.Gmel., <i>Ricinus communis</i> L. var, <i>Croton macrostachys</i> Del., <i>Brassica nigra</i> (L.) Koch, <i>Piper capense</i> L. f., <i>Securidaca</i> <i>Longepedunculata</i>	66	6	0.92	0.92	13
10	Osteoge nesis imperfe cta / Bone fracture/	Bone weakness	<i>Malus sylvestris</i> (L.) Mill.	13	1	1		
		Cancer	<i>Brassica oleraceae</i> L. var. Capitata	4	1	1		
		Paralysis	<i>Olea europaea</i> subsp. <i>cuspidata</i> (Wall. Ex G. Don) Cif.	6	1	1	1	1
11	Organ diseases	Ear disease	<i>Hymenodictyon floribundum</i> (Hochst. & Steud.) Robinson.	6	1	1		
		Eye infection	<i>Solanum gigantum</i> Jacq.	22	1	1		
		Heart disease	<i>Syzygium aromaticum</i> , <i>Zingiber officinale</i> , <i>Gloriosa</i> <i>superba</i> L.	66	3	0.97		
		Hepatitis	<i>Gloriosa superba</i> L., <i>Ricinus</i> <i>communis</i> L. var	23	2	0.95		
		night blindness	<i>Punica granatum</i>	5	1	1		
		Toothache	<i>Datura strumanium</i> L., <i>Afrocarpus falcatus</i> (Thunb.) C.N., <i>Ficus capensis</i> L., <i>Carica</i> <i>papaya</i> L., <i>Brucea</i> <i>antidysernterica</i> J.F. Mill., <i>Cordia africana</i> L., <i>Vernonia</i> <i>adoensis</i> Sch. bip. exWalp., <i>Ehretia cymosa</i> Thonn.,	38	8	0.81	0.96	6
12		Body pain		61	2	0.98		

	Others diseases	Cold disease	<i>Croton macrostachys</i> Del., <i>Brucea antidysenterica</i> J.F.Mill.	50	2	0.98		
		diabetes	<i>Moringa stenopetala</i> (Bak.f.)Cufod	5	1	1		
		Elephantiasis	<i>Maesa lanceolata</i> Forssk., <i>Combretum collinum</i> Fresen.	11	2	0.9		
		Loss of appetite	<i>Ficus thonningii</i> Blume	8	1	1		
		Thyroid gland infection	<i>Combretum collinum</i> Fresen.	6	1	1	0.98	4
13	Reproductive diseases	Continues ministratio n	<i>Punica granatum</i> L	5	1	1		
		Gonorrhea	<i>Euphorbia ampliphylla</i> Pax, <i>Gloriosa superba</i> L.	17	2	0.94		
		Prolonged ministratio n	<i>Punica granatum</i>	5	1	1		
		Retained placenta	<i>Mirabilis jalapa</i> L., <i>Cucurbita pepo</i> L., <i>Colocasia esculenta</i> (L.) Schott	21	3	0.9		
		Sexual impotency in men	<i>Ficus capensis</i> L.	22	1	1	0.97	5
14	Throat and Respiratory Diseases	Asthma	<i>Carica papaya</i> L., <i>Allium sativum</i> L., <i>Allium cepa</i> L.	66	3	0.97		
		Breathing problem	<i>Securidaca Longepedunculata</i>	18	1	1		
		Common cold	<i>Ruta chalepensis</i> L., <i>Allium sativum</i> L.	66	2	0.98		
		Cough	<i>Afrocarpus falcatus</i> (Thunb.)C.N., <i>Catha edulis</i> (Vahl) Forssk ex Endl. , <i>Brucea</i>	52	4	0.94		

			<i>antidysernterica</i> J.F.Mill., <i>Linum usitatissimum</i> L.					
		Tonsillites	<i>Ruta chalepensis</i> L., <i>Rhamnus</i> <i>prinoides</i> L.Herit., <i>Brassica</i> <i>carinata</i> A. Br., <i>Nigella sativa</i> L., <i>Solanum linnaeanum</i> Hepper & Jaeger, <i>Phyla</i> <i>nodiflora</i>	43	6	0.88		
		Tuberculos is	<i>Gloriosa superba</i> L.	7	1	1	0.96	6

7.10: Identified medicinal plant Species' families of the study area

No	Families	Number of species	Percent (%)	Cumulative Percent
1	Asteraceae	6	6.32	6.32
2	Euphorbiaceae	6	6.32	12.63
3	Brassicaceae	5	5.26	17.89
4	Fabaceae	5	5.26	23.16
5	Solanaceae	5	5.26	28.42
6	Lamiaceae	4	4.21	32.63
7	Moraceae	4	4.21	36.84
8	Cucurbitaceae	3	3.16	40.00
9	Malvaceae	3	3.16	43.16
10	Poaceae	3	3.16	46.32
11	Polygonaceae	3	3.16	49.47
12	Rosaceae	3	3.16	52.63
13	Rutaceae	3	3.16	55.79
14	Acanthaceae	2	2.11	57.89
15	Amaranthaceae	2	2.11	60.00
16	Amaryllidaceae	2	2.11	62.11
17	Asparagaceae	2	2.11	64.21
18	Boraginaceae	2	2.11	66.32
19	Ranunculaceae	2	2.11	68.42
20	Rubiaceae	2	2.11	70.53
21	Sapotaceae	2	2.11	72.63
22	Apocynaceae	1	1.05	73.68
23	Araceae	1	1.05	74.74

24	Asphodelaceae	1	1.05	75.79
25	Capparaceae	1	1.05	76.84
26	Caricaceae	1	1.05	77.89
27	Celastraceae	1	1.05	78.95
28	Colchicaceae	1	1.05	80.00
29	Combretaceae	1	1.05	81.05
30	Francoaceae	1	1.05	82.11
31	Linaceae	1	1.05	83.16
32	Loranthaceae	1	1.05	84.21
33	Lythraceae	1	1.05	85.26
34	Moringaceae	1	1.05	86.32
35	Myrtaceae	1	1.05	87.37
36	Nyctaginaceae	1	1.05	88.42
37	Oleaceae	1	1.05	89.47
38	Phytolaccaceae	1	1.05	90.53
39	Piperaceae	1	1.05	91.58
40	Podocarpaceae	1	1.05	92.63
41	Primulaceae	1	1.05	93.68
42	Rhamnaceae	1	1.05	94.74
43	Santalaceae	1	1.05	95.79
44	Scrophulariaceae	1	1.05	96.84
45	Simaroubaceae	1	1.05	97.89
46	Verbenaceae	1	1.05	98.95
47	Zingiberaceae	1	1.05	100.00
*	TOTAL	95	100	

7.11. Number of Species in each genus

Genera					
No.		Frequency	Percent	Valid Percent	Cumulative Percent
1	Ficus	4	4.2	4.2	4.2
2	Allium	2	2.1	2.1	6.3
3	Grewia	2	2.1	2.1	8.4
4	Gymnanthemum	2	2.1	2.1	10.5
5	Lepidium	2	2.1	2.1	12.6
6	Ocimum	2	2.1	2.1	14.7
7	Ricinus	2	2.1	2.1	16.8
8	Rumex	2	2.1	2.1	18.9
9	Solanum	2	2.1	2.1	21.1
10	Acanthus	1	1.1	1.1	22.1
11	Achyranthes	1	1.1	1.1	23.2
12	Afrocarpus	1	1.1	1.1	24.2
13	Albiza	1	1.1	1.1	25.3
14	Aloe	1	1.1	1.1	26.3
15	Aningeria	1	1.1	1.1	27.4
16	Asparagus	1	1.1	1.1	28.4
17	Baccharoides	1	1.1	1.1	29.5
18	Bersema	1	1.1	1.1	30.5
19	Beta	1	1.1	1.1	31.6
20	Brassica	1	1.1	1.1	32.6
21	Brucea	1	1.1	1.1	33.7
22	Buddleja	1	1.1	1.1	34.7
23	Calpurnia	1	1.1	1.1	35.8
24	Capparis	1	1.1	1.1	36.8
25	Capsicum	1	1.1	1.1	37.9
26	Carica	1	1.1	1.1	38.9
27	Catha	1	1.1	1.1	40.0
28	Citrus	1	1.1	1.1	41.1
29	Clausena	1	1.1	1.1	42.1
30	Clematis	1	1.1	1.1	43.2
31	Clutia	1	1.1	1.1	44.2
32	Coccinia	1	1.1	1.1	45.3
33	Coffea	1	1.1	1.1	46.3
34	Coleus	1	1.1	1.1	47.4
35	Colocasia	1	1.1	1.1	48.4
36	Combretum	1	1.1	1.1	49.5

37	Conomitra	1	1.1	1.1	50.5
38	Cordia	1	1.1	1.1	51.6
39	Croton	1	1.1	1.1	52.6
40	Cucurbita	1	1.1	1.1	53.7
41	Cynadon	1	1.1	1.1	54.7
42	Datura	1	1.1	1.1	55.8
43	Dracaena	1	1.1	1.1	56.8
44	Echinops	1	1.1	1.1	57.9
45	Ethretia	1	1.1	1.1	58.9
46	Euphorbia	1	1.1	1.1	60.0
47	Gloriosa	1	1.1	1.1	61.1
48	Hagenia	1	1.1	1.1	62.1
49	Hordeum	1	1.1	1.1	63.2
50	Hymenodictyon	1	1.1	1.1	64.2
51	Justicia	1	1.1	1.1	65.3
52	Linum	1	1.1	1.1	66.3
53	Maesa	1	1.1	1.1	67.4
54	Malus	1	1.1	1.1	68.4
55	Maturda	1	1.1	1.1	69.5
56	Mirabilis	1	1.1	1.1	70.5
57	Momordica	1	1.1	1.1	71.6
58	Moringa	1	1.1	1.1	72.6
59	Mutarda	1	1.1	1.1	73.7
60	Nicotiana	1	1.1	1.1	74.7
61	Nigella	1	1.1	1.1	75.8
62	Olea	1	1.1	1.1	76.8
63	Orbivestus	1	1.1	1.1	77.9
64	Osyris	1	1.1	1.1	78.9
65	Pavonia	1	1.1	1.1	80.0
66	Phragmanthera	1	1.1	1.1	81.1
67	Phyla	1	1.1	1.1	82.1
68	Phytolacca	1	1.1	1.1	83.2
69	Piper	1	1.1	1.1	84.2
70	Prunus	1	1.1	1.1	85.3
71	Punica	1	1.1	1.1	86.3
72	Rhamnus	1	1.1	1.1	87.4
73	Rothea	1	1.1	1.1	88.4
74	Ruta	1	1.1	1.1	89.5
75	Securidaca	1	1.1	1.1	90.5
76	Senna	1	1.1	1.1	91.6

77	Solanecio	1	1.1	1.1	92.6
78	Syzygium	1	1.1	1.1	93.7
79	Tragia	1	1.1	1.1	94.7
80	Triticum	1	1.1	1.1	95.8
81	Vachellia	1	1.1	1.1	96.8
82	Vigna	1	1.1	1.1	97.9
83	Vitellaria	1	1.1	1.1	98.9
84	Zingiber	1	1.1	1.1	100.0
	Total	95	100.0	100.0	

7.12. Medicinal Plant Species Data Diversity in Four Selected Semi-district

No.	Abono	Burka Gudina	Gile	Wara Babo
1	<i>Cordia africana</i> Lam.	<i>Vachellia abyssinica</i> (Hochst. ex Benth.) Kyal. & Boatwr.	<i>Prunus africana</i> (Hook.f.) Kalkman	<i>Vigna vexillata</i> (L.) A. Rich.
2	<i>Vachellia abyssinica</i> (Hochst. ex Benth.) Kyal. & Boatwr.	<i>Carica papaya</i> L.	<i>Ficus vasta</i> Forssk.	<i>Beta vulgaris</i> L.
3	<i>Carica papaya</i> L.	<i>Solanecio gigas</i> (Vatke) C. Jeffrey	<i>Rumex nepalensis</i> Spreng.	<i>Bersema abyssinica</i> Fresen.
4	<i>Prunus africana</i> (Hook.f.) Kalkman	<i>Nicotiana tabacum</i> L.	<i>Rhamnus prinoides</i> L. Herit.	<i>Rothea myricoides</i> (Hochst.) Steane & Mabb
5	<i>Ficus vasta</i> Forssk.	<i>Mirabilis jalapa</i> L.	<i>Colocasia esculenta</i> (L.) Schott	<i>Ficus sycomorus</i> L.
6	<i>Rumex nepalensis</i> Spreng.	<i>Phytolacca dodecandra</i> L 'Her.	<i>Solanum adoense</i> Hochst. ex A. Rich.	<i>Rhamnus prinoides</i> L. Herit.
7	<i>Vigna vexillata</i> (L.) A. Rich.	<i>Malus sylvestris</i> (L.) Mill.	<i>Gymnanthemum rueppellii</i> (Sch.Bip. ex Walp.) H. Rob.	<i>Colocasia esculenta</i> (L.) Schott
8	<i>Beta vulgaris</i> L.	<i>Datura stramonium</i> L.	<i>Senna septemtrionalis</i> (Viv.) H.S. Irwin & Barneby	<i>Solanum adoense</i> Hochst. ex A. Rich.
9	<i>Bersema abyssinica</i> Fresen.	<i>Vitellaria paradoxa</i> C.F. Gaertn.	<i>Asparagus africanus</i> Lam.	<i>Gymnanthemum rueppellii</i> (Sch.Bip. ex Walp.) H. Rob.
10	<i>Rothea myricoides</i> (Hochst.) Steane & Mabb	<i>Coffea arabica</i> L.	<i>Hymenodictyon floribundum</i>	<i>Senna septemtrionalis</i> (Viv.) H.S. Irwin & Barneby

			(Hochst. & Steud.) B.L.Rob.	
11	<i>Ficus sycomorus</i> L.	<i>Cucurbita pepo</i> L.	<i>Clutia abyssinica</i> Jaub. & Spach	<i>Asparagus africanus</i> Lam.
12	<i>Solanecio gigas</i> (Vatke) C. Jeffrey	<i>Catha edulis</i> (Vahl) Forssk ex Endl.	<i>Clausena anisata</i> (Willd.) Hook.f. ex Benth.	<i>Hymenodictyon</i> <i>floribundum</i> (Hochst. & Steud.) B.L.Rob.
13	<i>Nicotiana tabacum</i> L.	<i>Ruta chalepensis</i> L.	<i>Mirabilis jalapa</i> L.	<i>Clutia abyssinica</i> Jaub. & Spach
14	<i>Rhamnus prinoides</i> L.Herit.	<i>Ocimum lamiifolium</i> Hochst. Ex Benth	<i>Phytolacca</i> <i>dodecandra</i> L 'Her.	<i>Clausena anisata</i> (Willd.) Hook.f. ex Benth.
15	<i>Colocasia esculenta</i> (L.) Schott	<i>Gymnanthemum</i> <i>amygdalinum</i> (Delile) Sch.Bip.	<i>Malus sylvestris</i> (L.) Mill.	<i>Mirabilis jalapa</i> L.
16	<i>Solanum adoense</i> Hochst. ex A. Rich.	<i>Mutarda carinata</i> (A.Braun) D.A.German	<i>Datura</i> <i>stramonium</i> L.	<i>Phytolacca dodecandra</i> L 'Her.
17	<i>Gymnanthemum</i> <i>rueppellii</i> (Sch.Bip. ex Walp.) H.Rob.	<i>Nigella sativa</i> L.	<i>Vitellaria</i> <i>paradoxa</i> C.F.Gaertn.	<i>Malus sylvestris</i> (L.) Mill.
18	<i>Senna septemtrionalis</i> (Viv.) H.S.Irwin & Barneby	<i>Aloe pubescens</i> Reynolds	<i>Coffea arabica</i> L.	<i>Datura stramonium</i> L.
19	<i>Asparagus africanus</i> Lam.	<i>Clematis simensis</i> Fresen	<i>Cucurbita pepo</i> L.	<i>Vitellaria paradoxa</i> C.F.Gaertn.
20	<i>Hymenodictyon</i> <i>floribundum</i> (Hochst. & Steud.) B.L.Rob.	<i>Solanum linnaeanum</i> Hepper & P.- M.L.Jaeger	<i>Catha edulis</i> (Vahl) Forssk ex Endl.	<i>Coffea arabica</i> L.
21	<i>Clutia abyssinica</i> Jaub. & Spach	<i>Croton</i> <i>macrostachyus</i> Hochst. ex Delile	<i>Ruta chalepensis</i> L.	<i>Cucurbita pepo</i> L.
22	<i>Clausena anisata</i> (Willd.) Hook.f. ex Benth.	<i>Capsicum frutescens</i> L.	<i>Ocimum</i> <i>lamiifolium</i> Hochst. Ex Benth	<i>Catha edulis</i> (Vahl) Forssk ex Endl.
23	<i>Mirabilis jalapa</i> L.	<i>Hagenia abyssinica</i> (Bruce) J.F.Gmel.	<i>Gymnanthemum</i> <i>amygdalinum</i> (Delile) Sch.Bip.	<i>Ruta chalepensis</i> L.
24	<i>Phytolacca</i> <i>dodecandra</i> L 'Her.	<i>Echinops kebericho</i> Mesfin	<i>Mutarda carinata</i> (A.Braun) D.A.German	<i>Ocimum lamiifolium</i> Hochst. Ex Benth
25	<i>Malus sylvestris</i> (L.) Mill.	<i>Brucea</i> <i>antidysenterica</i> J.F.Mill.	<i>Nigella sativa</i> L.	<i>Gymnanthemum</i> <i>amygdalinum</i> (Delile) Sch.Bip.

26	<i>Datura stramonium</i> L.	<i>Allium sativum</i> L.	<i>Aloe pubescens</i> Reynolds	<i>Mutarda carinata</i> (A.Braun) D.A.German
27	<i>Vitellaria paradoxa</i> C.F.Gaertn.	<i>Lepidium sativum</i> L.	<i>Clematis simensis</i> Fresen	<i>Nigella sativa</i> L.
28	<i>Coffea arabica</i> L.	<i>Baccharoides adoensis</i> (Sch.Bip. ex Walp.) H.Rob.	<i>Solanum linnaeanum</i> Hepper & P.-M.L.Jaeger	<i>Aloe pubescens</i> Reynolds
29	<i>Cucurbita pepo</i> L.	<i>Orbivestus unionis</i> (Sch.Bip. ex Walp.) H.Rob.	<i>Croton macrostachyus</i> Hochst. ex Delile	<i>Clematis simensis</i> Fresen
30	<i>Catha edulis</i> (Vahl) Forssk ex Endl.	<i>Lepidium didymum</i> L.	<i>Capsicum frutescens</i> L.	<i>Solanum linnaeanum</i> Hepper & P.-M.L.Jaeger
31	<i>Ruta chalepensis</i> L.	<i>Linum usitatissimum</i> L.	<i>Hagenia abyssinica</i> (Bruce) J.F.Gmel.	<i>Croton macrostachyus</i> Hochst. ex Delile
32	<i>Ocimum lamiifolium</i> Hochst. Ex Benth	<i>Coleus abyssinicus</i> (Fresen.) A.J.Paton	<i>Echinops kebericho</i> Mesfin	<i>Capsicum frutescens</i> L.
33	<i>Gymnanthemum amygdalinum</i> (Delile) Sch.Bip.	<i>Zingiber officinale</i> Roscoe	<i>Brucea antidysenterica</i> J.F.Mill.	<i>Hagenia abyssinica</i> (Bruce) J.F.Gmel.
34	<i>Mutarda carinata</i> (A.Braun) D.A.German	<i>Ficus thonningii</i> Blume	<i>Allium sativum</i> L.	<i>Echinops kebericho</i> Mesfin
35	<i>Nigella sativa</i> L.	<i>Citrus × limon</i> (L.) Osbeck	<i>Lepidium sativum</i> L.	<i>Brucea antidysenterica</i> J.F.Mill.
36	<i>Aloe pubescens</i> Reynolds	<i>Grewia bicolor</i> Juss.	<i>Baccharoides adoensis</i> (Sch.Bip. ex Walp.) H.Rob.	<i>Allium sativum</i> L.
37	<i>Clematis simensis</i> Fresen	<i>Acanthus polystachyus</i> Delile	<i>Orbivestus unionis</i> (Sch.Bip. ex Walp.) H.Rob.	<i>Lepidium sativum</i> L.
38	<i>Solanum linnaeanum</i> Hepper & P.-M.L.Jaeger	<i>Ricinus communis</i> L. var.	<i>Lepidium didymum</i> L.	<i>Baccharoides adoensis</i> (Sch.Bip. ex Walp.) H.Rob.
39	<i>Croton macrostachyus</i> Hochst. ex Delile	<i>Ricinus communis</i> L.	<i>Linum usitatissimum</i> L.	<i>Orbivestus unionis</i> (Sch.Bip. ex Walp.) H.Rob.
40	<i>Capsicum frutescens</i> L.	<i>Syzygium aromaticum</i> (L.) Merr. & L.M.Perry	<i>Coleus abyssinicus</i> (Fresen.) A.J.Paton	<i>Lepidium didymum</i> L.

41	<i>Hagenia abyssinica</i> (Bruce) J.F.Gmel.	<i>Securidaca</i> <i>Longepedunculata</i> Fresen.	<i>Zingiber officinale</i> Roscoe	<i>Linum usitatissimum</i> L.
42	<i>Echinops kebericho</i> Mesfin		<i>Maesa lanceolata</i> var. <i>golungensis</i> Hiern	<i>Coleus abyssinicus</i> (Fresen.) A.J.Paton
43	<i>Brucea</i> <i>antidysenterica</i> J.F.Mill.		<i>Euphorbia</i> <i>ampliphylla</i> Pax	<i>Zingiber officinale</i> Roscoe
44	<i>Allium sativum</i> L.		<i>Dracaena</i> <i>afromontana</i> Mildbr.	<i>Grewia bicolor</i> Juss.
45	<i>Lepidium sativum</i> L.		<i>Capparis</i> <i>tomentosa</i> Lam.	<i>Acanthus polystachyus</i> Delile
46	<i>Baccharoides</i> <i>adoensis</i> (Sch.Bip. ex Walp.) H.Rob.		<i>Afrocarpus</i> <i>falcatus</i> (Thunb.)C.N. Page	<i>Ricinus communis</i> L. var.
47	<i>Orbivestus unionis</i> (Sch.Bip. ex Walp.) H.Rob.		<i>Achyranthes</i> <i>aspera</i> L.	<i>Ricinus communis</i> L.
48	<i>Lepidium didymum</i> L.		<i>Grewia ferruginea</i> Hochst. Ex A. Rich.	<i>Syzygium aromaticum</i> (L.) Merr. & L.M.Perry
49	<i>Linum usitatissimum</i> L.		<i>Tragia</i> <i>gallabatensis</i> Prain	<i>Securidaca</i> <i>Longepedunculata</i> Fresen.
50	<i>Coleus abyssinicus</i> (Fresen.) A.J.Paton		<i>Olea europaea</i> L.	<i>Buddleja polystachya</i> Fresen.
51	<i>Zingiber officinale</i> Roscoe		<i>Hordeum vulgare</i> L.	<i>Gloriosa simplex</i> L.
52			<i>Coccinia</i> <i>abyssinica</i> (Lam.) Cogn.	<i>Rumex abyssinicus</i> Jacq
53			<i>Ficus sur</i> Forssk	<i>Justicia schimperiana</i> (Hochst. ex Nees) T.Anderson
54			<i>Momordica foetida</i> Schumach.	<i>Ocimum gratissimum</i> L.
55			<i>Albizia gummifera</i> (J.F.Gmel.) C.A.Sm.	<i>Mutarda nigra</i> (L.) Bernh.
56			<i>Triticum aestivum</i> L.	<i>Calpurnia aurea</i> (Aiton) Benth.

57			<i>Aningeria adolfi-friederici</i> (Engl.) Robyns & Gilbert	<i>Cynodon dactylon</i> (L.) Pers.
58			<i>Ehretia cymosa</i> Thonn.	<i>Phragmanthera regularis</i> (Steud. ex Sprague) M.G.Gilbert
59			<i>Phyla nodiflora</i> (L.) Greene	<i>Pavonia urens</i> Cav.
60			<i>Buddleja polystachya</i> Fresen.	<i>Moringa stenopetala</i> (Bak.f.)Cufod.
61			<i>Gloriosa simplex</i> L.	<i>Brassica oleracea</i> L.
62			<i>Rumex abyssinicus</i> Jacq	<i>Conomitra linearis</i> Fenzl
63			<i>Justicia schimperiana</i> (Hochst. ex Nees) T.Anderson	<i>Punica granatum</i> L.
64			<i>Ocimum gratissimum</i> L.	<i>Allium cepa</i> L.
65			<i>Mutarda nigra</i> (L.) Bernh.	<i>Piper capense</i> L. f.
66				<i>Combretum collinum</i> Fresen.
67				<i>Osyris lanceolata</i> Hochst. & Steud
Tot.	51	41	65	67

7.13. Lists of Human, Livestocks and Both Human and Livestocks Diseases

No.	Human Disease	Livestock disease	Both human and livestock disease
1	Anemia	Abdominal pain	Anemia
2	Asthma	Anemia	Breathing problem
3	Athletes foot	Anthrax	Constipation
4	Back bone pain	Bloat	Cough
5	Bat urine	Blood urining	Diarrhea

6	Bloat	Breathing problem	Evil sprit
7	Blood pressure	Broken bone	Eye infection
8	Body pain	Chicken exoparasites	Febrile illness
9	Bone weakness	Colic	indigestion
10	Breathing problem	Constipation	Internal parasites
11	Cancer	Cough	Leech
12	Cold disease	Cow haven't milk	Loss of appetite
13	Common cold	Diarrhea	Pasturolosis
14	Common Wart	Elephantiasis	Rabies
15	Constipation	Epizootic lymphagities	Retained placenta
16	Cough	Evil sprit	Snake bite
17	dental problem	External parasite	Stomachache
18	devils problems	Eye infection	Urine retaintion
19	diabetes	Febrile illness	Wound
20	Diarrhea	foot and mouth disease	Evil eye
21	Ear disease	Indigestion	
22	Egg of lice	Internal parasites	
23	Elephantiasis	Intestine pain	
24	Evil eye	Intestine worms	
25	Evil sprit	Leech infection	
26	Eye infection	Liver worm	
27	Febrile illness	Loss of appetite	
28	Fire burn	Newcastil disease	
29	Gastritis	Pasturolosis	
30	Gonorrhea	Rabies	

31	Headache	Retained placenta	
32	Heart problem	Snake bite	
33	Hepatitis	Stomachache	
34	indigestion	Systematic illness	
35	Internal parasites	Thinness	
36	Kidney problem	Trypanosomiasis	
37	Leech	Urine retaintion	
38	Loss of appetite	Wound	
39	Malaria	Evil eye	
40	mind problems		
41	night blindness		
42	Paralysis		
43	Pasturolosis		
44	Pitriasis Versicolor		
45	Prolonged ministration		
46	Rabies		
47	Retained placenta		
48	Ring worm		
49	Scabies		
50	Sexual impotency in men		
51	Skin infection		
52	Smell of foot		
53	Snake bite		
54	spider poison		

55	Stomachache		
56	Tetanus		
57	Typhoid		
58	Thyroid gland infection		
59	Tonsillitis		
60	Toothache		
61	Tuberculosis		
62	Urine retention		
63	Vomiting		
64	Wound		
Total	64	39	20