



**JIMMA UNIVERSITY**  
**COLLEGE OF NATURAL SCIENCES DEPARTMENT OF BIOLOGY**

**ETHNOBOTANICAL STUDY OF WILD EDIBLE PLANTS IN DEGA  
DISTRICT, BUNO BEDELE ZONE, OROMIA REGION, SOUTH  
WESTERNETHIOPIA**

**MSc**

**THESIS**

**By: GETACHEW FIKADU SALBANA**

***MARCH, 2022***  
***JIMMA, ETHIOPIA***

**ETHNOBOTANICAL STUDY OF WILD EDIBLE PLANTS IN DEGA  
DISTRICT, BUNO BEDELE ZONE, OROMIA REGION, WESTERN  
ETHIOPIA**

**By: GETACHEW FIKADU SALBANA**

**ATHESIS SUBMITTED TO DEPARTMENT OF BIOLOGY, JIMMA  
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THE REQUIREMENTS FOR MASTER'S DEGREE IN BOTANICAL  
SCIENCES**

**MAIN ADVISOR: DEREJE DENU (PhD)**

**CO- ADVISOR: DASALEGN RAGA (MSc)**

***MARCH, 2022***  
***JIMMA, ETHIOPIA***

**JIMMA UNIVERSITY**  
**SCHOOL OF GRADUATE STUDIES**  
**DECLARATION**

I, GetachewFikadu hereby declare that this MSc thesis entitled “Ethnobotanical study of Wild edible plants in Dega District, Buno, Bedele Zone, Oromia Region, South western Ethiopia” is my original work and has not been presented in any other university, and all sources of materials used for this thesis work have been acknowledged.

Name: Getachew FikaduSalbana Signature\_\_\_\_\_

Date of Submission\_\_\_\_\_

**JIMMA UNIVERSITY**  
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**ADVISORS' APPROVAL SHEET**

This is to certify that this thesis entitled “Ethnobotanical study of Wild Edible plants in Dega Districts, Buno, Bedele Zone, OromiaRegion,Southwestern Ethiopia” submitted in partial fulfillment of the requirement for Master’s degree in Botanical Sciences under our supervision. Therefore, we recommend that the student has fulfilled the requirements and hence hereby can submit the thesis to the department.

Main Advisor: Dereje Denu (PhD) Signature\_\_\_\_\_Date\_\_\_\_\_

Co-Advisor: Dasalegn Raga (MSc) Signature\_\_\_\_\_Date\_\_\_\_\_

## **DEDICATION**

I dedicate this thesis manuscript to my wife Shibire Tafesse and my family for their dedicated partnership in the success of my life.

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**APPROVAL SHEET-II**

We, the undersigned, members of the board examiners of the final open defence by \_\_\_\_\_ have read and evaluated his thesis entitled “Ethnobotanical Study of Wild Edible Plant species in Dega District, Buno Bedele Zone, Oromia Region, South western Ethiopia” and examined the candidate. This is therefore to certify that the thesis has been accepted in partial fulfillment of the requirement of master’s degree in botanical science

Name of the Chairperson	Signature	Date
_____	_____	_____

Name of Major advisor	Signature	Date
_____	_____	_____

Name of Internal Examiner	Signature	Date
_____	_____	_____

Name of External Examiner	Signature	Date
_____	_____	_____

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## **ABSTRACT**

*Wild edible plants (WEPs) are commonly used to meet food requirements of rural people, especially during periods of food shortage. The study was conducted on Ethnobotanical Study of Wild Edible Plants in Dega District, Buno Bedele Zone, Oromia Region, South western Ethiopia. The main objective of the study was to assess and document wild edible plants in Dega District. A total of 119 informants were (88 males and 31 females) involved in this study and help with the documentation of relevant ethnobotanical information about WEPs. Data collection and analyses employed simple statistics in ethnobotanical methods. For data analyses descriptive statistics and quantitative were used in ethnobotanical methods. The study resulted in documentation of 32 WEP species growing and utilized in the study area. These species are distributed in 24 genera and 21 families. Fruits were the most commonly used plant parts in the community 19 species (59.4 %) and most of them 25 species (78.1%) are eaten fresh as raw.*

*The result of preference ranking indicated that *Syzygium guineense* subsp. *macrocarp* is the most preferred wild fruit followed by *Syzygium guineense* subsp. *afromontanum*. This was supported by the paired wise comparison. Direct matrix ranking analyses for the multipurpose species showed that *Cordia africana*, *Syzygium guineense* subsp. *afromontanum* and *Syzygium* subsp. *macrocarp* are the most cited species used for different purposes. The informant consensus analysis showed that *Cordia africana* and *Syzygium guineense* subsp. *afromontanum* are the most threaten species due to diverse uses. Although informants' listed *Syzygium guineense* subsp. *macrocarp* and *Syzygium guineense* subsp. *afromontanum* those were available in the market. This might be due to availability of sufficient food resources in the season or could loss of the resource and the associated knowledge. The use of eating WEPs products in the district still ongoing processes especially children consumed them based on the seasonal availability. Wild edible plants identified in the study area were available year-round at different seasons. The fruiting of WEPs during all season especially at dry season has indicated the resistance nature of these plants to water stress environments means they are important during the drought seasons. Findings in the study sites indicate that most preferred multipurpose WEPs have got the probability to be disappeared in a short period of time, so it is better to study the way of protection.*

**Keywords:** Dega, Ethnobotany, Indigenous Knowledge, Wild Edible Plant

## **List of Accrionomy and Abbreviations**

CSA	Central Statical Agency
FAO	Food Association Organization
FEE	Flora of Ethiopia and Eritrea
GPS	Geographical Position System
HH	House-Holds
ICF	Informant consensus factor
MOA	Ministry of Agriculture
MPs	Medicinal Plants
WEFs	Wild edible fruits
WEPs	Wild edible plants
WFP	World Food Program
DAO	Dega Agriculture Office
IPGRI	International Plant Genetic Resources institute
IBC	Institute of Biodiversity Conservation



## **INTRODUCTION**

### **1.1 Back ground of the study**

Wild edible plants (WEPs) are commonly used to meet food requirements of rural people, especially during periods of food shortage. These (WEPs) defined as the species that are neither cultivated nor domesticated. But they are available from their wild natural habitat and used as sources of food (Teklit and Afework, 2015). It has been used as source of food since ancient times (Özbucak *et al.*, 2007). In different parts of the world the use of wild plant resource is still continued, because human beings require these wild plants as a source of medicine, food, spices, fence, and shelter construction, timber production etc. (Acharya and Acharya, 2010).

In Ethiopia, the rural populations have a wider knowledge, tradition and opportunity of using wild edible plants despite the variation in age, sex, time and season (Getachew *et al.*, 2005; 2009). Due to this reason, they are an integral part of the diet of many rural communities and hence have diverse contributions in various ways. The consumption of wild edible plants (WEPs) seems more common in food in secure areas of the country as compared to relatively food sufficient areas (Sheathe and Dhillion, 2006). This trend of using Wild Edible Plants (WEPs) during periods of food shortage is also common in Ethiopia beginning important alternative food source for survival.

In addition to the use of Wild Edible Plants (WEPs) as supplemental to the main diet and as an alternative source of food areas, some of them serve as source of income to small-holder farmers in rural areas. The existence of diverse farming systems, socio-economics, cultures and agro-ecologies has endowed Ethiopia with a diverse biological wealth of plants, animals, and microbial species, especially crop diversity (IBC, 2007). This raises the questions if and how food insecure populations make use of biodiversity and Wild Edible Plants (WEPs) and what kind of potential available WEPs have to contribute to people's diets. These aspects are particularly interesting due to the facts that food insecurity is increasing (Ensermu and Sebsebe, 2014). However, studies addressing the contribution of WEPs and biodiversity to human diets are still rare and there are huge deficits with respect to information on WEPs nutritional properties. A healthy diet depends on a diversity of foods rich in vitamins and minerals and WEPs are untapped sources of important micronutrients (IPGRI, 2002).

Finding ways to alleviate hunger and poverty doesn't always depend on new crop varieties that are bred in a laboratory. Instead, reigniting an interest in and a taste for indigenous and traditional food can help improve nutrition, increase incomes, restore agricultural biodiversity, and preserve local cultures (Amanda *et al.*, 2011). Together with the lack of food composition data on WEPs, this has led to a routine undervaluation of WEPs in diets and to their neglect by researchers, policy makers and nutritionist (Figueroa *et al.*, 2009). However, these plants are categorized as underutilized or neglected crops since the economic potential of the plants have been poorly addressed and limited to local use only (Misra and Misra, 2016). Yet the plants provide essential vitamins, minerals, carbohydrates and proteins contributing to the health care significantly. Many WEPs are rich nutritionally as various reports presented these plants contain vitamins and micronutrients that supplements nutritional requirements (Kabuye, 1997). Either as impact of researches or cultural trends, the use of the plants as source of food is continued being highly pronounced in developing countries (Jadhav *et al.*, 2011; Dogan, *et al.*, 2013).

Despite the primary reliance of most agricultural societies on staple crop plants, the tradition of eating WEPs products continues in the present day. In addition to their role in closing food gaps during periods of drought or scarcity, WEPs play an important role in maintaining livelihood security for many people in developing countries. WEPs have been a focus of research for many Ethnobotanists in recent decades. Currently, there is renewed global interest in documenting ethnobotanical information on neglected wild edible food sources (Bharucha and Pretty, 2010). Since indigenous knowledge on Wild Edible Plants (WEPs) is being eroded through acculturation and the loss of plant biodiversity along with indigenous people and their cultural background, promoting research on wild food plants is crucial in order to safeguard this information for future societies (Ermias *et al.*, 2011). As far as my knowledge is concerned there has little information on Wild Edible Plants of Dega District. Therefore, this study was planned to asses and document' wild edible plants and fills the knowledge gap in this regard.

## **1.2 Statement of the problems**

The study conducted by Regasa (2001) state that local communities properly asses the forest resource around them and respect to traditional institutions and managing the forest resource that provide an opportunity for safe guarding the resources sustainably. Ethiopia also faces many serious challenges to efforts to conserve its biodiversity and forests (*Demel et al.*, (2010). The research has an overarching goal to propose environmentally, economically and socially sound strategies to be considered for sustainable use and management plan for the Wild Edible Plants (WEPs) to restore the resources and set the stage for sustainable utilization mode. Most of the study populations are found in the rural areas and the lives of these peoples face several challenges, including deforestation, drought, land degradation, climate changes and other.

People in the study area depend on WEPs at the time of food scarcity and insecurity due to drought and famine. As far as my knowledge is concerned, there has little information on ethnobotanical study of WEPs conducted so far in the study area. This shows that there is a knowledge gap regarding the WEPs of the district and hence this study was initiated to fill this knowledge gap.

### **1.3 Objective of the study**

#### **1.3.1 General Objectives:**

The main Objective of this Study was **to** assess and document Wild Edible Plant species in Dega District, Buno Bedele Zone, Oromia, Region, Southwestern Ethiopia.

#### **1.3.2 The specific objectives were to:**

1. Identify and document Wild edible plants used by the people in Dega District.
2. Determine the habitat distribution of Wild Edible Plants in the study area.
3. Assess the role of Wild Edible Plants to support food security in the study area.
4. Evaluate the conservation status of the most consumed wild edible plants in study area.

#### **1.3.3 Basic Research questions**

The research questions **were** prepared based on the objectives of the research:

1. What are the wild edible plants and parts used in the study area?
2. What is the habitat distribution of the Wild Edible Plants in the study area?
3. What is the importance of WEPs in food security in the study area?
4. What is the conservation status of wild edible plants in the local community?

### **1.4 Significance of the study**

The study was provided information on the importance of wild edible plants in generating income for the poor and food security during food shortage in the District. And also help to design different strategies to reduce the impacts of local communities on wild food plants of the District. In addition, it may use for conservation and sustainable use of wild edible plants.

In general, the study was used as a basis for further Study Would help the communities, farmers, agricultural experts and other concerned bodies to get awareness about the contribution of wild edible plant.

### **1.5 Scope of the study**

The study was delimited in Dega District Buno Bedelezone, Oromia Region, Southwestern Ethiopia, because of the limitation of capital and logistic as well as time. It focuses on collection and documentation of wild edible plants. In addition, the conservation status of wild edible plants in the study area was also being addressed.

## **LITERATURES REVIEW**

### **2.1 Definitions of Wild Edible Plants (WEPs)**

Wild Edible Plants are refers to plants that are not cultivated and that can be gathered in the field. If a plant is considered as a wild plant depends on the location Wild plants play an important role in rural communities, as the natives mostly depend on plants for food, traditional medicine and other livelihood requirements. The use of edible wild plants forms a part of the cultural traditions of rural and suburban societies throughout the world. In recent years, local knowledge has been increasingly studied using various ethno botanical tools to identify plants with high nutritional, medical and commercial potentials which are likely to contribute in better living of rural population. Wild edible plants: Are wild plants with one or more (Ermias, *et al.*, 2011). Parts that can be used for food if gathered at the appropriate stage of growth, and properly prepared (Ermias, *et al.*, 2011). Becoming extinct because it is either few in numbers, or threatened by changing environmental or predation parameters (Lee *et al.*, 1999). Indigenous people are endowed with knowledge of seasonal availability of WEPs and implications to climate change adaptations. The available information on the seasonal availability and their contribution to climate change adaptation was poorly documented in Ethiopia.

### **2.2 Wild Edible Plants in Ethiopia (WEPs)**

Ethiopia is a country with varied topography and a wide spectrum of habitats presenting a large number of endemic plants and animals. The country has about 6000 (Ermias, *et al.*, 2011) higher plant species of which about 10% are endemic (Ensermu and Sebsebe, 2014). Ethiopia also harbors two of the 34 global biodiversity hotspots (CI, 2004) and is recognized as a Pavlov's center of origin and diversification for many food plants and their wild relatives (Edwards, 1991). Forests, grasslands, riverside environments and wetlands are home to numerous WEPs in the country (Asfaw, 2009). Local communities in Ethiopia are also endowed with diverse indigenous knowledge, related to the rich biodiversity of the country.

In most parts of Ethiopia, wild edibles form integral parts of the feeding habits of many communities (Kebu and Kibebew, 2006). However, consumption of wild edibles is more common in food insecure areas than in other areas in the country (Teklehaymanot and Giday, 2010). For example, the Konso people in southern Ethiopia managed to endure three severe drought seasons of crop failure between 1996 and 1999 by consuming WEPs available in the

region (Guinand and Lemessa, 2001). Despite the wide availability and utilization of WEPs in Ethiopia, ethnobotanical information (Ermias, *et al.*, (2011) a need for documentation, nutritional analysis and domestication of WEPs to assist in the (Ermias, *et al.*, 2011). completely disappeared, their nutritional role and health benefits being reported in many surveys worldwide (Pardo-de-Santayana *et al.*, 200).

### **2.3 Importance of indigenous wild edible plants**

Indigenous wild edible plants refer to species that are neither cultivated nor domesticated, but are available from wild natural habitat and used as sources of food [Beluhan and Ranogajec, 2010]. The use of wild edible plants (WEPs) was present in historic and contemporaneous rural and indigenous societies globally (Vincent, 1985; Katewa, 2008; Gemedo-Dalle *et al.*, 2005). When compared to domesticated plant food sources, wild plant foods tend to be overlooked. However, there is substantial evidence that indicates the importance of wild edibles in terms of the global food basket. Since WEPs are freely accessible within natural habitats, indigenous people have knowledge of how to gather and prepare the food from wild sources (Ermias, *et al.*, 2011).

According to Abermound (2009), about one billion people in the world use wild foods (mostly from plants) on a daily basis. Besides, over 300million people obtain a considerable part of their livelihood in the form of NonTimber Forest Products (NTFPs) from wild forests [Belcher *et al.*, 2005].in the world uses wild foods (mostly from plants) on a daily basis. Besides, over300 million people obtain a considerable part of their livelihood in the form of NonTimber Forest Products (NTFPs) from wild forests [Belcher *et al.*, 2005].

### **2.4. Wild Edible Plant Resources**

Wild edible plants are with one or more parts that can be used for food if gathered at the appropriate stage of growth, and properly prepared. Edible wild plants could be weeds growing inurbanareasto native plants growing in deep wilderness (Hinnawi, 2010).Plants have been the source of food .Materials from the dawn of human civilization (Arnold, 1995 cited in Khanal, 2006). For instance, about 300 million people obtain part or their entire livelihood and food from wild, forests in the world (DMP, 1982). Over 70% of the wild edible plants are consumed when food scarcity is high and at times of starvation (Cunnigam, 2001; Teklehymanot and Mirutse, 2010). Those wild plants in Ethiopia are used as source of food both at times of plenty and of food shortage. Despite agricultural the fact that societies primarily rely on crop plants, the tradition of eating wild plants has not completely disappeared, their nutritional role and health benefits being reported in many surveys

worldwide (Pardo-de-Santayana *et al.*, 2007). Thus, wild edible plants still play an important role in human nutrition especially in the time of starvation (Khanal, 2006).

Globally, an estimated 1.02 billion people are undernourished (FAO, 2009). For many years the importance of wild plants in the developing world as a main food supplement and as a means of survival during times of drought and famine (Guinand and Dechassa, 2000). Wild food plants are of high nutritional content such as protein, vitamin B2, and vitamin C, which used as alternatives to conventional vegetables in the human diet (Fentahun and Herbert, 2008). According to many sources, the number of vitamins, minerals and other nutrients in wild food is on the average greater in wild foods (Hinnawi, 2010). Research supports that some of these foods, as part of an overall healthful diet, have the potential to delay the onset of many age-related disease (Amold, 1995 cited in Kahanal, 2006).

Ethiopia possesses one of the richest floras in Africa. Much of this floristic wealth is reflected in the fact that it is one of the Pavlov's centers of origin and/or diversity for many domesticated plant and their wild food plants (Bell, 1995 cited in Guinand and Dechassa, 2000; Zewge and Teklehaymanot, 2001). But little has been systematically documented on wild food plants (Gidey and Yirga, 2010). In addition, information on wild edible plants of Ethiopia is scattered in botanical monographs, glossaries and informal notes as well as in the rich oral tradition of different communities (Zemedede and Mesfin, 2001).

Zemedede and Mesfin (2001) extrapolated their data showing that about 5% of the total plant species of Ethiopian plants serve as food for human beings. In addition, Kebu and Fasil, (2006) identified 66 wild edible plant species classified among 54 genera and 34 families. Used as Lubricants, fuel, for lighting, in Paints and varnishes, as a wood preservative, waterproofing, etc. There has been renewed or increasing interest in consuming wild food plants. Despite agricultural societies' primary reliance on crop plants, the tradition of eating wild plants has not completely disappeared, their nutritional role and health benefits being reported in many surveys worldwide (Pardo-de-Santayana *et al.*, 200).

#### **2. 4.1 Wild edible Plants and their Nutrition**

Wild edible plants are plants that occur on a wild or are grown in local scale, and are categorized as underutilized whose economic potential have been poorly addressed to only traditional and local use (Misra and M.K. Misra, 2016). In addition to cultivation crops, Ethiopia flora contains many wild plants that produce quantities of food so, natural habitats, farm lands & home gardens are sources of edible plants. In addition to cultivated plants,

peoples in developing countries use WEPs as food during the period of food deficit (Jadhav, *et al.*, 2011, Dogan and Ugulu, 2013).

Especially in the time of starvation WEPs still play important roles in human nutrition (Khanal, 2006). FAO (2009) estimated that there are about 1.02 million peoples that are undernourished. According to (Ermias, *et al.*, 2011) different parts of food plants like leaves, stems, fruits, flowers, tubers, barks, seeds, roots and others are still consumed for their dietary value in many communities around the global. Many WEPs are nutritionally rich and can supplement nutritional requirement. Generally, the information available from the nutritional analysis WEPs shows their potential contribution to dietetic diversity and food security.

#### **2.4. 2 Potential contribution of WEPs to food security**

As cited by Sabatsec *et al.*, (2012) Seasonal food insecurity or shortage of enough food is the main problem in developing country in Ethiopia most of peoples in rural areas face several challenges like environmental degradation, drought, deforestation and climate change these results in a serious food insecurity among households. It was faced in tow districts occasionally because of the researcher focused to study about WEPs. FAO (2004) estimates that there are about 852 million peoples worldwide that are undernourished. Out of this 9 million are in industrialized countries, 28 million are in countries in transition and 815 million are from developing countries. The number of hungry peoples with shortage of food is growing at a rate of 4 million a year and in developing countries there are about 820 million peoples that suffer with shortage of food (FAO, 2006). More than 35% of Ethiopian people are food insecure (FAO, 2010).

Every living organism in the world impossible to survive without plants so their contribution for food security has fundamental value so, different researchers stated different values about plant diversity particularly WEPs. As suggested by (Cotton, 1996) almost all living organisms ranging from bacteria to large mammals gain protection and nourishment from plants. Humans derive food, medicines and a number of ecosystem services such as in purification, origin and recharge of water bodies, nitrogen fixation, cycling of nutrients as well as many more range of other products from plant biodiversity (Khanal, 2006). When compared to domesticated plant food sources, wild plant foods tend to be overlooked. As cited by (Ermias, *et al.*, 2011), over 50% of the world's daily requirement of proteins and calories are obtained from only three crops: Wheat, Maize and Rice.

The dependence on a few domesticated species limits food diversity & leads to over dependence on limited resources. By contrast more than 7000 species of plants are used for



food in human history as ethnobotanical investigations suggested (Grivetti and Ogle, 2000). These indicated that there are many WEPs which are important but unknown by ethnobotanists so, further study indifferent districts have been ongoing processes. Wild sources of food are important for the poor and landless, and are especially important during times of famine or conflict when normal food supply mechanisms are disrupted. According to (Tardio, *et al.*, 2006) even under normal conditions, wild plants have played an important role in complementing staple foods to provide balanced diets.

### **2.4.3 Sources of income**

WEPs also have another “safety net” function in terms of money earned from their sale. This is especially important in isolated regions without insurance mechanisms, but with high price, health and environmental risks (McSweeney, 2003). According to several studies wild fruits are an important source of income through commercialization (Styger *et al.*, 1999; Teklehaymanot, 2004). Even though there are no global estimates of the economic value of wild foods, there is no doubt that their use and trade becomes important during economic hardship (Bharucha and Pretty, 2010). These days an increased attention on the contribution of wild foods to rural livelihood and poverty reduction can be observed. In some communities in southern Africa, the sale of WEPs can amount to 50% of the two-talent income (Wiesum and Shackleton, 2005).

### **2.4.4 Nutritional prospect of wild edible plants (WEPs)**

Leaves, stems, fruits, flowers, tubers, barks, seeds, roots, and so on, of lots of WEPs are still consumed for their dietary value in many communities around the globe. Some of these WEPs are used as primary food sources while others are used as secondary condiments in dishes prepared from domesticated cultivars [Lockett and Grivetti, 2000]. These plants play an important role as a source of energy and micronutrients [Afolayan and Jimoh, 2009; De Caluwe, 2010a and 2010b]. Currently, preliminary research results on dietary analysis of many WEPs provide promising information.

## **2.5 Threats and conservation of Wild Edible Plants**

### **2.5.1 Threats of Wild Edible Plants**

Based on research findings, indigenous people living in forests best know, use and protect biodiversity. However, the survival and existence of indigenous people and their long term accumulated knowledge faces challenges as a result of modernization, genetic erosion on plant and animal resources, low recognition to their knowledge, varied culture and loss of biodiversity (Martin, 1995; Balick and Cox, 1996; Negash, 2001).

Environmental crises like global warming, loss of biodiversity and deforestation are becoming the major tribulations of human beings. In Ethiopia, WEPs are facing threats in natural habitats from various human activities such as fuel wood collection, harvesting for timber and walling or poles, (Kebu and Fassil, 2006). These practices adversely affect WEPs in the country and lead to reducing of economically crucial food plants (Assefa and Tesfaye, 2011). When the plants that have been serving as the raw material for the preparation of the different remedies are being destroyed, the traditional practices associated with them would also diminish (Kumbi, 2007). Generally, WEPs are threatened due to various human activities and natural causes such as habitat distraction (timber harvest, fuel wood collection, forest fire), over harvesting, over grazing, land use change/expansion of agricultural lands, developmental activities, invasive species and Climate change.

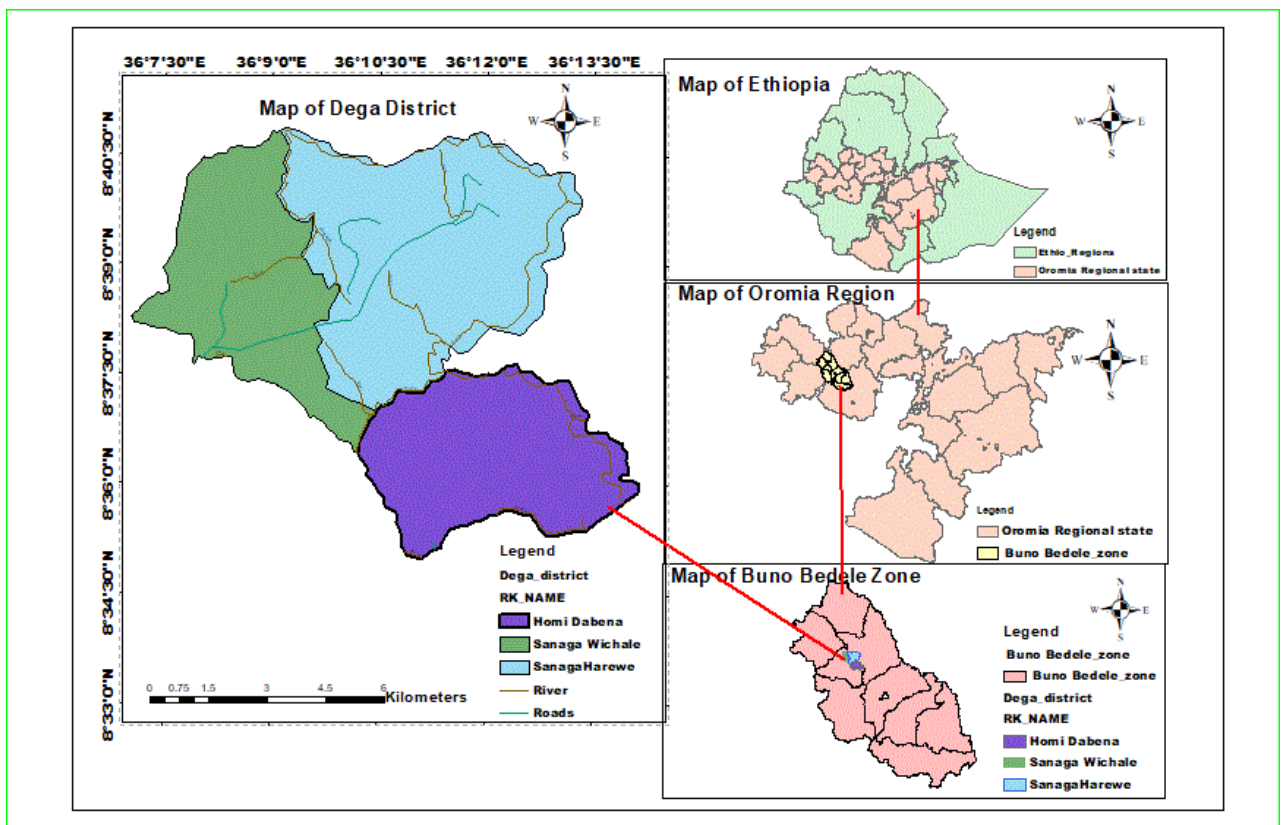
### **2.5.2 Conservation of Wild Edible plants**

Conservation refers to the wise use and appropriate management of natural environment and its natural resources. There are some conservation actions that have been undertaken around the world, this includes in-situ (in their natural habitat as in nature reserves and parks) or exsitu (in field gene banks, botanic gardens or cold rooms (Tilahun and Mirutse 2010). Researches recommend that WEPs in different parts of Ethiopia need Conservation and documentation (Balemie and Fassil, 2006, Zemed, 2009, Tilahun and Mirutse Giday, 2010). Several studies have demonstrated the roles of WEPs as sources of income for poor communities and as supplementary food sources during times of crises, Misuse of wild plant resources cause extinction of the useful Wild edible Plants, so wild plant resources require considerable conservation for sustainable usage in the future (Baressa and Anbessa, 2016).

## MATERIALS AND METHODS

### 3.1 Description of the study area

The study was conducted in Dega District, Buno Bedele Zone, Oromia Region, Southwestern Ethiopia. It is located at 548km of Addis Ababa and at 68km from Zone capital (Bedele). Dega District has 17 ganda (one urban town and 16 rural). Its total area is around  $46.22\text{km}^2$ . (Ganda) is the local name of small administrative unit. It is bordered by five neighboring Districts: -in north by Meko District, in the west Alge-Sachi district and in the east Dabo Hana and Bedele Districts, in the south by Chora District. The district lies between  $8^{\circ}33'0''$ - $8^{\circ}40'30''$ N Latitude and  $36^{\circ}07'30''$  - $36^{\circ}13'30''$ E longitude ( Dega Agriculture and Natural resources,2019).



**Figure1:** Map of the study area

### 3.1.1 Population of the study area

Dega District has 17 administrative ganda with a total population of 63,542 in which male 29,322(46%) and female 34,220(54%). The population distribution 51,649(81%) peoples are live in rural area and 11,893(19%) peoples are live in urban area (CSA, 2007).

**Table 1:** Total Population Size of Study Area

Rural			Urban			Total population in the study District		
Male	Female	Total	Male	Female	Total	Male	Female	Total
24,050	27,599	51,649	5,272	6,621	11,893	29,322	34,220	63,542

Source: (CSA.2007)

### 3.1.2 Economic activities

The main Livelihoods of peoples in the study area depend on mixed agriculture practice. More than 90% of the peoples of the study area are engaged in agriculture like crop cultivation and animal rearing while the remaining (about 10%) of the population are engaged in shopping, government employment and other service sectors. The people of the area mainly depend on rain fed agriculture and traditional farming system. Cereal crops such as teff, maize, barley and sorghum are the commonly cultivated crops in the study area. (Dega District Agriculture and Natural resource Office, 2019).

### 3.1.3 Climate

According to Dega District Agriculture and Natural resources Office report (2019), Dega District has three agro climatic zones (Highland (30%), Midland (65%) and Low land (5%)). The highland covers 13800.6hec Midland29901.3hec and Lowland 2300.1hec. The study area has small mountain, plain and valley land structure. Its altitude ranges from 1530 meter above sea level to 2475 meter above sea level. Around 60 % of the study area has above 1800 above sea level altitude the study area has experiences both cold and hot temperature. Its temperature ranges from 12<sup>0</sup>c at minimum to 27<sup>0</sup>c at maximum. The average annual temperature is 19.5<sup>0</sup>c. The major rainy season is between Aprils to the end of September with rainfall ranges from 900 mm in lowland of the study area to 1200mm in the Highland. The average annual rain fall is 1050 mm. Its climate condition is mainly affected by altitude and latitude. (Ethiopian Metrological Agency from Bedele station, 2019).

### **3.1.4. Land use system**

The land use pattern in the study area is similar to that of other areas of Buno Bedele Zone, whereby farmers divide their lands into several plots for different purposes such as for growing coffee and other cereals, grazing, and tree plantations. Homestead plots (a house with land and buildings around it, especially a farm) are used for growing the most important crops such as: maize, inset and vegetables. Distant farms (plot) are used for growing annual crops such as, teff, maize, sorghum, and beans (Dega District Agriculture and Natural resource office, 2019). About 35,389.5 hectares (76.59%) is potential for farming land. Out of this, 23,475 hectares (66.33%) are cultivated land. Other land uses pattern is forest land which covers 5206 hectares. Out of this natural forest cover is account 4948.75hek (13.98%), and plantation 357 ha (1%) Grazing land covers 1732.01 ha (3.75%) of its total area and 765 ha (2.16%) are covered by wetland. Of this, 655 ha. are potentially cultivated wetland and 85.62% ha. are cultivated and 110 ha (14.38%) uncultivated coffee 3,121ha (6.76 %), land covered by other perennial crop 11,452.17 ha (24.79%) of potential for perennial crop 14713.24 ha (Dega District Agriculture and Natural resource Office, 2019).

### **3.1.5 Soil type**

Soil colors vary from red and brown through grey to black. Textures range from clay to lime clay or sandy clay (Dega District Agriculture and Natural resources Office, 2019).

## **3.2 METHODS**

### **3.2.1 Study Design**

Cross-sectional study design was used to collect and document the wild edible plants in Dega District. After conducting preliminary survey, the study sites were identified; data collecting tools such as questionnaires, interview and observation check list were developed. Orientation on the need of this research was given for the selected participating informants

### **3.2.2 Preliminary Survey**

Prior to the actual research, a preliminary survey was conducted in the study area to gather information such as vegetation cover, habitat type and size of the study area. Such information was gathered by direct observation from concerned bodies in Dega community.

### **3.2.3 Sampling and techniques**

After preliminary survey, the study sites were selected based on the vegetation cover purposively from the village. There were three study sites selected. These three sites were Senaga Harawe, Senaga wuchale and Homi -Dabena. Most parts of Dega district land area is covered by crop plants and some parts of the area covered by natural vegetation. The main

criteria for the selection of site are the vegetation coverage of the area based on our observation during the preliminary survey.

### **3.2.4 Informant selection**

A purposive sampling method was employed to select representative sites from the *ganda* of the District and informants were selected simple random sampling methods. Simple random sampling is the simplest form of sampling and is the basis for many other sampling methods. Simple random sampling is most applicable for the initial survey in an investigation and for studies which involve sampling from a small area where the sample size is relatively small. When the investigator has some knowledge regarding the population sampled, other methods which are likely to be more efficient and convenient for organising the survey in the field, may be adopted. The irregular distribution of the sampling units in the forest area in simple random sampling may be of great disadvantage in forest areas where accessibility is poor and the costs of travel and locating the plots are considerably higher than the cost of enumerating the plot. In practice, a random sample is selected unit by unit. Two methods of random selection for simple random sampling without replacement are explained in this section. lottery method and selection based on random number tables :

**selection based on random number tables:** The procedure of selection using the lottery method, obviously becomes rather inconvenient when  $N$  is large. To overcome this difficulty, we may use a table of random numbers such as those published by Fisher and Yates (1963). For my study I was used selection based on random number tables of random numbers have been developed in such a way that the digits 0 to 9 appear independent of each other and approximately equal number of times in the table. The simplest way of selecting a random sample of required size consists in selecting a set of  $n$  random numbers one by one, from 1 to  $N$  in the random number table and, then, taking the units bearing those numbers. This procedure may involve a number of rejections since all the numbers more than  $N$  appearing in the table are not considered for selection. In such cases, the procedure is modified as follows. If  $N$  is a  $d$  digit number, we first determine the highest  $d$  digit multiple of  $N$ , say  $N'$ . Then a random number  $r$  is chosen from 1 to  $N'$  and the unit having the serial number equal to the remainder obtained on dividing  $r$  by  $N$ , is considered as selected. If remainder is zero, the last unit is selected. And also key informants were selected from each selected site in 'Ganda' following Martin (1995). Informant selection was based on the total population of the study sites from Dega District.

The informants (representatives of Households) were selected regardless of their age, education, religion and marital status. The selection of the informants was done randomly. The sample size was determined after getting the total number of households of the selected study villages' by applying the sample size determination formula (Daniel, 1999).

That was considered at 98% (0.98) of confidence with margin of errors 2% (0.02)

$$n = \frac{Nz^2pq}{d^2(N-1) + z^2pq}$$

Where;

n=sample size

N=total number of households from the study site (N=210)

q = 1-p = 1-0.98 = 0.02

d =margin of error =2% =0.02

z =degree of confidence at 98% (2.33), or Z value at 98% confidence from the table=2.33

p =prevalence 98% (0.98)      p+q= 1 then, q value=1-p which=1-0.98=0.02

$$n = \frac{Nz^2pq}{d^2(N-1) + z^2pq}$$

Where, N= 210

$$n = \frac{210 \times (2.33)^2 \times 0.98 \times 0.02}{(0.02)^2 \times (210-1) + (2.33)^2 \times 0.98 \times 0.02} = \frac{210 \times 5.43 \times 0.0196}{0.0004 \times 209 + 5.43 \times 0.0196}, n = \frac{210 \times 0.11}{0.0004 \times 209 + 0.11} = \frac{23.1}{0.194}$$

Then, n=119

### 3.2.5 Botanical Data collection

Following the selection of informant orientation was given for the respondents on how to fill the questionnaire. The questionnaire was administered by face-to-face communication with respondents. Ethnobotanical data were collected following Martin (1995), Maundu (1995) and Cunningham (2001).

Semi structured interview was applied to obtain information on useful plants. And group discussion was made with the informants at each ganda and site focusing on the status of the vegetation and acceptance of wild edible plants by the community. The data collection tools in this study were field observation, semi structured interview and focus group discussion.

**Field observation:** Field observation was conducted in the study site with the help of guidance and interviewed informants where most of the WEPs are found. The purpose of field observation was to collect all the relevant data including identification of wild edible plant species (vernacular name of the plant); parts used as food and habitat distribution of WEPs.

**Semi structured interview:** Semi structured interview contains some questions which were distributed to informants in English language and translated to Afan Oromo (the Official language of the region). The time and place for interview were selected based on the interest of the informants (Appendix 3).

**Focus group discussion:** A detail group discussion was conducted at each study site and the discussion was made with elders, agriculture office experts, youth and other peoples with 10 participants in each site. Priority was given to list WEPs found in the study area. The discussion containing 7 questions have been conducted prior to data collection to list WEPs in the study area and after data collection (specimen collection) to list the name of collected edible plants. At the end of the discussion the contribution of each informant was appreciated indicating the value of their knowledge in wise use of WEPs and biodiversity conservation by the researcher.

**Interview:** Interview was conducted individually or in group to collect data on varieties of WEPs found in the study areas, seasons of consumption and parts used as food, age of groups that use these foods and when these foods being consumed has been identified.

### **3.2.6 Specimen collection**

Full notes about the mode of collection, land forms, soil type, the nature of human activities and habit and habitat was recorded onsite. Based on ethnobotanical information provided by informants, collected sample specimens during guided field walk were numbered (coded, pressed and taken to Jimma University Herbarium for identification. As much as possible the fertile parts of the plants (flowers, fruits, seeds) were given due attention during the sample specimen collection for ease of identification. Botanical names were determined using taxonomic keys and descriptions given in the relevant volumes of the Flora of Ethiopia and Eritrea. The plant specimens with labels would finally be deposited at Jimma University Herbarium for later use.

### **3.3 Botanical Data Analysis**

The data collected through semi-structured interview was analyzed using percentages and descriptive statistics like frequency distribution. Microsoft Excel spread-sheet was employed for organizing the ethno botanical data. Preference ranking was performed to analyze most popular and preferred wild edible plants, at least in the context of the people who used them during food shortage in the study area. Peoples' preferences of wild edible plants would be undertaken with informants to determine their order of cultural importance across a



community. The scores were given to each species as the preference of the informants was added and ranked.

### **3.3.1 Preference Ranking**

Ten plant species had been listed and ranked by the key informants based on their personal preference or perception following the procedure (Martin, 1995 and Cotton, 1996). The most preferred plant was assigned with the highest number 10, while the least preferred plant was given the lowest number which was 1. Based on the information gained from 8 key informants preference ranking of ten most popular and widely used WEPs was computed for taste, and valued (1-10, 10=most preferred, 1=least preferred).

Furthermore seven threats of WEP species have been listed and ranked by the key informants based on their personal perception following the procedure explained by Martin (1995) ranging from seven to one. The most threaten factor for wild edible plant species was given the highest score, which is seven while the least threaten factor was given the lowest score, which is one (1).

### **3.3.2. Paired comparison**

Paired comparison was used to evaluate the degree of preferences or level of importance of certain selected plants following Martin (1995). After identifying five plant species which are used by a community, paired comparison had been carried out. The sequence of pairs was randomized by numbering the pairs from 1-5 in alphabetical order and the order within each pair was done by flipping a coin. The original order of the species was maintained for head, but the order was switch around for tails. Rank of species was given by adding numbers given by informants. Eight key informants and two agricultural officer total ten key informants were selected to carry out this activity. Informants asked to compare the given food plants based on their taste and allowed to give values for each pair according to their preference, the highest value (5) for the pair which they perceive best and the lowest value (1) for the pair which they assume is the list preferred. Middle level values for those pairs with intermediate preference. The scores given by the informants were summarized and ranked.

### **3.3.3 Direct Matrix Ranking**

Direct matrix ranking was carried out the method of Martin, (1995) and Cotton, (1996). Based on the information gathered from the informants and collected ethnobotanical data, eight most widely utilized multipurpose plant species were identified, scored and ranked by

key informants. The scoring and ranking of species were mainly to see the magnitude and degree of importance to the local communities.

### **3.3.4 Informant Consensus**

The researcher recorded the number of times a particular species mentioned by each informant. The informant consensus was helpful to see how frequently a particular species was mentioned by informants and was used in the analysis. It was also be used to confirm the authenticity of information by comparing it with other information given by other informants.

### **3.3.5 Data presentation**

The researcher selected a particular technique for application to the data analysis was being based on the effectiveness of the technique for sound interpretation of the result and identification of the inter relationships that may exist among the informants studied by simple statically analysis of informants' consensus.

### **3.3.6 Ethical Consideration**

Starting from the beginning to the end of data collection special ethical consideration of the informants was taken based on the cultural view of the local communities By respecting the informants' culture strictly I informed the objective of the research was not for commercial purpose or seeking income, but to inform them WEPs found around the study area have been used to benefit the community at present and future time they are sustained wisely.

## **RESULTS AND DISCUSSION**

### **4.1 Informants demographic features**

In this study area, a total of 119 individuals of which 88, male (74%) and the remaining 31 females (26%) were selected from three study sites for data collection. Ten key informants were identified and 14(12%) office personals were participated to provide information about wild edible plants of the study area. The respondent's occupation 14 of them (9 male and 5 females) are government employee and 105(88%), (79 male and 26 female) of them are farmers from the informants..Educational backgrounds of the respondents were categorized as illiterate 11(9 %), primary school (1-4)41(34%), primary second cycle (5-8) 28(24%), secondary school (9-12) 25(21%), diploma 8 (7%), degree or BSC and above 6 (5%).From the informants 58(49 %) of them are orthodox Christianity followers, 41 (34 %) of them are protestant, 13 (11%) of them are Muslim and 7(6%) of them are other.Of the total informants, 89% were married, whereas the remaining 11% of the informants were unmarried or single

**Table 2:** Age ranges, education level, Religion backgrounds and marital status of informants

Age groups	Sex			Total percentages (%)
	Male	Female	Total no.of informants	
18-35	14	6	20	17
36-44	23	8	31	26
45-56	32	11	43	36
57-62	15	6	21	18
63-70	4	-	4	3
Total	88	31	119	100
Education level	-	-	-	-
Illiterate	7	4	11	9
Primary school(1-4)	29	12	41	34
Primary school (5-8)	23	5	28	24
Secondary school(9-12)	20	5	25	21
Diploma	5	3	8	7
Degree /BSC and above	4	2	6	5
Total	88	31	119	100
Religion back ground	-	-	-	-
Orthodox	45	13	58	49
Protestant	31	10	41	34
Muslim	8	5	13	11
Others	4	3	7	6
Total	88	31	119	100
Marital status	-	-	-	-
Married	83	23	106	89
Single	5	8	13	11
Total	88	31	119	100

#### 4.1.1 Wild Edible Plants in the Study Area

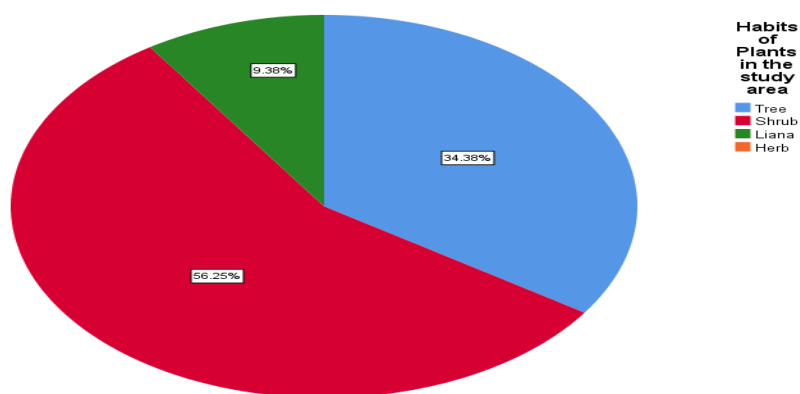
In this study area, a total of 32 WEPs species used by local people as a source of food and different purposes were recorded (Appendix, 1). These plants were categorized into 21 families and 24 genera. Family Achantaceae, Moraceae, Myrsinaceae and Capparaceae contributed about 9.4% of the species, Family Myrtaceae, Rubiaceae, Appocynaceae, contributed 6.25% and the family of , Vitaceae, Boraginaceae, Verbenaceae, Areaceae, Vernoniaceae, Euphorbiaceae, Cypparaceae, Cyathaceae, Flacourtaceae, Sapotaceae, Dioscoreae and Roceaceae contributed 3.12% of WEPs species.

**Table 3:** List of Wilde edible plant families, their number of species and percentage

No.	Family Name	Number of species	Percent (%)
1	Acanthaceae	3	9.4
2	Capparaceae	3	9.4
3	Myrsinaceae	3	9.4
4	Moraceae	3	9.4
5	Rubiaceae	2	6.3
6	Appocynaceae	2	6.3
7	Myrtaceae	2	6.3
8	Cypparaceae	1	3.1
9	Cyathaceae	1	3.1
10	Dioscoreaceae	1	3.1
11	Euphorbiaceae	1	3.1
12	Flacourtaceae	1	3.1
13	Roceaceae	1	3.1
14	Boraginaceae	1	3.1
15	Polygonaceae	1	3.1
16	Areaceae	1	3.1
17	Sapotaceae	1	3.1
18	Tiliaceae	1	3.1
19	Verbenaceae	1	3.1
20	Vernoniaceae	1	3.1
21	Vitaceae	1	3.1
	Total	32	100.0

#### 4.1.2 Habits of wild edible plants

Regarding the habit diversity of 32 species, 11(34.4%) were trees, 16(50%) were shrubs and 3(9.4%) were liana and 2(6.25%) were herbs,



**Figure 2:** Habits of Plants in the study area

#### 4.1.3 Plant parts used as food and condition of preparation

In this study different parts of the plants were reported to be used as foods. Fruits were the most commonly used part in the community which accounted for 59.4% (19 species). Barks of plants used as gum accounted for 6.3% (2 species) and other accounted for fruit and nectar 6.3% (2 species), nectar 9.4% (3 species), shoot and root 3.1% (1), shoot 6.3% (2 species) stem and leaf 9.4% (3 species). Regarding their mode of consumption, most of the plants are taken fresh as raw, which accounted for 78.1% (25 species).

**Table 4:** Parts of Wild Edible Plants Used as Food

Plant parts used	Number of parts used as food	Percentage %	Mode of consumption
Fruit	19	59.4	Raw or by grinding
Stem and leaf	3	9.4	Pilled or raw
Fruit and nectar	2	6.3	Sucking raw
Bark and gum	2	6.3	Chewing
Shoot	2	6.3	Grinding
Nectar	3	9.4	Sucking
Shoot and Root	1	3.1	Cutting raw
Total	32	100.0	

#### 4.1.4 Preference Ranking of Wild Edible plants

The result obtained from the preference ranking analysis shows that *Syzygium guineense subsp. macrocarp* was the best preferred wild edible plant by the community followed by *Syzygium guineense subsp. afrofromontanum* and the least preferred wild edible plant species from the list was found to be *Ficus vasta* was ranked last (Table 5). Preference Ranking indicate or show which plant is the best preferred and which plant species is the least preferred. It indicated by giving the number from (1-10), ten most popular and widely used WEPs was computed for taste, and valued (1-10), (10=most preferred), (1=least preferred).

**Table 5:** Food plant's rank based on preference ranking analysis

Name of species	Respondents (R <sub>1</sub> .R <sub>8</sub> )								Total	Rank
	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>	R <sub>7</sub>	R <sub>8</sub>		
<i>Syzygium guineense subsp. macrocarp</i>	10	7	9	8	9	8	10	8	69	1 <sup>st</sup>
<i>Syzygium guineense subsp. afrofromontanum</i>	8	10	7	1	6	7	9	10	58	2 <sup>nd</sup>
<i>Rubus steudneri</i>	9	8	8	7	7	5	7	1	55	3 <sup>rd</sup>
<i>Ritchiea albersii</i>	6	9	3	9	8	1	5	6	50	4 <sup>th</sup>
<i>Vangueria apiculata</i>	7	3	5	10	4	6	2	7	44	5 <sup>th</sup>
<i>Cardia africana</i>	3	5	1	2	10	4	8	9	40	6 <sup>th</sup>
<i>Ficus sur</i>	5	4	10	6	2	3	3	3	36	7 <sup>th</sup>
<i>Dioscorea bulbifera</i>	4	2	4	3	5	10	1	4	33	8 <sup>th</sup>
<i>Maesalancelata</i>	2	6	6	5	3	2	6	5	32	9 <sup>st</sup>
<i>Ficus Vasta</i>	1	1	2	4	1	9	4	2	24	10 <sup>th</sup>

R-represents respondents

#### 4.1.5 Paired comparison for level of importance of wild edible plants

A paired comparison was made among the most five top WEPs that were identified by the informants to be used as food obtained using ten informants to know their rank. This result indicates that *Syzygium guineense subsp. afrofromontanum*, *Syzygium guineense subsp. macrocarp*, *Cordia africana*, *Rubus steudneri* and *Dioscorea bulbifera* is selected by only 10 informants and ranked the last ( Table 6).

**Table 6:** Results of Paired Comparison on five wild edible plants based on their taste

Plant species	Respondents from (R <sub>1</sub> -R <sub>10</sub> )										Total	Rank
	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>	R <sub>7</sub>	R <sub>8</sub>	R <sub>9</sub>	R <sub>10</sub>		
<i>Syzigium guineense subsp. afromontanum, Cordia africana</i>	4	4	4	5	1	5	5	4	3	5	40	2 <sup>nd</sup>
<i>Cordia africana, Syzigium guineense subsp. macrocarp.</i>	5	2	2	3	4	3	3	5	5	4	36	3 <sup>rd</sup>
<i>Dioscorea bulbifera, Rubus steudneri</i>	3	3	1	4	3	1	4	3	4	3	29	4 <sup>th</sup>
<i>Rubus steudneri, Dioscorea bulbifera</i>	1	5	3	2	5	2	1	2	1	2	24	7 <sup>th</sup>
<i>Reteshia albersii, Cordia africana</i>	2	1	5	1	2	4	2	1	4	1	23	8 <sup>th</sup>
<i>Dioscorea bulbifera, Cordia africana</i>	2	1	5	1	2	4	2	1	3	1	22	9 <sup>th</sup>
<i>Reteshia albersii, Rubus steudneri</i>	1	4	5	4	1	2	1	3	4	1	26	6 <sup>th</sup>
<i>Syzigium guineense subsp. macrocarp, Dioscorea bulbifera</i>	2	3	4	2	2	5	3	1	1	5	28	5 <sup>th</sup>
<i>Syzygium guineense, subsp. afromontanum, Syzigium guineense. subsp. macrocarp</i>	3	4	5	3	5	4	5	4	5	4	42	1 <sup>st</sup>
<i>Rubus steudneri, Reteshia albersii</i>	4	1	2	1	4	3	2	1	2	3	21	10 <sup>th</sup>

R-represents respondent

#### 4.1.6 Direct matrix ranking of multipurpose wild edible plants

People in the study area largely depend on forest for various purposes such as food, construction, income value, Medicine, forage, fire wood and other. To assess the relative importance and to check the popularity of these multifunctional plants, direct matrix Ranking was employed. During the study wild edible plants were found to be multi-purpose in addition to food values. In the ranking six commonly reported multifunctional plant species and six use of those multi-functional food plants to the local people and indicated their scores



for each food plants with each other (use values from 1-6, (6= highest value,1=least value). Finally, the function of the plants by each category summed up, evaluated and ranking takes place.

Table 7: Result of direct matrix on six multipurpose food plants

Plant species name	Use categories of plants						Total	Rank
	Food	Medicine	Market income	Construction	Forage	Fire wood		
<i>Cordia africana</i>	4	5	6	6	5	5	31	1 <sup>st</sup>
<i>Syzygium guineense subsp. afromontanum</i>	6	2	3	5	5	6	27	2 <sup>nd</sup>
<i>Ficus sur</i>	5	1	1	2	2	4	15	3 <sup>rd</sup>
<i>Reteshia albersii</i>	3	5	2	2	1	1	14	4 <sup>th</sup>
<i>Acanthus eminence</i>	2	4	1	1	2	2	12	5 <sup>th</sup>
<i>Ficus Vasta</i>	1	2	4	1	1	2	11	6 <sup>th</sup>
Total	21	19	18	17	16	20		
Rank	1 <sup>st</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	2 <sup>nd</sup>		

#### 4.1.7 Informant Consensus for well known wild edible plants

Wild edible which are popular due to the wide range of food resources that are well known by the local people being first cited. The outcome this study showed that some wild edible plants are popular and highest informant consensus goes to *Syzygium guineense subsp. afromontanum* which was cited by 75 informants while *Cordia africana* was cited by 63 informants and *Syzygium subsp. macrocarp* was cited 58 informants and the others

Table 8: The top seven selected Wild edible plants according to informant's consensus

Scientific name of the plant	Total No. of citation	Percent (%)	Rank
<i>Syzygium guineense subsp. afromontanum</i>	75	63	1
<i>Cordia africana</i>	63	53	2
<i>Syzygium guineense subsp. macrocarp.</i>	58	49	3
<i>Ficus sur</i>	55	46	4
<i>Rubus steudneri</i>	53	45	5
<i>Ritchiea albersii</i>	48	40.3	6
<i>Dioscorea bulbifera</i>	47	39.5	7

#### **4.1.8 Uses of wild edible plants in the study Area**

The local people of the study area have wide range of indigenous knowledge on plant use. These knowledge arrays include the use of plants as medicine, food and other various livelihood services. Wild edible plants in the study area were found to have multi-purpose values in various ways such as medicine, construction, forage, firewood and other uses of plant.

#### **4.1.9 Contribution in food security**

The majority of food plant species are found in agricultural fields, forests, riversides and home garden according to informants. Many of the recorded wild edible plants of the study area are used as supplementary food sources and for food during food scarcity periods and hence play role in combating food insecurity. As the result from the respondents obtained shows, around 81% of the WEPs were used as supplementary food while the remaining 19% were used as food regularly.

#### **4.2 Income value**

WEPs have additional uses on the consumption value as food. The identified wild edible plants are marketable, and provide an opportunity to supplement household incomes in the study area and during the study three major markets of the District were observed. These were Harawe, Senaga and Dega market about 2(6.25%) of the total species collected from the study area.

##### **4.2.1 Gender Utilization practices and management of WEPs**

The house hold members participate in collecting, preparing for home consumption, managing and selling WEPs to maximize house hold income. However, there are still prevailing attitudes in the community that more responsibility according to informants were given to women(45%) and children (55%). All WEPs reported have been edible by inhabitants in the area. In normal circumstances they were eaten by children. These groups of the communities they can tell full information about wild edible plants found in the study area, most of the time women participate on the preparation of the collected plants for home consumption.

##### **4.2.2 Seasonal Availability of WEPs in the study area**

According to the informant's knowledge the availability of wild edibles varies in seasons. These plants foods are mostly abundant in winter (from December, January and February) 21 species (65.62%), from September, October and November 2species (6.25%), .March to

April 5 species (15.62%) and summer from June, July and August 2 species (6.25%) are used depending seasonally.

#### 4.2.3 Use diversity of WEPs

Among the 32 documented wild edible plant species in the study area 24 plant species (75%) were reported to have multipurpose roles, while 5 plant species (15%) have only medicinal value and 3 plant species (10%) of them are only for food value in the area (Table 9). This finding shows that the local people harvest wild edible plants of the area mostly for construction, fire wood, production of house furniture and for other purpose. The utilization of these plants for construction, fire wood and house furniture or equipment has the inter relationship with the daily life activities of the community.

**Table 9:** Use diversity of Wild Edible Plants

Uses of wild edible plants	Number of species	Percentage (%)
Food and construction	5	15.6
Medicinal value	5	15.6
Food and fire wood	5	15.6
Food and house furniture	4	12.5
Only Food value	6	19
Medicinal value and food	3	6.25
More than two functions	4	12.5
Total	32	100.0

#### 4.2.4 Medicinal values of wild edible plants

From the total wild edible plants recorded in the study area, 3(6.25%) species serve the local community both as sources of food and as traditional medicine. These Neutraceutical plants are used to treat 3 different human diseases.

**Table 10:** List of wild edible plants with medicinal values

Scientific name	Local name (Afan Oromo)	Parts of plants help to treats	Disease treated
<i>Cordia africana</i>	Waddeessa	Leaf by burning	Spider disease
<i>Dioscorea bulbifera</i>	Kottee harree	Fruits	Kidney
<i>Acanthus eminence</i>	Kosorruu	Leaf part	Spider disease

#### 4.2.5 Threats of Wild Edible Plants

In the study area rural people need plants in their livelihood for different aspects. However, from the interview with the informants various factors were recorded as the main threats to WEPs in Dega District. Accordingly, this survey reveals many threats facing wild edible plants. To understand local communities' perception on the factors more treating WEPs 7 factors through individual and group discussion, key informants giving priority ranking. The

most serious threats to WEPs in the study area were agricultural land expansion, fire destruction by man made, fragmentation and destruction of their habitats, firewood collection, charcoal production, plant use for house and fence construction, urbanization and habitat loss and fragmentation.

As a result, the accessibility of wild food plants becomes less when compared with the past decade. During the group discussion and key informants identified 7 factors. About 85% to be farm land expansion followed fire destruction by man made for the purpose of agriculture land expansion ,Construction materials and house furniture materials,fuel wood collection, over grazing, Urbanization respectively and habitat loss and fragmentation. Threats to wild edible plants Ranked by 8 key informants based on respondent’s preference or perception. The residual effect of the reduced attention given to wild edible plants means that they are over-harvested for fuel wood, construction material, medicine and other minor uses and this could lead to species rarity and habitat modification. Their degree of destructiveness (1= least destructive and 7= most destructive

**Table11.** Threats to wild edible plants Ranked by 8 key informants

Treating factors	Resp onde nts								Total	Rank
	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>	R <sub>7</sub>	R <sub>8</sub>		
Expansion of farm land	7	7	5	6	6	7	4	7	49	1 <sup>st</sup>
Destruction of fire by man made	3	6	1	7	7	6	6	4	40	2 <sup>nd</sup>
Constructionand housefurniture	5	4	7	1	5	5	7	3	37	3 <sup>th</sup>
Fuel wood collection	6	3	4	5	3	1	2	6	32	4 <sup>rd</sup>
Over grazing	2	5	3	3	4	2	5	2	26	5 <sup>th</sup>
Urbanization	1	2	6	2	1	3	3	5	23	6 <sup>th</sup>
Habitat loss and fragmentation	4	1	2	4	2	4	1	1	20	7 <sup>th</sup>

R-Respondents



**Figure 4:** Expansion of farm land in the study area which observed during data collection.

#### **4.2.6 Conservation and management of WEPs in the study area**

In the study area, most of the food plants were collected from farm lands, riverside, near mountain and around homes and forest. Most of the wild food plants have less conservation or protection. A local community in the study area has numerous indigenous management strategies to conserve plants around their environment. Due to their diverse uses wild edible plants are left to widely grow in farm lands, around farm boundaries and water side areas. Others frequently appeared around home garden as live fence, shade and along road sides. Cutting of valuable shrubs and trees are forbidden by the norms of the community. Although when they cut the branches of the trees in their farmland, they deprive the tip of that tree for continuation of that plant. Based on personal observation and communication with the people I revealed that children and livestock herders bring the seeds after consuming the fruits back to homes and cultivate them around homesteads and fence the seedlings saved from livestock foraging. This shows conservation and domestication of wild edible plants.



**Figure 5:** Group discussion with key informants in Dega Districts

#### **4.2.7 DISCUSSION**

In this study area, three study sites were purposively identified and 119 respondents were randomly selected for data collection. Ten key informants were identified from these three study areas. Total of 32 wild edible plant species belonging to 24 genera and 21 families identified by informants were collected and documented. The most frequently used parts of the wild edible plants reported in this study area were fruits. The dominance of fruits as edible parts has also been reported in several studies undertaken in different parts of Ethiopia (Zemedu Asfaw & Mesfin Tadesse, 2005; Getachew Addis *et al.*, 2005; Kebu Balemie & Fassil Kebebew, 2006; Tilahun Teklehaymanot and Mirutse Giday, 2010). This is due to the availability of these parts (59.4%) and best taste.

The mode of usage of WEPs was mostly fresh and raw. This result is also in agreement with the findings of previous studies conducted in Dabo Hana District, Bono Bedele zone, Oromia Region, Southern Ethiopia (Getachew Emiru, 2021). Most of the wild edible trees and shrubs that require no further processing are consumed as emergency food, at a time of chronic food shortage. *Syzygium guineense subsp. macrocarp*, ranked first in the preference ranking analyses. This could be due to its abundance in the study area. The species occurs widely in the district (Dega and Woina Dega). On the other hand, the result of pair-wise comparison indicated the preference of *Syzygium guineense subsp. macrocarp* and *Syzygium guineense subsp. afro-montanum* as the best wild edible plants. The most probable explanation

for this result might be the availability of the fruits in local markets. Fruits of the two species are the most frequently sold wild edible plant parts in the area according to informants. Thus, in addition to the nature distribution, humans also aid the supply of the fruits even to those who are farther from the natural habitats of the plants. In addition to provision of food the wild edible plants were found to be multifunctional in the area.

The species with the highest diverse use was found to be *Syzygium guineense sub sp .afromontanum* followed by *Cordia africana*. This shows that there is high pressure on this species. Since life cycle of the species is too long according to informant explanation, the population might be highly affected in the near future causing local extinction. Usage of the plants as fuel wood source is the most frequent mention from the informants. The local community uses different parts the trees for fire wood and charcoal production. This use of the plants is not only at household level but also as source of income. This is a major challenge to WEPs in many parts of the country as it is reported in other studies (Guinand & Dechassa Lemessa, 2000; Tigist Wondimu *et al.*, 2006).

The low availability of WEP in the local market indicated the little awareness of the people about this use category. Knowledge gap about the nutritional importance of WEP by the local community and the whole population by large might also be another reason for the situation. A study conducted in Tanzania (Ruffo *et al.*, 2002) and other parts of Ethiopia (Getachew Addis *et al.*, 2005) also revealed that the sale of wild food plants supplements low farm returns and contributes additional income to .Shrubs were the most harvested forms as source of food they were relatively common in the study area compared to edible tree & herb species. This could be associated with the abundance and year-round availability of shrub species in the area.

This shows that shrubs were the most harvested forms for food followed by trees and herbs`. According to informants' males knew more WEPs than female implying males are more familiar with WEPs, because of their day-to-day activities, mainly carried out in the field. The knowledge difference between male and female informants was some existent different. According to different researchers' young males of Ethiopian rural area have been reported to consume more wild edible fruits (Zemedede Asfaw and Mesfin Tadesse, 2001). Gender category in eating WEPs was not common but, males show slit difference because of opportunities to visit fields. Currently, there was an observed trend by households to maximize the management and utilization of WEPs both directly as human and livestock food, income generation and environmental services in some extend practiced. The researcher obtained much of the knowledge of WEPs in the study area from informants of younger ages (18-35),

when compared with the elder. This is because of the younger ones currently more contact WEPs as food than elders according to informants. According to informants the majority of food plant species were obtained from wild followed by agricultural field, forests, farm lands, riversides and home garden. The fact that high number of food plant species was obtained from wilds suggests that wilds are a good option to conserve food plants in the study area.



## CONCLUSION AND RECOMMENDATION

### 5.1. Conclusion

In this study area a total of 32 species of WEPs was collected and documented in Dega district Buno Bedele Zone Oromia Region, South western Ethiopia. Most of them were found and distributed around farm lands, home gardens, forest, mountains, and riversides. Informants stated that unfortunately the distribution indicated that it decreases from time to time. Informants listed that the most threatening factor of these WEPs were agricultural expansion, Destruction of forest by man made respectively. As older informants aged (63 and above) or (4 people) told us previously there were many more WEPs that now most of them have been passed away unless strong measurement takes place no one talk about WEPs tomorrow. In the study district the rural population was found to depend on their traditional knowledge for the utilization of plants in their surroundings. Despite the wider role of WEPs in rural communities, their contribution, management and utilization were not exhaustively documented. Because, in these area gives little consideration about ethnobotanical challenged of WEPs and their role to food security. According to the information attempted to conduct the use of WEPs in the study areas, they have great contribution during shortage of food in drought season and as survival of food source from these the researcher concluded that how many of them plays a role for food security. The use of eating WEPs products in the district still ongoing processes especially children consumed them based on the seasonal availability. Wild edible plants identified in the study area were available year-round at different seasons. The fruiting of WEPs during all season especially at dry season has indicated the resistance nature of these plants to water stress environments means they are important during the drought seasons. Most of WEPs are adapted in Woina Dega than Dega climatic conditions because most WEPs are available in Woina Dega conditions. Findings in the study sites indicate that most preferred multipurpose WEPs have got the probability to be disappeared in a short period of time so, it is better to study the way of protection.

## 5.2 Recommendation

Depending on the research findings of the study the following recommendations are:

- In the study area WEPs were used unwisely because of absence of knowing the consequence, so agricultural officers must deal with about it.
- Most WEPs undergo being disappeared unless measurement has been taken by the government and agricultural officers.
- The local people need supports through awareness raising education on the sustainable utilization and management of WEPs resources agricultural officers and ministry of education must be encourage the people to cultivate WEPs in their home gardens, farmlands, in the mountain side and at the edge of rivers may help to protect them by professional.
- Ethnobotanists must be coordinated with the government officers to practice the local peoples how to manage and conserve WEPs resources those needs to be maintained.
- Dega District needs farther assessment to identify the types of WEPs, distribution and documentation to assure the role of them for food security and sustainability by Ethnobotanists.
- Ethnobotanists must give the information for ministry of education to include the conservations strategies of Wild edible plants in the curriculum.
- Awareness should be generating among the local communities to keep the wild edible plants in the study area and safe guarding the natural resources.

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**Appendix I:**List of Habitats and Habits of Wild Edible Plants in the study area

NO.	Scientific name	Family	Local name (AfanOromo)	Habit	Habitat
1	<i>Acanthus eminence</i>	Acanthaceae	Kosorruu	Shrub	Road side
2	<i>Justicia schimperiana</i>	Acanthaceae	Dhummuugaa	Shrub	Road side
3	<i>Hgrophliaauriculata</i>	Acanthaceae	Mata bokkee	Herb	Fresh area
4	<i>Ficus sur</i>	Moraceae	Harbuu	Tree	River side
5	<i>Ficus Vasta</i>	Moraceae	Qilxuu	Tree	Forest
6	<i>Ficus Sycomorus.</i>	Moraceae	Odaa	Tree	Forest
7	<i>Rhamnus prinoides</i>	Myrsinaceae	Geeshoo	Shrub	Home garden / forest
8	<i>Maesalancelata</i>	Myrsinaceae	Abbayyii	Shrub	Near forest
9	<i>Embelea schimperi</i>	Myrsinaceae	Haanquu	Shrub	Forest
10	<i>Ritchiea albersii</i>	Capparaceae	Xuuphanoo	Tree	Forest
11	<i>Capparis facicularis</i>	Capparaceae	Qa'isa	Tree	Near forest
12	<i>Capparis tomentosa.</i>	Capparaceae	Arangamaa	Shrub	Forest
13	<i>Landolphia buchimanii</i>	Appocynaceae	Geebboo	Liana	Forest
14	<i>Carissa spairanum</i>	Appocynaceae	Agamsa	Shrub	Near to

					forest
15	<i>Syzygium guineense subsp. macrocarp</i>	Myrtaceae	Goosuu	Tree	Forest
16	<i>Syzygium guineense subsp. Afromontanum</i>	Myrtaceae	Baddeessaa	Tree	Forest
17	<i>Rytigynia neglecta</i>	Rubiaceae	Mixoo	Shrub	Near to forest
18	<i>Vangueria apiculata</i>	Rubiaceae	Buruurii	Shrub	River side
19	<i>Mimusops kumel</i>	Sapotaceae	Qolaatii	Tree	Forest
20	<i>Senna petersiana</i>	Cyathaceae	Raamsoo	shrub	Road side
21	<i>Croton mocrrostachyus</i>	Euphorbiaceae	Bakkanniisa	Tree	Forest
22	<i>Grewia ferruginea</i>	Tiliaceae	Dhoqonuu	Shrub	Near forest
23	<i>Lantana camara</i>	Verbenaceae	Midhaan durbaa	Shrub	Road side



23	<i>Oncoba spinosa</i>	Flacourtaceae	Akuukkuu	Tree	Road side
24	<i>Phenix recinata</i>	Areaceae	Meexxii	Shrub	Forest
25	<i>Senna petersiana</i>	Cyathaceae	Raamsoo	Shrub	River side
26	<i>Rumex nervosus</i>	Polygonaceae	Dhangaggoo	Shrub	Forest
27	<i>Cissus rotundifolia</i>	Vitaceae	Burii	Liana	Forest
28	<i>Cordia africana</i>	Boraginaceae	Waddeessa	Tree	Forest
29	<i>Cyperus status</i>	Cyperaceae	Qunnii	Herb	Road side
32	<i>Vernoniarupeli</i>	Vernoniaceae	Reejjii	Shrub	Near farm land

**Appendix II:** Families of wild edible plant species and parts used in the study area with their Mode of consumption and parts used for food.

No.	Family	Scientific name	Local Name (Afan Oromo)	Part used	Mode of consumption
1	Acanthaceae	<i>Acanthus eminence</i>	Kosorruu	Nectar	Raw
		<i>Hygrophila auriculata</i>	Mata bokkee	Nectar	Raw
		<i>Justicia schimperiana</i>	Dhummuugaa	Nectar	Raw
2	Capparaceae	<i>Capparis facicularis</i>	Qa'isa	Bark	Cooked
		<i>Capparis tomentosa</i>	Arangamaa	Fruit	Raw
		<i>Ritchiea albersii.</i>	Xuuphanoo	Fruit	Raw
3	Moraceae	<i>Ficus sycomorus</i>	Odaa	Fruit	Raw
		<i>Ficus sur</i>	Harbuu	Fruit	Raw
		<i>Ficus vasta</i>	Qilxuu	Fruit	Raw
4	Myrsinaceae	<i>Maesalancelata</i>	Abbayyii	Fruit	Raw
		<i>Rhamnus prinoides</i>	Geeshoo	Leaf and stem	Piled
		<i>Embeliaschimperi</i>	Haanquu	Fruit	Raw
5	Myrtaceae	<i>Syzygiumguineensesubsp. afromontanum</i>	Baddeessaa	Fruit	Raw
		<i>Syzygiumguineensesubsp. Macrocarp</i>	Goosuu	Fruit	Raw
6	Rubiaceae	<i>Rytigynia neglecta</i>	Mixoo	Fruit	Raw
		<i>Vangueria apiculata</i>	Buruurii	Fruit	Raw
7	Appocynaceae	<i>Landolphia buchimanii</i>	Geebboo	Fruit	Raw
		<i>Carissa spairanum</i>	Agamsa	Fruit	Raw
8	Verbenaceae	<i>Lantana camara</i>	Midhaan durbaa	Fruit	Raw
9	Sapotaceae	<i>Mimusops kumel</i>	Qolaatii	Fruit	Raw
10	Flacourtaceae	<i>Oncoba spinosa</i>	Akuukkuu	Fruit	Raw
11	Areaceae	<i>Phoenix reclinata</i>	Meexxii	Fruit	Raw
12	Polygonaceae	<i>Rumex nervosus</i>	Dhangaggoo	young root	Raw

13	Boraginaceae	<i>Cordia africana</i>	Waddeessa	Fruit	Raw
14	Tiliaceae	<i>Grewia ferruginea</i>	Dhoqonuu	Fruit	Raw
15	Cyathaceae	<i>Senna petersiana</i>	Raamsoo	Fruit	Raw
16	Roceaceae	<i>Rubus steudneri</i>	Goraa	Fruit	Raw
17	Euphorbiaceae	<i>Croton Marcrostachyus</i>	Bakkanniisa	Apical meristem	Raw
18	Cyperaceae	<i>Cyperus usitatus</i>	Qunnii	Bulb	Cooked
19	Dioscoreaceae	<i>Dioscorea bulbifera</i>	Kottee harree	Tuber and fruit	Cooked
20	Vitaceae	<i>Cissus rotundifolia</i>	Burii	Root	Raw
21	Vernoniaceae	<i>Vernoniarupeli</i>	Reejjii	Leaf and fluid	Raw

## Appendix III



### JIMMA UNIVERSITY

#### COLLEGE OF NATURAL SCIENCES DEPARTMENT OF BIOLOGY (MSc) PROGRAM IN BOTANICAL SCIENCES

#### Dear Respondents,

This is a questionnaire prepared for currently conducting a research on the title: Ethnobotanical Study of Wild Edible Plants in Dega District. The objective of this questionnaire is to gather relevant information in order to identify the major wild edible plants in Dega district. Moreover, it will have a great impact on the efficiency and effectiveness of achieving our goals. Any information obtained will be kept strictly confidential. You are selected as a respondent in this survey just due to chance and have nothing to do with your personal identity. I kindly request you to spare some of your precious time for filling this questionnaire. In line with this, I confirm that all data will be used for academic purpose and will be analysed anonymously and you are not exposed to any harm because of the information you give.

General Instruction for respondents

Please don't write your name.

Put a tick (✓ or X) mark against your choice for items with alternative;

Please write your answer briefly for open ended questions

**Part I: General Information of Respondents**

Date\_\_\_\_\_Kebele\_\_\_\_\_District\_\_\_\_\_Zone\_\_\_\_\_Region\_\_\_\_\_

—

1. Sex: Male:  Female

2. Age: 20-35  36-46  47-57  58-68  above 68

3. Marital status: single:  Married  Divorced  Windowed

4. Educational status: certificate  Diploma  Degree  masters (MSc)

5. Religion: orthodox  protestant  Muslim  other

**Part II Questioners' for Ethno botanical wild edible plant data collection in Dega district For Kebele and District Agriculture experts.**

1. Do you know any wild food plants? Yes  No  If yes (answer question 2).

2. List the wild edible plants in your area.

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3. What are the most common habitats of a given wild food plants?

herbsshrub  tree  liana

4. Which part(s) of the wild edible plant(s) is/are used? Fruit leaf bark flower

seed  nectar  latex  sap  rhizome  root

5. In which seasons of a year these plants cultivated? (Throughout the year   
summer  winter  autumn  spring

6. How is the mode of consumption of wild foods? Raw (fresh)  cooked  piling  specify  
others

7. If prepared, how the wild edible plants are processing during food  
preparation? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. Are there community members who depend on traditional wild edible plants as compared  
to cultivated crops?

Why? \_\_\_\_\_  
\_\_\_\_\_

9. Are wild edible plants easily accessible in the study  
area? \_\_\_\_\_  
\_\_\_\_\_

10. Are there any division of wild food plants like famine foods  no famine foods

11. What are the other uses of these wild edible  
plants? \_\_\_\_\_  
\_\_\_\_\_

12. Is there any interference between modernization and traditional wild food plants use in the area? \_\_\_\_\_

13. What are the threats to wild food plants in the area? List them \_\_\_\_\_

14. Are there traditional wild food plant conservation methods in the area? If so, mention the Management practices. \_\_\_\_\_

15. List the possible conservation methods. \_\_\_\_\_

16. What will be the future conservation methods for local peoples and other populations? \_\_\_\_\_

## **PART IV PERSONAL INFORMATION FOR DEGA LOCAL COMMUNITY**

Kebele\_\_\_\_\_District\_\_\_\_\_Zone\_\_\_\_\_Region\_\_\_\_\_

1. Age: 10-20  21-30  31-40  41-50  51-60  61-70  71-80 & above

2. Sex: Male  Female

3. Academic status: illiterate  grade1-4  grade5-8  secondary school 9-12  diploma,  degree & above

### **Part IV. Questions for focus group discussion**

1. List the name of wild edible plants in your area
2. List wild food shrubs and trees found in the study area?
3. Where are the most common habitats for wild food plants?
4. List the plant species and the parts used as food?
5. Times and community group use wild edible plants more frequently?
6. Habit of the plant (shrubs or trees).
7. List threats of wild edible plants and conservation methods, if any?



**Kutaa IV. Gaaffilee Afaan Oromootiin ykn afaan dhalootaatiin marii garee tiif dhiyaate.**

1. Maqaa biqiloota daggalaa nyaataaf oolan tarreessaa?
2. Maqaa biqiloota bosonaa nyaataaf oolani, muka, muka gadi kan ta'an(shrub) fi aramaa(herb) jechuun adda baasaa maqaa dhahaa?
3. Bakki argama ykn jireenya isaanii hoo?
4. Biqiloota nyaataman kana kutaawwan nyaataaf oolan adda baasaa, baala, ija, qolaa, kichuu fi hundee jechuun gareen ramadaa?
5. Yeroo nyaatamuu fi eenyuu akka nyaatu adda baasaa?
6. Biqiloota kana irratti maal maaltu dhiibbaa fidaa?
7. Akkaataa kunuunsa biqiloota kana tarreessaa? Yookaan tooftaalee kunuunsa biqiloota kanaa ibsaa?

.

**Part-III; Questions for selected local people about wild edible plants**

1. Are there wild edible plants you know in this District? a. Yes  b. No

2. Which wild edible plants habit is more used in this area?

Trees  shrubs  herbs  lianas

3. For what purpose could local people use wild edible plants?

a. For food only  b. For food and other purposes

4. Do wild edible plants have other purposes in addition to food value? a. Yes  b. No

5. If you answer No. 4 is yes, what are other purposes of these plants? List them on the space below \_\_\_\_\_

\_\_\_\_\_

6. Which part of wild edible plants is more used for food value?

Stem  leaf  fruit  root  seeds

7. Are there wild plants used for food sold in the local markets in this area? a. Yes  b. No

8. If your answer on question No. 7 is Yes, list them on space given;

\_\_\_\_\_  
\_\_\_\_\_

9. How do People of this area perceive the uses of wild edible plants?

- a. less     b. moderate     c. Good     d. Good

10. Which groups of the community commonly collect and use wild edibles?

- a. Children     b. adult     c. older (men/women)

11. Do the local people care for wild edible plants during collecting them from the field?

- a. Yes     b. No

12. In this area by what methods wild edible plants consumed?

- a. By eating     b. drinking     c. sucking nectar     d. other

13. Are there threats to wild food plants? a. Yes     b. No

14. If your answer on question No.13 is Yes, list these threats on the given space;

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15. Do you try to conserve wild edible food plants in your area? a. Yes     b. No

16. If your answer on question No.15 is yes, by what methods do you conserve wild edible plants?    List    them    \_\_\_\_\_

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17. What are the major possible solutions for the problems of extinction of wild edible plants? List them

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In your opinion, what are the future implications of the current situations to wild plants?

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**Appendix IV:** Paired Comparison with 10 Informants for five plants on their taste

**R<sub>1</sub>**-Results of Respondents in paired comparison

No	Plant species	<i>Rubus steudneri</i>	<i>Cordia africana</i>	<i>Dioscorea bulbifera</i>	<i>Syzygium guineense</i> subsp. <i>afromontanum</i>	<i>Syzygium guineense</i> subsp. <i>macrocarp</i>
1	<i>Rubus steudneri</i>	-	<i>Cordia africana</i>	<i>Dioscorea bulbifera</i>	-	<i>Rubus steudneri</i>
2	<i>Cordia africana</i>	<i>Cordia africana.</i>	-	<i>Cordia africana</i>	-	<i>Syzygium guineense</i> subsp. <i>macrocarp</i>
3	<i>Dioscorea bulbifera</i>	<i>Dioscorea bulbifera</i>	<i>Syzygium guineense</i> subsp. <i>afromontanum</i>	-	<i>Dioscorea bulbifera</i>	<i>Syzygium guineense</i> subsp. <i>macrocarp</i>
4	<i>Syzygium guineense</i> subsp. <i>afromontanum</i>	<i>Syzygium guineense</i> subsp. <i>afromontanum</i>	-	<i>Syzygium guineense</i>	-	<i>Syzygium guineense</i> subsp. <i>macrocarp</i>
5	<i>Syzygium guineense</i> subsp. <i>macrocarp</i>	<i>Syzygium guineense</i> subsp. <i>macrocarp</i>	-	<i>Syzygium guineense</i> subsp. <i>macrocarp</i>	<i>Syzygium guineense</i> subsp. <i>afromontanum</i>	-

R<sub>1</sub> Results of respondents in paired comparison

No.	Plant species	Rank
1	<i>Rubus steudneri</i>	1
2	<i>Cordia africana.</i>	3
3	<i>Dioscorea bulbifera</i>	2
4	<i>Syzygium guineense subsp. afromontanum</i>	4
5	<i>Syzygium guineense subsp. macrocarp</i>	5

R<sub>2</sub>- Results respondents

No.	Plant species	Rank
1	<i>Rubus steudneri</i>	5
2	<i>Cordia africana</i>	3
3	<i>Dioscorea bulbifera</i>	1
4	<i>Syzygium guineense subsp. afromontanum</i>	4
5	<i>Syzygium guineense sub sp. macrocarp</i>	2

R-3 Results of respondents R-4 Results of respondents

No.	Plant species	Rank
1	<i>Rubus steudneri</i>	3
2	<i>Cordia africana</i>	1
3	<i>Dioscorea bulbifera</i>	5
4	<i>Syzygium guineense subsp. afromontanum</i>	4
5	<i>Syzygium guineense subsp. macrocarp</i>	2

No.	Plant species	Rank
1	<i>Rubus steudneri</i>	2
2	<i>Cordia africana</i>	4
3	<i>Dioscorea bulbifera</i>	1
4	<i>Syzygium guineense subsp. afromontanum</i>	5
5	<i>Syzygium guineense subsp. macrocarp</i>	3

R-5 Results of respondents

No	Plant species	Rank
1	<i>Rubus steudneri</i>	5
2	<i>Cordia africana</i>	3
3	<i>Dioscorea bulbifera</i>	2
4	<i>Syzigium guineense</i> <i>subsp. afromontanum</i>	1
5	<i>Syzigium guineense</i> <i>subsp. macrocarp</i>	4

R-6 Results of respondents

No.	Plant species	Rank
1	<i>Rubus steudneri</i>	2
2	<i>Cordia africana</i>	1
3	<i>Dioscorea bulbifera</i>	4
4	<i>Syzigium guineense</i> <i>subsp. afromontanum</i>	5
5	<i>Syzigium guineense</i> <i>subsp. macrocarp</i>	3

R-7 Results of respondents

No	Plant species	Rank
1	<i>Rubus steudneri</i>	1
2	<i>Cordia africana</i>	4
3	<i>Dioscorea bulbifera</i>	2
4	<i>Syzigium guineense</i> <i>subsp. afromontanum</i>	5
5	<i>Syzigium guineense</i> <i>subsp. macrocarp</i>	3

R-8 Results of respondents

No.	Plant species	Rank
1	<i>Rubus steudneri</i>	2
2	<i>Cordia africana</i>	3
3	<i>Dioscorea bulbifera</i>	1
4	<i>Syzigium guineense</i> <i>subsp. afromontanum</i>	4
5	<i>Syzigium guineense</i> <i>subsp. macrocarp</i>	5

R-9 Results of respondents

No.	Plant species	Rank
1	<i>Rubus steudneri</i>	1
2	<i>Cordia africana</i>	4
3	<i>Dioscorea bulbifera</i>	2
4	<i>Syzygium guineense</i> <i>subsp. afromontanum</i>	3
5	<i>Syzygium guineense</i> <i>subsp. macrocarp</i>	5

R-10 Results of respondents

No.	Plant species	Rank
1	<i>Rubus steudneri</i>	2
2	<i>Cordia africana</i>	3
3	<i>Dioscorea bulbifera</i>	1
4	<i>Syzygium guineense</i> <i>subsp. macrocarp</i>	5
5	<i>Syzygium guineense</i> <i>subsp. macrocarp</i>	4

Results of Paired Comparison on five wild edible plants based on their taste

No	Plant species	Respondents from (R <sub>1</sub> -R <sub>10</sub> )										Total	Rank
		R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>	R <sub>7</sub>	R <sub>8</sub>	R <sub>9</sub>	R <sub>10</sub>		
1	<i>Rubus steudneri</i>	1	5	3	2	5	2	1	2	1	2	24	4 <sup>th</sup>
2	<i>Cordia africana</i>	3	3	1	4	3	1	4	3	4	3	29	3 <sup>rd</sup>
3	<i>Dioscorea bulbifera</i>	2	1	5	1	2	4	2	1	2	1	21	5 <sup>th</sup>
1	<i>Syzygiumguineese</i> <i>subsp. afromontum</i>	4	4	4	5	1	5	5	4	3	5	40	1 <sup>st</sup>
2	<i>Syzygiumguineense</i> <i>subsp. macrocarp</i>	5	2	2	3	4	3	3	5	5	4	36	2 <sup>nd</sup>

R-represents respondent



## Appendix V

### Photographs during Data collection



## I. PLATES OF SOME SELECTED WILD EDIBLE PLANTS IN THE STUDY AREA



**Plate 1)** *Ficus sur*, Local name in Afan Oromo (Harbuu)



**Plate 2)** *Oncoba spinosa* Local name in Afan Oromo (Akuukkuu)



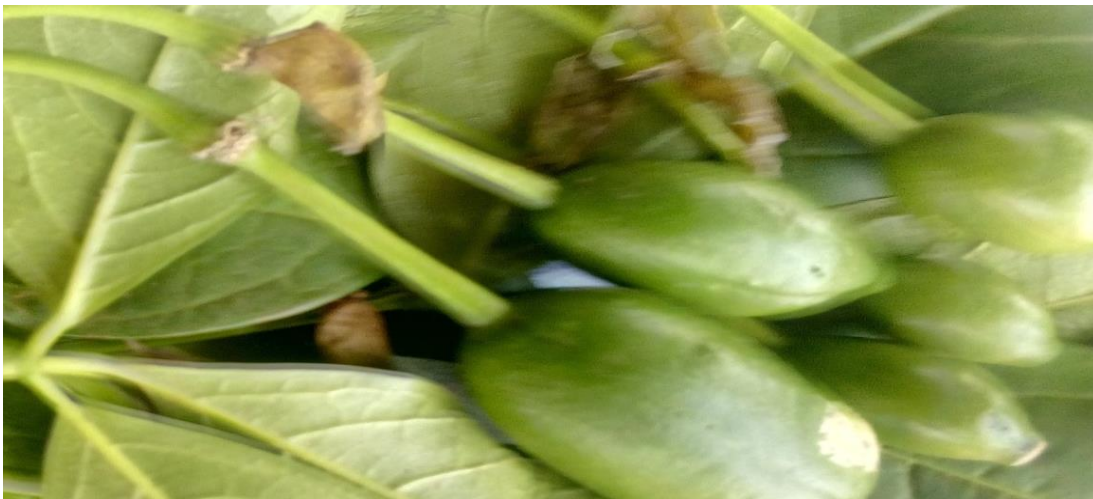
**Plate 3)** *Syzygium guineense sub sp. afromontum*, local name in Afan Oromo (Baddeessaa)



**Plate 4)** *Landolphiabuchimanii*, Local name in Afan Oromo (Geebboo)



**Plate 5)** *Cordia africana* fruit, Local name in Afan Oromo (Waddeessa)



**Plate 6)** *Ritchiea albersii*, Local name in Afan Oromo (Xuuphanoo)



**Plate 7)** *Carissa spinarum*, Local name in Afan Oromo (Agamsa)



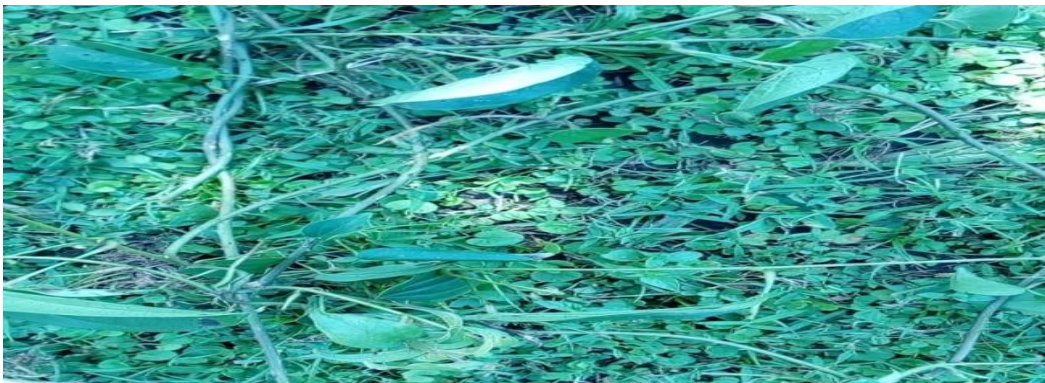
**Plate 8)** *Grewia ferruginea* Hochst. ex. A. Rich., Local name in Afan Oromo (Dhoqonuu)



**Plate 9)** *Rytigynianeglecta* (Hern) Robyus, Local name in Afan Oromo (Mixoo)



**Plate 10)** *Rubus steudneri*, Local name in Afan Oromo (Goraa)



**Plate 11)** *Cissus rotundifolia* Local name in Afan Oromo (Buri)



**Plate 12)** *Acanthuseminence* flower, Local name in Afan Oromo (Kosorru)

## A. Pressed plant Specimens



1. *Syzygium guineense* sbsp. *afromontum*, local name in Afan Oromo (Baddeessaa)



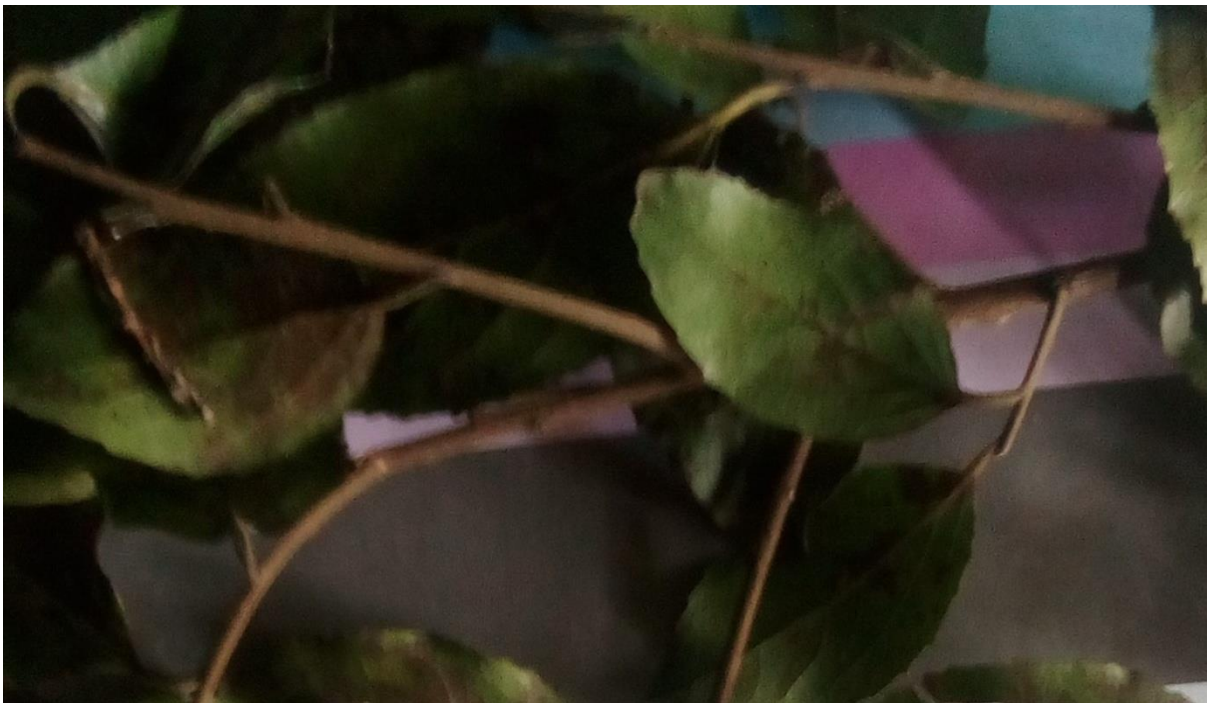
2. Scientific name. *Sena petersiana*, Local name in Afan Oromo (Raamsoo)



3. *Syzygium guineense* sub sp, macrocarp species Local name in Afan Oromo (Goosuu)



4. *Rubus steudnerii*, Local name in Afan Oromo (Goraa)

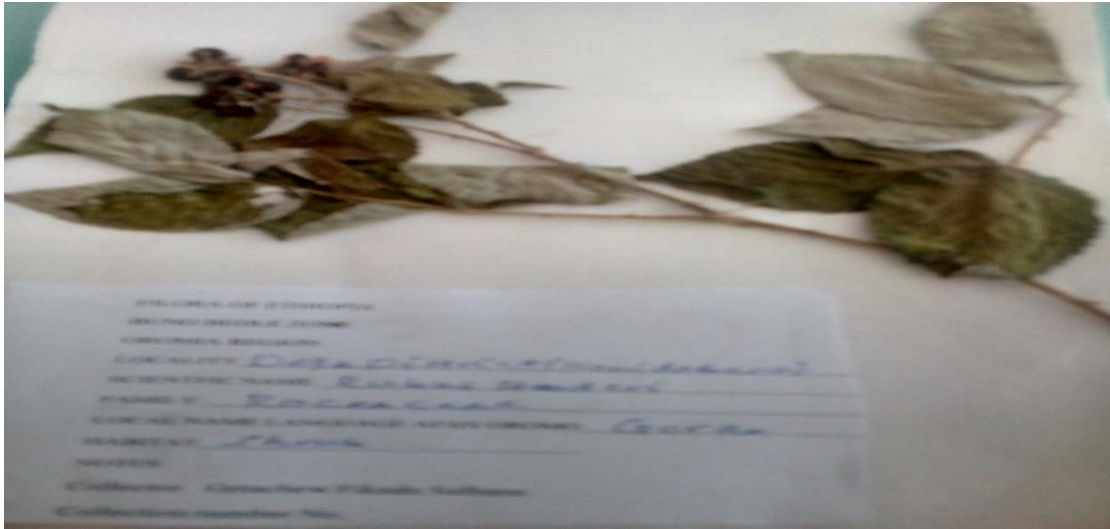


5. *Oncoba spinosa*, Local name in Afan Oromo (Akuukkuu)

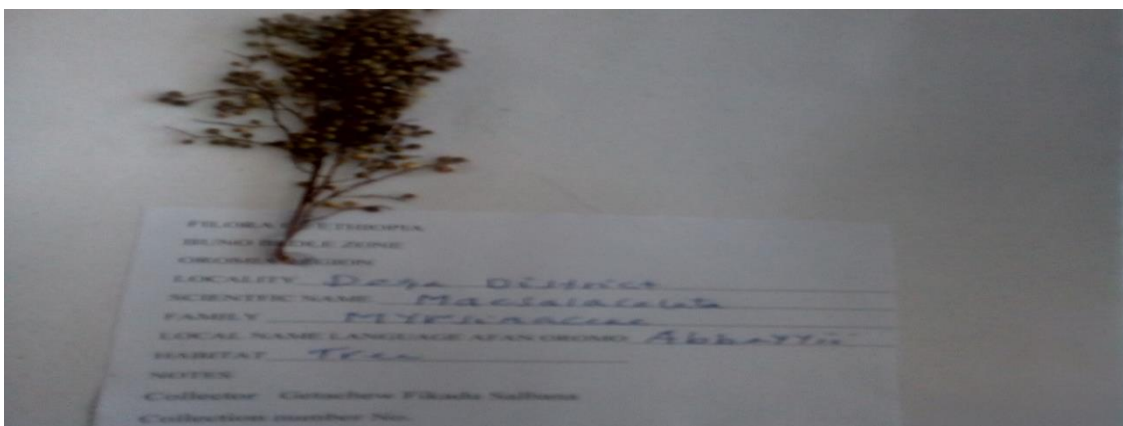


6. *Embelea schimperi*, Local name in Afan Oromo (Haanquu)

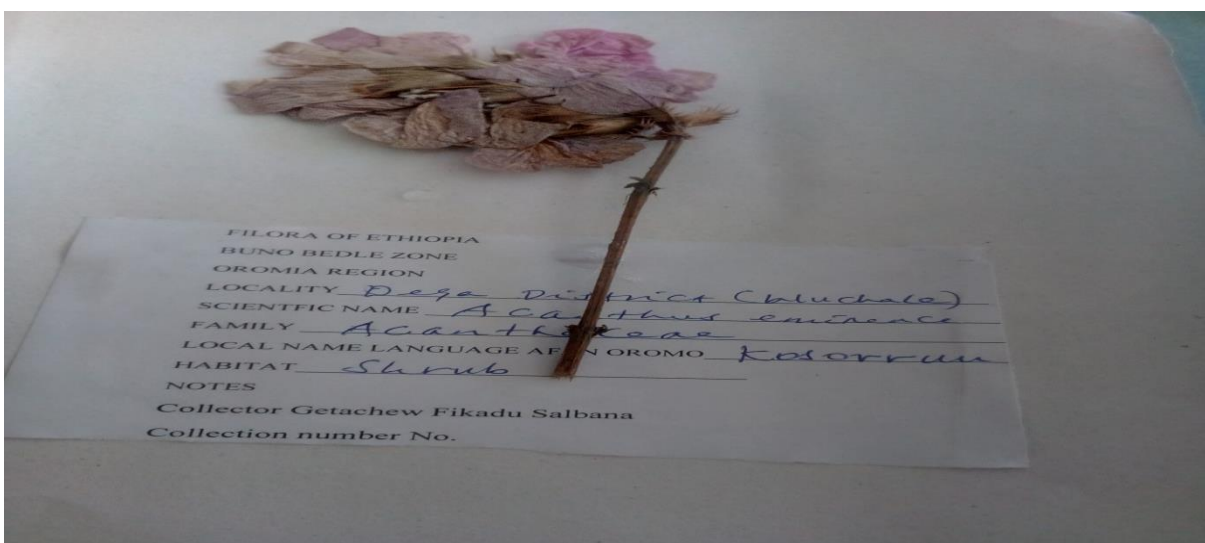
## B: Labelled plant specimens



1. scientific name *Stuedneria* (local name in Afan Oromo ,Goraa)

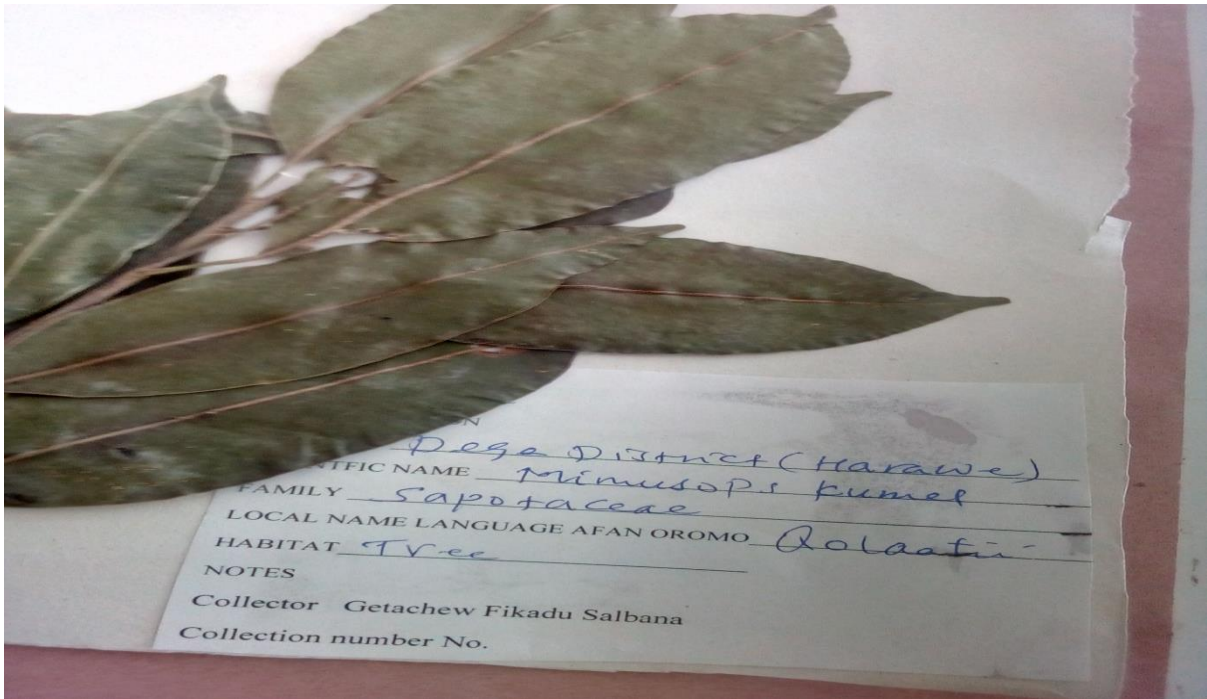


2. Scientific name *Maesalancelata* ( local name in Afan Oromo, Abbayyii)

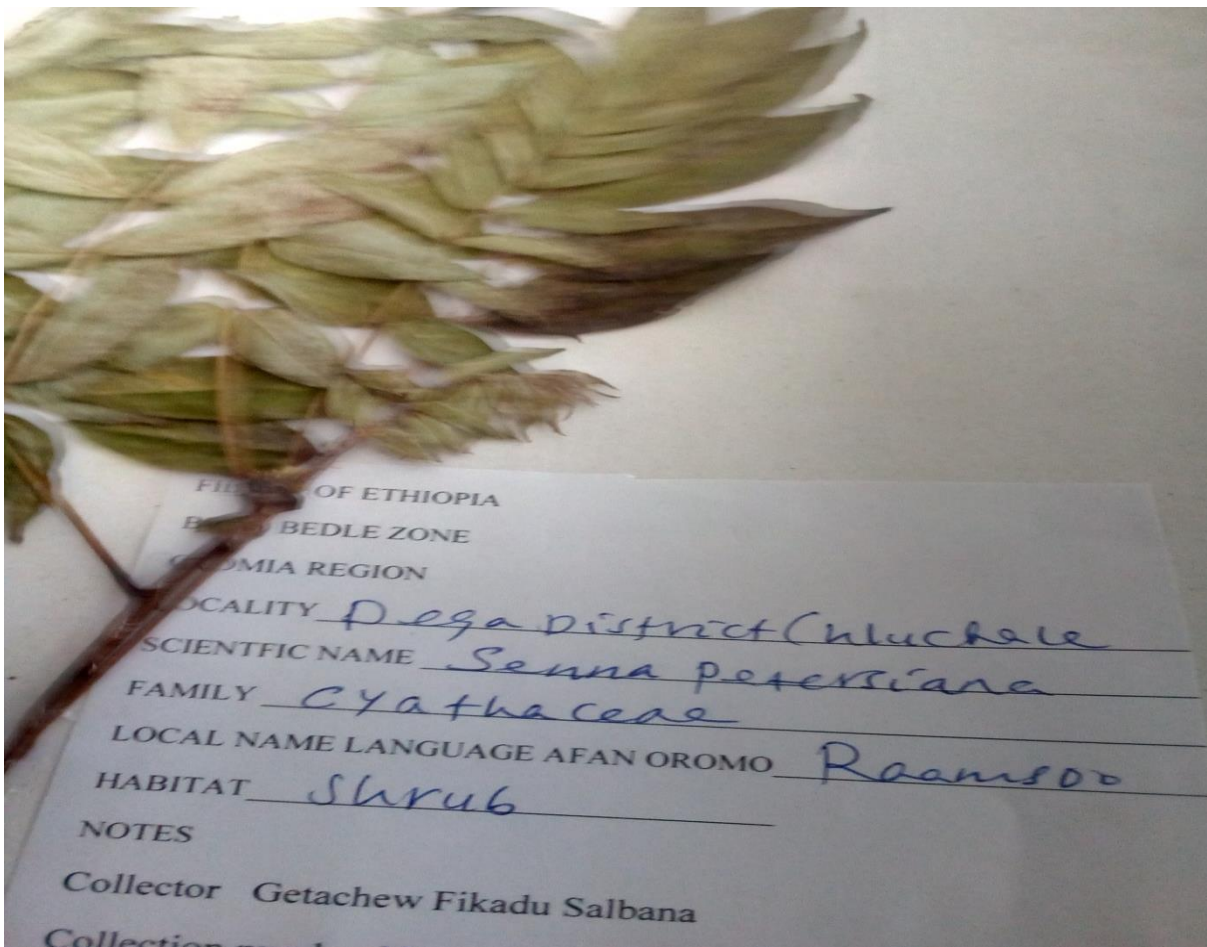


3. Scientific name *Acanthaceae* ( local name in Afan Oromo, Kosorruu)





4.scientific name *Mimusops kumel*( local name in Afan Oromo ,Qolaatii)



5.scientific *Senna petersoniana* (local name in Afan Oromo,Raamsoo)