



Jimma University

College of Natural Sciences

Department of Biology

Assessment of Non-timber forest products of Gebra Dima Forest, Ilu Aba Bora Zone, Oromia Region,
Southwest Ethiopia

By: Daditu Okuba

Main Advisor: Dereje Denu (PhD)

Co-advisor: Desalegn Rega (MSc)

A Thesis submitted to the Department of Biology, College of Natural Sciences, Jimma University, in
Partial Fulfillment of the Requirement for the Degree of Masters of Science in Botanical Sciences

March 2020

Jimma, Ethiopia

Jimma University

College of Natural Sciences

Department of Biology

Assessment of Non Timber Forest Products of Gebra Dima Forest, Ilu Aba Bora Zone,
Oromia Region, Southwest Ethiopia

By: Daditu Okuba

A Research Paper Submitted to Department of Biology, College of Natural Sciences,
Jimma University, in Partial Fulfillment of the Requirement for the Degree of Master of
Biology in Botanical Sciences

Approval sheet

Advisors

Signature

date

Dereje Denu (PhD)

Desalegn Rega(MSc)

Internal examiner

Kitesa Hundera (Professor)

External examiner

February 2020

Jimma, Ethiopia

Table of Contents

.....	i
List of tables	3
List of figure	4
List of Appendix	4
Acronyms.....	5
Acknowledgement	6
Abstract.....	7
1. Introduction.....	8
1.1 Back ground of the study	8
1.2. Statement of the Problem	10
1.3. Research Question.....	10
1.3. Objectives.....	10
1.3.1. General Objective	10
1.3.2. Specific Objectives	10
1.4. Significance of the Study	11
2. Literature Review.....	12
2.1 .Non Timber Forest Products	12
2.2. Categories and Uses of NTFPS	13
2.2.1. Food Products	13
2.2.2. Medicinal value	14
2.2.3. Fuel (Energy supply)	14
2.2.4. Honey product	14
2.2.5. Construction materials	15
2.3. Non Timber Forest Product to the rural household and Forest Conservation.....	15
2.4. Importance of NTFP for Rural household.....	16
2.5. Non Timber Forest Product Harvest and Biodiversity Conservation	16
2.6. Non Timber Forest Products and Its Role in the Household.....	18
2.6.1.Non Timber Forest Product as a Safety Net	18
2.6.2. Non Timber Forest Products as Poverty Trap	19
2.7.Non Timber Forest Products as source Income Diversification	19

2.8. Factors Influencing a Household’s Decision to collect and Use Non Timber Forest Products	19
2.9. Non Timber Forest Products and rural community.....	21
2.10. NTFPs in reconciling the objectives of forest.....	21
2.11. Diversity of non-timber forest products	22
3. Materials and Methods	23
3.1. Description of Study Area.....	23
3.2 .Sample size determination	24
3.3 Method of Data collection.....	25
3.4. Plant sample collection.....	25
3.5. Data Analysis	25
4. Results and Discussions.....	26
4.1. Results	26
4.1.1. Non-timber forest product in the study area.....	26
4.1.2. Honey.....	27
4.1.3. Firewood.....	27
4.1.4. Medicine	28
4.1.5. Wild spice or smell.....	29
4.1.6. Wild fruit	29
4.1.7. Toothbrush.....	30
4.1.8. Charcoal.....	30
4.1.9. Construction.....	30
4.2. Discussions.....	31
5. Conclusion and Recommendations.....	33
5. 1. Conclusion.....	33
5.2 Recommendation.....	33
Reference	34
Appendix 1. List of plant Species as a source of non-timber forest products in study area.....	40

List of tables

Table 1: list of household-.....	17
Table 2: List of important plants visited by honeybees.....	21
Table3: Plants from Gebra Dima forest used for firewood.....	22
Table 4: medicinal plants from Gebra Dima Forest used by the local community.....	23
Table 5: Wild plants used as a source of spices (collected from Gebra Dima Forest)	23
Table 6: the use of wild fruit plants.....	24
Table 7: plants used for toothbrush.....	24

List of figure

Figure 1: Map of Ale District.....	Error! Bookmark not defined.
Figure 2: specific description of location map of the study area (Gebra Dima natural forest).....	23
Figure 3: Demographic characteristics of respondents.....	21.
Figure 4: The Major use of non-timber forest products.....	26

List of Appendix

Appendix 1: List of Species non-timber forest in study area.....	40.
Appendix 2: Research question English	44
Appendix3 Questioner's Afaan Oromoo	47.

Acronyms

CIFOR-----Center for International Forest Research

FAO -----Food and Agricultural Organization

NTFP -----Non-Timber Forest Product

SPSS -----Statistical Package for Social Sciences

UNCED-----United Nations Conference on Environment and Development

EFAP-----Ethiopian Forestry Action Program

Acknowledgement

First, I am grateful to appreciate my Advisor Dereje Denu (Ph.D.) and Dessalegn Raga who has taken all the trouble with me while I was preparing the paper. Especially, their valuable and prompt advice, tolerance, guidance and useful criticisms throughout the course in preparing the paper, constructive corrections and insightful comments, suggestions and Encouragement are highly appreciated.

Abstract

Forests produce a great variety of goods and services for people. These products are typically been categorized into two main categories as timber and non-timber forest products. The objective of this study was to assess non-timber forest products and investigate the use of the non-timber forest products by the community around Gebra Dima forest, Ale District, Illu Aba Bor Zone Southwest Ethiopia. The type of Data was Primary data Non-timber forest information were collected using structured questionnaire and interview. In order to select the study sites in the district from forest adjacent kebeles, three rural kebeles were selected using purposive sampling technique. The collected data was checked, corrected and coded by using Microsoft excel. The findings revealed the following NTFPs in the study area charcoal, firewood, basket, fruits, construction, herbal medicine, spices, honey, brush tooth and wild coffee. Majority (79.4%) of the respondents considered honey as the most important NTFPs and other many uses in this area are firewood 77.6% of the total respondents, 15.4% consumption charcoal from the forests. 14.1% of respondents inform as they use wild fruit from this forest. 39.4% of informants in the study area responds as they uses plant from these forest for different constructions. 17.1% informants also respond as plant in the forest used as medicine. About 34.1% of respondents indicated that the local people collect different spices from a forest. The study concluded that respondents could not do without these NTFPs in their daily domestic activities as it serves as sources of food, local herbs, employment, income generating and thus means of livelihood. The study therefore. Current honey production system is totally traditional which could not generate better quality and quantity product of honey, therefore, it is recommended to look into its improvement through better production system. Further studies required on Gebra Dima forest to stop current Deforestation and Degradation other forest related problems. Conduct specific research on medicinal plants, concentrating on using different parts of the plants, such as fruits, herbs, leaves, and roots.

1. Introduction

1.1 Back ground of the study

Forests are important natural resources that provide a wide variety of products and services for the benefit of mankind. It supplements and complements agriculture contributes to food security. Millions of people throughout the world make an extensive use of forest resources to sustain their livelihood ((CIFOR 2006). The majority of rural households and a large proportion of urban households in developing countries, depend on plant products of forests to some parts of their nutritional and health needs (Byron and Arnold, 1999).

Forests produce a great variety of goods and services for people. These products could be categorized as timber and non-timber forest products (Mahassin Ahmed, 2006). Non-timber forest products (NTFP) category has often overshadowed by timber products (Arnold and Ruiz, 2001). The NTFPs contribute significantly to the livelihoods and welfare of households living in and adjacent to forests (Campbell *et al.*, 2002). The exploitation of NTFPs is ecologically less destructive than timber harvesting and other forest uses. Forests have value to people and give to human needs in a number of ways. Their contributions occur through either direct or indirect uses (Gregersen, 1996). These two, have increased recognition of the many values of forests. This has led to new interests and efforts to develop varieties of goods and services as a means to achieve development and conservations objectives (FAO, 2002). As a result, forests are recognized as rich reservoirs of many valuable biological resources.

Non-timber forest products are also called Minor forest products and they include all the non-industrial forest products that are harvested from trees, shrubs and other plants in the forest. This includes latex, resins, fruits and nuts, spices and oils as well as countless medicines. The scopes of NTFPs are proposed to be defined as all goods of biological origin other than timber, as well as services derived from forests and land uses (FAO, 1995).

The production of NTFPs and development by giving a foundation for sustainable economic development could reduce tropical deforestation (Brudtland, 1987). This has motivated researchers to put forth much effort on the determination of the monetary value of NTFP as well as their contribution to overall livelihoods elsewhere (Campbell and Luckert, 2002; Godoy and Bawa, 1993). NTFPs are effective in contributing to food self-sufficiency, security and supplementing income needed to purchase food (Angelsen and Wunder, 2003). In supplementing agricultural production, particularly important in reducing the shortages suffered during the hunger periods of the agricultural

cycle. They help to even out seasonal fluctuations in availability of food and often contribute to essential inputs for people as nutrition (Godoy and Bawa, 1993).

The nature of NTFPs harvest supports sustainable management; forest resources and conservation biodiversity. NTFPs contribute to the socioeconomic welfare of the communities living around (Gakou, 1996). Their amenability to integration with the management of protected areas allows controlled extraction of NTFP (Gakou, 1996). Ecotourism, recreation and other services, which are environmentally sound and safe, can generate income especially for local populations provide intellectual property and heritage values as well as intrinsic values of several NTFPs to the communities and their economic diversity (Wickens, 1990).

For many, the money earned from collecting, selling or processing of forest products provide households to not only purchase consumable goods and pay for basic expenses but also serve as asset accumulation and income specialization (Berhanu, 2004; Mohamed Andilo, 2007). It is clear that collection/production of NTFP should be seen as part of a wider conservation and livelihood strategy of rural households. Furthermore, the most rural communities do not depend exclusively on NTFP for their livelihoods but that NTFP exploitation complements other livelihoods activities. In this respect it has been noted that the livelihood role of NTFP can take different forms Safety net, means for income diversification and means for income specialization (Angelsen and Wunder, 2003; Belcher *et al.*, 2005).

Benefit from forest vary with households depending on their socio-economic characteristics (wealth status, family size in general and composition of members in a household, education level, sex and age of the household head), access to forests, access to markets, institutional arrangements governing access to forests and marketing channels and off-farm employment opportunities (Berhanu Debele,2004). Recently a great deal of attention has been given to forest products that are plant based but do not come from timber. These alternative products are found growing under the forest canopy as herbs, shrubs, vines, moss and lichens (Hammenta and chamberlain, 1998). Non-timber has less attention than more important timber products. Therefore, the study was conducted at Gebra Dima forest in order to record the diversity of gather information on different types of forest products.

1.2. Statement of the Problem

The majority of farming communities (84%) in Ethiopia are dependent on agricultural activities including forest for their livelihood. This dependency on the forest resources has a long history in the country. In spite of the fact that forest product collections are very popular activities in the country, it is very recently that such forest dependency received research attention (Byron and Arnold,1999).Some information have been documented on dry land resources principally on gum-resin products and southern moist areas on forest (Ahmed Mohammed, 2009).Due to study area have diverse ecosystem and biodiversity, forests have been many non-timber products, but the role that these forest resources plays in the rural household not been well documented. The study designed to generate information on the role of non-timber forest products in the rural household of the study area. The information generated to improve management of the forest resources and their use in the households of the local people.

1.3. Research Question

1. What are the main types of NTFPs in the study area?
2. What type of plant species are used as a source of NTFPs for the households in the study area?
3. Which non-timber forest product is commonly utilized by the household in the study area?

1.3. Objectives

1.3.1. General Objective

The general objective of the study was to assess non-timber forest products used by community around Gebra Dima forest, Ale District, Illu Aba Bora Zone Southwest Ethiopia

1.3.2. Specific Objectives

The specific objectives of the study were-

- To assess non-timber forest products used by the community around Gebra Dima forest
- To identify plant species used as a source of NTFP around Gebra Dima forest.

1.4. Significance of the Study

Attentions for the conservation of forest are increasing in all part of the globe. This is due to the fact the increasing reverence given to the role of forest in various aspect and reasonably priced the entire life care in creating sustainable and in the vital conservation of biodiversity. This has also tired the consideration of the humankind area towards the need for creating mechanisms to ensure sustained development of the sector and to allow sharing of information between countries, organizations and agencies.

This study described what had carried out to ensure the significance of the non-timber forest products. For maintaining ecological balance and long-term conservation of natural resources, particularly non-timber product of the area there is a need with actively involve the quiescence of local individuals in assessment preparation performance and monitoring processes, as they are the best judge.

2. Literature Review

2.1 Non Timber Forest Products

All over the world, NTFPs studied in various fields such as ethno-biology, forestry, economic botany, conservation biology, anthropology and marketing. This cross-disciplinary study has led to development of many terms and definitions for different types of forest products. Forest products area often equated with timber products. However, forests produce and harbor many other goods and services. This goods and services can categorize into tangible and non-tangible products (Reference/s). The non-tangible products include environmental, socio-cultural functions. These again include regulation function information, and carrier functions (Ros- Tonen *et al.*, 1995). The tangible economic goods are the timber and non-timber products. Among timber products are pulpwood and logs for poles, sawn wood, veneer and plywood. Non-timber forest products can be define from the viewpoint of either their origin or function using origin as a line of argumentation the term NTFP comprises vegetal products and products of animal origin(Reference/s).

As indicated above, there have been many alternate terms that were used more or less as synonyms as NTFP. These are terms like wild products, natural products, non-wood forest products, minor forest products and many others have entered the vernacular. The use of the term minor forest products in contrary to NTFP refers solely to those products obtainable directly from the wood, bark, leaves or roots of the principal forest trees (Ros-Tonen *et al.*, 1995) especially commercially important products such as gums and resins, tannins, turpentine etc. This kind of definition undermines the various components of forest products obtained from forest ecosystems including firewood and products from animal origin.

Moreover, apart from suggesting the products are inferior to timber products it reflects ambiguity and confusion that inhibits understanding, progress in research and development (Belcher, 2003) in NTFP. Short it does not refer to all forest resources obtained from shrubs, herbs and ferns. To avoid such misrepresentation of resources obtained from forest the technical term NTFP has been emerged to capture the multiple and diverse array of resources obtained from forest ecosystem (FAO, 1995). Although the term does officially include animal products, most commonly used are products from plant origin. The definition of non-timber forest products (NTFPs) has been a subject of debate ever since coined the term NTFP (Belcher, 2003). NTFPs defined as all biological materials other than timber that are extracted from forests for human use (Ahenkan and Boon, 2011). The definition of non-timber forest products (NTFPs) has been a subject of debate ever since Beer and McDermott (1989) coined the term 'NTFP' (Belcher, 2003; Neumann and Hirsch, 2000). Beer and McDermott (1989) defined NTFPs as "all biological materials other than timber, which are extracted from forests

for human use” (Ahenkan and Boon, 2011). Ever since then, many of NTFPs have been proposed depending on the purpose of the study. Some of NTFPs tend to characterize them by what they are 'not', thus indicating that NTFPs include a wide range of products and in some instances this leads to inconsistencies in the results from empirical studies. Thus, the debate about NTFPs tends to be centered on the scale of extraction or production, the nature of the product, the ownership and distribution of benefits, and the source of the product (collected from either the wild or from domesticated sources) (Ahenkan and Boon, 2011; Belcher, 2003).

2.2. Categories and Uses of NTFPS

Forests contribute to all aspects of rural life providing food, fodder, fuel, medicines, building materials, and materials for all sorts of household items, as well as many more intangible benefits such as cultural symbols, ritual artifacts and locals (Falconer, 1995). There is however, great variation in the extent to which forest products used from area to area and even between households within a community. Indeed, this variation reflects the extent to which NTFPs are an integral part of rural livelihoods. People only exploit resources from the forests when they cannot find them on nearby fallow lands or when they are collecting for trade and better supplies are available in the forest. Classifying these products into like categories is an important part of understanding the NTFPs. NTFPs can be classified into different categories, based on the purpose of use (food, fuel, medicine, household utensils, farm implements) level of use (self-supporting, commercial); the part of plants harvested (leaf, fruit, stem, roots) and trophy from wild animals (Jeannette, 2000).

2.2.1. Food Products

From various studies, many food products are harvested each year from the forest and are used personally or taken to the family for consumption especially during the dry season to cushion the family during harsh climatic conditions. These food products include wild fruits and berries, herbs, essential oils, honey, nuts, seeds, spices, coffee, tea, insects, edible tubers and roots, and saps. Wild forest plants comprise a great portion of the daily diet for many people Shillington (2002). In central and east Africa, for example, approximately 1,500 species of wild plants are collected for consumption. Oiled seeds, leaves and fruit are among the non-timber forest products which contain many of the necessary vitamins and other nutritional elements for survival. Falconer (1992) noted that forest foods continue to contribute significantly to the diet of many rural households while a great variety of goods are gathered from forest and fallow lands, the forests commonly supply tubers, mushrooms and snails. Many different fruits and seeds are eaten as snacks on the farm or in the bush, especially by children. Foods gathered from fallow and forest areas are added to sauces as flavoring, as medicines or substitutes for staple food

during periods of scarcity and especially for their healing properties. Collectively, these foods add diversity and flavor to the diet as well as providing protein, energy, vitamins and minerals (Falconer, 1992).

2.2.2. Medicinal value

This includes medicinal plants, bark, resin and seeds (Andel, 2006). Forests supply medicines for the vast majority of urban and rural people medicines are consistently ranked as one of the most-valued forest products by diversity of people. Falconer (1992) state that all people use plant medicines and the majority of them (80%) rely on wild plants as their main medicinal source. Even amongst urban households plant medicines are widely used, especially as first aid. Although there are many different healing practices and beliefs, common to most are the use of plants. Knowledge is not confined to specialist healers; the majority of people know common plant treatments. Knowledge of common medicines is passed on through families and this knowledge continues to evolve as the environment changes. Many forest plants were used for medicinal value for many years. In Sub-Saharan Africa, for example, health care is largely a forest-based service. Barfoot (2006) indicated that there are many reports that caution the extraction of non-timber forest products from the forest, especially of medicinal plants. It had been noted that plants used for medicinal purposes are harvested more than any other product from the natural world. China, for example, is home to approximately 24,000 native species, with more than 10,000 of these being used medicinally. It is also estimated that 50,000 species of plants are used medicinally throughout the world.

2.2.3. Fuel (Energy supply)

Andel (2006) also noted that fuel includes fuel wood (firewood, charcoal), petroleum substitutes, and lighting resins. All rural households rely on fuel wood to meet all their energy needs. Most fuel wood is collected from farms, bush fallows and the forest. The supply of fuel wood is not a problem in any of the study villages. Although in some cases, where the fuel wood is used commercially such as in markets or preparation of cooked foods for sale, fuel wood collection may be difficult and claim that readily available supplies are scarce (Falconer, 1992).

2.2.4. Honey product

Beekeeping is as old as human history itself (Farm Africa, 2008). Beekeeping is an ancient tradition in Africa and is practiced by the wider rural community. For example, studies in Ethiopia suggested that Ethiopia has favorable climate for an extended flowering season that supports the involvement of farmers in beekeeping activities (EFAP, 1994). Ethiopia has been an

important honey and beeswax producing country, which dominated by local consumption. Annual honey consumption nearly equals annual production, currently estimated at 43,000 tones. As stated by (Ayalew and Gezahegn, 1991), Ethiopia is the leading honey producer in Africa and one of the ten largest honey and beeswax producing countries in the world. Moreover, Riadh, (2007) indicated that beekeeping had significant role in forest conservation and development. This is because beekeepers conserve the forest or fragmented large trees for hanging beehives and to remain the plant to stay long with flowering so that they could collect honey frequently.

2.2.5. Construction materials

These include forest products like palm leaves or grass for roof thatch, bamboo, wood (sticks and poles) (Andel, 2006). Building materials such as cement and aluminum roofing sheets are available, but the majority of rural households in the study area cannot afford these, relying instead on the forest for their building materials. (Falconer 1992) explained that, in most cases, rural houses are mud and wattle, utilizing sapling-size trees as standing poles and rapier (leaf petioles) or bamboo to produce a lattice. While specific species are sought after for particular needs, a great variety of different materials are used, even within one community

2.3. Non Timber Forest Product to the rural household and Forest Conservation

The NTFPs traded contribute to the fulfillment for the daily needs and provide employment income particularly for rural people and especially disadvantaged groups of women and therefore hold potential for rural poverty alleviation (UNCED, 2000). Poor individuals and local communities in developing countries tend to be particularly dependent on NTFPs for subsistence and supplementary income enterprises based on NTFPs diversify opportunities for gainful employment and income generation (FAO, 1996). Poor households even where they are involved in market-oriented production on NTFPs, it is often undertaken as a part-time activity, they tend to receive low return and are vulnerable to competition and cannot be always sustained (Belcher *et al.*, 2005 ; Adanech, *et al.*, 2013). Environmental dimensions of NTFPs cover a wide range of roles and aspects. As it is mentioned by ecosystems NTFPs, activities hold prospects for integrated forms of development that yield higher rural incomes and conserve biodiversity while not competing with agriculture. The sensitive international interest in NTFP has developed after the seminal paper by (Peters *et al.*, 1989). This was contingent with the increasing acceptance of people-oriented forestry and sustainable development concepts (Brundtland, 1987). The argument was that tropical forests provide NTFP of significant livelihood value, leading to consideration of NTFP harvest as strategy for sustainable development and natural resource management specifically reducing tropical deforestation (Anderson 1990; Balick and Mendelsohn, 1992). Owing to the variation in the type of products,

forest types, regions, production techniques and market force, this optimist view however was challenged (Ros-Tonen and Wiersum, 2005).

2.4. Importance of NTFP for Rural household

Millions of people throughout the world make extensive use of biological products from the wild. These items, commonly termed as Non Timber Forest Products (NTFPs) are harvested for both subsistence and commercial use; either regularly falls back during times of need. Add to people's livelihood security especially for rural dwellers. NTFPs may also have marked cultural significance and value (Shackleton and Shackleton, 2004). Estimates done by the WHO (2000) revealed that 80% of the people living in developing countries use wild plants to meet some of their health and nutritional needs. NTFPs are conventionally viewed as the products of the poor unlike that of the timber for the rich. However, evidence indicated that in developing countries forest products are also an integral component of the livelihood of as size able proportion of urban households (Byron and Arnold, 1999).

NTFPs cover a wide range of products with different characteristics, which are utilized in a variety of context and play important roles in various household livelihood strategies. This involves thousands of plant and tree species, most of which are consumed within the household of the gatherers and are not traded in markets. Studies conducted by (Shackleton and Shackleton, 2004) show that extraction, processing and trading of NTFPs is often the only employment available for the population in remote rural areas indicate that NTFPs are dependable source of income and food supply in the rural areas.

However, it is a diminishing resource because of its dependency on land, which is known to be under pressure of depletion from agriculture and development of public infrastructures. Several opportunities for improved rural development are linked to NTFPs. In many areas, rural populations are traditionally depended on local forest resources to provide additional income through collection and marketing of NTFPs. Where employment opportunities from traditional industries are declining, workers looking for alternative income sources often turn to collection of these products from nearby forest.

2.5. Non Timber Forest Product Harvest and Biodiversity Conservation

A non-timber forest product had been seen more compatible with biodiversity conservation than timber extraction or agriculture. This depends very much on the production system employed ranging from natural forest to agricultural forestry system (Belcher *et al.*, 2005; Ros-Tonen and

Wiersum, 2005). The maintenance of a forest similar structure in relation to NTFP production ables the maintenance of some of the conventional forest environmental functions like carbon sequestration, nutrient cycling, erosion control and hydrological regulation. Likewise, compared to alternative land uses, forests and home gardens managed for NTFP production also retain a large amount of plant and animal biodiversity (Michon and DeForesta, 1997).

However, this proposition raises concerns about the relatively impact of NTFP harvest from the natural forest. Research illuminates that any harvest has ecological impact, including gradual reduction in the seed vigor and decreased rate of seedling establishment of harvested species disruption of local animal populations and nutrient loss from harvested material. This in turn resulted in the reduction of composition, abundance and genetic diversity of forest species in general and those of a more infixed habitat in particular (Peters *et al.*, 1989). Related to alternative land use systems this seems minimal, but it is the low extraction level rather than the ecological ability to maintain yields that makes the extraction of NTFP sustainable. In addition to, the high plant diversity of tropical forest with the exception of oligarchic forest consist low species density. In observed of this forest does rarely satisfy quantity demanded relative to alternative land use systems when market prevails for particular NTFP.

The existence of market demand then motivates producers to open up the forest and enrich with desired product or motivates to clear the forest for planting it (oil palm).The discussion above suggests that unless the original proposition qualified conservation by commercialization thesis is not realistic. It is inaccurate to tempt NTFP harvest yield conservation and poverty alleviation simultaneously without qualifying it with proper management considerations. The tradeoffs outweigh the synergies (Wunder, 2001).

The counter proposition is that low intensity extraction of NTFP from a natural forest can have a low impact on the local ecology and on biodiversity at the landscape scale and even at the species level (Belcher *et al.*, 2005). Thus designing the condition in which forests can be managed in a way that minimizes the ecological impact of harvesting may result in a balance between conservation and commercialization. This forms the current thinking of the NTFP commercialization and conservation thesis. Additionally increased production of NTFPs might be achieved through human intervention such intervention may range from enriching forests with valuable NTFP species to cultivation of NTFP species in agro forestry systems. The value of NTFP in such anthropogenic vegetation types is higher than that of undisturbed natural forests (Ros-Tonen and Wiersum, 2005).

2.6. Non Timber Forest Products and Its Role in the Household

NTFPs conventionally viewed as the products of the poor unlike that of timber for the rich. However, evidence indicated that in developing countries forest products are also an integral component of the livelihoods of a sizable proportion of urban households (Byron and Arnold, 1999). NTFP cover a wide range of products with different characteristics that is utilized in a variety of different context and play important roles in various household livelihood strategies. Different studies show a typology of the different strategies in which NTFP (Angelsen and Wunder, 2003; Belcher *et al.*, 2005). This last strategy does not imply however, that households do not depend on forest since they may use forest resources for direct consumption. As indicated by this typology, some NTFP serve as safety net or as a poverty trap while others may provide regular important cash income. They also provide agricultural inputs, input for small-scale enterprises and underpin capital formation. Below the major functions are described:

2.6.1. Non Timber Forest Product as a Safety Net

NTFPs considered as vital safety nets, helping rural people to avoid, mitigate or rise out of poverty. It provides the poor quick cash or auto consumption goods especially in the event of unpredicted shortfalls such as failure of agricultural crop or disasters (Angelsen and Wunder, 2003). Wild resources known to provide famine food following crop failure or scarce agricultural products. Money earned from the sale of forest products has been shown to complement agricultural income. It also helps to offset the financial cost of health expenditure (McSweeney, 2003). Thus, this safety net function of NTFP insures at least people against falling into greater poverty by reducing their vulnerability to such risk. NTFP contribute towards sustaining rural livelihoods and reducing vulnerability not only during exceptional circumstances but also on a daily basis (Wunder, 2001). This makes the boundary between NTFP used for direct household provisioning and NTFP use as a safety net indistinct. What potentially complicates this further are certain livelihood activities (the sale of NTFP) that may have originated as a response to misfortune but have since become a permanent strategy.

To further disaggregate this safety net function (Shackleton *et al.*, 2008) distinguished between daily and emergency net. The former encompasses the benefits accruing from forest a resource that is accessed on a frequent and regular basis however; the latter refers to the standard safety-net function widely described in the literature. Such distinction suggests that on the one hand, everyday use is in itself a safety net in that it is a cost saving to households with a low cash income. It allows money to be saved and spent on other livelihood strategies such as agriculture, which may in turn contribute to the household's sustainability. This implies the safety net function of NTFP applies not only for thos

e groups of people who use the resource frequently or in large quantity but also for those groups of people who intermittently use them.

2.6.2. Non Timber Forest Products as Poverty Trap

According to some studies, two characteristics of NTFPs are important to clarify the visible differences. There are low capital and skill requirements for NTFP extraction as well as open /or semi-open access to the resource; so that poor households can easily extract the resource. Some NTFP usually have a low return to labor, so that they have poor potential to alleviate poverty (Wunder, 2001; Angelsen and Wunder, 2003). These characteristics help to locate NTFP uses either as safety nets or as poverty traps. Following such characterization NTFP could be considered as safety nets when there is a lack of better alternatives for households and NTFP provide some food security. However the implication of NTFP extraction can be a poverty trap when there is low development potential of these products. NTFP in many cases however, provide an important livelihood contribution to people with limited or no better alternatives (Delang, 2006) noted that in western Thailand wild food plants remain preferred alternative to commercial food crops owing to efficient use of time in gathering wild food plants compared to engaging in the market economy in order to purchase commercial food crops.

2.7. Non Timber Forest Products as source Income Diversification

Subsistence use of NTFP represents the greater part of its value to households. However, they are also source of cash income. Such income seldom appears to account for a large share of a household's total income but complements other livelihood activities (Shackle ton and Shackle ton, 2004). Being able to collect and use NTFP to meet daily needs for energy, shelter, food and medicine allows the scarce cash resources to be used to secure other household needs and to attempt to accumulate the necessary asset base for a more secure livelihood. This includes education of children investment in agricultural tools, capital for income generation activities and the like. Such a cost saving would best be reflected by replacement values of the goods that the NTFP substitute, rather than direct-use value based on farm-gate prices (Shackle ton and Shackle ton, 2004).

2.8. Factors Influencing a Household's Decision to collect and Use Non Timber Forest Products

In the above discussion, it has been indicated that NTFP have various functions in different contexts and circumstances. Assuming a household is a major decision making unit, a number of variables that govern NTFP production decisions are briefly presented here (Mubarak Koss, 2017, Arnold and Ruiz Perez, 2001). These factors are broadly categorized into physical, economic, political, cultural

and personal factors. This explicitly includes factors like property regimes, distance to market, alternative livelihood, labor, proximity to forest, wealth (capital), gender, age, education, and accumulated forest knowledge.

Land and Resource Tenure (Property Regime): Property rights are often poorly defined and local people may not have legal rights to use the forest. In contrast open access resources offer opportunities for people with limited resources the inability competitors often prevents producers from making a good living from those resources (Belcher *etal.*,2005). In the absence of clearly defined access, most commercially valuable NTFPs are over harvested in the wild and the potential to sustainably harvesting for livelihood enhancement are limited. On-farm cultivation will increase the economic value of NTFP to landowner households, but the decrease NTFP access for landless households. On-farm cultivation of high value NTFP may reduce pressure to harvest from the wild, but may increase incentives to clear forest to cultivate these new crops. Therefore, the status of tenure partly determines the role of NTFP in the household livelihood.

Market, Access to markets is a key factor in determining the extent and type of NTFP use and production in the household's livelihood (Godoy *et al.*, 2000).**Labor:** labor is the key input in the collection and production of NTFP. In the subsistence nature of forest product gathering, it is not economical to employ hired labor. Therefore, availability of family labor when other things equal (when family members are not all involved in other activities as agriculture) contributes to increased forest collection (Wollenberg and Septiani, 1998).**Proximity of Household to the forest** the farther the forest from household the lower the interest to collect NTFP (Hegde *etal.*, 2000).**Wealth,** The intensity and nature of NTFP production, consumption and sale is highly influenced by wealth status. Low-income groups depend on a greater variety of forest and forest product commodities than high-income groups.

Genders are Forest gathering is done by both males and females (Adanech, *et al.*, 2013; Cavendish, 2000). Intensity type and nature of NTFP collection is strongly linked to the sex of individual concerned. Various reasons have been put forward for gender differentiation in the collection and production of NTFP (Cavendish, 2000). However, there are exceptions that females mainly do daily food gathering, while male households mainly focus on cultivation of commercial NTFP. **Age,** The use and production of NTFP is also influenced by the age of individual or households concerned. For example, schoolchildren on their trips to school and during school breaks collect wild fruit and forage when they are hungry. **Education,** education is an important variable governing the dependency of forest resource extraction. Education is assumed associated with access to new information and opens up better employment opportunities diverting people from subsistence

agricultural and extraction activities (Moubarakatou, 2017; Gunatilake, 1998). Accumulated Forest Knowledge accumulated forest knowledge affects the household's ability to collect. Households with better understanding of forestry and forest products have a comparative advantage over less knowledgeable households (Moubarakatou, 2017).

2.9. Non Timber Forest Products and rural community

Economic theory predicts that a shift from subsistence to a cash economy will stimulate specialization to maximize economic opportunities. Some NTFP serve households as a means of income specialization. In this case, households devote most of their time on few rewarding NTFPs production, influenced by the degree of the production technology skill and presence of capital to process and trade the product. Suggested that is only in areas that are well integrate into the cash crop that some NTFPs producers are able to pursue specialize strategy in which the NTFPs Ruiz Perez *et al* (2004). Contributes more than 50% of total household income collectors and producers tend to be better off than their peers are Wunder (2001) also stated that NTFPs income specialization is observed in areas in which NTFPs have market opportunities. Increasing market demand for wild-harvested forest products tends to result in overexploitation but cultivation and intensified forest management are identified ways to maintain or increase the supply of valuable products to stable or expanding markets. Role of

2.10. NTFPs in reconciling the objectives of forest

Conservations and rural development has often been hampered by limited understanding of the complexity of the factors that affect the contribution of NTFPs to local livelihoods. The prevailing ecological conditions, social relations of production, cultural practices of resource use and economic and political structures have an important role in shaping the of NTFPs for forest conservation and poverty alleviation in a particular setting (Salafsky *et al.* 1993, Neumann and Hirsch 2000).

Detailed case studies of the ecological, socio-cultural, economic and political dimension of NTFP extraction are therefore needed to understand better the local-specific factors that either facilitate or constrain the sustainability of NTFP Harvesting. Such analyses can offer valuable insights into the complexity of social, economic and political contexts of NTFP extraction and thus contribute to the understanding of NTFP extraction gained through quantitative, macro-scale analyses (Byron 1999, Ruiz Pérez *et al.* 2004, Belcher *et al.* 2005). In their analysis of the importance of NTFPs in tropical small-scale forestry, Harrison and Herbohn (2001) concluded

2.11. Diversity of non-timber forest products

NTFPs have long been harvested for subsistence and trade (Tick-tin 2004). An estimated 50 million economically marginalized forest dwellers in India harvest large quantities of NTFPs for their subsistence as well as for trade are used worldwide and most are harvested from wild lands. In the Upper Amazon region, aboriginals consume 139 species of native fruit, harvested extensively from the forest (Vasquez and Gentry, 1989). In North Bolivia an indigenous tribe “Chacobo” uses 75 tree species as NTFPs (Boot, 1997). Most of the medicinal and aromatic plant taxa used in the drug industry come from wild lands of the plants supplied to the international market are from wild stock (Mishra *et al.* 2009). NTFPs are important in the economies of developed countries as well.

However, using existing data it is virtually impossible to derive meaningful estimates of trade volume because most of the trade goes unrecorded and available data mostly refer to protected species (De Beer and McDermott, 1996). Because of the rapid decimation of forest resources, particular NTFPs preparation of detailed inventories of plant and animal parts and products harvested in a given area is an essential prerequisite for developing appropriate management strategies and action. The reason is because NTFPs help to combat poverty among forest dwellers by contributing to their livelihoods, food security, incomes, health, and sustainable human development in particular and conservation of forest ecosystems at large (FAO 1995). The Barak Valley region in the southern part of Assam, India, a part of the Indo-Burma Biodiversity Hotspot (Myers *et al.* 2000) and located in the confluence region of the Oriental and Palearctic biogeographically realms, is rich in both plant and animal diversity. The forest dwellers in the valley depend on non-timber forest products for their livelihoods, and have been collecting materials including lac, resin, edibles, honey, ivory, bush meat and others for generations described the socio-economic dependence of various forest dwelling communities on NTFPs.

3. Materials and Methods

3.1. Description of Study Area

This study was conducted in Ale District, Ilubabor Zone Oromia Regional state southwestern Ethiopia on Gebra Dima forest. It is located at about 652 km southwest of Addis Ababa and 52 km northeast of Mettu town. Ale district is bordered by the Southern Nations, Nationalities and Peoples region in the south, by Nono in the west, by Bure in the northwest and by Metu district in the northeast. Gore is the capital of Ale district and its geographical location is 8°9'N latitude and 35°31'E longitude (figure 1) within an elevation of 2035 m above sea level shows to figure (1). Maximum annual temperature of the town is 32.1°C while minimum 27°C. Coffee is the cash crop of the district, while major cereal crops include maize, sorghum, teff, and legumes (seed); fruit crops like mango, orange, papaya, avocado, and apple. The natural vegetation of the area is a broad-leaved and evergreen with the most dominant tree species. An area of about 37,889.87 hectare is covered by natural forest (Ale District natural Forest and wildlife conservation, 2018). Ale district has three climatic zones; highland, midland and lowland (Dega, Woina-Dega and Kola). A total population of Ale district up to 2008 was 14201 (male = 6,469; female = 7732). Of the total population, 5063 were urban dwellers.

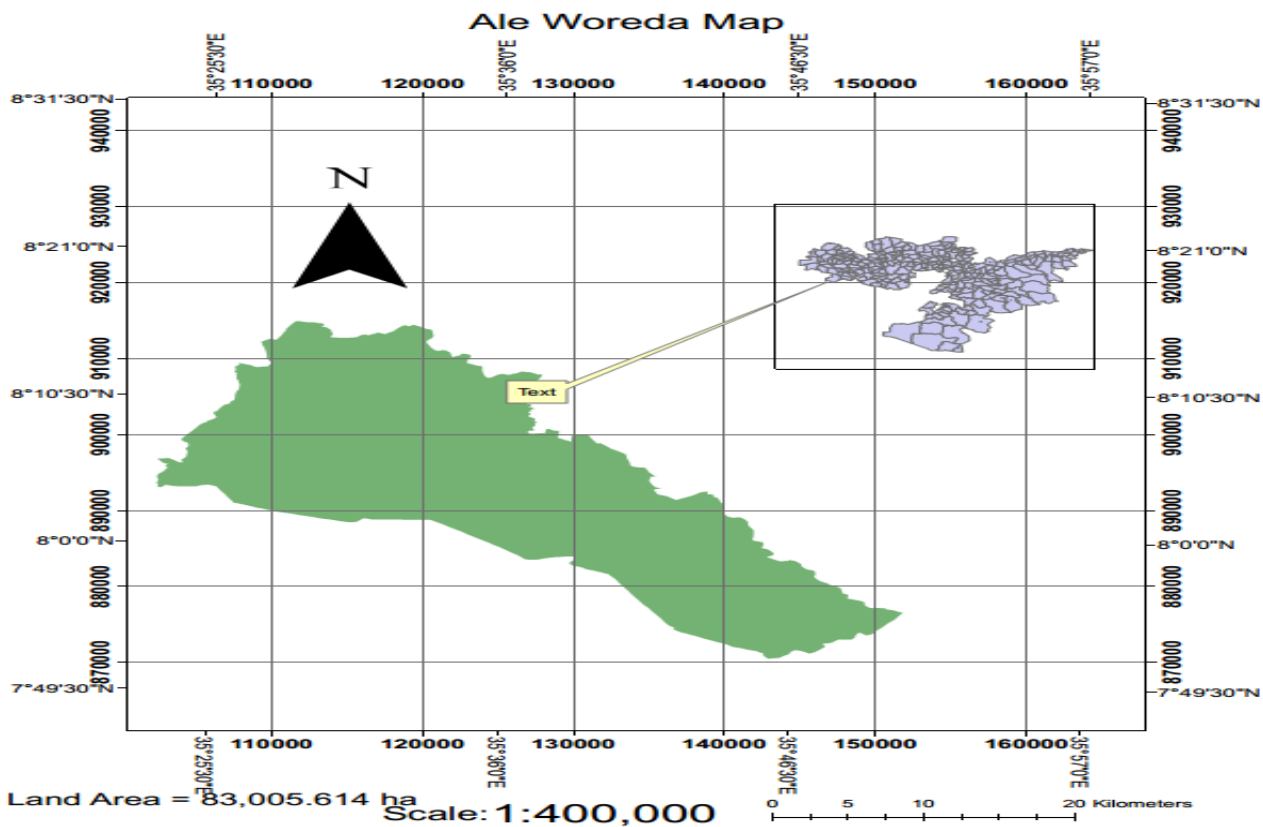


Figure 1: Map of the study area



3.2 .Sample size determination

Preliminary survey was carried out to have an overview of the distribution of the forest resources in the study area. Three rural Ganda adjacent to Gebra Dima forest were selected purposively based on their dependence on NTFPs. The size of sample population for each Ganda was determined using sample size determination formula as used in (Yamane, 1967) considering confidence level of 95% and accepting the level of precision (e) of 5%. For each Kebeles, questionnaires were distributed to purposively selected respondents. The sample size was determined using the following formula (n= 340 respondents) out of 2242 households in the study area as indicated in Table 1.

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

The Sampling frame and sample size.

Where: n = sample size

N = Population size sample (population of the communities)

e = level of precision considered (5%) (e is the significance level)

Table 1: list of household

No	Name of Kebeles	Total household	Sample
1	Gebra Dima	710	108

2	Jeto	746	113
3	Kechi Boren	784	119
		2242	340

3.3 Method of Data collection

For this study area, was collected; used primary data the form of structured questionnaire and interview. Before starting a full data collection, some preliminary information about the overall population of the district was assessed through informal survey. Pre testing of the questionnaire was conducted and appropriate refinements and modifications were made in the questionnaire. The information obtained from the pre-test was used to revise the questionnaire to make it more focused and easier to administer. Changing the questionnaire to local language to make it easier for the respondent to understand. After incorporating the lessons learned from the pre-test, the questionnaire was ready for administration. Interview, the general purpose of the study area was explained to each respondent and the confidentiality of his or her information assured. Key informant interview the approach entailed focus interview in which key informants was interviewed for a certain period.

3.4. Plant sample collection

Transect walk was carried out with the key informants of the three Kebeles around the forest. After getting information on the type of plants used for NTFP, the sample specimens of the plants were collected, pressed and taken to Jimma University Herbarium for identification.

3.5. Data Analysis

The collected data were checked, corrected and coded by using Microsoft excel. The qualitative data and quantitatively. The quantitative data were analyzed by using descriptive statistics such as, frequencies, percentages, standard deviation, mean and presented in tables and charts.

4. Results and Discussions

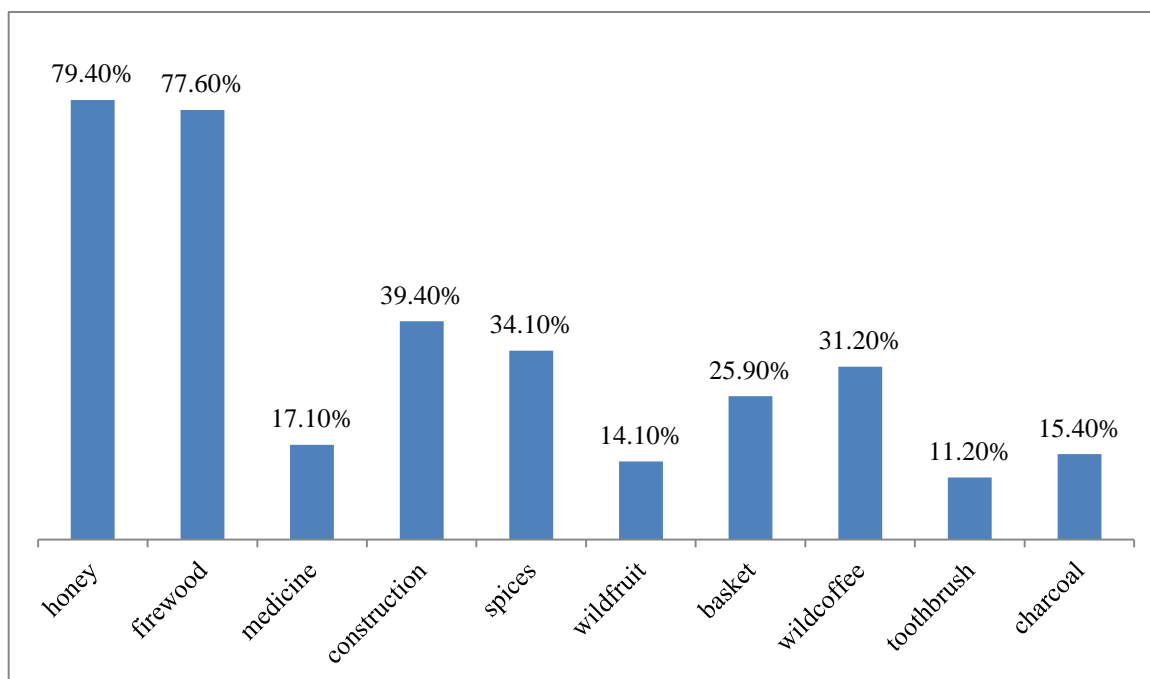
4.1. Results

Demographic characteristics were presented in Table 2. The figure shows that among 340 respondents in three kebeles, the number of female and male were 31.5% and 68.5% respectively. The majority of respondents were illiterate (57.9%), primary school (28.5%), high school (12.1%), the lowest number corresponds to the University education level (3%), and diplomas 1.2%. Table 2. This hinders the implementation of NTFPs conservation practices and occupation of respondents. The main occupation of respondents includes: Farmers (62.4%), private (16.8%), house wife (17.9%), non-government (3%) and government (2.6%) and the marital status of respondents were 95.6% married and 4.4% are unmarried. The majority of respondents are between 19 and 45 years old.

Table 3: Demographic characteristics of respondents

4.1.1. Non-timber forest product in the study area

Overall, 68 belonging to 41 families were recorded from the Gebra Dima forests as a source of non-timber forest products. (Appendix 1). The most common NTFPs of the study area was honey production followed by firewood, toothbrush, medicinal plants, construction, basket, wild fruits, honey and spices (Figure 2)



4.1.2. Honey

Of the total respondents, 79.4% harvest honey from the forests. Honey obtained from the forests was not collected from beehives but from big trees that have holes where bees come to initiate the habitat as the beehives and then make honey. Most of the plants in Gebra Dima forest visited by bees for honey production belong to *Asteraceae*, *Araliaceae*, *Euphorbiaceae*, *Meliaceae* and *Acanthaceae*.

Table 3: List of important plants by honeybees

s/no	Type of plant	Family	Uses	Part of plant
01	<i>Vernonia amygdalina.</i>	<i>Asteraceae</i>	Honey	Flower
02	<i>Ekebergia capensis</i>	<i>Meliaceae</i>	Honey	Branch
03	<i>Echinops macrochaetus</i>	<i>Asteraceae</i>	Honey	Flower
04	<i>Croton macrostachyus</i>	<i>Euphorbiaceae</i>	Honey	Branch
05	<i>Vernonia auriculifera</i>	<i>Asteraceae</i>	Honey	Flower
05	<i>Justicia schimperiana</i>	<i>Acanthaceae</i>	Honey	Flower
07	<i>Schefflera a byssinica</i>	<i>Araliaceae</i>	Honey	Flower
08	<i>Hagenia abyssinica</i>	<i>Rosaceae</i>	Honey	Flower

4.1.3. Firewood

Of the total respondents of this study, 77.6% showed that firewood was collected from the forests. This implies that firewood is the major sources of energy for cooking in the study area. This could probably be due to the availability of firewood at relatively low price in the study area. In addition, people in the study area do not have access to other energy sources.

Table 4: Plants from Gebra Dima forest used for firewood

Types of plants	Family	Use	Part
<i>Calpurnia aurea</i>	<i>Fabaceae</i>	Firewood	Branch
<i>Celtis Africana</i>	<i>Moraceae</i>	Firewood	Branch
<i>Chionanthus mildbraedii</i>	<i>Oleaceae</i>	Firewood	Branch

<i>Croton macrostachyus</i>	<i>Euphorbiaceae</i>	Firewood	Branch
<i>Ficus thonningii</i>	<i>Moraceae</i>	Firewood	Branch
<i>Ekebergia capensis</i>	<i>Meliaceae</i>	Firewood	Branch
<i>Justicia schimperiana</i>	<i>Acanthaceae</i>	Firewood	Branch
<i>Maytenus arbutifolia</i>	<i>Celasteraceae</i>	Firewood	Branch
<i>Psidium guajava.</i>	<i>Myrtaceae</i>	Firewood	Branch
<i>Bersama abyssinica</i>	<i>Melanthaceae</i>	Firewood	Branch
<i>Flacourtia indica</i>	<i>Flacourtiaceae</i>	Firewood	Branch
<i>Ficus vasta</i>	<i>Moraceae</i>	Firewood	Branch
<i>Maesa lanceolata</i>	<i>Myrtaceae</i>	Firewood	Branch
<i>Albizia gummifera</i>	<i>Fabaceae</i>	Firewood	Branch
<i>Ritchiea albersia</i>	<i>Caparidaceae</i>	Firewood	Branch
<i>Bredelia micrantha</i>	<i>Phyllanthaceae</i>	Firewood	Branch
<i>Apodytes dimidiata</i>	<i>Icacianaceae</i>	Firewood	Branch

4.1.4. Medicine

As respondents said, those native communities use different plant species as a cure for a plenty of diseases like malaria, headache, stomach costive, for different stomach parasitic diseases and pneumonia. According to those respondents, majority of medicinal plants are herbs and lianas. However, there are also many important plants used for medicinal purpose such as *Oxalis corniculata* .(Table 5).

Table 5: Some medicinal plants from Gebra Dima Forest used by the local community

S/N	Scientific name	Family	Uses	Part
01	<i>Oxalis corniculata</i>	<i>Oxalidaaceae</i>	Medicine	Leaf
04	<i>Ocimum lamiifolium</i>	<i>Lamiaceae</i>	Medicine	Leaf
05	<i>Clerodendrum myricoides</i>	Lamiaceae	Medicine	Leaf
06	<i>Indigofera tinctoria</i>	<i>Fabaceae</i>	Medicine	Root
07	<i>Vernonia amygdalina</i>	Asteraceae	Medicine	leaf
08	<i>Ocimum gratissimum</i>	Lamiaceae	Medicine	Leaf
09	<i>Clausena anisata</i>	<i>Rutaceae</i>	Medicine	Leaf
10	<i>Lepidium stivum</i>	<i>Brassicaceaea</i>	Medicine	Seed
11	<i>Acacia abyssinica</i>	<i>Fabaceae</i>	Medicine	
12	<i>vernonia species</i>	Asteraceae	Medicine	Leaf

4.1.5. Wild spice or smell

Wild spices collected by the local community from Gebra Dimaforest were *Aframomum corrorima*, *Lippia adoensis* and *Apodytes dimidiata* (Table 6). Native community use these plants for adding flavor to food, medicine and drinks. The medicinal values of *Aframomum corrorima* in the local community were also highly pronounced in different forms. In spite of the higher value attached to these spices by the local community, it is difficult to get these resources under a wild state currently. About 34.1% of respondents get spices from the forest. Collecting spices like *Aframomum corrorima* from the forest it takes more time and demand a long trip to the natural forest.

Table 6: Wild plants used as a source of spices (collected from GebraDima Forest)

s/no	Scientific name	family	Uses	Part
01	<i>Aframomum corrorima</i>	<i>Zingiberaceae</i>	Spies	Seed
02	<i>Lippidia adoensis</i>	<i>Verbenaceae</i>	Spices	Leave
03	<i>Apodytes dimidiate</i>	<i>Mettenuisaceae</i>	Spices	Root

4.1.6. Wild fruit

People use some wild plants in Gebra Dima forests as the source of food at times of food shortage. According to the study, native communities in the study area use many forest leaves and fruits for consumption. Although they use these wild plants as source of food during food scarcity, it accessibility is not easy. According to the survey results, 14.1% of respondents said edible forest leaves and fruits are collected from the forests. Many of the vegetables were extracted during the rainy season for consumption at household levels while fruits and berries were harvested both during the rainy and dry season (Table 7).

Table: 7 the use of wild fruit plants

s/no	Type of plant	Use	Part use	Season	
				Dry	Rainy
01	<i>Ficus sur</i> Forssk.	Food	Fruity		
02	<i>Dovyalis abyssinica</i>	Food	Fruity	Dry	
03	<i>Mushroom</i>	Food	All part	Dry	
04	<i>Nicandra physaloides</i> <i>Gaertn.</i>	Food	Fruity		Rainy
05	<i>Carissa spinarum</i>	Food	Fruity	Dry	Rainy
06	<i>Syzygium guineense</i> (willd.)Dc	Food	Fruity	Dry	

4.1.7. Toothbrush

In the study area, it was observed that 11.2% of respondents reported as collecting toothbrush from the forests. The respondents showed that, *Clausena anisata* collected from the forest.

Table 8: plants used for toothbrush

Types of plants	Family	Uses	Part
<i>Clausena anisata</i>	<i>Rutaceae</i>	Toothbrush	Branch

4.1.8. Charcoal

Of the total respondents, 15.4% consumption charcoal from the forests .collect from the forest consumption charcoal burning is less in the community owing to the energy requirements to cook, heat and light most of the homesteads.

4.1.9. Construction

Almost all the communities use the natural forest for house construction materials like lianas for mooring, trees and shrubs for construction and farm implementing materials. The findings revealed that 39.4% of respondents in the study area were collected from the forests and 60.6% not. Uses of the respondent in the study area collected plant for the construction of house, furniture, and dweller. Construction materials like roofing thatches, furniture materials were easily obtained from the forest used. The high demand of these materials was contributing to the depletion of some of the common tree species that were used locally for roofing rafts and agricultural materials including collected to construction lianas, *Cyperus Myrsine Africana L* and grass dweller rural house. Grass-thatched housing units within the study area demand frequent rehabilitation to maintain structural functions of grass thatched roofs and mud walls, which consume most of the materials fetched from the forest for the purposes of house construction.

4.2. Discussions

The local people in the study area use different non-timber forest products from the forest. The non-timber forest products used in the study area include: toothbrush, firewood, medicinal plants, basket, wild fruits, honey and spices. According to current study, 79.4% of respondents collect honey from the forest. The plant species used for Honey production from the study area are in the families of Asteraceae, Araliaceae, Euphorbiaceae, Meliaceae and Acanthaceae. This finding is similar to the result obtained by Belay Haile (2018) from Gurafarda District in which 75.47% of honey collected from the forest. A The finding differ from Twaha Abeid (2015) who reported 40% honey collection from the forest and 60% from other in Tanzania. Debisa (2006) also reported plants used for honey production from the same family like Asteraceae.

Firewood consumption burning used for different purpose is high in the study area. About 77.6% of respondents respond as they use non-timber forest for firewood. These indicate that the inhabitants of study area use mostly non-timber for firewood. These finding is different from Msalilwa (2013) conducted in Kilolo district who reported 98% of inhabitants uses non-timber forest for firewood. Other study conducted in Tanzania by is different from the finding of this study Twaha (2015) reported that 71.7% of respondents collect firewood from forest. The plant species used for firewood by local community include *Calpurnia aurea*, *Carissa spinarum* and *Celtis africana*. These finding is also similar with Muktareta (2017). Charcoal 15.4% consumption charcoal from the forests. Collect from the forest consumption charcoal burning is less in the community owing to the energy requirements to cook, heat and light most of the homesteads. Findings are similar with Mainga V. Nzinzi (2016) who reports 20% of respondents respond as they use non timber forest for charcoal.

According to current finding, 17.1% informants also respond as plant in the forest used as medicine. These findings are not similar with Muktar *etal* (2017) who reports 66.7 of respondents informs as they use medicinal plants from forest. The plant species used as medicine include: *Oxalis corniculata* L, *Lepidium satium*, *Ocimum lamiifolium*, *Clerodendrum myricoides*, *Indigofera* sp. L and *Vernonia* sp. These are also not similar with Belay (2018) conducted in Gurafarda district, identify *Vernonia amygdalina*, *Bersama abyssinica* are used as medicine.

About 34.1% of respondents indicated that the local people collect different spices from this forest. This is different from Belay (2018) who reports 51.9% of respondents collecting spice from forest. The species used as spices from this forest includes, *Aframomum coririma*, *Lippidiaadoensis* and *Apodytes dimidiata*. This is similar with Belay (2018).

According to current finding, 14.1% of respondents inform as they use wild fruit from this forest. This finding is different from Twaha (2017) who reports 60.8% of respondents informs as local people collect fruits from forest and Kilinzo (2009) who reports 85% of respondents informs as study area inhabitants collect fruits from forest. The plant species used to produce fruits are *Ficus sur*, *Douyalis abyssinica*, *Mushroom*, *Nicarndra physloides* .L and *Carissa spinarum*.L. Plants in the study area also used as tooth brush and wild coffee and 11.2% of respondents informs as they uses plants in this forest as tooth brush. Plantspecies in this forest used as toothbrush and wild coffee includes; *Clausena anisata*, and *Coffea arabica* L

Plants in these forest also used for construction materials like roofing thatches, furniture materials are easily obtained from the forest and 39.4% of informants in the study area responds as they uses plant from these forest for different constructions. This finding is different from Muktar *etal* (2017) who reports 31% of respondents informs as inhabitants uses plants for construction from forest. The plant species those used for construction in the study area includes; *Cyperus digitatus* Roxb, *Myrsine africana*, *Schefflera abyssinica*, *Justicia schimperiana*, *Maytenus arbutifolia*, *Croton macrostachyus*, *Ekebergia capensis* Sparm , *Centhrus setigerus* and *Pennisetum schimperi* A.Ric. These is similar with Muktare *al* (2017)

5. Conclusion and Recommendations

5.1. Conclusion

The study identified NTFPs such as wild fruit, firewood, medicinal plants, spice, basket, honey, construction, wild coffee and toothbrush. Charcoal and firewood are widely used primary sources of energy by the households. About 14.1% of people in the study area collect wild fruit from the Gebra Dima forest, where as 77.6% of people collect firewood, 66.7% of people in the study area in collection of medicinal plants 17.1%. Furthermore 79.4% of people in the study area collect honey from these forest, spices 34.1% of people also collect spices from the these forest. Also in the study area it was observed that wild coffee 31.2% of people engaged in collection from the forest, also it was observed that 25.9% of people engaged in collection of basket from the these forest and 15.4% of people in the study area in collection of charcoal from these forest. However the study concluded that majority of the respondents cannot do without using NTFPs for domestic purposes as sources of food, employment and income generating activities.

5.2 Recommendation

Based on the findings of this study, we recommended the following points.

- Current honey production system is totally traditional which could not generate better quality and quantity product of honey, therefore, it is recommended to look into its improvement through better production system.
- Further studies required on Gebra Dima forest to stop current Deforestation and Degradation other forest related problems.
- Conduct specific research on medicinal plants, concentrating on using different parts of the plants, such as fruits, herbs, leaves, and roots.

Adopt a more people-oriented forest-management approach by strengthening the forest-extension wing of the Forest Department, and facilitate collaboration and coordination between various government organizations including the Forest Department, the Forest Research Institute, university forestry departments, NGOs, and international organizations.

Reference

- Adanech Asfew, Mulugeta Iemenih and Kassa Habtemariam (2013). Importance, Determinant and Gender Aspects of Forest Resources, In Case Of Western Hararge, Jelo Forest
- Ahenkan, A and Boon, E. (2011). Non-timber forest products (NTFPs): clearing the confusion in semantics. *Journal of Human Ecology*, 33(1): 1-9.20.
- Ahmed Mohamed (2009). Contribution of non-timber forest products to household food and security. *Food science and quality management*. Yabelo Borana Ethiopia
- Andel, (2006). Non-timber forest product and the value of wild plants. The Netherlands
- Anderson, B. (1990). Extraction and forest management by rural inhabitants in the Amazon estuary In: Anderson (Ed.): *Alternatives to Deforestation: Steps Towards Sustainable Use of the Amazon Rain Forest*. New York: Columbia University Press, pp. 65-85.press.
- Angelsen, A. and Wunder, S.(2003.) Exploring the forest-poverty link and safety net: key concepts, issues and research implications. Center for International Forestry Research (CIFOR) Occasional Paper, No. 40. Bogor, Indonesia.
- Arnold, JEM. and Ruiz Perez (2001). Non-timber forest products match tropical forest conservation and development objectives. *Ecological Economics*, 39, 437-447.
- Aylew, Kebede and Gezahegn, Teregna.(1991). Suitability classification in Apiculture development Ministry of Agriculture. Addis Ababa.
- Balick, P. and Mendelsohn .R. (1992). Assessing the economic value of traditional medicines from tropical rain forests. Vol.6 pp128-130. Institute of economic botany. New York
- Barfoot, J. (2006). A Study to Investigate the Potential for Development of Non-Timber Forest Products and Values from the Boreal Forests of Newfoundland and Labrador Memorial University of Newfoundland Botanical Garden.
- Belay Haile (2018) .Assessments of non-timber forest products status in the Guraferda district of Ethiopia
- Belcher (2003). Comment what is not a non-timber forest product. *International Forestry Review*, 5(2): 161-168.

- Belcher, B.M., Ruiz and Achdiawan R. (2005). Global patterns and trends in the use and management of commercial NTFPs: Implications for livelihoods and conservation. *World Development*, 33(9): 1435-1452.
- Birhanu Debele (2004). Contribution of Non-Timber forest products to the rural household economy: Gore district, Southwestern Ethiopia. MSc Thesis Hawassa University. Ethiopia
- Brudtland(1987). Report of the world commission one environment .<http://www.are.admin.ch>
- Byron and Arnold, JEM (1999).Dependency on the forest resources has a long history in the country. *World Development*, 27(5): 789-805.
- Campbell B.M and. Luckertm K. (2002). Towards understanding the role of forests in rural livelihoods.pp. 1-16. In *Earth scan: London*.
- Cavendish W. (2000). Empirical Irregularities in the Poverty–Environment Relationship of Rural Households: Evidence from Zimbabwe. *World Development* 28: 1979-2003.
- Centre for international research CIFOR (2006). A future beneath the trees an International Symposium on Non- Timber Forest Products Community Economic Development and Forest Conservation Royal Roads University, Victoria, BC, pp. 2-12.
- Chikamai B.N and Tchatat (2004). NTFPs provide essential beauty urban for areas, and used as population consumer. German Research Institutions Sino-German Symposium. 1-6pp
- Delang Claudio (2006).NTFP extraction can be a poverty trap when there is low development potential of these products. *Ecological Elsevier* .Vol.59 (1) pp64-73
- EFPA, (1994). Ethiopian Forestry Action Programme. EFPA, Addis Ababa.
- Falconer J.(1995). The major significance of ‘minor’ forest products: The local use and value of forests in the West African humid forest zone .FAO .1995 Non- Wood Forest Products in Nutrition. Food and Nutrition Division. In Non-wood, forest products for sustainable forestry. Yogyakarta, Indonesia, 17-27 January 1995. Non-timber Forest Products, FAO. Rome.
- Falconer, J. (1992). Non-timber forest product in southern Ghana. A summary Report, ODA forestry Series, No 2.23pp.
- Farm Africa. (2008). A study on private sector linkage for bees products producers in Bale APM Consult. Addis Ababa.

- Food and Agriculture Organization (1995). Non-wood forest products for rural income and sustainable forestry (FAO). 92-5-103765
- Food and Agriculture Organization (1996). The proceeding of the International Conference on 145 Domestication and Commercialization of Non-Timber Forest Products in Agroforestry Systems. Non Wood Forest Products No. 9 .FAO. Rome. Food and Agriculture Organization (2002). <http://www.fao.org/docrep/004/y3655e/y3655e03.htm>
- Gakou (1996). Learning With Farmers for Policy 147 Changes in Natural Resource Management. In Forest Trees and People Newsletter, No.31. P 14-19.
- Godoy and Bawa (1993). The economic value and sustainable harvest of plants and Animals from the tropical forest: assumptions, hypothesis and methods. *Economic Botany* 47, 215–219.
- Godoy, Wilkie, H., Cuba G and Dimmer J (2000). Contribution of non timber forest products livelihood strategies to rural development in dry land of Sudan potential and failure .agricultural system 117(2013)90-97
- Gregersen, H.M. (1996). Economics for environmental and natural resources management. In: Forest Valuation for Decision-making, Lessons of experience and proposals for improvement. Paul, Minnesota College of Natural Resources, University of Minnesota
- Gunatilake .H.(1998). The role of rural development in protecting factor influencing household: evidence from Sri Lanka. *J. Environ. Manage.* 53, 273–292
- Hammenta.L and chamberlain James (1998). sustainable use of non-timber forest product alternative forest based on income opportunity Hagerstown, MD. pp141-147
- Hammentt.l and Dylan Jenkins (1998). non timber forest product alternative forest product; new opportunity for alternative forested income .forest landowner 58(2):66-69
- Hegde. R. Nuppenau, and Enters T (2000). Forest products and household economy: a case study from Mudumalai Wildlife Sanctuary, Southern India. *Environmental Conservation*, 27(3), 250-259.
- Jeannette V.R (2000). Non-timber forest products (NTFP). Their role in sustainable forest management in the tropics .Theme studies, series1, Forests, forestry and biological diversity support group, Wageningen, the Netherlands.49pp.

- Mahassin Ahmed (2006). Contribution of Non-timber Forest Products (NTFPs) in Household Livelihood in the Rural Areas of Shiekan Province, North Kordofan State, Sudan
- McSweeney.K (2003). Tropical forests as safety nets. The relative importance of forest Product sale as smallholder insurance, Eastern Honduras. The International Conference on Rural Livelihoods, Forests and Biodiversity. 19-23 May, (2003), Bonn, Germany.
- Michon. G and DeForesta (1997). Agro forests: Pre-domestication of forest trees or true domestication of forest ecosystems? *Netherlands Journal of Agricultural Science* 45, (4): 451-462
- Mohamed Andilo.(2007). The contribution of non-timber forest products to rural livelihood in southwest Ethiopia. MSc Thesis, Wageningen University and Research Center.
- Msalilwa, U. (2013). Role of Non-Timber Forest Products in Climate Change Adaptation by forest dependent Communities in Kilolo district, Iringa, Tanzania. Dissertation submitted in partial fulfilment of the requirements for the degree of Masters of Science in Forestry of Sokoine University of Agriculture Morogoro, Tanzania, pp 59.
- Mubarak Koss (2017) factor affecting of household non-timber forest products. In Eastern Uganda. MSC agricultural and Applied Economic university of Nairobi
- Muktar Reshad , Muktar Mohammed, Ahmed Mohammed and Alemayehu Beyene (2017) Diversity of Non-Timber Forest Products (NTFPs) and its Source Plant Species: The Case of Jello-Muktar Forest, Eastern Ethiopia. vol.60
- Nahayo.A, Ekise I.E and Niyigena. D(2013). Assessment Of the Contribution of Non Timber Forest products to the Improvement of Local People's Livelihood in Kinigi Sector Rwanda. *Journal of Environmental Studies and Management* Vol. 6 No.6 2013
- Narendran.Suresh, Dattaraja, Ravindranath and Sukumar, (2001). Non-timber forest product extraction, utilization and valuation: A case study from the Nigeria biosphere reserve, southern India. *Economic Botany* 55, (4): 528-538.
- Neumann,R. and Hirsch,E. (2000). Commercialization of Non-timber Forest Products: Review and Analysis of Research .Center for International Forestry Research (CIFOR).Indonesia.*
- Pant (2007). Bamboo for life for people and red panda A Study on utilitarian value and management of bamboo and its relation with red panda conservation in Maimjhuwa, Nepal. MSc Thesis and Research Center.

- Peters C.M, Gentry A.H and Mendelsohn R.O (1989). Valuation of an Amazonian forest .Nature Institute of Economic Botany, New York Botanical Garden, Bronx, 339(6227):655-656
- Prema. G (2002). Gender Role and Contribution to Forest-Based Livelihoods. Paper reported to UN. New Delhi and India rain forest. Nature 406, (6791): 62 - 63.
- Riadh, M. (2007). Assessing the Role of Non-Timber forest products in the livelihoods of communities living inside and outside of Lawachara National Bangladesh.
- Ros-Tonen Mirjam, Dijkman and Lammerts Bueren E, (1995).Commercial and sustainable extraction of non- timber forest products: Towards a policy and management oriented research strategy. The Tropenbos Foundation, Wageningen, the Netherlands.
- Ros-TonenMirjam and WiersumFreer (2005). The scope for improving rural livelihoods through non-timber forest products: Paper presented at The International Conference on Rural Livelihoods, Forests and Biodiversity19-23, Bonn, Germany
- Ruiz-Perez.M(2002). Gender is also an important factor forest dependence Commercialization products foresters' non ligneous zone de forest humid Cameroun. Arbres, Forest Comminutes Regales 19: 19–44
- Ruiz-Perez.M, Belcher, Achdiawan, Alexiades and Campbell.B (2004).Markets drive the specialization strategies of forest peoples. Economic and Society 9(2), 4.
- Ruiz-PerezM Belcher, Achdiawan, Alexiades and Campbell.B(2004).Marketsdrive the specialization strategies of forest peoples. Economic and Society 9(2), 4.
- Ruiz-PerezM(2002).Gender is also an important factor forest dependence Commercialization products foresters' non ligneous zone de forest humid Cameroun. Arbres Forest Comminutes Regale 19: 19–44
- Shackle tonCharlie and Shackleton Sheona (2004). The importance of non-timber forest products inrural livelihood security and as safety nets: a review of evidence from South Africa. South African Journal of Science, 100, 658-664
- ShackletonSheona, Campbell.B, LotzSisitka and Shackleton Charlie (2008). Links between the local trade in natural products, livelihoods and poverty alleviation in a semi-arid region of South Africa. World Development, 36(3), 505-526.

- Shillington, J.L. (2002). Non Timber Forest Product Gender and household in Nicaragua, a commodity chain analysis. Nicaragua.
- Stevens (2003). Distribution Utilization and Sustainability of Non timber Forest Products from Takamanda Forest Reserve Cameroon.Smithsonian Institute/MAB Biodiversity Program, Series 8. Washington D.C.: Smithsonian Institute
- Twaha Abeid (2015) Assessment of The Contribution Of Non-Timber Forest Products To Household Food Security And Income around Baga Catchment Forest In Lushoto District, Tanzania
- United Nations Conference on Environment and Development (2000).Forest resources of Europe, CIS, North America, Australia, Japan and New Zealand Main report. Geneva. (UNCED).
- Wickens G.E (1990). “What is Economic Botany?” Economic Botany .44:12-28.
- Williams and Shackleton (2002). The role and value of savannah non-timber forest products to rural households in the Kat River Valley, South Africa. Journal of Tropical Forest Products, 8(1), 45-65.
- Wollenberg,E and Septiani (1998).Estimating the Incomes of People Who Depend on Forests. In Incomes from the Forest: Methods for the Development and Conservation of Forest Products for Local Communities, ed. E. Wallenberg and A. Ingles. Bogor: CIFOR.
- World Health Organization (2000). Food Security and Nutrition Survey. USA
- Wunder S. (2001). Poverty alleviation and tropical forests: what scope for synergies? .World Development, 29: 1817–1833.
- Yamane Taro (1967).Statistics an introductory analysis 2nd edition. Harper and Row New York

Appendix 1. List of plant Species as a source of non-timber forest products in study area

S/No	Species	Afan Oromo	Family	(Habit)
16	<i>Acacia abyssinica</i> Hochst ex.Benth.	Laftoo	Fabaceae	Tree
36	<i>Acacia seyal</i> Del	Doddota	Fabaceae	Tree
56	<i>Achyranthes aspera</i> L	Darguu	Amaranthaceae	Herb
26	<i>Aframomum corrorima</i>	Wagiyoo	Zingiberaceae	Herb
62	<i>Albizia gummifera</i> (J. f. Gmel.) C.A.Sm	Hambabbessa	Fabaceae	Tree
68	<i>Alphys macrobotry</i>	Serxee	Lauraceae	Tree
67	<i>Apodytes dimidiata</i> E.Mey. ex Arn	Wendabiyoo	Icaciaceae	Tree
47	<i>Bersama abyssinica</i> Fresen	Lolchisa	Melanthaceae	Tree
65	<i>Bredelia micrantha</i> (Hochst)	riqaa raabaa	Phyllanthaceae	Tree
53	<i>Bridelia micrantha</i>	Giraaba	Euphorbiaceae	Tree
1	<i>Calpurnia aurea</i> (Ait.) Benth	Ceekaa	Fabaceae	Shrub
2	<i>Carissa spinarum</i> (Forssk.) Vahl	Hagamsa	Apocynaceae	Shrub
37	<i>Carissa spinarum</i> (Forssk.) Vahl	Hagamsaa	Apocynaceae	Shrub
3	<i>Celtis africana</i> Burm.f.	Cayii	Moraceae	Tree
4	<i>Centhrus setigerus</i> Vahl.	Sardoo	Poaceae	Herb
5	<i>Chionanthus mildbraedii</i> Stearn	Gagamaa	Oleaceae	Tree

15	<i>Clausenaanisata</i> (Willd.)Benth.	Ulumaayii	Rutaceae	Shrub
25	<i>Clematis simensis</i> Fresen.	Hidda feetii	Ranunculaceae	-
32	<i>Clerodendrum myricoides</i> (Hochst.) Vattke	Maraasisa	Lamiaceae	Herb
46	<i>Coffea arabica</i> L.	Buna	Rubiaceae	Shrub
52	<i>Crateva adansonii</i> Dc.subsp. adonsoni	Harangamaa	Capparidaceae	Shrub
38	<i>Croton macrostachyus</i> Del	Bakkanisa	Euphorbiaceae	Tree
55	<i>Cyperus digitatus</i> Roxb	Caffee	Cyperaceae	Herb
22	<i>Diospyros abyssinica</i> (Hiern)F.White	Lookoo	Ebenaceae	Tree
6	<i>Dovyalis abyssinica</i>	Koshomii	Flacourtiaceae	Tree
54	<i>Echinops hoehnelii</i> Schweinf.	Kosorru	Asteraceae	Shrub
45	<i>Ehretia cymosa</i> Thonn	Ulaga	Boraginaceae	Shrub
30	<i>Ekebergia capensis</i> Sparm	Sombo	Meliaceae	Tree
20	<i>Ficus sur</i> Forssk.	Harbuu	Moraceae	Tree
58	<i>Ficus thonningii</i> Blume	Dambii	Moraceae	Tree
60	<i>Ficus vasta</i> Frossk	Qilxuu	Moraceae	Tree
59	<i>Flacourtia indica</i> (Burm.f.)Merr.	Akukkuu	Flacourtiaceae	Tree
57	<i>Gnidia glauca</i> (Fresen) Gilg.	Qaqaroo	Thymelaceae	-
48	<i>Grewia ferruginea</i> Hochst. exA. Rich	Dhoqonu	Tiliaceae	Herb
33	<i>Hagenia abyssinica</i>	Heexoo	Rosaceae	Tree
50	<i>Impatiens tinctoria</i> A.Rich.	Hansosilaa	Balsaminaceae	Shrub

34	<i>Indigofera spicata</i> Forrsk.	Qoricha hadha'a	Fabaceae	Herb
40	<i>Justicia schimperiana</i> (Hochst. ex A. Nees) T. Anders	Dhumuga	Acanthaceae	Shrub
7	<i>Kalanchoe petitiana</i> A. Rich.	Bosoqqee	Euphorbiaceae	Herb
30	<i>Lepidium sativum</i> L.	Feecoo	Brassicaceae	Herb
8	<i>Lippia adoensis</i> Hochst. Ex. Walp. var. <i>adoensis</i>	Kusaye	Verbenaceae	Shrub
61	<i>Maesa lanceolata</i> Forssk.	Abbayyii	Myrtaceae	Shrub
9	<i>Malva verticillata</i> L.	Hincini	Malvaceae	Shrub
41	<i>Maytenus arbutifolia</i> (A. Rich.) Wilczek	Kombolcha	Celastraceae	Tree
14	<i>Millettia ferruginea</i> (Hochst.)	Sotaloo	Fabaceae	Tree
10	<i>Myrsine africana</i> L.	Kacama	Myrsinaceae	Tree
11	<i>Nicandra physaloides</i> L. Gaertn	Hawwixii	Solanaceae	Herb
31	<i>Ocimum lamiifolium</i> . Hochist	Qoricha michii	Lamiaceae	Herb
28	<i>Ocimum Gratissimum</i>	Dammakasee	Lamiaceae	Shrub
29	<i>Oxalis corniculata</i> L.	Qorichaabudaa	Oxalidaceae	Herb
51	<i>Pennisetum schimperii</i> A. Ric	Migira	Poaceae	Herb
12	<i>Phoenix reclinata</i> Jacq.	Meexxi	Arecaceae	Tree
18	<i>Phytolacca dodecandra</i> L'Herit	handoode dhalaa	Phytolaccaceae	Shrub
23	<i>Premna Schemperi</i> (Hochst.) Schauer	Urgessa	Verbenaceae	Tree

66	<i>Prunus africana</i> (Hook.f.) kalkm.	Homii	Rosaceae	Tree
42	<i>Psidium guajava</i> L.	Zaayituna	Myrtaceae	Tee
17	<i>Ricinus communis</i> L.	Qobboo	Euphorbiaceae	Shrub
64	<i>Ritchiea albersia</i>	Daqqoo	Caparidaceae	Tree
19	<i>Rosa abyssinica</i>	Gora	Rosaceae	Shrub
24	<i>Schefflera abyssinica</i> (Hochest.ex .Rich.)Harma	Gatamaa	Araliaceae	Tree
21	<i>Syzygium guineense</i> (willd.)Dc.	Baddessa	Myrtaceae	Tree
27	<i>Urtica simensis</i> Steudel	Dobbii	Urticaceae	Shrubs
13	<i>Vernonia amygdalina</i> Del.	Eebicha	Asteraceae	Shrub
44	<i>Vernonia auriculifera</i> Hiern	Reejii	Asteraceae	Shrub
43	<i>Vernonia hymenolepis</i>	Soyyomma	Asteraceae	Shrub
63	<i>Vernonia species</i>	Reenjii	Asteraceae	Shrub

Appendix 2: Research question English

Jimma University, School of Post Graduate Studies College of Natural Science

Assessment of Non Timber Forest Products in utilization of Gebra Dima Forest of Ale District Ilu
Aba Bora Zone, Oromia Region, southwest Ethiopia

Question to the households

Date of interview...

Sex: 1) Male 2) Female

Age:

Address: kebeles house no.

3. Educational status

1) Illiterate read and writes

2) grade 1-6 Grades 7-12 Tertiary education

4. Marital status

1) Married 2) Single

3) Divorced 4) widowed

5. Occupation

1) Government employee 3) Unemployed

2) Private employee (specify) 4) House maid

5) House wife

6) Daily lab our 7) NGO employee

1. How long have you in this area (year) -----

2. Do you collect NTFPs 1.no 2. Yes if you yes

3. What are different types of non-timber forest products found in the area?

No	Types of non timber	Species	Local name

4. What are uses of collect NTFPs?

No	Type of NTFPs	Uses	Part

5. Do you get any income from Gebra Dima forest? A yes B no

If the answer for question number 'one' is 'yes' what type of income source do you obtain from the forest?

- 1. Food 2. Firewood 3. Honey
- 4. Medicine 5. Construction 6. Wild fruit (specify)

7. What are the main types of NTFPs in the forest area?

- 1. Honey 2. Spice 3. Firewood 4. Food 5. Wild fruit and other

8. What is the habit of the sources of NTFPs?

- 1. Herbs 2. Trees 3. Shrubs 4. Climbers 5. Other

9. Do you practice preserving of Non Timber Forest Products? 1. Yes 2. No

10. If yes, which ones? Please list

NO	Type of Non Timber Forest Products	How do you preserve	Reason for Preservation
1			
2			
3			

11. Do you employ any management practices for the Non Timber Forest Products? 1. Yes= 2. NO

10 a) If yes, please describe

12. What is the likely effect in your daily life if the forest continues to decline and eventually Disappear?

A. No effect B. Some effect C. Significant effect

13. At seasonal are the NTFPs are most available for collection

Another question

1. Do you collect NTFPs?
2. What kind of NTFPs do you collect?
3. How do you use of different kinds NTFPs?
4. Do you sell those NTFPs?
5. If yes information about marketing of type of NTFPs in your area

Appendix3: Questioner's Afaan Oromoo

Jimma University, School of Post Graduate Studies College of Natural Science

Assessment of Non Timber Forest Products in utilization of Gebra Dima Forest Ilu Aba Bora Zone,
Oromia Region, southwest Ethiopia

Question to the households

Guyya itti funanamee

Saala: 1) dhiira 2) dhala

umuri:

Address: kebeles lakkofsa mana

1. Sadarkaa barnoota Abbaa

1.Kan hin baranee 3.Elementary school

2.high school 4.Dippiloomaa 5.degreef isaa ol

4. Marital status

1) Kan fudhee/ heerumte 2.kan hin heerumne /hin funne

5. Sadarkaa (gahee) hojii

1) hojaata mootuma 3) hojii kan hin qabne

2) hojii dhunfaa employee (specify) 4) qonnan bula

5) haadha mana /bulchitu

6 nGO /kan mootuma kan hin tahin

1. Wagga meeqaf naannoo kana jiratanitu?

2. Biqiloota Warra Xaawulaf Hin Tahin Kana Faayadamtani Beektu?

1. lakki 2. eyye yoo jeten isaan kaam fahi

3. Gosti Biqiltoota kana Bosonaa Kanati beekaman ummaanni itti faayadam akkam fahi warra NTFPs ?

Lakk	Maaqa biqiloota	gosa kami (species)	Faayida isa

4. Faayida Maalitif Waaliti Qaabdu?

No	Biqiloota sana	Faayida isaani	Part/jirma ,hiidda, baala isaa isa

5. Galii Argatan Jira Bosona Gebra Dima Kanara? 1. Eyye 2. Lakki

7. Biqiloota Warra Xawuula Hin Tahin Kana Kessa Inni Irra Caala Faayada Argatan Maali

1. damma 2. qimaqimami 3. Qoran bobahu 4. nyaata 5. Wild fruit and 6.other

9. Egumsa Bosona Kanaf Godhaamu Jira ?1. Eyye 2. Lakki

10. Yoo Jiraate Haala Warra Akkamif

13. biqiloota kana argachuf waaqti isaa adda adda moo yerooma tokko argachun hin dandahama?

Lakk Gosaa biqilaa Waaqti kam

Honey

Firewood

Food

Spice