
**ADDIS ABABA UNIVERSITY**

**COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCE**

**DEPARTMENT OF ZOOLOGICAL SCIENCE**

# ETHNOBOTANICAL STUDY OF HOMEGARDEN PLANTS COMPOSITION IN ENEMAY DISTRICT, EAST GOJJAM ZONE, AMHARA REGION, ETHIOPIA

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# Thesis approval sheet

As member of the board of Examiners of the master of science (MSC) thesis open defense examination, we have read and evaluated this thesis prepared by **Abdela Adem** entitled "**Ethnbotanical study of homegarden plant composition in Enemay district East Gojjam zone, Amhara region, Ethiopia"**. We hereby certify that; the thesis is accepted for fulfilling the requirements for the award of the Degree of Master of Science in Biology.

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## LIST OF ABBREVIATION

| | |
|---|---|
| CSA | Central Statistical Agency |
| EEPA | Ethiopian Environment Protection Authority |
| FAO | Food and Agricultural Organization |
| HG | Homegarden |
| WHO | World Health Organization |

***ETHNOBOTANICAL STUDY OF HOMEGARDEN PLANTS COMPOSITION IN ENEMAY DISTRICT, EAST GOJJAM ZONE, AMHARA REGION, ETHIOPIA***

*BY: ABDELA ADEM*

**May, 2024**

## *ABSTRACT*

The study was carried out in Enemay woreda, East Gojjam and Amhara Regional state of Ethiopia. The study aimed at assessing the role of homegardens and management practices by local people of Enemay district. The method used to collect Ethnobotanical data was field observation, and semi-structured interview or focus group discussions. From the total of 11604 households, 200 informants were selected by simple random and purposive sampling techniques. Descriptive statistical analyses were used to analyze the collected data and results were generated using tables and graphs. The majority of households 95674 (57.88%) in Enemay Wereda cultivate fruit and vegetable in their homegardens. A total of 73 homegarden plant species belonging to 64 genera and 34 families were collected in the study area. The most popular families were poaceae represented with 9 (12.3%) plant species followed by Asteraceae and Rosaceae each accounted 5(6.84%) of plant species. Among 73 plant species grown in homegarden of the study area, 14 species of plant species were used as food, 26 species used as a medicine and 10 species as a spice. *Capsicum annuum* L., *Daucus carota* L. and *Saccharum officinarum* L were used for food and medicinal purpose. The fruit part was widely used parts 12 (44.4%) of homegarden plants used as food and the seed was also widely 5(18.51%) used parts of homegarden plants in medicine. The local management practice of homegarden in the study area involves the activity of family members. Each family member has their own activities in homegarden management. The concerned body should support and create awareness on how to manage, cultivate and wisely uses of homegarden as they give multi-function at different aspects, as sources of food, medicine, spice, multiple uses.

Key words: Enemay, Ethnobotany, Ethiopia, Homegarden

# 1 INTRODUCTION

## 1.1 Background of the study

Home gardens (HGs) are common in most tropical countries and play a vital role in supporting households in many diverse ways, including the provision of food, fuel wood, building materials, fodder for livestock, and cash income. They are regarded as a source of income diversification and also play a crucial cultural and social role in rural communities (FAO, 2004). Most households in rural farming communities keep and manage a homegarden in addition to their farm (Guuroh, 2011). HGsare increasingly becoming an important aspect of most farming systems. Like most systems, these home gardens are constantly facing pressure of change mainly brought about by demographic, economic, technological and social changes in society (Tesfaye Abebe, 2005).

Ethnobotany is a key science for working with local people on the botanical aspects of conservation and development. Ethnobotany remains the leading tools in finding how people have traditionally used plants (Martin, 1995, Balick and Cox, 1996).An ethnobotanical research is very important for a country like Ethiopia, where local people depend on local plant resource for their livelihood. Traditional knowledge is the information that people in a given community have developed, based on experience and adaptation to a local culture and environment. Such knowledge is a potential for reducing hazards and maintaining cultural and biological diversity. There is growing practice of homegarden which have a number of function related with yearly and permanent agricultural crops within the society home, this homegarden plants and crops are mainly planted and supported by members of the family (Christanty*et al*., 2004).This methods mainly anthropogenic and show the insight or understanding of the local culture and ecological attitude that have taken a long history (Kumar and Nair, 2004, Tesfaye Abebe *et al*., 2010). Totally, farm land used to grow/cultivate a number of different plant species of plant, especially plants that cannot grow away from the house. Furthermore, they are the place of further indigenous knowledge (Eyzaguirre and Linares, 2004).

Many indigenous plants, in addition to others come from different parts of the countries, are grown/cultivated around home. Some Self-generated group of the same species of plants (e.g

*Enset venrricosum Coffea arabica*, *Aframomum corrorima*, *Piper capense*, *Passiflora edulis*, *Solanum dasyphyllum*) are found natural ecosystems. The last few decades have created awareness all over the world and get high chance on homegarden plants, indicating the advantage of their actual and potential values in the supply of food, medicine and other household requirements (Benneh, 1974; Torquebiau, 1992). Homegarden play a vital role in fulfilling society household interests from food supply and food security to increasing family nutritional status, addressing primary healthcare, income generation and fulfilling other necessity functions. Although it has been continue for centuries, around home agro ecosystem is under menace due to environmental degradation, local crop or plant varieties are replaced by invasive species, monoculture, shortage of water in addition to cultural degradation and replacement. Based on these biodiversity conservation and utilization will be a dream without giving emphasis about traditional systems (Altieri and Merrick, 1987). Homegardens are realized as an important self-sustaining agro ecosystem with the dual function of production and on farm conservation of the agro biodiversity (Zemede Asfaw and Zerihun Woldu, 2002). From ancient time up to now people use a number of undomesticated species of plants for food, medicine, clothing, shelter, fuel, fiber, fence, source of income and to full fill their culture and religious needs all over the world (Tesfaye Seifu,2004). The presence of a number of plant species gives a variety of socio-economic and ecological functions. The production of food and other products like firewood, fodders, medicinal plants and ornamentals (Christanty,1985). The main aim of this study is to identify, record and assess the plant species and their uses grown around home in Enemay district, East Gojjam Zone, Amhara Region, Ethiopia.

## 1.2 Statement of the Problem

Home gardens play a vital role in fulfilling society household interests from food supply and food security to increasing family nutritional status, addressing primary healthcare, income generation and fulfilling other necessity functions. Hence, it has been continuing for centuries, a homegarden is under risk due to environmental degradation, local plant varieties are replaced by exotic species, agricultural activities, timber production, construction, monoculture, shortage of water and land. Based on biodiversity conservation and utilization will be a dream without give emphasis about traditional systems (Altieri and Merrick, 1987). Further researches are required to identify particular types of Ethiopian household useful plants

This study was very important in order to balance our ecosystem, conservation of plant genetic diversity, supply the homegarden products for requirements of the people and providing people to use modern farming system in Enemay district. Without any know-how about the basic features of the homegarden farmers cannot use their indigenous knowledge and conservation of home garden. As far as my knowledge is concerned there is no documented information about the use of homegarden and how to conserve them at Enemay district. Due to this reason, there may be destruction of plant species and permanent loss of gene.

## 1.3 Objectives

### 1.3.1 General Objective

The main objective of this research was to study the homegarden composition and management practices by local people of Enemay district, East Gojjam zone, Amhara Region, Ethiopia.

### 1.3.2 Specific Objectives

- ✓ To identify plant species grown in the homegardens of Enemay Wereda
- ✓ To assess the uses of plant species grown in homegardens of Enemay Wereda
- ✓ To make an inventory of plants grown in homegarden used by local communities of Enemay district.
- ✓ To assess management practices of homegardens by local people in Enemay district.
- ✓ To investigate the threats to homegarden species of Enemay District.

## 1.4 Research questions

1. What is the role of homegarden plants in the study area?
2. Which species of home gardens are used for multiple purposes?
3. Which homegarden plant species of the study area have medicinal value to treat human and animal diseases?
4. How do local people manage plants that are grown in homegardens?

# 2 LITRATURE REVIEW

## 2.1 Origin and Development of Ethnobotany

Ethnobotany deals with the direct relationship of plants with man. The term "Ethnobotany'' was first used by Harsh Berger in 1895, to the study of plants used by primitive and aboriginal people. According to (Martin, 1995), ethnobotany is the study of local people's interaction with the normal environment: how they classify, manage and use plants that are available around them. (Balick and Cox 1996, defined it as the relationship between plant and people. According to (Cotton, 1996), ethnobotany is the study of the indigenous knowledge on useful plants. Present ethno-botany links with different field of studies such as botany, nutrition, conservation and pharmacology, opening a wide field so as to enrich the human knowledge (Balick, 1996).

Among the relationships of humans with plants, indigenous knowledge on traditional medicine is one. Thus, people depend on plants not only for food but also for preparation of remedies. Ethno-botanical research documents the knowledge on cultural interaction of people with plants, and figure out how local people have traditionally used plants for various purposes and how they incorporate plants into their cultural tradition and religion (Balick and Cox, 1996).Clement (1998) has identified three stages in the history of ethnobotanical research, which he terms the pre-classical, classical and postclassical. Both the pre-classical and classical stage included an interest in documenting the economic use, vernacular nomenclature, and systematic classifications of plants as well as broader interests such as the knowledge of resources and how to manage them.

## 2.2 Definition of Homegarden

Different countries call homegarden using different names. These include *housegardens*, *household gardens*, or *kitchen gardens* by their defining criterion that they are adjacent to the house where the gardener lives. These can be urban homegardens (private garden adjacent to a house in a town or city) or rural homegardens (garden adjacent to a house in a rural area). They are also known as solar in Chiapas and Spanish; GartlorGortein Eastern Tyrol and German and kebun*rumah*in Kalimantan and Indonesian (Christian *et al.*, 2004).

In Ethiopia, homegarden is also named by different vernacular names at different places by different ethnic groups. For instance, the term homegarden is equivalent with vernacular name YEGUARO-ERSHA *(*Amharic) (means backyard farm while at the same time indicating the closeness of the cultivation plot to the house; EDDO (Afaan Oromo) in eastern Ethiopia and GUARO in parts of central Ethiopia (Zemede Asfaw, 2002).

## 2.3 Importance of home gardens for plant conservation

Homegardens are microenvironments containing high levels of species and genetic diversity which serves not only as sources of food, fodder, fuel, medicines, spices, construction materials and income in many countries around the world, but homegarden plants are also important for ***in situ* conservation** of a wide range of plant genetic resources (Watson and Eyzaguirre, 2002). Home gardens are dynamic systems; their structure, composition, and species and cultivar diversity are influenced by changes in the socioeconomic circumstances and cultural values of the households that maintain these gardens. Understanding the factors and decision-making patterns that affect the management of home gardens is crucial for including home gardens as a strategic component of *in situ* conservation of biodiversity. The conservation of biodiversity is inseparable from the sustainable use of plant genetic resources in agriculture. Thus, biodiversity conservation is both a goal and a means to secure the livelihoods and wellbeing of farming communities in poor irrigations of the developing and a conservation function (Eyzaguirre and Watson, 2002).

Homegardens have high potential for in situ conservation of genetic resources (Watson and Eyzaguirre, 2002; McNeely, 2004; Schroth*et al.,* 2004; Kumar, 2011, Ajeesh*et al.,* 2015). Plants are important source of medicine for human, animal livestock and used as biological pesticides to protect crops from disease and pest infection. Herbs and medicinal plants grown in homegardens all over the world and in developing countries nearly 80% of the people use them to treat illness disease and also improve health condition (Rao et al., 2006). Interaction in and around homegarden create and reinforce social status and ties the household and the community. Homegardeners habitually exchange planting materials, vegetable, fruit, herbals and medicinal plants for social, cultural and religious purpose. Such integrations are essential for social integration and building social capitals (Soemarwoto, 1984). Homegardens provide multiple

environmental and ecological benefits. They serve as a primary unit that initiate and utilize ecologically friendly approach for food production while conserving biodiversity and natural resource. Home gardens are usually diverse and contain rich composition of plant species (Blanckaert *et al.*, 2004).

## 2.4 History of local practice on growing homegarden plants in Ethiopia

Ethiopia has long history of agriculture with different agro- ecology. It is also a primary for many advantageous plants or crops diversity. The country is an important world center of domesticated plants and a primary center of diversification for many important plants (Harlan, 1969).

There is no exact information but a predicted long history of people starting the practice of cultivating of useful plants around home in Ethiopia. However, a long history is described based on the ancientness of agriculture, crop composition, and oral literature. The presence of high number or varieties of wild Enset/false banana (*Ensete ventricosum*) around the home of the community in different part of Western Ethiopia have been show that ancient settlements abandoned long ago. In Ethiopia, the long history (backto5000-7000 year) of cultivating useful plants around home is estimated or predicted to have related with the beginning of agriculture in the country (Ehret, 1979; Brandt, 1984).

## 2.5 Role of homegarden plants

The presence of varieties of plant species is very important for nutritional values. That means, when a varieties of homegarden plants are grown, someone have the chance to get sources of vegetable protein, carbohydrates, vitamins, and minerals and economic income (Martin, 1984; Abdoellah, 1985). In addition to nutritional status and economic income many homegarden plants are very important source for non-food needs (like fuel wood and building materials) and also, they have an important role from a social perspective (Abdoellah, 1985).

In most country sides, cultivating of homegarden plants is an important place for socializing or religious value. Many products of homegarden plants are shared freely between neighbors and local communities believed that plant species that cultivated in homegarden are indicators of

weather condition or worship. Around home is also important to make competition between neighbors by showing or comparing their attitude and awareness about cultivating of plants around their home; with someone who do not have his or her own plants around their home (Abdoellah, 1985). Some society within a particular area change the existing planting trees around their home based on commercialization or market pressure to get more income. That means, planting of commercial plants around home has the capacity for structural and functional change. Around home,cash crop plants such as carrot, Khat, Bahirzaf (Eucalyptus), and Tid (Juniper) become dominated. However, exchange was occurring due to accessibility, climatic and edaphic factors which are favorable to grow plants around home. Mostly domestication of plants is linked with human settlement. This new settlement area around the homestead have access to water, better soil fertility due to organic waste inputs, and easily protect the plant from animals (Harlan, 1975).

### 2.5.1 Food

In many developing countries millions of people do not have enough food to meet their daily requirements and a further more people are deficient in one or more micronutrients and macronutrient. Thus, in most of the time local communities depend on homegarden plants to meet their food consumption and Over 83% of the homegarden plants were consumed during times of food scarcity and starvation from where the stored cultivated food crops are declining progressively (Reta Regassa *et* al., 20150. Based on their culture, the people of the world feed up on different types of food. However, 90% of the food is derived from plant materials and most of this is of high nutritional value (Tigist Wondmu *et* al., 2006). The most frequent food plants species in the homegarden are *Ensete ventricosum, Carica papaya, Persea americana,Coffea arabica, Musa xparadisca, Mangiferaindica* and *Zea mays* (Reta Regassa et. al., 2015)

### 2.5.2 Multipurpose use

Plants remain vital to many aspects of traditional or local life such as tools, shelters, door, window, charcoals, construction materials, fire wood, food as well as ornament and spiritual value (Cotton, 1996). For example Photochemical study of *Ruta chalpensis* L. In order to screen the different classes of secondary metabolites present in the aerial parts of *Ruta chalpensis* L., a

photochemical screening was carried out. The results of the chemical characterization have demonstrated the presence of several chemical compounds known to have interesting biological activities (antibacterial activity, antifungal activity, antioxidant activity). These include polyphenol substances, including catech in tannins, flavonoids (flavones), sterols, triterpenes and alkaloids. These detected chemical families are in agreement with other works (Al Said *et al*., 1990, Mohra *et al.*, 1982, Ulubelen and Terem, 1988) on the same specie (*Ruta chalepensis* L.), in Egypt, Turkey and Saudi Arabia. In addition, previous research has allowed the isolation of alkaloids, coumarins and flavonoids present in *Ruta chalepensis* L. (Emam *et al.*, 2010, Eweis *et al*., 2016). These phenolic or terpene compounds would be in favor of antioxidant, anti-inflammatory, and antibacterial properties and therefore largely responsible for the use of this plant in the plant protection products industries. Again, the yield of the crude aqueous extracts of the aerial part of *Ruta chalpensis* L.

## 2.6 Indigenous knowledge and homegarden management

The homegarden, beyond its importance in the supply of household needs, it is a place for the generation and maintenance of valuable biological diversity and its associated cultural heritage. This heritage is revealed in the depth of local peoples' indigenous knowledge, practices, and skills (Zemede Asfaw, 2002). Similarly, homegarden are often the focal point of a household's social interactions within the family and with visitors and serve to keep knowledge of varieties and uses of cultural diversity alive from generation to generation (Eyzaguirre and Watson, 2002). However, little is known as to who actually conserves biodiversity in traditional communities, how cultivated plant portfolios are formed, how germplasm diffuses locally and regionally, how social and cultural structures foster or impede the flow of planting material, and knowledge and biodiversity interplay to create rich agricultural systems (CBDC, 2009).

# 3 MATERIALS AND METHODS

## 3.1 Description of the study area

This study was conducted in Enemay District, East Gojjam Zone, which is one of the districts in East Gojjam zone, Amhara Region of Ethiopia. Enemay Woreda is found 269.7 km from Addis Ababa in the northwest direction, 227.4 km from Bahir Dar in the south and 90 km from Debre Markos in the north east. Enemay Woreda is bordered in the south by Dejen Woreda, in the west by Debay telatgen, in the north by Enarji Enawuga and in the east by the Shebel berenta woreda. The total area of the woreda is 733.02 $Km^2$ (CSA, 2007). It consists of 23 Kebeles. Of these six are urban. It has plateaus, plains, and valley and terrain topography. Enemay woreda lie in altitude ranging on 2535 m above sea level. The district is located between 10° 39'-10$^o$ 10' N latitude and 28° 00'-28$^o$ 30' E longitudes Figure 1). It has three agro-climatic zones. These are Dega (alpine) with cold climate, Woina-Dega (temprate) with moderate temperature and Kolla (tropic) with hot and less adequate rainfall. Enemay Woreda has mean annual rainfall ranges from 750 mm to 1000 mm.

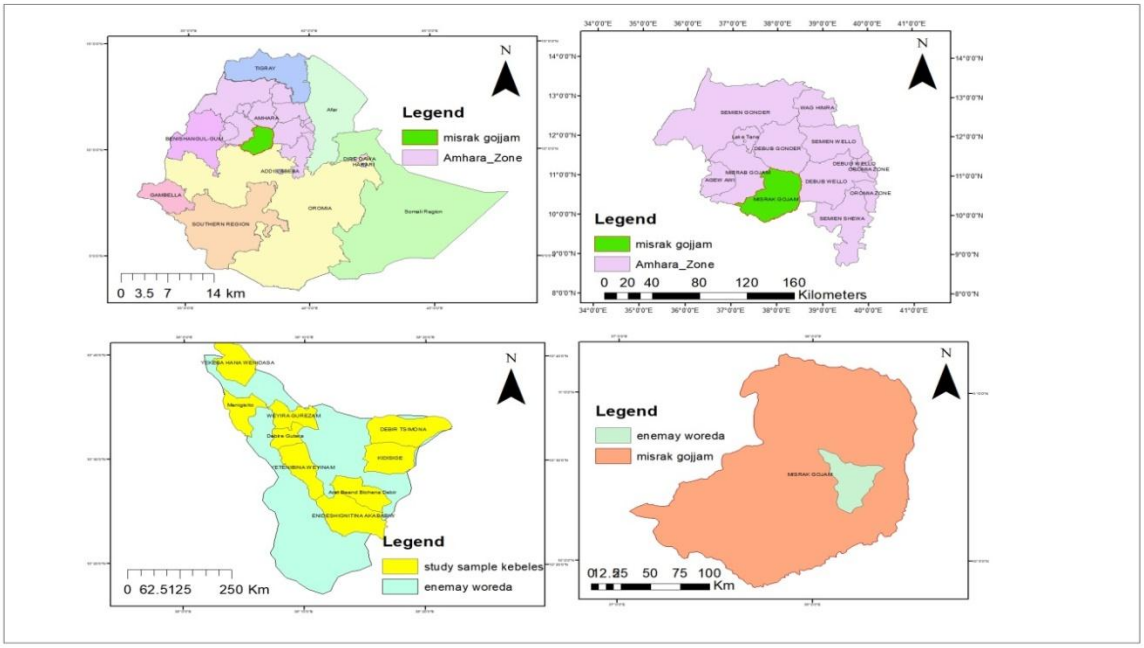


**Figure 1.Map of Ethiopia showing Amhara region and the study area**

## 3.2 Climate of the study area

The rain fall in Enemay district is bi-modal with main rainy season from June to September. However, unreliable short rainy season occur from February to March. The mean annual temperature is 15.5$^{O}$C (EWOFED, 2005).

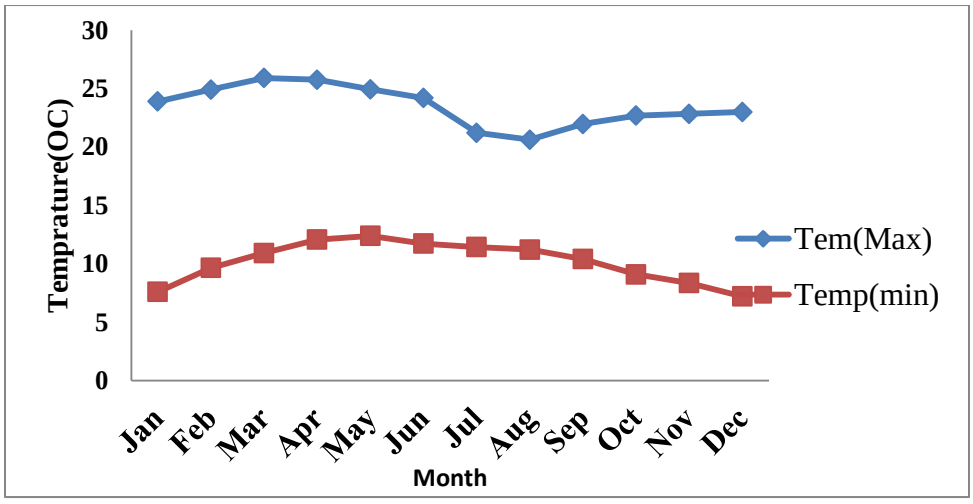


Figure 2, Mean monthly Temperature

## 3.3 Population of the study area

According to the Central Statistical Agency of Ethiopia the wereda has a total population of, 165,292, of whom 82,175 are men and 83, 117 women (CSA, 2007). The people are dependent on agriculture and livestock (use mixed system). Majority of them are inhabitants practiced in Ethiopian Orthodox Christianity (92.05%), while 7.78% of the population are Muslim (CSA, 2007).

## 3.4 Study Design

The study was designed by the investigator, was a cross sectional study design through field observation, and semi structured interview and focus group discussions. Ethnobotanical data collection was carried out from October to March 2023 to identify the role of homegarden plants at Enemay district.

## 3.5 Study participants:

All the local community who are living in Enemay District participated in the study based the inclusion and exclusion criteria after a brief orientation about the purpose of the study.

**Inclusion criteria**

1. The participants were enrolled for this study if they own permanent resident in Enemay District and if they experienced or experiencing the ethnobotany of plants in Enemay District as well as if
2. They are voluntary and provide the informed consent.

**Exclusion criteria**

The guest, visitor, tourist, participant ≤ 18 years old as well as participate who are not willing and voluntary as well as who do not provide the informed consent were not included.

## 3.6 Data collection tools

Field notebook, pen or pencil, geographical positioning system (GPS), Pre-printed checklists of semi-structured questions for interview, plant press and collecting bags were used during field plant collection and for further identification.

### 3.6.1 Semi-structured interview

A semi structured interview check list (Appendix I) was prepared to collect the data. The check list was prepared in English and translated to the local language (Amharic). The check list contained what plants are grown around home, their uses, method of preparation in case of medicinal plants and other important ethnobotanical information.

### 3.6.2 Field observation

The field walk was needed for effective data collection. This involved not only observations, but also asks the informants while walking in the study sites and writing their point of view about the role of homegarden plants and protection of plant.

### 3.6.3 Focus Group Discussion (FGD)

Focus group discussion is used to gain in-depth understanding of the issue and was used to collect data. The focus group discussion members were 9-15 people in each discussion. This was done by forming small group discussion and allows them to share ideas, experience and opinions on the use of home garden

## 3.7 Sampling Techniques

### 3.7.1 Sampling for quantitative study

**Simple random sampling techniques** was used to conduct this research to avoid researcher bias and to give equal probability of chance to the respondent

## 3.8 Sample size determination techniques

### 3.8.1 Sample size in quantitative study

To select the respondents, written consent was taken from the leaders of district. They were informed the aim of the research .i.e. not for commercial purpose but for educational and documenting the role of homegarden plants at Enemay wereda. For this study 9 sample kebele were selected out of 23 kebele. The total population of the district is 165292. We took 200 sample of households who have home gardens, and to get more information 9DA, 1 Wereda official and 9 kebele chairman totally 217 sample were selected out. In the selected 9 kebele there are 11604 households who have home gardens. The sample was selected by using sample size determination formula of Yamane (1967). i.e.

$$n = \frac{N}{1+N(e)^2}$$ Where n is sample size

N- Total population in the studying area within 9 kebele who has homegarden (N=11604)

e- Level of precision (e=0.07)

$n = 11604/1+11604(0.07^2) = 200$

The number of households from each village was also allotted using proportionate allocation procedures. The allocations of the number of sampled households in each village with the proportion to the number of household heads living in each village were carried out based on the following formula.

$$n = \frac{NS}{N\ total}$$

Where n =number of required samples

N= number of households in one village

S=total households to be treated;

N total=the number of households in all villages

Then the sample size in each kebele is:

| No | Name of kebele | Type of settlement | Total household | Total sample selected in each kebele | Remark |
|---|---|---|---|---|---|
| 1 | Yekebehana | Rural | 1694 | 29 | |
| 2 | Mengsto | Rural | 1344 | 23 | |
| 3 | Woyra | Rural | 1536 | 27 | |
| 4 | Debre tsimona | Rural | 1286 | 22 | |
| 5 | Kidisigie | Rural | 1237 | 21 | |
| 6 | Gotera | Rural | 811 | 14 | |
| 7 | Bichena debir | Rural | 812 | 14 | |
| 8 | Endeshignt | Rural | 1595 | 28 | |
| 9 | Hager hiwot | Rural | 1289 | 22 | |
| | Total | | 11604 | 200 | |

## 3.9 Data analysis

The collected data were analyzed following survey and analytical tools presented in the form of charts, tables, graphs, Excel spreadsheet and as percentage frequency were applied to analyze and summarize the data on the role of homegarden plants.

## 3.10 Ethical consideration

In Ethnobotanical research, ethics are crucial in creating smooth relationship with the local community. Special ethical considerations were based on the cultural view of the local communities in the study area we had:-

- A very systematic approach to the respondent, telling the fact and convincing each respondent by respecting his/her culture strictly.
- Informed that the aim of the research is not for commercial purpose but for academic reason.
- Legal letters that allow the researcher to conduct this study was received from Addis Ababa University to the Department of Biology and different concerned sector offices of the study wereda.

# 4 RESULT

## 4.1 Homegarden activities in Enemay wereda

The majority of households 95,674 (57.88%) in Enemay Wereda cultivate fruit and vegetable in their homegardens. Homegardens is locally known as "Yeguaro Atikilt.'

### 4.1.1 Taxonomic diversity of homegarden plants

A total of 73 plant species grown in home gardens which belong to 64 genera and 34 families were collected, identified and documented in the study area (Appendix III).Among the 73 plant species 15 species were shrubs, 34 species were herbs and 21 were trees and climber 3 (Figure 2).The most utilized families were Poaceae contained 9 (12.3%) of plant species followed by Asteraceae and Rosaceae which accounted 5 (6.8%) of plant species.

Among 73 homegarden plants recorded in the study area, 27(36.98%) species of homegarden used as food, 26(35.6%) species are used as a medicine, 10 (13.6%) species as spices (Figure 3).

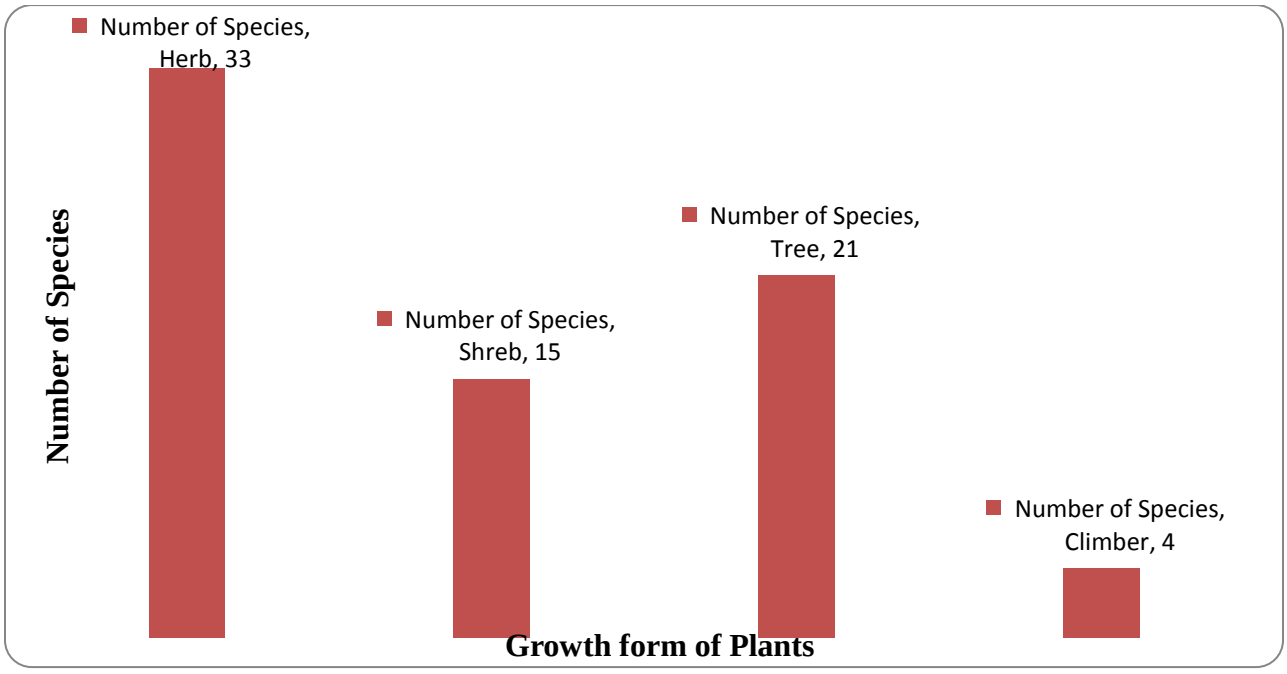


Figure 3, Life forms of homegarden plants in Enemay District

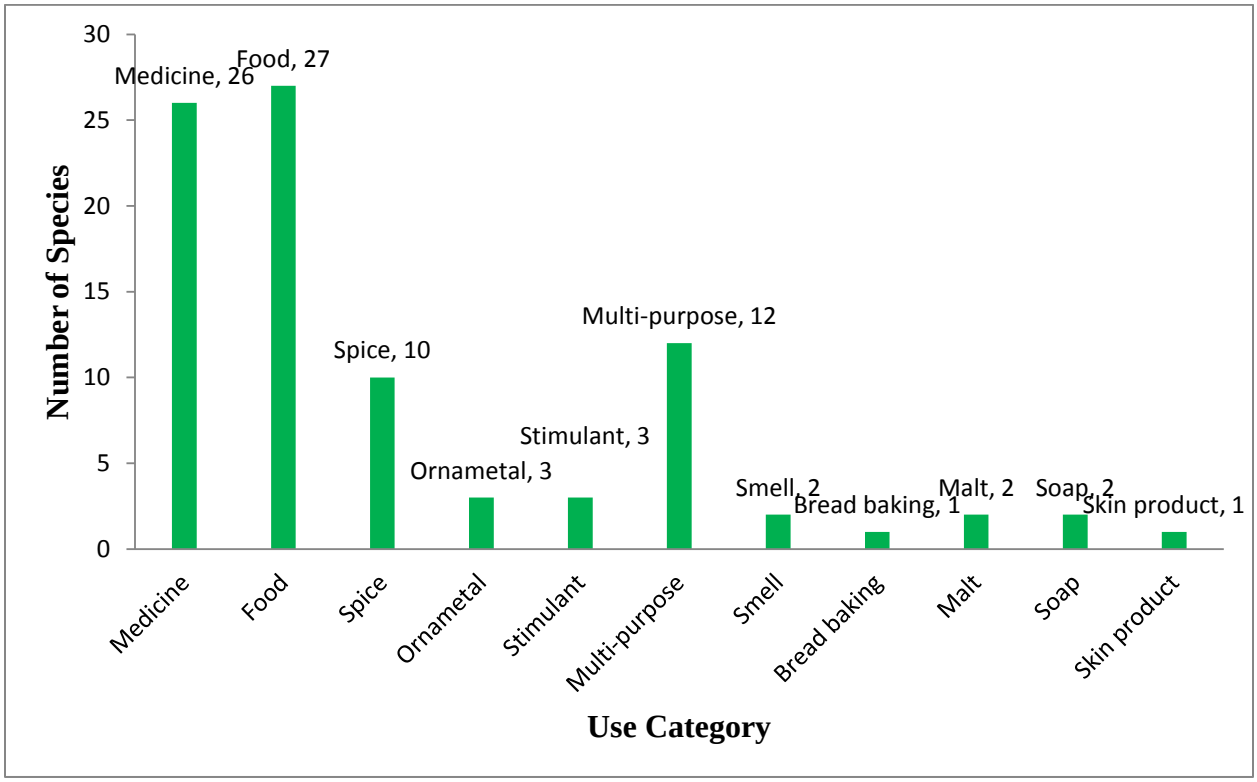


Figure 4, Number of species and use category of home gardens in Enemay District

### 4.1.2 Plants used as source of food

Food supply homegarden plants are cultivated in the study area but the quantity and the quality of homegarden products depend on the season. Usually, more products are harvested during rainy season from June to September and sometimes February to May. The informants reported that the major food and nutritional supply among homegarden plants were vegetables. The most edible plant parts in the study area were fruits which accounted 12 (44.4%) and the least edible parts were stem and tuber which each contained 1 (3.7%) plant species. Family Poaceae possesses the highest number of food plant spices which accounts for 5 species (18.5%) (Table 1)

**Table 1. Plant species used as a source of food in homegarden of the study area**

| NO | Local name | Scientific name | Genera | Family | Edible Parts |
|---|---|---|---|---|---|
| 1 | Abesha gomen | *Brassica carinata* A, Br | Brassica | Brassicaceae | Leaf |
| 2 | Carrot | *Daucus carota* L. | Daucus | Apiaceae | Root |

| | | | | | |
|---|---|---|---|---|---|
| 3 | Dinich | *Solanum tuberosum* L. | Solanum | Solanaceae | Tuber |
| 4 | Duba | *Cucurbita pepo*L. | Cucurbita | Cucurbitaceae | Fruit |
| 5 | Karia | *Capsicum annuum* L. | Capsicum | Solanaceae | Fruit |
| 6 | Key sir | *Beta vulgares L.* | Beta | Chenopodiaceae | Root |
| 7 | Key shnkurt | *Allium cepa* L. | Allium | Alliaceae | Leaf |
| 8 | Kosta | *Brassica rapa* L. | Brassica | Brassicaceae | Leaf |
| 9 | Nechi shinkurt | *Allium sativum* L. | Allium | Alliaceae | Fruit |
| 10 | Selata | *Lactuca sativa* L. | Lactuca | Asteraceae | Leaf |
| 11 | Shencora ageda | *Saccharum officinarum* L | Saccharum | Poaceae | Stem |
| 12 | Tikl gomen | *Brassica oleraceae*L. | Brassica | Brassicaceae | Leaf |
| 13 | Timatim | *Lycopersicon esculentum mill* | Lycopersicon | Solanaceae | Fruit |
| 14 | Bakela | *Vicia faba L.* | Vicia | Fabaceae | Seed |
| 15 | Bekolo | *Zea mays L.* | Zea | Poaceae | Seed |
| 16 | Gebs | *Hordeum vulgare L.* | Hordeum | Poaceae | Seed |
| 17 | Sende | *Triticum aestivum L.* | Triticum | Poaceae | Seed |
| 18 | Teff | *Eragrostis teff(Zucc.)* | Eragrostis | Poaceae | Seed |
| 19 | Apple | *Malus sylvesteris* Mill | Malus | Rosaceae | Fruit |
| 20 | Avocado | *Persea americana* Mill | Persea | Rutaceae | Fruit |
| 21 | Birtukan | *Citrus sinensis L.* | Citrus | Rutaceae | Fruit |
| 22 | Injori | *Rubus steudneriSchweinf.* | Rubus | Rosaceae | Fruit |
| 23 | Kok | *Prunus persical L.* | Prunus | Rosaceae | Fruit |
| 24 | Lomi | *Citrusaurantifolia (christm)* | Citrus | Rutaceae | Fruit |
| 25 | Mango | *Mangifera indica*L. | Mangifera | Anacardiaceae | Fruit |
| 26 | Tiringo | *Citrus medica L.* | Citrus | Rutaceae | Fruit |
| 27 | Zytun | *Psidium guajava L.* | Psidium | Myrtaceae | Fruit |

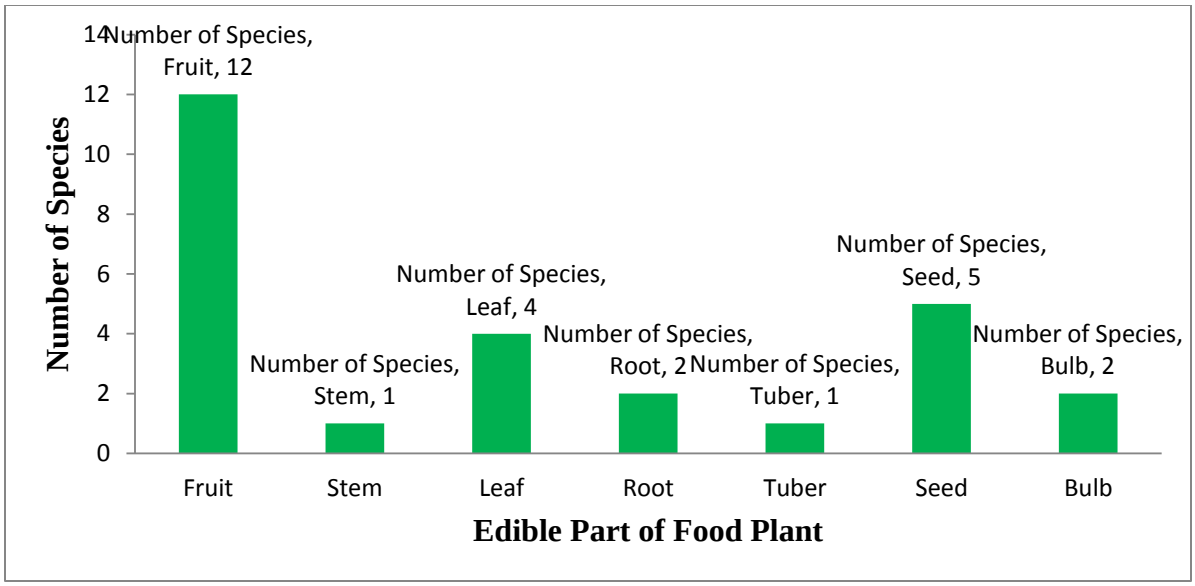


**Figure 5. Edible parts of the homegarden food plants in Enemay District**

### 4.1.3 Medicinal plant species grown in home gardens

In the study area, a total of 26 homegarden plant species with medicinal value were recorded and these accounted 35.6% of the total plant species documented. It is obvious that the community cultivates medicinal plant to treat various human and animal diseases. Traditional practitioner reported that growing medicinal plants in homegarden is like having drug store at home. For instance, *Melia azedarach* L. grows around home which is used for shading and medicinal value. Crushing was widely used method of preparation of medicine in the study area. The Family Asteraceae and Solanaceae accounted the highest number of medicinal plants. Majority of medicinal plants was shrubs accounting 10 species (38.5%) and herbs which accounted for 8 species (30.87 % (Table 2).

**Table 2,** Medicinal plants recorded from Homegardens of Enemay District

| NO | Local name | Scientific name | Family | Plant part used | Preparation& utilization | Growth form | Disease treated |
|---|---|---|---|---|---|---|---|
| 1 | Ades | *Myrtus communis* L. | Myrtaceae | Both dried and fresh leaf | Crushed the leaf and mix with butter ,the smear on infected part | S | Dandruff |
| 2 | Agam | *Carissa spinarum L.* | Apocynaceae | Root | Cresh the fumigate | S | Brain tension or stress |
| 3 | Anfar | *Buddleja polystachya* Fresen | Loganiaceae | Leaf | Make soft by rubbing and insert with new cloth until bleeding stop | S | Excessive menstruation |
| 4 | Avocado | *Perseaamericana* Mill. | Rutaceae | Leaf | Boil and drink njuice | T | Kidney infection |
| 5 | Bisana | *Croton macrostachyus Del.* | Euphorbiaceae | Bark | Crush, pound, then drink Juice | T | Tape warm |
| 6 | Carrot | *Daucus carota* L. | Apiaceae | Fresh root | eat the fresh carrot or rousted a minimum temperature | S | Night blindness |
| 7 | Chikugn | *Artemisia afra. Jacq.* | Asteraceae | All parts | Fumigate and drink concoction | H | Evel eye |
| 8 | Damakesie | *Ocimum lamifolium H* | Lamiaceae | Fresh or dried Leaf &seed | Leaf & seed crushed and mixed with boiled coffee then | S | Mich, head ache |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | drunk | | Fever illness |
| 9 | Endod | *Phytolacadodecandra*L Herit. | Phytolaccaceae | Both dried &fresh Seed and leaf | Crush and homogenized with water, then drunk | S | *Remove delayed placenta |
| 10 | Gesho | *Rhamnusprinoides* L'.Herit | Rhamnaceae | Fresh leaf | Crush and homogenized with water and drunk | S | Stomach ache |
| 11 | Girawa | *Vernania amygdalina Del.* | Asteraceae | Leaf | Pound and cream | T | Dandruff |
| 12 | Gorteb | *Plantiago lanceolata L.* | plantaginaceae | Leaf | Crush, powder then creem | H | Wound and bleeding |
| 13 | Karia | *Capsicum annuum* L. | Solanaceae | Fresh fruit | Directly eaten | H | Malaria |
| 14 | Hareg resa | *Zehneria scabra (Linn.F)* | cucurbitaceae | Leaf | Boil and take the fume in in close fashion | C | Febrile illness |
| 15 | Lomi | *Citrus aurantifolia (Christm)* | Rutaceae | Fresh fruit | Press the juice and drunk | S | Intestinal parasite |
| 16 | Nechshnkurt | *Allium sativa* L. | Alliaceae | Both fresh &dried bulb | Peeled &ate for evil & malaria, crush &boil then drink like tea for common cold | H | Common cold,<br>Evil, Malaria |
| 17 | Neem | *Azadirachta indica A. Juss* | Meliaceae | Fresh leaf | Put the leaf on the table or floor | T | Fly repellant |
| 18 | Sensel | *Justicia schimperiana T. Andres* | Acanthaceae | Leaf | Wash with fresh part | | External parasite |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 19 | Shembeko | *Arundo donax* L. | Poaceae | Dried stem | Smoke for vomiting &tied on neck for evil | H | Vomiting, Evil eye |
| 20 | Shenkora ageda | *Saccharum officinarum* L. | Poaceae | Fresh stem | Boiled and drunk | T | Cough, gastritis |
| 21 | Tenadam | *Ruta chalepensis* L. | Rutaceae | Fresh fruit | Directly chewing fruit | H | Stomach pain, evil eye |
| 22 | Tiklgomen | *Brassica oleraceae*L. | Brassicaceae | Fresh leaf | Eaten by rousting with minimum temperature | H | Constipation, gastritis |
| 23 | Tinbaho | *Nicotiana tabacum* L. | Solanaceae | Dried leaf | Crush and mixed with water then allowed to drunk | S | To remove Leech* |
| 24 | Tult | *Rumex nepalensis spr-ng* | polyganaceae | Root | Chew and swallowed the juice | H | Stomach ache |
| 25 | Woira | *Olea europea L. subsp Cuspidata* | Oleaceae | Leaf | Pound, squeeze the drop | T | Eye disease |
| 26 | Yeset kest | *Asparagios africanus Lam* | Asparagoceae | Root | Chew and swallowed the juice | S | Excessive menstruation |

**Where: H for herbs; T is for tree; S for shrubs * treat only animals**

### 4.1.4 Homegarden plants of Enemay Wereda used as a spice

Plant species used as spice are also recorded in homegardens of the study area. Among the total recorded species, 10 (13.6%) of them were used as a spice. According to the respondents spices are used for house hold supply and income generation. The family Lamiaceae accounted for the highest number (3) of spices (Table 3)

**Table 3. Homegarden plants used as spice**

| NO | Local name | Scientific name | Family name | Usage |
|---|---|---|---|---|
| 1 | Key shinkurt | *Allium cepa* L. | Alliaceae | Chopping the bulb and add in to 'wot' |
| 2 | Nech shnkurt | *Allium sativum* L. | Alliaceae | Preparation of pepper corn to make 'wot'. |
| 3 | Tenadam | *Ruta chalepensis* L. | Rutaceae | Preparation of pepper corn |
| 4 | Siga metbesha | *Rosmarinus officinalis* L. | Laminaceae | Added to meat |
| 5 | Besobla | *Occimum basilicum* L. | Laminaceae | Directly added in to 'shiro wot' or crushing with shirogy mill |
| 6 | Gesho | *Rhamus prinoides*L'Hér. | Rhamnaceae | It helps to make 'tella and tej' |
| 7 | Koseret | *Lippia adoensis* Hochst var Koseret | Verbenaceae | Add to 'shiro' preparation |
| 8 | Dinblal | *Coriandrum sativum L.* | Apiaceae | Add on bread |
| 9 | Kundo beriberi | *Schnus molle L.* | anacardiaceae | For pepper preparation |
| 10 | Nana | *Mentha spicata L.* | Lamiaceae | Spice for tea |

### 4.1.5 Homegarden plants of Enemay wereda used as aromatic plants

The local community in the study area has grown aromatic plants. Among the total 73 homegarden plants recorded in the study area, 2(2.73%) of them were aromatic (Table 4)

Table 4, Aromatic plants on Home gardens of Enemay District

| NO | Local name | Scientific name | Family name | Usage |
|---|---|---|---|---|
| 1 | Arity | *Artemisia absintnthium* L. | Asteraceae | Smear butter with it and directly smell |
| 2 | Tej sar | *Cymbopogon nardus* L. | Poaceae | Put on the ground during coffee ceremony for good smell |

### 4.1.6 Multipurpose Homegarden plants of Enemay District

Based on the researcher observation and key informants, out of the total homegarden plants collected in the study area,12 (16.42%) have multi purposes like using for fire wood, local construction local farming tools, local home tools (coffee mortar and pestle) and fence. *Eucalyptus globulus* used for all activities (Table 5. It is also dominantly cultivated homegarden plant in the study area. Euphorbia spp. is widely used as a fence in the study area (Figure 5).

Table 5, Multipurpose Homegarden plants of Enemay District

| | | | Multi-purpose | | | | |
|---|---|---|---|---|---|---|---|
| NO | Local name | Scientific name | Fire wood | construction | Local farm tools | Local home tools | Fence |
| 1 | Wanza | *Cordia africana* L. | ✓ | ✓ | X | ✓ | ✓ |
| 2 | Nech bahirzaf | *Eucalyptus globulus* Labill | ✓ | ✓ | ✓ | ✓ | ✓ |
| 3 | Girar | *Accacia abyssinica* Hochst. ex. Benth. | ✓ | X | ✓ | ✓ | ✓ |
| 4 | Abesh Tid | *Juniperus procera* Hochst. ex Endl | ✓ | ✓ | X | ✓ | ✓ |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5 | Weyra | *Olea europaea subsp. cuspidata* | ✓ | X | ✓ | ✓ | ✓ |
| 6 | Key bahirzaf | *Eucalyptus camaldulensis. Denh* | ✓ | | ✓ | ✓ | ✓ |
| 7 | Kega | *Rosa abyssinica Lindely* | ✓ | | | | ✓ |
| 8 | Agam | *Carissa spinarum L.* | ✓ | | | | |
| 9 | Yefereng tsid | *Cupressus lusitanica Mill.* | ✓ | ✓ | | ✓ | ✓ |
| 10 | Sessa | *Albizia gumefera (J.F.Gmel)* | ✓ | ✓ | | ✓ | ✓ |
| 11 | Girawa | *Vernania amygdalina Del* | ✓ | ✓ | | | ✓ |
| 12 | Bisana | *Croton macrostachyus Del.* | ✓ | | | ✓ | ✓ |

### 4.1.7 Homegarden plants of Enemay Wereda used as a stimulant

Three species of homegarden plants *Catha edulis* (Vahl) Forssk. ex Endl.,*Coffea arabica* L.and *Nicotina tabacum* L.each accounting 3(4.1%) were recorded as stimulants in the study area. The people in the study area widely use *Catha edulis* (Vahl) Forssk. ex Endl.In two ways as a stimulant (i.e. firstly directly chewing the leaf particularly the tip parts of the shoot. Secondly, boiling the leaf with water and finally drink like tea with sugar. It is used to relieve from depression. People also use *Nicotina tabacum* as a stimulant by drying its leaf and crushing it until it becomes flour. Then, smoke the flour through their mouth with pipe (Table 6).

**Table 6. Plant used as a stimulant grown in homegarden**

| NO | Local name | Scientific name | Family name | Usage |
|---|---|---|---|---|
| 1 | Buna | *Coffea arabica* L. | Rubiaceae | Drinking the decoction |
| 2 | Chat | *Catha edulis* (Vahl) Forssk. ExEndl. | Celastereaceae | Chewing the leaf or drinking the decoction |
| 3 | Timbaho | *Nicotina tabacum*L. | Solanaceae | Smoking |

### 4.1.8 Soap plants of Enemay District homegarden

In the study area, 2 species (2.73%) *Phaytolaca dodecandra* and *Laggera tomentosa* were used as soap (cleaning agent). The leaf and the seed parts of both plants were reported to be collected and crushed with pestle and mortal. The crushed part homogenized with water until it forms foam. In the production of foam, the seed part is better than the leaf part of *Phaytolaca dodecandra* and leaf of *laggera tomentosa*.

### 4.1.9 Bread baking plants of Enemay District

In the study area, species *Musa x parasidica* (1.36%) was recorded and used during baking local bread. The leaf of *Musca X parasidica* put on baking plate and then the dough on it, then the dough is covered with *Musca X parasidica* for flavourus baking.

### 4.1.10 Homegarden used as malt pressing and make local skin products

Another species *Ricinus cammunis* L., and *Croton macrostachyus* Del. (2.73%) were identified in the study area for dual uses. The people in the study area use both spices for two purposes.

#### 4.1.10.1 Malt pressing (Bikil Mergecha)

In the study area, people use the leaf part of the *Ricinus communis* L.to press the malt. In pressing malt, the people dig hole on the land and put the leaf under the hole, then put the germinating seed on the leaf, then, again cover the germinating seed with *Ricinus communis* L. Finally cover with soil and put heavy stone over the soil for well malt pressing.

#### 4.1.10.2 Make local skin product

People in the study area use *Ricinus cammunis* L. seeds as lubricant to soften cattle skin to make local serving materials. In making local skin products, people in the study area crush the seed with mortar and smear the crushed part to the skin so that the skin gets softened

### 4.1.11 Homegarden used as Ornamental value

Ornamental plants are grown for decoration with different style, they may be grown at flowerbed, at window and have attractive colors. In the study area Pelargonium spp. was the common (2.3%) plant grown for ornamental purpose around home.

# 5 DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

## 5.1 DISCUSSIONS

A total of 73 plant species, distributed in 64 genera and 34 families, were collected together with their uses. The family Poaceae was the leading family represented by 9 plant species and Asteraceae and Rosaceae were the second leading families represented by 5 plant species each. Study conducted in other parts of Ethiopia reported that Solanaceae and Rutaceae were the first leading families each contain 6 species of homegarden plants followed by Fabaceae and Lamiaceae each contain 5 species of homegarden plants (Arayaselassie Abebe, 2018). Similar study at Hawassa city, family Fabaceae accounted 20 species of homegarden which was the dominant followed by Euphorbiaceae which accounted 17 species (Reta Regasa, 2016). Similar study from Bishoftu town reported that family Fabaceae contained 13 species, and followed by Lamiaceae which contains 7 species (Regasa Bekele, 2014).

### 5.1.1 Use categories of homegarden plants in Enemay Wereda

#### 5.1.1.1 Food value of home gardens

Food supply homegarden plants are cultivated in the study area but the quantity and the quality of homegarden product depend on the season. Usually more product is harvested during rainy season from February to May, and June to September. Informant indicated that the major food and nutritional value homegarden plants were fruit and vegetables which account for 37.77%.This result showed that local community give great attention for food plants. Various studies conducted in different parts of Ethiopia reported that majority of plants grown around their homes are food plants. For instance, the findings of Mekonnen Amberber *et al.* (2013) indicated as 37.77% of homegarden plants in Holeta town are food plants. In a similar study by Belachew Wasihun *et al.* (2003), Habtamu Hailu (2008) and Reta Regassa (2016) indicated that 48%, 37% and 27.9% of homegarden plants used as a food in Arbaminch, Sebeta area and in Hawassa city, respectively. In addition to food supply, the food plants also served local people as a source of income (Tigist Wondimu *et al.*, 2006).

#### 5.1.1.2 Medicinal plants in home gardens of Enemay Wereda

Plants species collected in homegarden (35.6%) were used for medicinal purposes mainly treating human diseases. This result indicates that people in the study area give attention to human ailments as compared to livestock. The result agrees with the finding of Moa Megersa, *et al*. (2013). In the study area, leaf parts account for 7(43.75%) of medicinal value crushing was commonly used method of preparation of medicine in the study area (Table 5). This result was similar to other finding in Ethiopia (Bizuneh Weldeab, *et al*., 2018).

#### 5.1.1.3 Plant species used as a spice in homegarden

Plant species used as a spice are recorded in homegarden of the study area. From the total recorded species, 10 (13.6%) of them were spices. The result showed that cultivation practice of local community was good for spice plants and the result agrees with Mathewos Agezie and Lieke (2016). Other studies at Eastern Hararghe reported presence of 10 homegarden plant species used as spices (Aryaslassie Abebe, 2018) and similar studies also reported that 15 homegarden species were used as a spice at southern Ethiopia at Hawassa city (Reta Regasa, 2016).

#### 5.1.1.4 Homegarden used as Ornamental value

Ornamental plants are grown for decoration with different style, it may be grown at flowerbed, at window and have attractive flower. In the study area Pelargonium spp. (2.3%) used as ornamental purpose around home. The result agree with (Reta Regassa, 2016).

#### 5.1.1.5 Market assessment of homegarden in Enemay wereda

Market assessment was conducted in the administrative town of Enemay wereda at Bichena. The market serves for 13 kebeles and neighboring wereda around Enemay. In this market, homegarden products such as garlic, cabbage, carrot, potato, apple, mango, banana, buckthorn, tomato, chills were available as homegarden plants. The local community, merchants and farmers buy and sell freely with each other on two market days (Saturday and Tuesday) and the farmers/producers transport their products by local transport system. This indicates that the market chain between merchant and producers was very weak.

#### 5.1.1.6 Gender role in Local management practices of home garden

The local management practices of homegarden in the study area involves the activity of family members (men, women and children). Each family member have their Owen activities in homegarden management. For instance, men participate in the preparation of land for homegardens, planting homegarden, harvesting the product and fencing the homegardens while women and children participate in day to day follow up such as keeping homegarden from domestic animal destruction, remove the weed from homegarden and watering them and the result confirmed with the finding of (Regassa Bekele (2014) and (Zemed Asfaw, 2002).

Figure 7. Local management of homegarden from domestic animals

#### 5.1.1.7 Role of home gardens plant in biodiversity conservation

Home gardens are effective in plant biodiversity conservation in the study area complementing forest loss from time to time which is a threat for the future plant biodiversity. As a result, local community cultivate and plant multipurpose plant species like *Eucalyptus globuloes* in their homegarden that can be used as local homemade materials , traditional farming tools, charcoals, construction, fire wood and also cultivate others used as, food, medicine, spice. Growing homegarden has significant role in natural forest conservation. These results agree with the finding of Mathewos Agazie, (2013) who conducted Homegarden survey in Ethiopia.

## 5.2 CONCLUSION

The ethnobotanical study conducted in Enemay District has not only cataloged a diverse array of plant species but also illuminated the integral role of the homegardens play in the socio-economic and ecological frameworks of the community. Through the documentation of 73 different plant species spanning 64 genera and 34 families, this research underscores the rich botanical diversity maintained within these traditional agro-ecosystems. Notably, the Poaceae family emerged as the most prevalent, signifying its crucial role in local agriculture and sustenance.

Homegardens in Enemay serve as crucial reservoirs of agrobiodiversity, providing multiple functions from food production to medicinal uses. These gardens significantly contribute to the community's food security and health, offering ready access to a variety of nutritional and medicinal plants. For example, the study highlighted how local practices incorporate both food and medicinal plants, with a remarkable overlap in the use of certain species for both purposes. This dual use of plants not only optimizes the limited space available in home gardens but also enhances the resilience of household livelihoods against socio-economic or environmental disruptions.

Additionally, the research has revealed that these home gardens are a living repository of traditional knowledge, with the cultivation and use of plants closely linked to the cultural fabric of the community. This knowledge, passed down through generations, is crucial for the survival of indigenous practices and the conservation of plant diversity. However, this traditional

knowledge is threatened by modernization and a shift away from agrarian lifestyles. Thus, the preservation of this knowledge is not only about maintaining biodiversity but also about protecting cultural heritage.

The study also draws attention to the sustainability of these homegardens. While they play a pivotal role in conserving biodiversity and sustaining livelihoods, they are vulnerable to pressures such as land degradation, climate change, and the encroachment of modern agricultural practices. There is a clear need for strategies to safeguard these systems, ensuring their role in biodiversity conservation and the well-being of the local communities continues.

In conclusion, the ethnobotanical study in Enemay District has provided a comprehensive insight into the role of homegardens in sustaining local biodiversity and cultural heritage. It highlights the necessity for integrated conservation strategies that encompass ecological, cultural, and socio-economic elements. These gardens are not merely sources of food and medicine; they are also crucial in maintaining ecological balance, supporting sustainable agricultural practices, and preserving invaluable cultural practices. Moving forward, a focused effort is required to ensure these traditional systems are supported, sustained, and integrated into broader conservation and sustainable development frameworks.

## 5.3 RECOMMENDATIONS

To maximize the ecological, economic, and health benefits of home gardens in the study area, the following targeted recommendations are proposed:

- **Educational Programs on Biodiversity and Ecosystem Services:**
    - **Action**: Develop and deploy educational workshops and materials that emphasize the roles of biodiversity and ecosystem services provided by home gardens.
    - **Purpose**: To raise awareness among the community about the importance of diverse plant species for food security, medicinal uses, and ecological balance.
    - **Stakeholders**: Wereda agricultural office, local schools, and community centers.
- **Community-Driven Garden Expansion Initiatives:**
    - **Action**: Launch community-led projects to expand the number and variety of home gardens, incorporating both traditional and innovative gardening practices.

- **Purpose**: To increase the resilience of local food systems and medicinal plant sources, while fostering community engagement and ownership.
- **Stakeholders**: Local agricultural offices, community leaders, and local farming cooperatives.

- **NGO Partnerships for Resource Support:**
  - **Action**: Form partnerships with NGOs to secure ongoing support in the form of seeds, plants, and cultivation tools for rare and valuable species.
  - **Purpose**: To enhance plant diversity and ensure the availability of critical medicinal and food plants in local gardens.
  - **Stakeholders**: NGOs focused on agriculture, conservation, and sustainable development.
- **Market Access Enhancement:**
  - **Action**: Increase the number of market days and improve market infrastructure to facilitate better access and reduce post-harvest losses.
  - **Purpose**: To ensure that garden produce reaches consumers more efficiently, enhancing the economic benefits for local gardeners and providing fresher options for consumers.
  - **Stakeholders**: Local government, market planners, and trader associations.
- **Sustainable Harvesting and Conservation Education:**
  - **Action**: Implement programs that teach sustainable harvesting techniques and conservation practices specifically tailored to the preservation of medicinal plants.
  - **Purpose**: To prevent overharvesting and promote the sustainable use of key medicinal species, ensuring their availability for future generations.
  - **Stakeholders**: Environmental NGOs, agricultural extension officers, and traditional healers.
- **Documentation and Promotion of Traditional Knowledge:**
  - **Action**: Document and promote the use of traditional knowledge through local media, publications, and educational forums.
  - **Purpose**: To preserve and valorize the knowledge of medicinal plant uses and other traditional practices, fostering a greater appreciation and transmission of this knowledge across generations.

- **Stakeholders**: Cultural historians, local educators, and elder community members.

By implementing these recommendations, the potential of home gardens to support local needs and contribute to sustainable development can be significantly enhanced. These efforts will not only bolster local food and health systems but also contribute to the broader goals of ecological preservation and cultural heritage conservation.

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# APPENDICES

## APPENDIX I

Format for collecting ethnobotanical data using a checklist of questions to conduct Semi-structured interviews on Homegarden plants.

**General information**

1. Date……residence area(village)……..Keble code…….
2. Name of respondent ……..sex……age……..serial no……
   2.1. Marital status…….occupation (main Job)……..
   2.2. Religion: orthodox……..protestant……..Muslim……others…..
   2.3. For how long have you lived in the area?

      A. Since birth,
      B. For the last 20 years,
      C. For the last 10 years,
      D. For less than 10 years

   2.4. Educational background (what is the last grade you attended?)…… Ethnobotanical data for medicinal plants
3. List the traditional way of classifying forests (vegetation), landscapes and the soils in your area: Vegetation, Landscape and Soil
4. Where do these plants grow? (From where you obtain it?)
5. What is the habit of the plant? Tree (T), shrub(s), herbs (h),hemi parasite(hp), grass(g), Climber (CL), liana (LI)….. .
6. What is the most common habitats of a given homegarden plant?
7. What part/s of the homegarden plant(s) is/are used? leaf(l), roots (Tuber(Tu) Rhizome (r) and corms (co)), bark(K),Stem(St), Flower(Fr),Fruit(Fr), Seed(Sd), Sap(Sp) Latex(Lt), (Wp) Nectar(N) Twig(T), (Ri), Inflorescence(In) or Whole plant.
8. How is the mode of consumption homegarden plant? Fresh, cooked, after putting in other some place for some times, after piling, washed with water, specify?

9. Which plant species are used to medicinal and as wild foods throughout the year? If so which part(s) uses
10. Are there any division of wild food plants like famine foods, non-famine foods etc. in your areas
11. Are the homegarden plants marketable? If so
    - 11.1. Which age groups sell and exchange them most often?
    - 11.2. Which plant species are more common on the market?
    - 11.3. Where are their sources?
12. What are their benefits?
13. Which plant species are the most preferred in their uses as medicinal /wild food and why?
14. Are there homegarden plants conservation methods in the area? If so mention the management practices by the indigenous people.

# APPENDIX II

## Collected data

| NO | Collector no- | Local name | Scientific name | Familly name | Habitat |
|---|---|---|---|---|---|
| 1 | AA01 | Besobla | *Occinumbacilicum* L. | Lamiaceae | S |
| 2 | AA02 | Dimblal | *Coriandrum sativum* L. | Apiaceae | H |
| 3 | AA03 | Tenadam | *Rutachalepensis* L. | Rutaceae | H |
| 4 | AA04 | Arit | *Artemisia absinathum L.* | Asteraceae | H |
| 5 | AA05 | Insosila | *Impatiens rothi Hook. F* | Balsaminaceae | H |
| 6 | AA06 | Duba | *Cucurbitapepo* L. | Cucurbitaceae | C |
| 7 | AA07 | Yabeshagomen | *Brassica carinata* A Br | Brassicaceae | S |
| 8 | AA08 | Sigametbesha | *Rosimarinus officialis L.* | Lamiaceae | S |
| 9 | AA09 | Koba | *Musa x paradisiac L.* | Musaceae | T |
| 10 | AA10 | Apple | *Malussylvesteris* Mill | Rosaceae | T |
| 11 | AA11 | Wanza | *Cordia Africana Lam.* | Borginaceae | T |
| 12 | AA12 | Khat | *Catha edulis* | Celastersceae | T |
| 13 | AA13 | Endod | *Phytolacadodecandra L'.Herit* | Phytolaccaceae | H |
| 14 | AA14 | Weyra | *Oleaeuropaea L. subs p, cuspidate* | Oleaceae | T |
| 15 | AA15 | Birtukan | *Citrus sinensis L.Osb.* | Rutaceae | S |
| 16 | AA16 | Bisana | *Croton macrostachyus Del.ex Hochst* | Euphorbiaceae | T |
| 17 | AA17 | Sessa | *Albizia gummifera(J.f.Cmoi)C.A.sum* | Fabaceae | T |
| 18 | AA18 | Kundo berberi | *Schinus molle L.* | Anacardiaceae | T |
| 19 | AA19 | Zeytun | *Psidium guajava L.* | Myrtaceae | T |
| 20 | AA20 | Kok | *Prunus presica L.* | Rosaceae | T |
| 21 | AA21 | Gesho | *Rhamusprinoides L'.Herit* | Rhamnaceae | T |
| 22 | AA22 | Enjori | *Rubus steudneri scheeinf* | Rosaceae | T |
| 23 | AA23 | Lomi | *Citrus aurantifolia (Christm)* | Rutaceae | S |
| 24 | AA24 | Tiklgomen | *Brassicaoleraceae*L. | Brassicaceae | H |
| 25 | AA25 | Kosta | *Brassica rapa L.* | Brassicaceae | H |
| 26 | AA26 | Selata | *Lactuca sativa* L. | Asteraceae | H |
| 27 | AA27 | Keysir | *Beta vulgaris* L. | Chenopodiaceae | H |
| 28 | AA28 | Anfar | *Buddleja polystachya Fresen* | Loganiaceae | S |
| 29 | AA29 | Shencoraageda | *Saccharumafficinarum* L. | Poaceae | T |
| 30 | AA30 | Shembeko | *Arundo donax* L. | Poaceae | T |

| | | | | | |
|---|---|---|---|---|---|
| 31 | AA31 | Serdo | *Eleusine flaccifolia (Forssk)* | Poaceae | C |
| 32 | AA32 | Mango | *Mangifera indica* | Anacardiaceae | T |
| 33 | AA33 | Avocado | *Persea americana* Mill | Rutaceae | T |
| 34 | AA34 | Koseret | *Lippia adoensis Hochst ex. Wosp* | Lamiaceae | H |
| 35 | AA35 | Karia | *Capsicum annuvum* L. | Solanaceae | H |
| 36 | AA36 | Buna | *Coffeaarabica* L. | Rubiaceae | T |
| 37 | AA37 | Tejsar | *Cymbopogoncitratus(DC)Stapt.* | Poaceae | H |
| 38 | AA38 | Damakesie | *Ocimum lamifolium H.* | Lamiaceae | T |
| 39 | AA39 | Teff | *Eragrostis teff (Zucci)Trotter* | Poaceae | H |
| 40 | AA40 | Gebs | *Hordium Vulgare L.* | Poaceae | H |
| 41 | AA41 | Timatim | *Lycopersiconesculntum* Mill | Solanaceae | H |
| 42 | AA42 | Carrot | *Daucuscarota* L. | Apiaceae | S |
| 43 | AA43 | Korchi | *Erythrina brucei Schweinf* | Fabaceae | T |
| 44 | AA44 | Tsigereda | *Rosa richardii Rehder* | Rosaceae | S |
| 45 | AA45 | Neem | *Azadirachta indica A.Juss* | Meliaceae | T |
| 46 | AA46 | Gulo | *Ricinuscammunis L.* | Euphorbiaceae | T |
| 47 | AA47 | Sindie | *Triticum aestivum L.* | Poaceae | H |
| 48 | AA48 | Bekolo | *Zea mays L.* | Poaceae | H |
| 49 | AA49 | Bakela | *Vicia faba L.* | Fabaceae | H |
| 50 | AA50 | Girawa | *Vernania amygdalina Del.* | Asteraceae | T |
| 51 | AA51 | Areg resa | *Zehneria scabra (Linn.F)* | Cucurbitaceae | C |
| 52 | AA52 | Tiringo | *Citrus medica L.* | Rutaceae | S |
| 53 | AA53 | Sensel | *Justicia schimperiana T.andresHoscht. ex (Nees)* | Acanthaceae | S |
| 54 | AA54 | Keskeso | *Laggera tomentosa (Sch.Bip.ex. A.Rich)* | Asteraceae | H |
| 55 | AA55 | Gorteb | *Plantago lanceolata L* | Plantaginaceae | H |
| 56 | AA56 | Tult | *Rumex nepalensis Spreng* | Polygonaceae | H |
| 57 | AA57 | Timbaho | *Nicotianatabacum* | Solanaceae | S |
| 58 | AA58 | Zihon Sar | *Pennisetum violaceum Lam.* | Poaceae | H |
| 59 | AA59 | Nana | *Mentha spicata L.* | Lamiaceae | H |

| | | | | | |
|---|---|---|---|---|---|
| 60 | AA60 | Nechshnkurt | *Allium sativum L.* | Alliaceae | S |
| 61 | AA61 | Key shnkurt | *Allium capa L.* | Alliaceae | H |
| 62 | AA62 | Dinch | *Solanumtuberosum* L. | Solanaceae | S |
| 63 | AA63 | Key bazirzaf | *Eucalptus camaldulensis. Dehnh* | Myrtaceae | T |
| 64 | AA64 | Nechbahizaf | *Eucalyptus globulos* | Myrtaceae | T |
| 65 | AA65 | Chikugn | *Artimisia afra. Jacq* | Asteraceae | H |
| 66 | AA66 | Girar | *Accacia abyssinicaHochst.ex Benth* | Fabaceae | T |
| 67 | AA67 | Kega | *Rosa abyssinica Lindely* | Rosaceae | S |
| 68 | AA68 | Agam | *Carissa spinarum L.* | Apocynaceae | S |
| 69 | AA69 | Yabesha Tid | *Juniporusprocera Hochst ex. Endl* | Cupressaceae | T |
| 70 | AA70 | Yeset kest | *Asparagus africanus Lam.* | Asparagaceae | C |
| 71 | AA71 | Yeferenji Tid | *Cupressus listanica Mill* | Cupressaceae | T |
| 72 | AA72 | Gravilia | *Grevillea rebusta R.br* | proteaceae | T |
| 73 | AA73 | Ades | *Myrtus communis L.* | Myrtaceae | T |

# APPENDIX III

**Homegarden plants classification**

| NO | Genera | Number of genera | Family | Number of family |
|---|---|---|---|---|
| 1 | Allium | 2 | *Cucurbitaceae* | 2 |
| 2 | Brassica | 3 | *Solanaceae* | 4 |
| 3 | Cucurbita | 1 | *Brassicaceae* | 3 |
| 4 | Solanum | 1 | *Chenopodiaceae* | 1 |
| 5 | Beta | 1 | *Rosaceae* | 5 |
| 6 | Malus | 1 | *Lauraceae* | 1 |
| 7 | Lycopersicoum | 1 | *Apiaceae* | 2 |
| 8 | Persea | 1 | *Poaceae* | 9 |
| 9 | Daucus | 1 | *Asteraceae* | 5 |
| 10 | Saccharum | 1 | *Alliaceae* | 2 |
| 11 | Lactuca | 1 | *Acantaceae* | 1 |
| 12 | Albizia | 1 | *Apocynaceae* | 1 |
| 13 | Arundo | 1 | *Rubiaceae* | 1 |
| 14 | Lippia | 1 | *Rutaceae* | 4 |
| 15 | Coffea | 1 | *Lamiaceae* | 4 |
| 16 | Ruta | 1 | *Meliaceae* | 1 |
| 17 | Asparagus | 1 | *Asparagaceae* | 1 |
| 18 | Capsicum | 1 | *Balsamiaceae* | 1 |
| 19 | Occinum | 2 | *Rhamnaceae* | 1 |
| 20 | Azadirachita | 1 | *Boraginaceae* | 1 |
| 21 | Citrus | 3 | *Myrtaceae* | 4 |
| 22 | Buddleja | 1 | *Celasteraceae* | 1 |
| 23 | Phytolaca | 1 | *Cupressaceae* | 2 |

| | | | | |
|---|---|---|---|---|
| 24 | Catha | 1 | *Oleaceae* | 1 |
| 25 | Artemisia | 2 | *Musaceae* | 1 |
| 26 | Cymbopogon | 1 | *Euphorbiaceae* | 2 |
| 27 | Rosimarinus | 1 | *Anacardiaceae* | 2 |
| 28 | Rhamus | 1 | *Fabaceae* | 4 |
| 29 | Cordia | 1 | *Loganiaceae* | 1 |
| 30 | Eucalyptus | 2 | *Phytolaccaceae* | 1 |
| 31 | Accacia | 1 | *Plantaginaceae* | 1 |
| 32 | Juniperus | 1 | *Polygonaceae* | 1 |
| 33 | Olea | 1 | *Proteaceae* | 1 |
| 34 | Musa | 1 | *Musaceae* | 1 |
| 35 | Ricinus | 1 | | |
| 36 | Plantago | 1 | | |
| 37 | Nicotiana | 1 | | |
| 38 | Myrtus | 1 | | |
| 39 | Mentha | 1 | | |
| 40 | Mangifera | 1 | | |
| 41 | Carissia | 1 | | |
| 42 | Croton | 1 | | |
| 43 | Cupressus | 1 | | |
| 44 | Eleusine | 1 | | |
| 45 | Eragrostis | 1 | | |
| 46 | Erytherina | 1 | | |
| 47 | Grevillea | 1 | | |
| 48 | Hordeum | 1 | | |
| 49 | Impatiens | 1 | | |

| | | | | |
|---|---|---|---|---|
| 50 | Justicia | 1 | | |
| 51 | Laggera | 1 | | |
| 52 | Pennisetum | 1 | | |
| 53 | Prunus | 1 | | |
| 54 | Psidium | 1 | | |
| 55 | Rosa | 2 | | |
| 56 | Rubus | 1 | | |
| 57 | Rumex | 1 | | |
| 58 | Saccharum | 1 | | |
| 59 | Triticum | 1 | | |
| 60 | Vernania | 1 | | |
| 61 | Vicia | 1 | | |
| 62 | Zea | 1 | | |
| 63 | Zeneria | 1 | | |
| 64 | Coriandrum | 1 | | |

# APPENDIX IV

**List of informant in the study area**

| No | Name | Sex | Age | Name of kebele | Occupation |
|---|---|---|---|---|---|
| 1 | Abate Gashaw | M | 66 | Woira | Farmer |
| 2 | Getachew Tena | M | 45 | Woira | Farmer |
| 3 | Abaynesh Zemene | F | 52 | Yekebehana | Farmer |
| 4 | Abebe Getachew | M | 56 | Mengisto | Farmer |
| 5 | Abera Werku | M | 71 | Bichena debir | Farmer |
| 6 | Ademu Afewerk | M | 48 | Bichena debir | Farmer |
| 7 | Admas Arage | M | 58 | Debretsimona | Farmer |
| 8 | Admasu Chekol | M | 63 | Endeshighit | Farmer |
| 9 | Alayu Abebe | M | 36 | Gotera | Farmer |
| 10 | Alemitu W /aregay | F | 67 | Gotera | Farmer |
| 11 | Altaye Tizazu | M | 46 | Kidisgy | Farmer |
| 12 | Amare Taschalew | M | 56 | Woira | Farmer |
| 13 | Asalif T/tsadik | M | 45 | Yekebehana | Farmer |
| 14 | Asamin Shewaye | M | 32 | Mengisto | Farmer |
| 15 | Asefa Zbene | M | 65 | Woira | Farmer |
| 16 | Aselefech Asfaw | F | 70 | Bichena debir | Farmer |
| 17 | Aynabebe Arega | F | 68 | Kidisgy | Farmer |
| 18 | Asefa Kebede | F | 50 | Ager Hiwot | Farmer |
| 19 | Asfaw Mersha | M | 50 | Kidisgy | Farmer |
| 20 | Atirsaw zenebe | M | 52 | Mengisto | Farmer |
| 21 | Atile endale | M | 72 | Woira | Farmer |
| 22 | Atirsaw Belay | M | 48 | Debretsimona | Farmer |
| 23 | Aweke Demelash | M | 50 | Kidisgy | Farmer |
| 24 | Awlacew Walte | M | 66 | Bichena debir | Farmer |
| 25 | Ayalew zenebe | M | 50 | Mengisto | Farmer |
| 26 | Aytenw Tesfaye | M | 35 | Kidisgy | Farmer |
| 27 | Ayinenesh Dagne | F | 44 | Woira | Farmer |
| 28 | Basazin girmaye | M | 57 | Endeshegnit | Farmer |
| 29 | Bekele amitataw | M | 58 | Endeshegnit | Farmer |
| 30 | Bekele wondaferew | M | 58 | Woira | Farmer |
| 31 | Belay argaw | M | 30 | Mengisto | Farmer |

| | | | | | |
|---|---|---|---|---|---|
| 32 | Belay demeke | M | 40 | Yekebehana | Farmer |
| 33 | Belayhun Ayalew | M | 38 | Ager Hiwot | Farmer |
| 34 | Belayhun tefera | M | 60 | Mengisto | Farmer |
| 35 | Belaynesh lakew | F | 65 | Gotera | Farmer |
| 36 | Beletew tesfa | M | 45 | Woira | Farmer |
| 37 | Cherie assefa | M | 35 | Woira | Farmer |
| 38 | Damitew zelibanous | M | 60 | Kidisgy | Farmer |
| 39 | Degu sirahbizu | M | 50 | Bichena debir | Farmer |
| 40 | Demekech shewafera | F | 60 | Yekebehana | Farmer |
| 41 | Derbe ashagrie | M | 68 | Endeshegnit | Farmer |
| 42 | Dereje belayneh | M | 55 | Mengisto | Farmer |
| 43 | Dereje birhanie | M | 32 | Mengisto | Farmer |
| 44 | Difabachew yilfashewa | M | 45 | Woira | Farmer |
| 45 | Emishaw getabalew | M | 42 | Gotera | Farmer |
| 46 | Enani tadesse | F | 55 | Kidisgy | Farmer |
| 47 | Endale aygemtie | M | 60 | Yekebehana | Farmer |
| 48 | Endalamaw agachew | M | 40 | Ager Hiwot | Farmer |
| 49 | Etaferahu girma | F | 40 | Woira | Farmer |
| 50 | Etagegnehu assefa | F | 60 | Bichena debir | Farmer |
| 51 | Fikresilassie mekonnen | M | 35 | Mengisto | Farmer |
| 52 | Fantaye zelibanos | F | 42 | Debretsimona | Farmer |
| 53 | Gebrehiwot weldeyesus | M | 47 | Kidisgy | Farmer |
| 54 | Gebremariam belayhun | M | 41 | Yekebehana | Farmer |
| 55 | Gashaw dessie | M | 29 | Yekebehana | Farmer |
| 56 | Gashaw tsegaw | M | 35 | Ager Hiwot | Farmer |
| 57 | Geremew debebe | M | 60 | Woira | Farmer |
| 58 | Gessese alemayehu | M | 47 | Gotera | Farmer |
| 59 | Getachew abay | M | 60 | Yekebehana | Farmer |
| 60 | Getachew abebe | M | 45 | Endeshegnit | Farmer |
| 61 | Getahu Mamo | M | 34 | Bichena debir | Farmer |
| 62 | Getenesh Abera | F | 30 | Kidisgy | Farmer |
| 63 | Getenesh Amtataw | F | 40 | Debretsimona | Farmer |
| 64 | Getnet Damtew | M | 45 | Yekebehana | Farmer |
| 65 | Genet Gashaw | F | 30 | Mengisto | Farmer |
| 66 | Getnet Mamo | M | 34 | Gotera | Farmer |
| 67 | Getu Ergetie | M | 42 | Kidisgy | Farmer |

| | | | | | |
|---|---|---|---|---|---|
| 68 | Girma BIRU | M | 49 | Kidisgy | Farmer |
| 69 | Girmachew Tesfaye | M | 40 | Ager Hiwot | Farmer |
| 70 | Girmaye Lemma | M | 45 | Woira | Farmer |
| 71 | Girmaye Tsegaye | M | 54 | Woira | Farmer |
| 72 | Gizachew Amtataw | M | 45 | Yekebehana | Farmer |
| 73 | Gorems W/meskel | M | 57 | Mengisto | Farmer |
| 74 | Habtamu Shewayrga | M | 45 | Endeshegnit | Farmer |
| 75 | Hailu Ajibe | M | 56 | Debretsimona | Farmer |
| 76 | Kabtamu ZEMENE | M | 57 | Yekebehana | Farmer |
| 77 | Kasegn Yitna | M | 55 | Bichena debir | Farmer |
| 78 | Kebede Gizaw | M | 55 | Gotera | Farmer |
| 79 | Kefelegn Awgichew | M | 36 | Woira | Farmer |
| 80 | Kifetew Hailu | M | 70 | Kidisgy | Farmer |
| 81 | Lemma Bekele | M | 27 | Mengisto | Farmer |
| 82 | Manaye Amete | M | 45 | Gotera | Farmer |
| 83 | Mebreku Demeku | M | 64 | Yekebehana | Farmer |
| 84 | Melaku Abebaw | M | 35 | Kidisgy | Farmer |
| 85 | Merkebu Ashagrie | M | 61 | Endeshegnit | Farmer |
| 86 | Mindesil Zike | M | 28 | Debretsimona | Farmer |
| 87 | Minil Chernet | M | 50 | Woira | Farmer |
| 88 | Misaw Esubalew | M | 35 | Gotera | Farmer |
| 89 | Mitke Shibeshi | M | 36 | Gotera | Farmer |
| 90 | Monk Beshaw Tefera | M | 65 | Yekebehana | Farmer |
| 91 | Mulatu Negesse | M | 47 | Mengisto | Farmer |
| 92 | Mulugeta w/aferew | M | 56 | Kidisgy | Farmer |
| 93 | Mulunesh Mekonn | F | 50 | Gotera | Farmer |
| 94 | Mulushewa Awgichew | F | 47 | Woira | Farmer |
| 95 | Negede Tilahun | M | 42 | Endeshegnit | Farmer |
| 96 | Negede Zerefa | M | 65 | Debretsimona | Farmer |
| 97 | Nigist Ergete | F | 50 | Yekebehana | Farmer |
| 98 | Prist Agonafir F/Mariam | M | 65 | Woira | Farmer |
| 99 | Prist Alemu Ergete | M | 40 | Mengisto | Farmer |
| 100 | Priest Ayalkie H/yohans | M | 48 | Mengisto | Farmer |
| 101 | Prist Chane  Mengstie | M | 70 | Kidisgy | Farmer |
| 102 | Prist Getachew Tadiwos | M | 60 | Ager Hiwot | Farmer |
| 103 | Prist H/Gebreal Mindesil | M | 69 | Gotera | Farmer |

| | | | | | |
|---|---|---|---|---|---|
| 104 | Prist Kefelegn Lemma | M | 41 | Woira | Farmer |
| 105 | Prist Niguse Zame | M | 65 | Ager Hiwot | Farmer |
| 106 | Prist Shenkute Mindesil | M | 45 | Debretsimona | Farmer |
| 107 | Yilma Keterew | M | 80 | Yekebehana | Farmer |
| 108 | Sasahu Gima | F | 40 | Yekebehana | Farmer |
| 109 | Habtamu Moges | M | 32 | Endeshegnit | Farmer |
| 110 | Shifera Beyene | M | 56 | Gotera | Farmer |
| 111 | Sidelil Gucho | M | 78 | Woira | Farmer |
| 112 | Sitotaw Argaw | M | 36 | Mengisto | Farmer |
| 113 | Tadese Kassaye | M | 80 | Yekebehana | Farmer |
| 114 | Tadese Shenkut | M | 80 | Kidisgy | Farmer |
| 115 | Talef Yemiru | F | 35 | Ager Hiwot | Farmer |
| 116 | Tasebew Bekahagn | M | 62 | Kidisgy | Farmer |
| 117 | Taytu Werku | F | 60 | Kidisgy | Farmer |
| 118 | Teju Tadiwos | M | 50 | Woira | Farmer |
| 119 | Tbelt Awraris | M | 50 | Yekebehana | Farmer |
| 120 | Tsegaye H/gebreal | M | 77 | Mengisto | Farmer |
| 121 | Wendimgezahu Dejen | M | 60 | Ager Hiwot | Farmer |
| 122 | W/medkin G/Tsadik | M | 80 | Mengisto | Farmer |
| 123 | Waganesh Agachew | F | 29 | Kidisgy | Farmer |
| 124 | W/mariam Geremew | M | 55 | Yekebehana | Farmer |
| 125 | Wolde Fikru | M | 52 | Endeshegnit | Farmer |
| 126 | Yehuala Ashagre | M | 45 | Mengisto | Farmer |
| 127 | Yeshidnber Shewandegif | M | 65 | Gotera | Farmer |
| 128 | Yimenash T/weld | F | 63 | Kidisgy | Farmer |
| 129 | Yitaysh Erkie | F | 36 | Yekebehana | Farmer |
| 130 | Yitna Zemedkun | M | 38 | Endeshegnit | Farmer |
| 131 | Yonas Mekonn | M | 26 | Endeshegnit | Farmer |
| 132 | Zebene Belayhun | M | 60 | Yekebehana | Farmer |
| 133 | Zemetu Negese | F | 30 | Mengisto | Farmer |
| 134 | Zenebe Werku | M | 60 | Kidisgy | Farmer |
| 135 | Yizengawu Tadesse | M | 70 | Bichena debir | Farmer |
| 136 | Adane Ayalewu | M | 40 | Debretsimona | Farmer |
| 137 | Alegawu Tilaye | M | 57 | Woira | Farmer |
| 138 | Abreham Mengistu | M | 20 | Kidisgy | Farmer |
| 139 | Kasanesh Gelaneh | F | 62 | Endeshegnit | Farmer |

| | | | | | |
|---|---|---|---|---|---|
| 140 | Adugnaw Menberu | M | 30 | Ager Hiwot | Farmer |
| 141 | Belay Tenayie | M | 76 | Bichena debir | Farmer |
| 142 | Abebe Bezuneh | M | 48 | Ager Hiwot | Farmer |
| 143 | Amakel Awukewu E | F | 60 | Debretsimona | Farmer |
| 144 | Endashaw Alemu | M | 40 | Woira | Farmer |
| 145 | Adera Eneyewu | F | 62 | Yekebehana | Farmer |
| 146 | Melkamu Bezabeh | M | 35 | Mengisto | Farmer |
| 147 | Mr Menker baye | M | 55 | Ager Hiwot | Farmer |
| 148 | Selam kasshun | F | 44 | Woira | Farmer |
| 149 | Belachewu Muneye | M | 62 | Endeshegnit | Farmer |
| 150 | Gashu Ademas | M | 50 | Bichena debir | Farmer |
| 151 | Etayehu Bantie | F | 63 | Endeshegnit | Farmer |
| 152 | Atenafu Tariku | M | 75 | Ager Hiwot | Farmer |
| 153 | Belayneh wale | M | 60 | Debretsimona | Farmer |
| 154 | Melak Meherit Tamer | M | 75 | Debretsimona | Farmer |
| 155 | Aragaw Marene | M | 38 | Debretsimona | Farmer |
| 156 | Yesh Aweke | F | 45 | Woira | Farmer |
| 157 | Belayneh Adamu | M | 55 | Endeshegnit | Farmer |
| 158 | Shemachash Demes | F | 65 | Bichena debir | Farmer |
| 159 | Abrham Fenta | M | 76 | Endeshegnit | Farmer |
| 160 | Meskerem Abebawu | F | 20 | Ager Hiwot | Farmer |
| 161 | Sirgut Getachew | F | 44 | Woira | Farmer |
| 162 | Abele  Hunegnaw | M | 35 | Endeshegnit | Farmer |
| 163 | Neguse Debase | M | 27 | Endeshegnit | Farmer |
| 164 | Getu Alemayehu | M | 60 | Yekebehana | Farmer |
| 165 | Webersit Fenta | F | 45 | Woira | Farmer |
| 166 | Amare Derese | M | 28 | Debretsimona | Farmer |
| 167 | Ayalewu Abebe | M | 50 | Endeshegnit | Farmer |
| 168 | Belachew Abateneh | M | 42 | Debretsimona | Farmer |
| 169 | Gashaw Alemu | M | 48 | Ager Hiwot | Farmer |
| 170 | Mechu Zewdu | F | 29 | Mengisto | Farmer |
| 171 | Anedargachew Addis | M | 21 | Endeshegnit | Farmer |
| 172 | Temsgen Bantie | M | 39 | Endeshegnit | Farmer |
| 173 | Yeshareg Getenet | F | 45 | Debretsimona | Farmer |
| 174 | SHegaw Shefiraw | M | 50 | Ager Hiwot | Farmer |
| 175 | MulugojamAbateneh | F | 60 | Debretsimona | Farmer |

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| 176 | Demek Belay | M | 35 | Endeshegnit | Farmer |
| 177 | Dagne Aebebe | M | 75 | Yekebehana | Farmer |
| 178 | Teruye Fenta | F | 41 | Ager Hiwot | Farmer |
| 179 | Yedenkal Seraw | M | 51 | Ager Hiwot | Farmer |
| 180 | Laku Tadesse | F | 45 | Yekebehana | Farmer |
| 181 | Damtie Terefe | M | 63 | Endeshegnit | Farmer |
| 182 | Aragie Yilehal | F | 60 | Endeshegnit | Farmer |
| 183 | Fate Oumer | M | 42 | Bichena debir | Farmer |
| 184 | Talema Anteneh | M | 52 | Debretsimona | Farmer |
| 185 | Asegde Baleh | M | 64 | Ager Hiwot | Farmer |
| 186 | Kuemelachew Gobeza | M | 63 | Yekebehana | Farmer |
| 187 | Getenet chane | M | 63 | Ager Hiwot | Farmer |
| 188 | Getachew Belay | M | 45 | Debretsimona | Farmer |
| 189 | Neguse Wubale | F | 65 | Endeshegnit | Farmer |
| 190 | Fentanesh Adamu | F | 65 | Ager Hiwot | Farmer |
| 191 | Yegrem Tariku | M | 70 | Yekebehana | Farmer |
| 192 | Tadele Muneyilet | M | 48 | Endeshegnit | Farmer |
| 193 | Mekonen Mesfin | M | 43 | Yekebehana | Farmer |
| 194 | Kasyetu Mekonen | F | 80 | Debretsimona | Farmer |
| 195 | Adamu Amare | M | 20 | Endeshegnit | Farmer |
| 196 | Hasen Eslemane | M | 68 | Bichena debir | Farmer |
| 197 | Leweye Getahun | M | 78 | Yekebehana | Farmer |
| 198 | Moseye Demsie | M | 21 | Debretsimona | Farmer |
| 199 | Thegaye Adamu | M | 53 | Endeshegnit | Farmer |
| 200 | Kidus Abebe | M | 68 | Yekebehana | Farmer |

# APPENDIX V

Photographs showing Field and Herbarium Activity


TECNO
SPARK