ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
INSTITUTE OF REGIONAL AND LOCAL DEVELOPMENT STUDIES
(IRLDS)

PRODUCTION AND COMMERCIALIZATION OF NON-TIMBER FOREST PRODUCTS IN GOMMA AND MANNA WOREDS OF JIMMA ZONE: IMPLICATIONS TO RURAL LIVELIHOODS

BY: ASEFA TEFERI

JULY 2008

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A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Masters of Arts in Regional and Local Development Studies

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SCHOOL OF GRADUATE STUDIES

REGIONAL AND LOCAL DEVELOPMENT STUDIES

PRODUCTION AND COMERCIALIZATION OF NON-TIMBER FOREST PRODUCTS (NTFPs) IN GOMMA AND MANNA WOREDAS OF JIMMA ZONE: IMPLICATIONS TO RURAL LIVELIHOOD SECURITY

BY ASEFA TEFERI

A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Master of Arts Degree in Regional and Local Development Studies (RLDS)

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Acronyms and Abbreviations

CIFOR-Center for International Forestry Research

CTFRN- Research method for the European tropical Forest Research Network

DFID-Department for International Development

ETB-Ethiopian Birr

FAO-Food and Agricultural Organizations of the United Nations

FGD-Focus Group Discussion

ILRI -International Livestock Research Institute

IPMS-Improved Product Marketing System

ITCZ-Inter tropical convergence zone

Max- Maximum

MFP-Minor Forest Products

Min- Minimum

N- Number of respondents

NCCR-Swiss National Center of Competence in Research

No.-Number

NTFPs-Non-Timber Forest Products

NTPP-Non-Timber Plant Products

NTRV-Non-Timber Forest Resources and values

NWFPs-Non-Wood Forest Products

NWFRs-Non-Wood Forest Resources

Qt-Quintal

SD-Standard Deviation

SLF- Sustainable Livelihoods Framework

TLU- Tropical Livestock Unit

UNDP-United Nations Development Programme

UNECA - United Nations Economic Commission for Africa

Abstract

Production and commercialization of NTFPs by forest fringe communities have invaluable importance in terms of both rural livelihood security and resource conservation, perspectives. It ensures food availability particularly during slack periods and provides cash income when other income such as coffee is non-existent. The study area, Jimma zone of Oromia regional state, is one the natural afromontane forest zone found in south west Ethiopia with rich potential for the production and commercialization of NTFPs as alternative approach to livelihoods improvement and forest resource conservation. The main objectives of this study were to assess the state of production and utilization of NTFPs in the study area, and to identify major production and marketing challenges.

The analysis was made using both primary and secondary data. The primary data were collected in 2008 from 105 sample households selected randomly after their proportion was identified for the sample kebeles and wealth groups. There FGDs conducted were also supplemented by data collected from key informants and voluntary discussants. Descriptive statistics and statistical tests (chi square test and t-test) were used to examine the association between socio-demographic variables and different NTFPs production decision.

Pest incidence, lack of inputs, shortage of land and limited skilled personnel, absence of irrigation and the expansion of chat are the major production constraints identified. The major marketing challenges identified in the area include lack of transportation facility, absence of standardized measurement, low market demand, lack of developed processing technology, absence of wholesalers and limited export market.

It was found from the analysis that the different wealth groups depend on NTFPs to varying degrees with the rich group relatively well integrated to both production and commercialization of valuable NTFPs such as honey and fruits. The poor, on the other hand, heavily relies on root crops mainly due to the food security they offer in off-peak periods and partly due to the low cost of inputs compared to beekeeping, for example. Changes in important livelihood assets over the past five years indicates increment for the rich more followed by medium and stagnated or declined for the majority of the poor.

The chi-square test of association between different socio-economic variables hypothesized to affect NTFPs production decision found significant for level of education of the head, size of land, access to credit, sex and extension contact and the production of honey at 95% level of confidence. Other variables like family size, age of the head, leadership role of the head, were found to have weak association with the production of either honey, fruits or spices at ($p<0.1$) level of confidence. Therefore it is imperative to target the poor and female headed households who are benefiting the least from NTFPs through better access to credit; extension contact and input supply; provision of farmers' field school and formal education; and control of wild animal.

Chapter One

1. Introduction

Of the 600 million people living in sub-Saharan Africa, the World Bank estimates that quite a vast number (420million) depend on forests and wood lands for their livelihoods. Studies have also shown that many more around the world rely on forest products to varying degrees for fuel, food, fodder, medicinal plants, building materials, and a source of income (Van Reenen, 2005; Stronkhorst, 2005; Vivero, 2002; FAO, 1995). However, according to forest resource assessment 2000 (cited in FAO, 2003) there is an annual loss of nearly all-tropical forests of 9.4 million hectare with the increasing fuel wood demand and exploitation of forests for timber being the leading reasons of deforestation.

The preservation of tropical forests is therefore a timely issue in pursuit for food security in situations of forest-based livelihoods. This is true for two reasons: the rural households are accustomed to and dependent on these forest products and because the exploitation of NTFPs is less damaging to the forest resource than the timber logging (Van Reenen, 2005) to ensure sustainability of natural resource utilization. This in turn calls for designing and implementing better resource utilization strategies

Forests have got different important functions such as regulating climate, providing homes for plants and animals, producing timber and non-timber products, and social values. It has been estimated that some 80% of the people in developing countries to date, use non-Timber forest product, (NTFPs) for health and nutritional needs (Van Reenen, 2005; FAO, 2003a). Van Reenen (2005) also shows that some of NTFPs are significant in terms of international trade, which includes honey, gum Arabic, rattan, resins, essential oils and plant and animal parts for pharmaceutical products. In spite of a wide range of goods and services they provide, NTFPs have been rarely recognized as valuable products (Van Reenen, 2005; Bih, 2006). As a result, there is an ever-intensifying threat on the fragile forest resources of the country left in few pockets of the southwestern parts of Ethiopia where the Jimma zone is found.

This does not only mean the loss of the big trees in themselves but also endangering a wide variety of the high value NTFPs such as coffee, honey, fruits, resins, spices, root crops and many others that could be produced in an integrated system in such rich ecology.

The southwestern part of Ethiopia, where the Jimma zone (the study area) of Oromiya regional state is found, primarily depends on coffee production as their economic base. The Jimma zone alone constitutes about 23.2% of the regions out put and 11.8% of Ethiopia's total out put being one of the three top coffee producers zone (CSA, 2006). Sole dependence on coffee production is often subject to market failures as coffee price is externally determined making the farmer coffee producers' price recipients. The situation has made the area vulnerable to market shocks forcing them to convert the coffee farm to alternative land uses such as cereals in response to fall in coffee prices. This does not only affect their livelihood base but also the environment as coffee farm is converted to other land uses clearing the coffee forest and its shade trees. This calls for the diversification of livelihood base of the local people by enhancing the production and commercialization of NTFPs other than coffee so as to help the community withstand coffee market failures by ensuring sustainable flow of return from the diversified base of the forests. Hence, conservation efforts should not only focus on the protection of forests, but also on improving local livelihoods in such away that conversion forces will be reversed (Stronkhorst, 2005).

Cognizant of the various purposes of forests that include environmental, economic and social benefits and values the regional state of Oromiya in collaboration with different non-governmental organizations has tried different interventions to ensure the sustainable use of natural resources. Such interventions have long been preservationist in approach which tries to conserve forests through lowering forest dependence of local livelihoods. The current approach rather assumes direct linkage between livelihoods and conservation to relieve poverty (Van Reenen, 2005; Chowdhury, 2005). The two possible sustainable forest contributions to poverty alleviation that have been brought forward are NTFPs and ecotourism (Stronkhorst, 2005).

1.1. Statement of the problem

It is understood that agriculture remains to be the backbone of the Ethiopian economy, the success of which is under threat by different factors one of which being the ever intensifying land degradation. The problem of land degradation is severe in the highlands of Ethiopia whereas most part of the country is devoid of its natural vegetation.

NTFPs play significant role in diversifying the sources of farm households' income by adding up on the income from annual crop production and live stock rearing and by sustaining the flow of return in time by virtue of their perennial nature (FAO, 2005). Moreover, NTFPs production is also by far less damaging when compared with timber logging in the area which is destructive and quite unfriendly with the issue of sustainability. This demands the production of economically valuable NTFPs to tackle both problems of insecure rural livelihood and land degradation, simultaneously. As a result, NTFPs are ever more becoming important as a means of combating deforestation hence maintaining forest cover by realizing income from it. Thus, NTFPs are important from socio-economic and resource conservation paerspectives (FAO, 2005; Stronkhorst, 2005).

The study area, Jimma zone, appears to have a good potential for NTFPs production, as it is one of the few areas of remaining natural forest vegetation in the country. Wiersum (2005) indicated that the forests, on top of their ecological functions, harbor a number of valuable NTFPs such as honey and coffee which provide an important contribution to the livelihood improvement. Therefore, enhancement of the production of NTFPs would help the two issues: improved livelihood and forest conservation objectives than the exploitative /destructive nature of timber production.

Despite the protectionist role of the state, Jimma area is rather known to have been providing timber, which is produced by traditional and destructive manner not only inducing ecological degradation but also threatening the potential for rural livelihood diversification and income generating opportunities. This could have been reversed by emphasizing on the NTFPs production and commercialization as alternative means of

livelihood. The local community is not benefiting from this ample opportunity in an integrated approach. As a result, the rural communities are not as such fully engaged in the production and processing of NTFPs and even those who are producing face different problems in the production, management and marketing processes (ONRS, 2006).

Therefore, the lower production and productivity relative to its potential might be attributed to socio-economic and biophysical factors with in which local farmers operate. Studies carried out in the area have so far focused on the genetic conservation of selected species with little emphasis given to the role NTFPs play in livelihood security (Mbogga and Wubalem, 2004; Getachew and Taye, 2004). Few studies have been done very recently in southwest Ethiopia on how NTFPs could contribute to livelihood improvements and ensure sustainable resource use (Van Reneen, 2005; Chowdhury, 2005; Wiersum, 2005; Getachew and Wubalem, 2004; Motuma and Abebe, 2004; Abebe etal., 2006). It is however, acknowledged that NTFPs are very diverse and that the scope for its exploitation is both product and location specific (Ros-Tonen and Wiersum, 2004). They emphasized on NTFP as a livelihood base for the forest communities. Little attention has been given for the vast opportunity in such potentially rich NTFPs site as Jimma area where issues related to awareness; technological accessibility; marketing arrangements and the overall role of NTFPs in rural livelihood worth investigating. This study attempts to find out the state of NTFPs production and commercialization in the intention of realizing secure rural livelihoods through environment friendly production systems .Because the whole process requires not only maximizing productivity, but also good market arrangements for the products even to go beyond national boarder and ensuring that the producers get reasonable price (Tegenge, 2005).

This demands the identification of major determinant factors of NTFPs production decision, processing or marketing, challenges and opportunities of NTFPs. This is central to set appropriate intervention mechanisms so as to promote NTFPs production that supplement coffee to establish improved livelihood base through sustainable use of natural resources in a head long pursuit of sustainable livelihood for the local community.

1.2. Objectives of the study

The general objective of the study was to assess the NTFPs production potential and actual utilization in Jimma zone and the implications for rural livelihoods and the environment and the commercialization process of NTFPs. The specific objectives were.

- To assess the state of production and utilization of major NTFPs in the study area.
- To identify the major socio-economic and biophysical determinants of NTFPs production by the communities in the study area.
- To assess the contribution of NTFPs to improved rural livelihood in the light of food security, employment, diversification and income generation; and to the environment.
- To examine the commercialization processes through different market channels.
- To assess the major challenges and opportunities for the NTFP sector in the area.

1.3. Research Questions

The following were the research questions designed to achieve the stated research objectives.

- What NTFPs are there in the area? And what is the actual utilization compared with its prevailing production potential?
- What major socio economic and biophysical determinants affect the NTFPs production in the study area?
- Does the technological gap affect the production potential of NTFPs in the area?
- What are the contributions of NTFPs production to improved rural livelihood in the light of food security, employment, and income diversification and to the sustainable use of the environmental resources?
- What implications does the commercialization process through the marketing channels in general have for major NTFPs in the area?
- What are the good opportunities to be exploited and the challenges to overcome in realizing sustainable use of forests and livelihood diversification in the area?

1.4. Significance of the study

The output that would be developed from this study is of relevance to different stakeholders at various levels. It could provide analysis useful to producer households, governmental and non-governmental development organizations, donors, and research and extension institutions committed to simultaneous improvement of natural resource base and economic advancement through sustainable utilization of forests via NTFPs production. Moreover, it could provide important information for local traders, processors and exporters of major NTFPs in identifying market demands and potential market opportunities both in land and overseas. Above all, the ultimate goal of this study is the betterment of the forest based livelihoods of the communities under consideration and then of all stakeholders in the production and commercialization of NTFPs which would eventually make meaningful contribution to the national economy through the proper implementation of the- would- be derived recommendations.

1.5. Scope of the study

The scope of this study was delimited to the production and marketing of major NTFPs and their implication to rural livelihood and the environment in the study area, which were identified through survey. Among others coffee, fruits, honey, spices and root crops take the lion share. This study, however, focused on the inventory of major NTFPs other than coffee; their production, processing, utilization and services. Instruments were prepared in such a way that it is sufficient enough to provide the required information to meet the stated objectives. It is also worth to note that forest services such as medicine, shade, fences, and other utensils are assessed in this study.

1.6. Delimitation of the study

This study was delimited to three kebeles of Gomma and Manna districts in Jimma Zone of Oromiya regional state. Three kebeles: Haro from Manna, and Chidero Suse and Ganji Ilbu from Gomma were covered by the survey.

1.7. Limitation of the Study

Even though attempts were made to generate reliable data to answer the stated research questions the researcher can not claim to have undertaken exhaustive survey of NTFPs in the study area as a number of factors constrained the research process. One among others is the unwillingness of some household heads to be interviewed and the lack of interest by some other households to provide genuine information on matters pertinent to production, income, land holding, etc. Time constraint was another limitation to the result of this study as this thesis was under taken in a few months time, which would have otherwise been better surveyed for a reasonably longer time. Moreover, part of the data used in this thesis were gathered from key informants using a checklist rather than a structured formal questionnaire due to constraints related to both time and financial matters. Nonetheless, this thesis would provide a good insight for further research and other concerned stakeholders on the state of NTFPs production and commercialization and its implications to rural livelihood security and the environment.

1.8. Organization of the Thesis

This thesis is organized in six chapters. The first chapter is the introduction part having seven sub sections. Description of the study area and the review of related literature make up the second and third chapters, respectively. The fourth chapter is the research methodology part. The fifth chapter deals with the result and discussion with its respective sub sections; whereas, the sixth and last chapter is the conclusion and recommendations part.

Chapter Two

2. Study Area Description

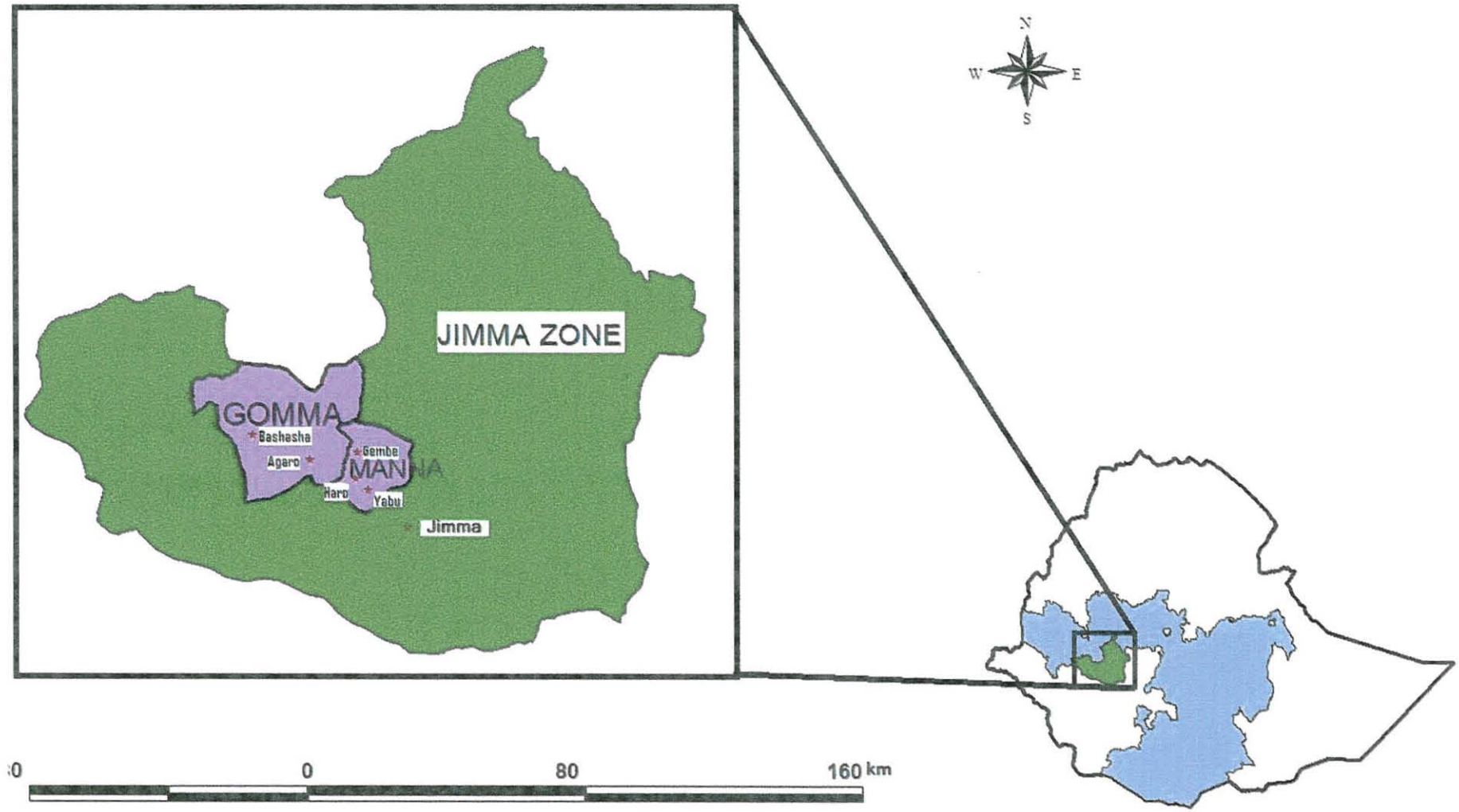
2.1. Location and Extent

Jimma Zone is one of the 24 zones of the oromiya regional state. The absolute location of Jimma extends between 7^0 13'20" – 8^0 53' 16" north latitudes and $35^0$51'07" – $37^0$36'16" east longitudes. Geographically, the zone is bordered by SNNPR in the south, Illu Abba-Boora in the North, West Wollega in the north and East Wollega in the north east. Towns and cities in Jimma include Agaro, Genet, Jimma and Saqqa among others.

According to the socio-economic profile of the zone prepared by the zonal planning and economic development office, the total area of Jimma is about 18,415 km^2. Of the total area, about 2946.4km^2 (16%), 11417.3 km^2 (62 %) and 4051.3km2 lie under the high land, medium and low lands, respectively. This zone has 17 districts the boundaries of which are mostly demarcated by natural features such as long rivers, mountains, and gorges and often with man made roads and conventionally designated marks. The study area: Gomma and Manna districts are in this zone and their respective capitals are Agaro and Yabbu, Yabbu and Agaro are about 25 and 60 kms away from Jimma, respectively. Gomma is the largest district in the zone; Where as, Manna is the smallest.

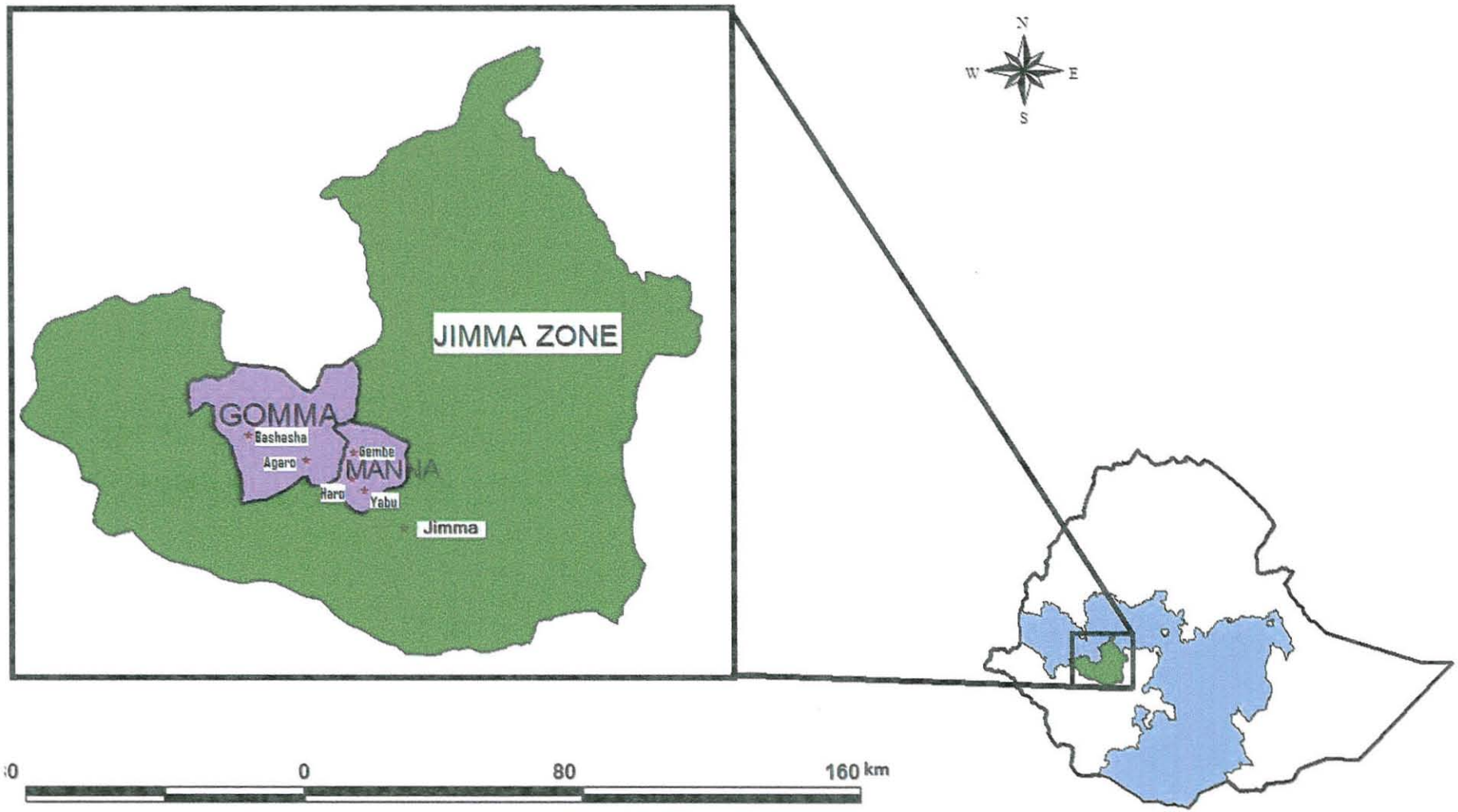
Gomma district extends between 7^0 40' - 8^0 04' north latitudes and 36^0 17' - 36^0 46' east longitudes. It is bordered with Dedesa district north; Limmu Kossa district in east; Manna district in southeast; with Seka Chokersa in south and Gera district in the west. It is situated in the central part of the zone. The woreda covers a total area of 93,657 hectares. It has a total surface area of *1270.07* Km^2 that accounted for 6.5% of the total area of Jimma zone. On the other hand, Manna district extends between $7^0$38' - $7^0$54' north latitudes and $36^0$38' - $36^0$53' east longitudes. It is bordered with Gomma and Limmu Kossa districts in the north; Kersa district in the east; Seka Chekoresa district in the south; and Gomma district in the west. It is situated in the central part of the zone covering a total area of (*479.8*$Km^{2)}$ 38,663 ha having different land use systems. It is the smallest district of the zone accounting for 2.5% of the total area of Jimma zone.

Figure 2.1 Map Showing the Relative Location of the Study Area



Source: Ethio-GIS (2004)

Figure 2.1 Map Showing the Relative Location of the Study Area



Source: Ethio-GIS (2004)

2.2 Bio-physical characteristics

Relief: The relief of the zone generally reveals a decreasing altitude from west to east and North wards. The altitude ranges between 880 and 3360 m.a.m.s.l. The lowest altitude of the zone is situated along the Gibe valley and the highest altitude is in the Nadda district at Guddo Mountain. Generally, the physical feature of the zone depicts different dissected and undulating plane accommodating various altitudinal zones.

Drainage: Jimma Zone is endowed with many perennial rivers; namely, Gibe Gojeb, Tunjo Gibe, Gilgel Gibe, etc and many other small rivers and streams with untapped potentials. These large and small perennial rivers form a dendrite pattern over the zone. The rivers are generally categorized under two river basins; the Omo-Gibe and Abay basin, which all together make the zone high potential area for irrigation and hydro electric power generation. The drainage of Gomma woreda is characterized by big rivers like Chische, Kolobe, Naso and numerous springs both seasonal and perennials. The total area of the district lies in the Dedesa River Basin. Dedesa, Awetu, Dugaji Koncho, Temsa'a, Jewe and Kolombo are the major perennial rivers that drain to Gibe River. Manna woreda on the other hand has 13 big rivers and 453 spring water. The total area of Manna district lies in the Didesa river basins. Yebu, Aniso, Wanja, Feche, Sogido, Awetu, and Urgessa are the major perennial rivers that drain to Didesa RiveR (ONRS, 2004).

Climate: The woredas are characterized by a tropical high land climate with heavy rainfall, warm temperature and long wet period. The mean annual rainfall ranges between 1200 – 2500 mm with mean annual temperature of 20-25^{0}c. There are four seasons considered throughout the year and the heavy rain fall season ranges from June to early September. Tropical climate of mean monthly temperature above 18^{0}c and the winter dry season specifically characterizes most part of Gomma district. Generally, the climate of the region is governed by the movement of ITCZ and it receives an adequately sustained amount of rainfall which is largely sufficient for a variety of crops grown in the zone. Most part of the two districts belongs to subtropical (Baddaa daree) and cool (Baddaa)

agro-climates. Baddaa daree and Baddaa agro-climates do respectively constitute 88% and 12% of the district areas. The western parts do have Badda (cool) agro-climate with the mean annual temperature ranging between 15-18^{0}c while the vast part of the district is classified under subtropical climate with mean annual temperature ranging between18-22^{0}c.

Soil: Even though, no detail studies about the soil of the zone are available, the soil of Gomma and Manna woredas is dominated by clay porous and well-drained soils of Nitosol type. They are deep reddish brown to red in color and have generally good potential for agriculture and are easily workable. The soil fertility increases towards the low land and the high land parts where the area is covered with forest. The soil under the forest coverage is very fertile, black in color with good retention capacity. However, the soil in the medium altitude is relatively exhausted due to high population pressure. The soil of Gomma woreda is typically clay in texture. Its soil association lies in the either category of Leptosol/Regosol, Phaeozem/Regosol or Phaeozem. The major soil categories of Gomma district are Orthic Acrisols(10%), Dystric Nitosols and Choromic & Pellic Vertisols(80%). Orthic Acrisols cover the western part of the district and constitutes about 10% of the district soils. Dystric Nitosols is confined to the central, southern and eastern portion of the district. Manna woreda has reddish brown to dark reddish soil associations. All the soils types have good agricultural potentialities. Certainly, because of the fact that there is little or no forest degradation, soil degradation is not serious problem in these woredas (ONRS, 2004).

Vegetation and wild life: Jimma zone is one of the regions where remnants of tropical rainforest are found. According to the zonal planning and economic development office, 25% of the total area of the zone was under forests. The dominant tree species in the high land natural forest zone include Tikur inchet, kerero, wanza and zigba which are highly valued for lumbering (ONRS, 2004). Gomma and Manna are known to have been well under vegetation cover. The vegetation is consisted of many valuable tree species both in terms of economic and environmental aspects. These include Alibizia, Bisana, Wanza, Acacia, Birbera, Eucluaptus and many others hosting a wide variety of wild animals such as monkey, apes, and columbus, hyena, tiger and different kinds of birds. Despite this

fact, there is an increasing scarcity of wood for infrastructures and of grass for grazing due to the fast growing human population and live stock possession.

2.3. Demographic characteristics

The zone has an estimated total population of 2,860,164 of whom 1,434,197 are females and 1,425,967 are males. And 13.2% of its population is urban dwellers with an estimated area of 18,696km2 and crude density of 150.64 persons per sq. km. The highest population density is depicted in Manna and Gomma districts with about 324 and 265 persons / $km^{2,}$ respectively. Gomma woreda has a total population size of 266,144 of which 132,539 are male and 133,605 are female where as Manna woreda has a total population of 151,958 of which 76,367 are male and the remaining 75,591 are female. In terms of ethnic composition, the Oromo people are the predominant ethnic group with the Yem people being a significant minority (ONRS, 2004).

2.4. Land use and Farming system

According to the data obtained from rural and agricultural development office of the zone from the total area of 18,415km2 about 50% (9,658.4km2) is under cultivation; 25%(4.829km2) is forested, 10% (1,93.7km2 is wood land; the other 10% (1,931.7km2) is grassland and 5% (965.84km2) is for other purposes (ONRS, 2004).

Mixed farming system of both crop production and animal rearing is well practiced. Although, the livelihood of most farmers in this zone depends on coffee other perennial crops are also important. The crop calendar of both Gomma and Manna Woreda shows that land in the woreda is meant for different purposes such as production of coffee, maize, chat, fruits and taro as main crops owing to their economic importance. The farming system common in the area is mixed farming combining cash crop production, cereal and livestock rearing. Fallow method is not used as soil conservation technique because of the growing scarcity of land for crop production. Traditional horizontal ploughing remains to be the only method of soil conservation, as a result. These woredas have no serious land use problems related to degradation, but damage of crops by wild animals and the scarcity of land for crop production (ONRS, 2004).

Chapter Three

3. Review of Related Literature

3.1. Overview of Non-Timber Forest Products

In most of the cases whenever we speak of forest products, timber assumes the first rank. However, forests harbor a multitude of products both timber and non- timber ones. The later were often neglected, in spite of their valuable contribution in a wide range of aspects, until the last two decades (Van Reenen, 2005). NTFPs have in the past been referred to 'minor' forest products which underestimated the importance of NTFPs and hence created a biased impression in the minds of practicing foresters in their management (Bih, 2006).

There have long been debates about the terminology and about what should be included and what should not be included in the definition of NTFPs. According to Belcher (2003), there are many alternate terms that are used more or less as synonyms each with its proponents such as *wild products, natural products, non-timber forest and grassland products, veld products and sustainably produced wood products* as distinct from industrial timber and many others have entered the vernacular.

The collective term NTFP includes a huge variety of products / species and associated production and marketing systems. There are indeed products in this category that are accessible to poor people , that are used in subsistence systems, that provide important sources of cash income , and that are harvested in relatively benign ways (Belcher,2003; DeBeer and McDormot, 1989). According to Belcher (2003), the term NTFPs is further confused with the emerging research interests in NTFP from many perspectives each with their own interests and languages. Development organizations see NTFPs as a means for generating subsistence and cash income to benefit the poor. Conservation-oriented groups may be interested in individual species of NTFPs, especially in cases where commercial over-exploitation is seen as a threat, or they may see NTFPs as instruments to help achieve conservation, with low intensity management regimes preferred over more intensive management systems (Belcher, 2003). This author further summarizes five main elements to the interpretation of the NTFP concept that seem to matter most to users. These are: the nature of the product (or service); the source of the product (or

service); the production system for product; the scale of production; and the ownership and distribution of benefits.

The following are the terms in use with the continuing confusion over the definitions and scope of NTFPs. Chandrasekharan (1995) felt non-tangible benefits of forest should be included and thus built the term non-wood forest benefits. For Wong (2000) these same resources meant non-wood goods and services. There are also common terms which place central importance on timber making all other products minor-minor forest products (MFP) (Falconer, 1990). Some others still consider it as a resource and not a product because often raw materials are harvested-non-timber forest resources (NTFRs) (UNDP, 2001). There are also many more terms such as Non-Timber Plant Products (NTPP), non-timber forest resources and values (NTFRV), and non-wood forest resources (NWFP).

FAO defines non-wood forest products to include all goods of biological origin, as well as services, derived from forest or any land under similar use, and exclude wood in all its forms (FAO, 1999). This FAO definition excludes all woody raw materials and services. According to Ros-Tonen et al. (1995) Non-timber forest products can be defined as "all tangible animal and plant products other than industrial timber, which can be collected from forest for subsistence and for trade". As such any part of any plant or animal harvested can be described as NTFP. For the purpose of this study NTFPs consist of goods of biological origin other than timber, derived from forests, other wooded land and trees outside forests.

Nowadays no matter what terminological differences persist in referring to the term NTFPs; it is acknowledged that these products serve a variety of purposes as subsistence needs, at times of hardships and as a means to earn cash income on a regular basis from diversified sources with out compromising the issue of sustainability (Angelsen & Wunder, 2003).

3.2. Classification of Non-Timber Forest Products

Forests harbor a variety of products categorized under NTFPs. Energy, 1998 (in Adepoju, etal; 2007) identified 138 products from 80 forest species in Michigan Upper Peninsula. As to the United Nations and food and agricultural organization it is claimed that at least 150 non –wood products are found to be important in international trade. A better understanding of the NTFPs industry demands the classification of these products into like categories. Adepoju (2007) broadly classified NTFPs into edibles and non-edibles. The former include edible plants and animals, honey, oils, fish, spices etc where as the later refers to products like grasses, ornamental plants, for cosmetic use, medicinal products, etc.

1. *Edibles:* include products such as mushroom. These two classes are further classified into four general categories (Van Reneen, 2005 and Adepoju, 2007). The most well know and documented edible forest products and many other food products are gathered from the forest. It is however difficult to make an assessment of their economic magnitudes as such products are not widely traded and are usually collected and consumed by the harvesters themselves (Adepoju, 2007).
2. *Medicinal and dietary supplements*: this includes plant based products that are processed into medicines eighteenth century on wards, over 100 plant species indigenous to the U.S. were commonly accepted for their medicinal properties the majority of which are wild harvested and traded as botanical products (Faster, 1995 in Adepoju,2007)
3. *Floral products*: it includes pine boughs, grapevines ferns, and other plant products used for decorative application.
4. *Specialty wood products*: this group includes handcrafts curving and tunings, musical instrument containers, special furniture pieces as well a utensils. As to Adepoju (2007) specialty wood products in general are considered non traditional if they are produced directly from trees and not from lumber or timber purchased from mills.

3.3. Non-Timber Forest Products in Africa

Although NTFPs play a major role in the rural economy of Africa, information on their overall contribution is patchy and incomplete, except for a few species and products of commercial importance (FAO, 2003). African forests are sources of a variety of NTFPs such as fruits, gums and resins, honey and bees wax, medicinal and aromatic plants, dying and tanning materials, bamboo and bush meat (Mbogga and wubalem, 2004). Such non-timber forest products are of significant importance to the livelihoods of rural communities and often account for a major share of household income as a source of food (Amborse, 2003). Contrary to expectations, increased demand has not necessarily led to improved management including domestication and a substantial proportion of products are collected from the wild, hence resource depletion is a major threat (FAO, 2003; Falconer, 1990). Africa has not been able to back advantage of its wealth of raw material and traditional knowledge and investing on processing which undermines opportunities for employment creation and income generation

3.4. Non-Timber Forest Products in Ethiopia

By virtue of its varied ecological and climatic conditions, Ethiopia, hosts some of the most important, diverse, flora and fauna in Africa (Vivero, 2002). The most important NTFPs in Ethiopia include coffee, spices, condiments; honey and wax; bamboo; reeds; natural gums such as gum Arabic, frankincense and myrrh; edible plant products like leaves and shoots, fruits, seeds, tubers, mushrooms, edible oil, and fat; fodder; fibers; bark, simple sugar products; essential oils tannins and dyes; resins; latex; ornamental plants and giant/ long grasses (Getachew and Wubalem, 2004)

These products are of invaluable contribution to the improvement of the livelihoods of rural communities through the provision of food, medicine, additional income and employment opportunities and foreign exchange earnings of the country (Freese, 1998, De Beer McDormot, 1989). Moreover, NTFPs are also equally valuable in terms of resource conservation by complementing wood based management offering a basis for managing forests in a more sustainable way, thereby supporting biodiversity conservation (Mbogga and Wubalem, 2004). NTFPs are also major service of feedstock and energy for forest industries and others. Despite the fact that the NTFPs of Ethiopia are diverse

and important to secure rural livelihood on sustainable basis, the majority of them are still less known, less managed and underutilized.

The production /harvesting, commercialization and transformation of certain NTFPs by the rural poor can be a means of shifting efforts a way from the unsustainable exploitation of forests products such as frankincense, myrrh and gum Arabic, wild life heritage, and endangered hardwood and softwood timber that are obtained from ecologically sound species (Getachew and wubalem, 2004). Among others NTFPs especially such as frankincense, myrrh, gum Arabic, bamboo, spices, medicinal plants, edible plants essential oils, honey and bees wax, civet and wild life resources other than bees and civet to improving household and national economy, have significant potential contribution (Freese, 1998).

3.5. Non- Timber Forest-product and services

3.5.1. Edible Fruits and Roots

In Africa, trees have been traditionally important in emergency cases especially in times of drought, famine and wars (Virero, 2002). There are numerous forest plants with potential edible parts like (fruits, seeds, leave, roots and tubers) that can either be directly consumed or transformed in food industries (Vivero, 2001) . Wild plants seem more commonly consumed staple crops wide spread in food insecure areas at times of crop failure and cash income. Famine food plants include some wild food plants like Avisaemaspp and Huernia spp that are purposely cultivated on farm fields to be available and used at times of food shortage, even if they are aggressive weeds.

The edible plants of Ethiopia are estimated to constitute about 8% of the higher plants species in the country where about 25% of these are cultivated as food crops and the remaining 75% are categorized as wild, semi-wild or naturalized. Species with edible fruits contributed to 61.6% with edible leaves 27.7% stems 14.4% roots 13.3%, and seeds 10.3% (Getachew and Wubalem, 2004) out of which 15% are considered as famine foods.

3.5.2. Honey

Trees often play an important role in honey production as they provide fodder for bees throughout the year (Abebe etal, 2006). The Ethiopian climate and the extended flowering season are favorable for apiculture. The varied ecological and climatic condition has made Ethiopia a home to some of the most diverse flora and fauna in Africa. Beekeeping is an ancient tradition in Ethiopia and found widespread in most parts especially in the southwest montane forest region with the highest hive density in Africa (Abebe. etal. 2006).

Honey production in Ethiopia is mainly traditional with traditional and modern hives constituting about 4-10 million and 10,000 hives, respectively (Getachew & Wubalem, 2004). Annual honey production amounts to 24,000 tones, equal to about one third of the total honey production in Africa and ranks 10^{th} in the world (Abebe etal., 2006). The main products domestic production is used as table honey in rural, 55-60% remaining part is sold in local markets and a considerable amount is also exported (Abebe etal, 2006). Annual production of wax is estimated at 3,200 tones making Ethiopia the 4^{th} largest wax producer next to China, Mexico and Turkey (Getachew & Wubalem, 2004).

Ethiopia is considered to be a potential giant for honey production owing to its diverse habitat and flora (Abebe etal. 2006). The forest areas in the southwestern and southeastern parts of the country are well known for their honey production. In addition the availability of traditional skills and forest resources for bee fodder are good opportunities for honey production. These areas are also free from pesticides and other agrochemical residues (Hartmann, 2004). However, production and commercialization from traditional hives is low (5-6kg) of honey per hive while in areas where new technology has been recorded. Being free from agro-chemical residues, forest honey has the potential of being marketed as 'organic honey' (Abebe etal, 2006).

Nonetheless, the potential of honey and wax production has been undermined by the destruction of the natural vegetation that provides the sources of nectar (Getachew & Wubalem, 2004). To avert the trend control of deforestation and associated land escape degradation, active planting of nectar-yielding plants and the development of processing and marketing schemes would be some of the basic means to increase the volume and

value of honey and wax production (Abebe etal, 2006). Thus, integrating honey production and commercialization to forest management is vital to attract international trade.

3.5.3. Spices

According to Jansen (1981) harvesting and cultivation of wild spices is common in many areas of southern Ethiopia such as sheka, kaffa, Benchi maji south Omo and GamoGofa. The mountainous forest region in the southwest parts of Ethiopia has a great potential for spices production (Abebe etal, 2006). Commercial spices such as Aframomu angustifolium (Korerima) and Piper capense (Timiz) are endemic to the rain forest areas of the south west region (Vivero, 2001)

Ethiopia was well known for its considerable exports of korerima capsules to the world market, mainly as a substitute for the Indian cardamom. However, the supply decreased during the last few decades in response to the ever increasing destruction of the natural habitat, which is even threatening the mere existence of the crop in the country.

Korerima has some superior qualities compared to cardamom: it has a relatively wider adaptation and higher productivity, a factor that could have attracted producers' interest to expand its production (Abebe etal, 2006). The production and commercialization of spices in general was, however, constrained by absences of processing industries and lack of sustainable market outlets. Therefore, taking into account the potential value of spices for improved livelihood and national economy, there is an urgent need for their commercialization via improved production system (Ibid).

3.5.4. Medicinal Plants

The forests are good source of production with medicinal values (leaves, barks, roots, fruits, etc). Forests provide the only medicines available to a large proportion of Ethiopia's population as more than 80% depends on traditional medicine from NTFPs for their human and livestock health care practices (FAO, 1995). Some plants contain high concentrations of particular chemicals that are the base for modern drug equivalents while many other plants chosen for their traditional medicinal qualities have high

concentrations of vitamins and minerals that help counteract illnesses caused by dietary deficiencies (Vivero, 2002).

As regards, its commercialization, in modern pharmaceutical, around 25% active material comes directly or indirectly from plant materials (Fransworth, 1988). The same source states that about 75% of medicinal plants used in pharmaceuticals were discovered through traditional uses whose collection is undertaken at two levels: by specialized healers and by household members. Knowledge of plant that treat most common diseases in the area is shared by most of the household members, making it necessary to consult a specialist only when the case is complicated (Vivero, 2002).

There are 35, 000 medicinal plants in the world and over 600 species of medicinal plants on record, constituting about 10% of Ethiopia's vascular flora, i.e. 6000-7000 species (FAO, 1995). They are found well distributed all over the country, with greater concentration in the south and southwest. The woodlands of Ethiopia followed by dry montane forest complex of the plateau are major sources of most of the medicinal plants (Getachew & Wubalem, 2004).

Medicinal plants and knowledge of them use as a bridge that links education and knowledge of institutions, health and population issues, sustainable development, environmental and cultural issues, gender, and rural, urban and private sector strategies (Daba, 2002).

Some important medicinal plant species of Ethiopia are becoming scarce due to environmental degradation and over-exploitation. The use of traditional medicine is increasing than ever before because modern medicine has become very expensive and beyond the reach of most people. Hence the role of traditional health care systems may not decline in the future as they are both culturally viable and an important way of getting relief from various diseases, and because they are free and/or affordable (Getachew & Wubalem, 2004). However, information is lacking for most species regarding regeneration, parts used, specific uses, price and dose (FAO, 1995). Despite their importance in terms of socio economic and biodiversity, medicinal plants are threatened by environmental degradation, deforestation, population growth, agricultural expansion,

over harvesting, uncontrolled hunting, lack of proper management and unsustainable utilization.

3.6. Socio- economic importance of NTFPs

There has been a growing need for and awareness about the different aspects of NTFPs. They contribute for the improvement of the livelihoods of rural communities and the nation by providing food, fodder, medicine, and additional income and though their cultural, social, economic, environmental and ecological uses, employment opportunities and foreign exchange earnings of Ethiopia (Daba, 2002) The dry lands of Africa, which occupy about 80% of the countries that constitute up the in Intergovernmental Authority on Government (1GAD) including Ethiopia and between 30-90% of other countries, hosts a wide variety of NTFPs (Getachew and Wubablem, 2004). NTFPs are of significant importance in the dry land areas of the world including Ethiopia where other alternative resources are hardly available for supporting the livelihood of local communities owing to the difficult environmental conditions featured by scanty and erratic rainfall high evaporation and poor soils (Bih, 2006). NTFPs are now even perceived to be of importance to some local and national economies as well as being important elements in sustainable forestry and for their "contribution to environmental objectives, including the conservation of biological diversity" (FAO, 2003). NTFPs have the following most important socio-economic contribution world wide.

- About 140 million people live with in or on the margins of forests relying on them for fuel, firewood and raw materials for clothes, hunters-gatherers groups who have a vast and irreplaceable knowledge of the forests in which they live (WWF, 1989 in Getachew and Wubalem,2004)
- The total value of the world trade in NTFPs is 11 billion US and of which about 60% is imported by EC, USA and Japan (Vivero, 2001)
- World trade in honey is 300,000 tones, valued at US$300 million and Ethiopia being 4^{th} in bees wax and 10^{th} in honey production (Virero, 2001).
- Forest dwellers in Philippines are about 18 million who are primarily dependent on the collection and sell of NTFPs for their livelihood (FAO, 1995)

- The economic value of NTFPs amounted to US$19 million in 1998, or around 3% of regional income in North-West and south West provinces of Cameroon (Van Dorp etal.1999)
- The economic contribution of NTFPs exceeds 70% of the total value of forest based exports and 13% of total exports (Lele etal. 1994) and about 80% of forest dwellers depend on NTFPs for 20-25% of their food requirements.
- Estimates of the number of people who are dependent on NTFPs for at least part of their income range from 200 million world-wise to 1 billion in Asia and the pacific (Bih, 2006)
- NTFPs could foster broader-based economic growth than large scale timber operations (Arnold, 1995).
- In the United States pacific Northwest alone trade in NWFRs reaches at least US$200 million annually (Hansis, 1998)
- Estimates of world trade in medicinal plants alone to be US$10000 million annually (Freese, 1998)
- Indonesian exports of rattan and other NWFPs exceeded US$134 million per year and Indian trade is estimated to be $1billion(Freese, 1998)

3.6.1. The Role of NTFPs in Livelihood Security

***Forest and food-security in Africa*:** Although the forests of Africa is known for its variety, importance and richness in food source, progress has been very slow in designing and implementing measures to increase the contribution of wild plants and animals to food production and food security (Vivero, 2002). On the contrary, the steadily growing population pressure in most African countries will undoubtedly induce different forms of unsustainable forest resources utilization ultimately leading to the total forest depletion. However, there is still a room of hope to reverse this trend by assigning economic value to forests themselves to help different stakeholders (people, government and enterprises) develop a strong interest in conserving and utilizing forests in a sustainable way (Vivero, 2002). Food security is the outcome of the complex interactions among natural resource management, political, social and economic factors. Forests as one important element with in this interaction matrix affect food security in many ways (Daba, 2002) Trees and

forests contribute in many ways a wealth of products that may be used for food, medicines, and beverages and other ways that improve the well being –livelihood of the local population (Vivero, 2002). Commercial significance should not be the only gauge to measure the relative value of NTFPs and suggested that their importance in respect of the well being of the people concerned would be more applicable (Gunnar, 1982)

Non-timber forest products constitute a critical component of food security and it is an important source of income for the poor in many developing countries (Adepoju, etal, 2007; FAO, 1995). In many areas rural populations are traditionally depended on local forest resources to provide additional income through collection and marketing of NTFPs. Charlie etal (2004) cited in Adepoju (2007) looked in to the role and importance of NTFPs in the daily lives of rural people in south Africa and discovered that more than 85% of the households use products such as wild spinaches, fuel wood, wooden utensils, edible, fruits, etc and more than 50% of the households investigated made use of edible insects, wood for construction, bush meat, wild honey and reeds for weaving.

A lot of research work has come out to understand the importance of forest products for poor household economy and food security in Africa during this last decade. However, they hardly address the situation in Ethiopia. In six countries surveyed recently in southern and eastern Africa (Arnold etal, 1994 in Vivero, 2002), an estimated 763,000 persons were employed in small scale production or trading in four types of forest product activity: grass, cane and bamboo products (42%), and woodworking (27%). In Zimbabwe small scale forest based enterprises, which mostly are based on NTFPs employed 237,000 people in 1991, compared to 16,000 employed in Cameroon forestry and forest industries for the same year (Spore, 2000) NTFPs sold annually in local or regional markets in Cameroon account for more than 150,000 EURO and about 3000 metric tone Prunus africana bark and bark products exported since early 1990s earned US 220 million per year (Spore, 2000).

The employment in small-scale enterprises has to be seen with in the broader framework of non-farm activities for income diversification. Non farm earnings to African farm household are substantial and they form 22% to 93% depending on the countries (cash and in-kind income (Vivero, 2001).

Poverty, food security and forest based Livelihoods in Ethiopia:

Ethiopia, one of the poorest countries in the world, most densely populated countries in Africa and having low productivity for most of its crops, inevitably faces chronic food insecurity, exacerbated by the recurrence of drought periods (Vivero, 2002). Consequently, an estimated 50% of the country's population is food insecure or below poverty line and more that 40% of them survive with less than one dollar per day.

Nevertheless, efforts made to ensure food security have been too often characterized by isolated interventions, which do not address the complexities of the core problems that underlie food security (Daba, 2002). Forests in general and NTFPs in particular provide a wide range of economic opportunities for tens of thousands of people in Ethiopia. NTFPs are important source of livelihood in many rural areas of Ethiopia (Vivero, 2002).The income of many rural households in western and southern parts of the country is supported through the non-wood product collection of spices and honey from forests (Daba, 2002).

Apart from income generation and employment creation NTFPs also serve as food supplement. Edible fruits, nuts roots, leaves etc, are some of the food diversity that are used by communities in many parts of the country playing an important role in the consumption patterns and income diversification of rural communities in Ethiopia (Vivero, 2002; Daba, 2002).In many areas of Ethiopia forests are rural supermarkets with increasing importance during food shortage times, which are now a common phenomenon, providing hunger "food" for many community members as their livelihood strategy to cope with famine season (Daba. 2002).

Generally, Arnold (1998) notes the contribution of out puts from forest and tree resource to improve livelihood in four ways: *increased income, increased well being, reduced vulnerability and more sustainable use of natural resources*

The Role of NTFPs at Household Level: Many poorer forest dwellers are dependent to a greater extent up on NTFPs as their survival strategy (Poulsen, 1982). In many villages and towns the contribution of forests and trees to food supply is essential for food

security as it provides a number of important dietary elements but could not be obtained from the normal agricultural produce (Vivero, 2002). Though most of the forest foods may not be consumed in great quantities as opposed to staple foods they add diversity and flavoring to the diet (Poulsen, 1982). On top of adding vitamins and minerals to characteristically grain dominated diets, the most well documented and important use of forest food is in meeting seasonal food needs (Vivero, 2002). Arnold and Townson, 1998 also underscores the importance of forest income in its timing than its magnitude. Hence NTFPs have immense potential for ensuring food security and improvement of rural livelihood in Ethiopia. For instance, the use of roots and tubers increases greatly during one of the lean seasons. Trees have always been important in emergency periods especially, in times of drought, famine and wars (Vivero, 2002). Forest fruits are useful at times of crop failures while roots and tubers are more appropriate food sources as they tend to be good sources of energy (Irrvine 1952 in Viveo, 2002).

Belcher et.al. (2006) identified five distinctive groups of cases each characterized by the role of the NTFP in the household economy. The groups are.

- *Subsistence group*: The NTFP contributes little to the total household income, i, e, cash and subsistence is the main or the only source of cash income. Cases are situated in remote areas, and the product is of extracted from defacto, open access lands.
- *Supplementary group:* The NTFP contributes less than 50% to the total household's income, and the household are well integrated into the cash economy the NTFP is collected from the wild and supplement the household's income, often at times, when other sources of income are low.
- *Integrated group:* similar to the supplementary group, the NTFP contributes less than 50% to the household's income, and households are well integrated in to the cash economy. In the integrated group, however, the products is cultivated and integrated in to a diverse set of income earning activities- production is predominant, on private lands and market, are mostly local.
- *Specialized extraction group:* The NTFP contributes more than 50% to the household's income and the households are well integrated into the cash

economy. The product is harvested from the wild, is often of high value and traded nationally or internationally.

- *Specialized cultivation group:* The NTFP species is cultivated in intensive systems and contributes more than 50% to the household cash income. Integration into the cash economy is high. Cultivation is mostly on private lands and markets tend to be international.

Belcher etal, (2006) from the 52 cases studied; found that African cases tend to fall in the subsistence category while the specialized categories are relatively common among the Asian cases.

3.6.2 Forests and Household Livelihood Strategies

"Livelihoods consist of capabilities, assets-both material and social resources and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and hocks, maintain or enhance its capabilities and assets, and provide net benefits to other livelihoods locally and more widely, both now and in the future, while not undermining the natural resource base''(FAO, 1995).

Rural people are heterogeneous in terms of the livelihood strategies they pursue. The life course followed by a household is explained by context, assets owned and the organizational and institutional frameworks in place, which all together function to either promote or constrain livelihood activities (Degefa, 2005). This author also adds that a closer look at the rural economy shows a sizable proportion of households making their livelihood overwhelmingly from non-farm activities.

Access to natural resources is essential for sustainable poverty reduction. The livelihoods of rural people without access, or very limited access to natural resources are vulnerable because they have difficulty in obtaining food. Maintaining and/or accumulating other assets, and recovering after natural or market shocks or misfortunes (Baumann, 2002 in Van Reenen, 2005; Degefa, 2005).

Rural livelihoods may be considered as dynamic strategies by which rural people seek first to survive and then to improve their well being overtime. In these strategies

livelihood activities may relate to poverty alleviation in different ways. Angelsen and Wunder (2003) categorized these relations in different ways

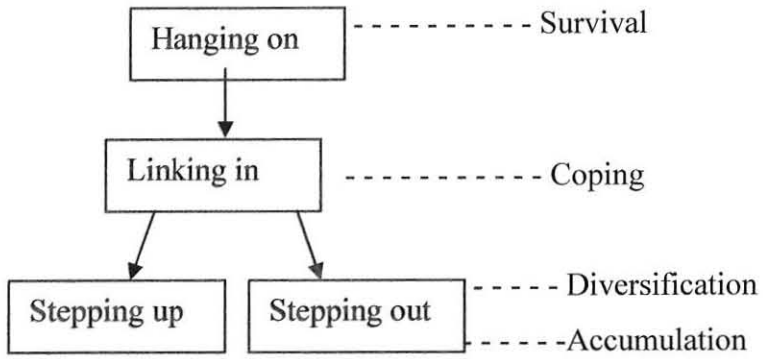


Figure 3.1 Categorization of livelihood strategies

- The ***survival strategy (Hanging on)*** implies a strategy based on real survival. Forest products are the last possibility for households to obtain food and prevent destitution while there are no other income sources around for the households to maintain their current livelihood
- The ***coping strategy (hanging on/ linking in)*** is used when there are a few other opportunities to improve household conditions. Households are using forest products for food security or for the provision of cash for essential livelihood costs.
- The ***diversification strategy (linking in)*** is mostly used by households with a low to intermediate income. They have access to different sources of incomes, and forest products are not considered as a major income source but rather as something additional. Households are trying to spread their risk by diversifying their livelihoods.
- The ***'Accumulation strategy' (Stepping up)*** is predominantly used by households with an intermediate to high income. Forest products are used as a means to household assets and income. Only selected financially attractive products are used often in specialized production including manufacturing systems. These NTFP production systems may form the most important sources of income to the households.

3.7 The Sustainable Livelihoods Framework

The SLF is based upon the following core principles:

People Centered: analysis of peoples' livelihood and their dynamics over time is emphasized rather than their resources. This shows that sustainable livelihood can be achieved when development programs are targeted to people on the basis of their capabilities and livelihood strategies.

Holistic: strives to understand the livelihood of people as a whole with all its facets. In the SLF emphasis is given to analyze the various factors which constrain or provide opportunities and to show how these are related to each other (DFID, 2000). It considers multiple influences on people and acknowledges the multiple livelihood strategies that people adopt to achieve multiple livelihood outcomes.

Dynamic: Based up on the dynamic nature of the livelihood of people and the institutions that shape them, the livelihoods approach is also dynamic to understand change so as to support positive patterns of change and help mitigate negative impacts.

Building on Strengths: the livelihoods approach starts with the analysis of strengths, which is also described as assets or capitals. It stresses the inherent potential of individuals in terms of access to resources and the ability to influence different factors with the aim of achieving their own livelihood objectives.

Sustainability: As its name implies, the SLF aims for outcomes that are sustainable.

Vulnerability Context

Vulnerability context refers to the external environment in which people exist and gain importance through direct impact up on people's asset status (Devereux, 2001). It encompasses trends (of demography, resources), shocks (such as human health shocks, natural shocks, crop/livestock health shock), and seasonality (of rainfall, prices, production, employment opportunities etc). The most important characteristic of these factors is that they are not susceptible to control by local people themselves, at least in the short and medium term (DFID, 2000).

dwellers is improved by growing trees in home gardens and on farms (Okafor etal., 1994) and studies in Machakos district in Kenya revealed a well managed ecosystem combining crop production with economically valuable trees planted on cultivated land (Triffen, etal. 1994). Studies in Ethiopia also confirmed that the incidence of soil erosion on a rural cropland is more than that of land under perennial crop in tone (ha) year. According to Alemneh (1990) the absence of vegetative cover not only intensifies soil loss but also contributes to the depletion of organic matter content in the soil that has a significant implication on the over all land productivity.

3.10. NTFPs and Resource Conservation

In the early 1980s, the protectionist paradigm that had dominated nature conservation since the 19th century began losing ground. It was replaced by a strong notion among both conservationists and development practitioners that poverty reduction and environmental protection should go hand in hand (Adams 1990, Roe and Glliot 2004 in Belcher, etal. 2006). In the following years several approaches emerged to reconcile development and conservation goals. The promotion of commercial non –timber forest product (NTFPs) production encompassing both extraction and cultivation, is one of these approaches (Ros –Tonen etal, 2005)

NTFPs were assigned a prominent role in various conservation and development projects based on the proposition that supporting the production and trade of NTFPs leads to livelihood improvement with out compromising the environment (Belcher,etal, 2006). That proposition is based on the following assumptions.

- Commercial NTFP production can provide economically attractive options to farmers helping to increase their income and offering development opportunities.
- NTFP production is more benign way to use tropical forests than most land use alternatives, allowing for the conservation of key forest values.
- Increased monetary value of NTFP will prevent people from converting the lands into other land uses.

By the same token, Van Reneen (2005) considers the use of NTFPs as the solution on poverty alleviation and forest conservation mainly due to the fact that the rural households are accustomed to and dependent on these forest products and because the

exploitation of NTFPs is less damaging to the forest than the timber harvesting. Moreover, when NTFPs were seen as valuable products, the value of the whole forest would increase which made it even more important to preserve these forests.

However, according to (Guillen etal, 2002) despite the rapidly growing demand for various NTFPs, they have largely been overlooked in mainstream conservation and forest policies. Only limited data is available on the resource base, management, utilization and marketing of NTFPs. As opposed to timber and agricultural products no regular national monitoring of NTFPs has been carried out in each country.

NTFPs have been assumed to effectively contribute to the preservation of tropical forests and the improvement of forest dwellers' economic situation by raising awareness about the value of natural resources (Schroder, 2000). The forest department of FAO considerate of the growing recognition of their socio-economic importance has embarked on a major program for the promotion and development of NTFPs (Getachew & Wubalem, 2004). The program targets to improve the utilization of NTFPs as a contribution to sustainable forest management and to the conservation of the biological diversity of forest recourses and simultaneously to improve food security for rural people (FAO, 1995)

3.11. Constraints Facing the NTFPs Sector

NTFPs have long been considered as minor forest products and have historically been neglected by governments when compared with timber products (Adepoju, 2007). Consequently, the capacity to promote sustainable use of NTFPs and realize increased financial return to local uses as incentives for forest conservation is low (Adepoju, 2007). There is also no adequate understanding of the available resource base, their taxonomic classification, management, utilization and marketing of NTFPs (Getachew and Wubalem, 2004)

The existing expertise and knowledge is also not well documented or is hardly accessible. There is equally a lack of appropriate methods and tools to promote sustainable use of NTFPs and successfully regulate trade (Adepoju, 2007). Generally, as regards the issue

of sustainable production and marketing of NTFPs there are a number of challenges to be met some of which includes declining resource, inequitable market access and constraints related to policy context, and certification matters (Thanh, undated; Adepeju, 2007)

Declining resource: in most tropical countries NTFP collection and cultivation has been practiced along with commercial timber production. For instance, in Indonesia most of the forests have been leased to private timber concessions whose primary objective is timber production. NTFPs are mostly collected by the local community living around the concessions. Many NTFP resources have now diminished or disappeared threatening both the livelihood base of the local community and the forest cover (Thanh, undated). As to Thanh, if the situation is not reversed, the concession operation will continue to have negative impact on both the environment and the livelihood of the local communities as resources are declining and NTFPs will no longer be obtained to supplement food demand in bad times.

Access to Market: the problem of NTFP commercialization is inequitable access to market especially for the marginalized population (Adepoju, 2007). Rural communites do not have sufficient information regarding market demand and price and may not respond adequately to current market trends (Thanh, undated). Moreover, under many of the circumstances most of the benefits accrue to retailers while the rural community receive very little of it.

Policy: in most tropical countries, government policy pertinent to the utilization, management and development of forest resources is primarily concerned with the production of timber (Pannayotou, 1991). Timber is an important sources of foreign exchange for the majority of these countries other commodities being considered as minor forest products. The ignorance of many polices might perhaps be due to the fact that NTFPs are often associated with traditional uses that are not widely known and are seldom marketed through known channels to add to a nation's GNP (Pannayotou, 1991). Moreover, policy development in most of the cases is still largely disconnected from field experiences (Adepoju, 2007).

In many cases in tropical countries rural communities have even lost their control over NTFP despite the fact that NTFP collection is an essential part of their livelihood strategy (Thanh, undated) this is because of the policy favoring the logging company while the local community lacks legal support to secure their interest.

> *...Professional biases, lack of inter-sectoral thinking and the like are often believed to be the root causes of the problem. Forests are seen as something secondary to agriculture and usually juxtaposed to agricultural structure in the country. The institutional status of forestry sector is given lower profile in the structure and has never been stable. Forest scientists are never consulted for interventions that affect environment, forests. Forestry related decisions are usually made by non-foresters. This is true at all levels. Leave also foresters, forest communities are never consulted when the forest areas are planned to be cleared to make ways for commercial tea, coffee and other development activities (Daba, 2002).*

The narrowly focused policy programs are known for their isolated interventions as routine activities that the country is experiencing since time immemorial (Daba, 2002). As to this author, the linkage that is forgotten is the connection between forests, health, and knowledge, cultural and economic values on one hand and livelihood security on the other.

Certification of NTFPs: forest certification focuses primarily on timber product where there are wide arrays of other marketable products i.e, NTFPs for a healthy forest. Some of these products may be as valuable as timber off of the same acreage (Thanh, undated). However, a question of sustainability might arise for NTFPs, too when we talk of large scale harvest. Many of the questions are similar to timber product certification, with a different answer for NTFPs. Will small scale enterprise be able to follow such a labeling scheme? What criteria and indicator will be used to assess the sustainability of NTFP production? Given that most small scale enterprises often lack adequate capital, who will bear a cost of certification? etc. are all problematic for the certification of NTFPs (Chowdhury etal., 2005)

Conceptual Framework of the study

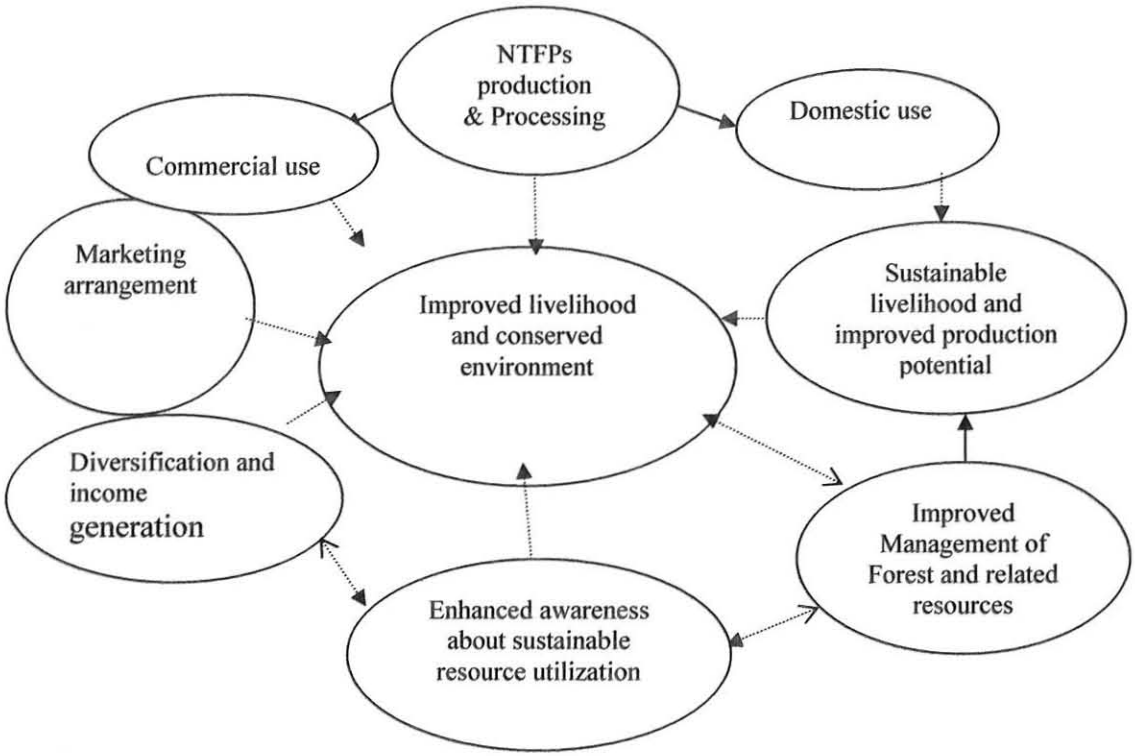


Figure 3.3. Own construction based on (DFID, 2000; V.Reenen, 2005)

This shows linkages among the components, affecting one another, many of them being mutually dependent and self-reinforcing. Production and processing of NTFPs would help rural households diversify their livelihoods in terms of both direct consumption and income generation. This contributes to sustainable livelihood and improved production potential provided that there is good market arrangement and awareness creation about sustainable resource utilization. These would add the value of forests which would eventually help the simultaneous improvements of rural livelihoods and natural resource conservation. Because these NTFPs are produced in a forest ecosystem as they are shade loving.

Chapter Four

4. Methodology

4.1. Sample size and sampling technique

The two districts of Jimma zone: Gomma and Manna were purposively selected for this study for two reasons. One thing they are the two densely populated districts of the zone and the other was spatial accessibility to easily organize field work. Then three leading NTFPs producing kebeles were selected based on discussion made with the stakeholders such as key informant farmers and district and zonal level agroforestry experts. These kebeles were Haro from Manna district and Chidero Suse and Ganji Ilbu kebeles from Gomma district. The former kebele was taken for it is relatively close and accessible to central markets (Agaro, Jimma) where as the later two kebeles were situated along the main road with out cooperative union and off the road-distant but with cooperative union, respectively. These kebeles were therefore believed to represent areas under varied production and marketing situations found at different distance from the Zonal market center, and hence with different levels of accessibility.

A total of 105 households were covered by the survey. The kebeles were sub-divided in to villages and sub-villages. Two Gotts were randomly selected from each kebele and stratified based on wealth status to draw representative samples. The wealth ranking was carried out with the participation of key informants and development agents who have adequate knowledge about the life conditions of the households in their respective Gotts. Size of land under coffee and the state of the house in which they live were major indicators of wealth. Those households considered as rich has the land size of not less than 1.25ha. and corrugated house of good standard. The medium wealth group own land size of not less than 0.75 ha. The poor wealth group own less than 0.75 or no land at all. In addition the rich and the medium were both self sufficient and the former often lending money and cereal to the poor who are usually self insufficient. The numbers of households surveyed in each of the three kebeles were drawn proportionally by employing a stratified random sampling technique.

Table 4.1 *Distribution of the Sample Households by Kebele and wealth group*

Woreda	Kebele	Gotts[1] selected	Total No. of Households	Wealth Group			Total No. of Households selected (%)
				Rich	Medium	Poor	
Gomma	Chidero Suse	Suse	212	8	12	14	32.4
		Gomole					
	Ganji Ilbu	Hiriyo	240	12	13	10	33.3
		Ilbu					
Manna	Haro	Haro	248	5	12	19	34.3
		Qawaa					
Total			700	25	37	43	100

Source: Obtained from woreda capacity building office and computed based on the above procedure

4.2. Nature and source of Data

In order to meet the purpose of this study, data on the production, processing and utilization of NTFPs by the households were gathered. Both primary and secondary data were used for the purpose of this study. The primary data were generated from heads of households included in the sample, few aged people and experts and voluntary discussants.

The primary data were collected using survey questionnaire, focus group discussions and key informant interview. The survey was conducted through interview using individual pre-tested structured questionnaire. Well-trained enumerators with the researcher's close supervision and participation administered the questionnaires.

Another source of primary data was an inventory of NTFPs in the area done by key informant interviews, Focus group discussions, & mapping. Accordingly, three focus group discussions, having five to six members, were conducted using a checklist in which

[1] Gott is a smallest local administrative unit under kebele.

voluntary discussants from different groups participated. This was used to generate qualitative data pertinent to the production, processing and utilization of NTFPs. The FGDs were used to generate information about the production and utilization of major NTFPs, challenges and opportunities in their production and marketing. Key informant interview with elders and knowledgeable people were used to obtain data about other non-timber forest uses and services as medicine, shade, bee fodder, fences, utensils and fuel wood.

Secondary data were gathered from different institutions and consultations of different literatures. This was supplemented by the information gathered from key informants and participants identified at the different levels in the marketing channels.

4.3 Ethical Considerations

As it is a norm in any social research in general and the issue investigated in particular, ethical considerations were made while conducting this study. A letter of support was written by the Institute of Regional and Local Development Studies of Addis Ababa according to which the wereda administration office wrote a letter of support for the DA's of the respective kebeles. The sample household heads were also informed that their response would only be used for the purpose of this study and will be kept secret. They were also informed that they have full right not to take part in the study or not to respond to all or part of the questions. Therefore, 105 voluntary household heads have taken part in this study.

4.4. Methods of Data Analysis

A pre-coded questionnaire was used the entry and analysis of which was carried out using statistical package for social scientists (SPSS) window version 12. Descriptive statistics such as ratios, percentages, mean, minimum, maximum, and standard deviation and statistical tests such as chi-square and t- test were employed.

4.5 Definitions of explanatory variables and Hypothesis Setting

Sex of the household head: It was found in rural areas of Hararghe that women have their own role to play in the decision making process of various aspects of a household, but

with minimal power in deciding over the cropping pattern and farm operations (Hadija and Bezabih, 2003). By the same token Teressa (2003) found that female-headed households were less likely to plant trees significantly. However, female headed households are expected to decide positively in producing NTFPs owning to their perennial nature and low input once planted than yearly ploughing the land.

Age of the household head: It indicates the farming experience gained by the household in number of years. Age might have positive or negative effects on adoption of technology with dominance of the latter. Terressa (2003) found out the inverse relation between age and tree plantation decision. Nevertheless, age is expected to have positive influences by the experience gained in understanding the economic and environmental role of NTFPs.

Household labor: The size of household member in the working age group has positive relation in the adoption of improved crop varieties especially in labor demanding technologies.

Literacy rate of the household head: Education affects land management livelihood strategies and out comes in complex ways, and trade offs are apparent among different objectives of farming households like agricultural intensification; improved income; and sustainable land use (Pender, 2005). Hence literate household head are expected to produce NTFPs considerate of land degradation, agricultural marketing and improved technologies.

Number of children attending formal education: children in the family may influence the decision of the household head. The households with more number of children attending formal education were hypothesized to positively affect NTFPs production decision.

Leadership role of the household in the community: This refers to the household head's involvement in different political, administrative, religious and social issues in the community. These leaders of society can have better access to information and hence hypothesized to produce NTFPs in response to the information they get about the gain of doing so.

Land holding size: It was measured in 'facaasaa' equivalent of 0.25 ha. Land size was found to have mixed results. Teressa (2003) found positive contribution of farm size on fruit trees plantations where as Getaw and Girma (2005) in Berihun (2007) found negative effects. Generally, households with large land holding size were expected to have a tendency of allocating a portion of their land for NTFPs.

Livestock holding: livestock, measured in tropical livestock unit is farmers' important sources of income, food, capital, and draught power. It has a positive impact on the adoption of improved agricultural technologies in general and oxen ownership draught power related technologies in particular (Terresa, 2003). It was hypothesized that households with large size of livestock tend to plant trees for being capable of shouldering risk and prolonged return.

Land security: Decision about technology adoption is affected by access to land and security of land tenure (Doss, 1999 in Berihun, 2007). Farmers' decision on their land is highly determined by their confidence on land tenure security. Land security was hypothesized to have positive relation.

Irrigation access: in many cases NTFPs are produced by at least supplementary irrigation water during dry season in Ethiopia. Access to irrigation was, therefore, hypothesized to positively affect NTFPs' production decision

Access to market: It favors the adoption of agricultural technologies including improved land management practices and this is significant for perishable products.

Agricultural extension service on fruit trees: Agricultural extension service is an important component in farmers' decision determinant factor analysis. They may include visit of demonstration sites, participation in trainings, visit of the extension agent, etc. For the purpose of this study, visit of the extension agents related to NTFPs was hypothesized to have positive implication on NTFPs production.

Access to credit: As capital is one of the inputs in production and farmers resolve financial capital constraints through credit. And provision of credit increases the adoption of technologies. Therefore, households who have access to credit service were hypothesized to produce more NTFPs.

Perception on drought resistance of fruits: Farmers' decision can be affected by future expectations and perception. If farmers perceive fruits as drought tolerant, they most likely plant fruits.

Perception on disease and pest resistance: Those households who perceived fruits as disease resistant are expected to plant or grow fruits.

Chapter Five

5. Result and Discussion

5.1. Socio-Economic Characteristics of Respondents

5.1.1. Demographic Characteristics

The socio-demographic characteristics of sample households which include sex, religion, ethnicity, marital status, literacy rate, and leadership role in the community is summarized in Table 2. Out of the 105 household heads interviewed, female headed households were found to be only nine in number constituting 8.6 % of the total respondents. As regards religion, muslims are predominant making up 89% of the sample households. Oromo is the single most predominant ethnic group (83%) while Amhara makes up 7.5% with others constituting the remaining 9.5%.

With regard to the marital status, 90.5% of the respondents are married where as the rest 9.5% are either single or widowed. Most of the single households are male where as the widowed ones are entirely female headed.

Concerning literacy about 32% of the respondents were found to be illiterate (unable to read and write). 40% of the sample household heads have different political, administrative and social roles in the community.

Family size of the respondents on average is about 6.4 with a standard deviation of 2.9 and the maximum being 15. The respondents' age on average is 47 with a standard deviation of 12.3, and the minimum and maximum ages of the respondents are 21 and 80 years, respectively.

Table: 5.1 *Population Characteristics of the Respondents*

Characteristics	Category	No.	Percent
Sex	Male	96	91.4
	female	9	8.6
Religion	Islam	89	84.8
	Christian	16	15.2
Ethnic	Oromo	87	82.9
	Amhara	8	7.6
	Others	10	9.5
Marital status	Married	95	90.5
	Single	4	3.8
	Widowed	6	5.7
Literacy rate	Illiterate	32	30.5
	Grade 1-4	21	20.0
	Grade 5-8	36	34.3
	Grade 9-12	15	14.3
	post secondary	1	1.6
Leadership role	Political leader	22	21.0
	Village/social leader	20	19.1
	No leadership role	63	60.0

Source: Field survey, 2008

5.1.2. Land Holding and ownership

The average land holding size of the respondents was 4.33 *Facaasaa*[2] (1.1 ha) with a standard deviation of 2.73 *facaasaa* (0.6ha). The land distribution among the sample kebele revealed that the proportion of households which own a hectare or less for Haro, Chidero Suse and Ganji llbu was 68.6%, 64.7% and 51.4%, respectively. This shows acute land shortage for all sample Kebeles. About 33.7%

[2] Facaasaa is alocal unit used to measure land and 1Facaasaa=0.25ha.

of the households own a land size ranging from 1.5 to two hectare and only 5.8% of the respondents possess land size of more than 2ha.

Moreover, the land possessed by the 'poor' category was small as 86% of them own less than one hectare. This implies that land is an important livelihood asset the access to which and lack thereof determines the livelihood category to which a household belongs. Due to the increasing scarcity, land is mostly owned privately by individual households. 25% of the respondents sharecrop in land from others and only five households rented in land from others.

Table: 5.2 *Land holding by kebele*

			size of land (ha.)				
			up to 1	1.1-2.0	2.1-3.0	3.1 & above	Total
Kebele	Ganji Ilbu	Count	18	16	1		35
		% within Kebele	51.4%	45.7%	2.9%	0.0%	100.0%
	Chider o Suse	Count	22	10	2		34
		% within Kebele	64.7%	29.4%	5.9%	0.0%	100.0%
	Haro	Count	24	9	1	1	35
		% within Kebele	68.6%	25.7%	2.9%	2.9%	100.0%
Total		Count	64	35	4	1	104
		% within Kebele	61.5%	33.7%	3.8%	1.0%	100.0%

Source: Field survey, 2008

5.1.3. Livestock Holding

The households' livestock holding is on average 1.63 in Tropical livestock unit (TLU[3]) with SD of 1.1. Households in the rich category have relatively larger number of livestock holding in general when compared with those in the 'medium' and 'poor' categories. The livestock holding in the sample kebeles is insignificant as they are assigned very minimal role in their livelihood strategies. This might be due to the respondents' primary dependence on activities that do not require draught power and partly due to increasing scarcity of grazing land.

[3]TLU= Cattle-1, Calf-0.5, Goat and Sheep-0.1, Horse-1.0,Mule-1.15, Camel-1.45, Donkey-0.65, and Poultry-0.005 (Storck etal 1991)

5.1.4. Production of Cereals

Though the livelihood of the respondents primarily rely on NTFPs such as coffee, it is also important to have a look at some important crops (cereals). Mixed farming system of both crop production and livestock rearing is practiced by the sample households with negligible contribution of the later. Maize, sorghum, teff and haricot bean are produced by 51%, 23%, 20% and 11% of the households, respectively during the 2006/07 production period. Type and extent of cereals production is primarily dictated by the nature and size of land each household owns. As a result, those areas that are not suitable for coffee are mostly put under cereals. Coffee is produced by all the sample households though the extent of production greatly varies from 1 Qt-30 Qt, in response to the size of land allotted to coffee by each household. This crop is a staple cash crop in the study area as it is for the country.

Sample households produced per household on average 290, 775, 162 and 24 Kgs of sorghum, maize, teff and haricot bean, respectively in 2006/07. With the exception of a few rich households who produce up to 100 quintals, cereals are usually consumed and not sold out. Only few households sell a portion of the cereals, mainly maize and sorghum, in excess of their consumption requirement and with small portion reserved as seed for the next season. Vegetables (onion, tomato, cabbage and carrot) are produced by about 16% of the respondents in their home garden basically for their own consumption. A few households also produce haricot bean and use it for direct consumption and do not sell it due to subsistence nature of its production.

Table: 5.3 *Average amounts of crops and vegetables produced, consumed, sold and income earned per household in 2006/07*

	Amount produced(kg)	Amount consumed(kg)	Amount sold(kg)	Income earned(ETB)
Coffee	800.00	48.1	747.19	6764.31
Onion	134.00	32.92	100.54	135.00
Tomato	65.00	45.10	19.31	123.75
Cabbage	87.00	42.48	43.85	45.71
Carrot	22.00	7.50	14.50	42.50
Maize	1516.00	445.96	1069.69	2659.38
Sorghum	530.00	242.11	287.08	1061.43
Teff	221.00	170.65	57.74	833.33
Haricot bean	33.50	33.50	-	-

Source: Field Survey, 2008

5.2. Production and Management of NTFPs

It was realized in the survey that the communities in the study area make their livelihoods from diverse and often valuable non-timber forest products. These NTFPs were found to serve a number of purposes as sources of household consumption and means of income generation with different degrees of dependence by the households. Assessment of the production and utilization of the most important NTFPs in the study area such as fruits, honey, root crops, and spices is presented as follows.

5.2.1. Fruit Production

The major fruits produced by the respondents include avocado, mango (*Mangifera indica*), orange (*Citros aurantium*), banana (*Musa acuminata*), guava (*Psidium guajaova*), and papaya (*Caracal papaya*) among others. The other fruits cultivated in the area include lemon (*Citros lemon*), cashmir, pineapple, jack fruit, etc. The last two are introduced very recently, i.e. during the past four years or so. Other commercially important perennial trees grown include chat (*Chatha edulis*), sugar cane and gesho (*Rhamnus prinoids*) among others. However, there exists no much difference in the

average number of fruit trees possessed by the different wealth groups except for avocado and mango which were relatively higher for the rich (Table 5.5)

Table: 5.4 *Average number of fruit trees possessed by sample households by wealth group in 2006/07*

Fruit type	Wealth Category						Total	
	Rich		Medium		Poor			
	N	No. of fruits	N	No. of fruits	N	No. of fruits	N	No. of fruits
Avocado	22	16.14	33	5.09	33	5.15	88	7.87
Mango	22	5.00	32	3.91	36	3.89	90	4.17
Pineapple	4	13.75	3	4.00	1	3.00	8	8.75
Banana	16	16.94	16	23.13	16	10.31	48	16.79
Orange	15	3.67	28	2.54	23	3.78	66	3.23
Coke	1	3.00	2	3.50	0	0	3	3.33
Guava	9	2.44	12	1.67	17	2.18	38	2.08
Papaya	10	4.90	17	4.12	14	3.00	41	3.93
Jack fruit	2	2.00	5	1.20	1	10.00	8	2.50

Source: -Field survey, 2008

Even though, fruit tree planting has long been a tradition in the area the number of fruit trees owned by sample households and the corresponding yield was low. About 62% of the respondents began fruit tree planting 15 years ago and 15% of them planted fruits at least before 10 years.

About 37.8% of the sample household planted fruit trees with the objective of increasing cash income to supplement income gained from coffee and 39% of them produced fruits for home consumption. The rest 23% planted fruit trees anticipating both cash income and household consumption.

On the other hand, the respondent households reported that damage by wild animals, shortage of land and lack of improved verities are the major problems for not growing fruit trees. Despite this fact, 78% of the respondents intended to plant more fruit trees in particular avocado, mango, apple, and jack fruit. 63% of the households intended to plant avocado alone mainly due to its high nutritious value in household consumption, low input once planted and matured, and high market demand with encouraging market return. It was also realized that avocado is not damaged by wild animals and seedlings are easily available.

5.2.1.1. Modes of Fruit Production

Fruits in the study area are produced under rain fed condition. It is only the seedlings which need irrigable or hand fetch water to cope with extended drought periods. Nearly 60% of the respondents perceived that fruit trees such as mango, avocado, banana, papaya, orange and guava are drought resistant and can grow well without irrigable water.

Fruit cultivation is, however, limited to homesteads and not grown in the field. This is due to the damage caused by the wild animals and problem of theft in remote areas. As a result, fruits like mango, banana, papaya, and guava, which the respondents considered to be most susceptible and preferred by apes and monkeys, are usually grown in home gardens with *enset* and chat. However, avocado, which is not eaten by wild animals, was sometimes grown in the field with coffee, but not appropriate shade tree for coffee due to its dense leaves, as reported by key informants.

5.2.2. Honey Production

Honey is a much valued NTFP in the study area. Trees of different species were of important role in honey production through the provision of fodder for bees during the different seasons of the year. The flowering of different nectar yielding trees during various seasons makes beekeeping an interesting sector from which returns are expected throughout the year often meeting critical household needs. Moreover, beekeeping is a highly conservational livelihood strategy as income is generated through honey bee flora with little or no much input once put in place.

It was found that 41.9% of the sample households practice beekeeping owning beehives ranging from traditional to modern ones. The average number of beehives per honey producing households is about 5.54 with the minimum and maximum number of beehives being 1 and 28, respectively. About 43% of the respondent households practice beekeeping to benefit from the sale of honey and consumption at home; where as 30% of honey producers owned bee hives to increase their livelihood asset. About 57% of the households responded that they started beekeeping after the extension service had created high awareness for them to diversify their livelihood strategies than hanging on coffee

income alone. And 31% of the respondents began beekeeping in response to market failure for other products or bad harvest while the remaining 10% were initiated by the improving market demand for honey.

Those sample households which do not practice beekeeping have got different reasons for possessing neither traditional nor modern beehives.

Table: 5.5 *Reasons for not having modern beehives*

Description		No of responses	% of cases
Inadequate provision or problem of affordability		38	58.6
Lack of awareness		18	28.5
Unavailability of bee swarm		14	21.5
Land shortage in a home garden		27	41.6
Lack of man power		3	4.6
Bees attack in home garden & theft in field sites		11	17
Unavailability of flowers and water		1	1.5
N=65	Total response	112	173.3

Source: -Field survey, 2008

About 58.6% of non-bee keepers responded that the inadequate provision of modern beehives or problem of affordability is their main reason for not using modern beehives. Lack of awareness, unavailability of bee swarm, land shortage in home garden and fear of bees attack were also reported as reasons for not adopting modern beehives by 28.5%, 21.5%, 41.6% and 17% of the respondents, respectively.

Most of the respondents had a strong reservation on adopting modern hives because they feel that bees strongly constrain home garden land use for other important crops used as a coping strategy. Land in home garden is small (25mx40m), but of valuable importance for a household accommodating (*chat, enset*, roots, hives, and fruits) different livelihoods strategies.

5.2.2.1. Modes of Honey production

There were both traditional and modern hives possessed by those households practicing beekeeping. In 2006/07, a total of 264 beehives were owned by the sample households. Of this, 42 are traditional and 222 are modern ones. The traditional bee hives were kept in the coffee forest hanged on large trees to attract bee swarm. Some households possessed traditional hives alone and some others own both traditional and modern types. Traditional hives were meant for obtaining honey for one time (a season) and dumping the bees out or sale them to the owners of modern hives. The traditional hive owners do not worry about the next season and the sustainability of honey production as they believe another bee swarm would be captured again to produce honey for the next season. This, indeed, is a threat to bees in general and honey production in particular making bee swarm increasingly scarce for those who practice beekeeping sustainably using modern beehives. Those households which use modern hives have got different reasons for their preference of modern to traditional hives.

Table: 5.6 *Reasons for using modern hives*

Description		No. of response	% of cases
It is more productive		31	79.6
Suitable for bee management		28	71.8
Avoids climbing trees to hang up hives		9	23
Allow us to use large trees for other purpose		1	2.6
N=39	Total response	69	177

Source: -Field survey, 2008

79.6% of modern hive owners preferred modern hives to the traditional one mainly for it is more productive and up to 25 kg/hive of pure honey would be obtained at times of good harvest as opposed to 2-6 kg/hive of honey from the traditional one. And 72% responded that modern hives are by far suitable for bee management by making timely supervision as the hives are kept in a home garden, but not in a field. Theft is a big problem to keep modern beehives in field-distant sites from home. On the other hand, land shortage in the home garden has constrained the number of hives.

5.2.2.2. Honey Harvesting and Seasonality

Honey type in the area is usually named by the name of dominant tree species (flora type) at any given particular time of the year during which honey is produced/harvested. It was realized that the diversity of trees and shrubs in the area has greatly contributed to local honey production. Major honey bee trees identified in Jimma area (Gomma and Manna) include *Croton macrostachyus*, Vernonia, *Coffee arabica*, *Syzgium quineense*, *Acacia, Cordia*, Albizla and *Mangifera indica* species. As different nectar yielding plants flower at different times, bees make honey types different in terms of both quality and quantity. About 64.4% of the households engaged in beekeeping responded that they harvest honey twice a year; where as, 12.4% and 6.7% harvest three times and only once per annum, respectively. This being the case, the FGD revealed that there are circumstances under which honey is harvested even four times a year.

This implies the varying nature of honey production calendar from place to place and even year to year depending on the flowering season of the existing high nectar yielding plant species which are in turn responsive to slight change in rainy seasons.

Table: 5.7 *Flowering periods of honey bee trees and honey production Periods in Jimma area*

Dominant plant species	Flowering period	Type of Honey (Vernacular name)	Remark
Vernonia and coffee	January - February	*'Damma Dheebicha'* vernonia honey	Preferred to have medicinal value, but bitter in taste
Croton macrostachyus	June - July	*'Damma Bakkaniisaa'* Croton honey	Diluted, poor quality, but large in volume of production
Guizota scabra	November-December	*Damma Keelloo/Tuufoo* Guizotia honey	Good for consumption, sweet in taste

Source: - Field survey, 2008

As regards honey quality and preference, 60% of the respondents ranked (*damma dheebicha*) vernonia honey first; where as 28.9% of the respondents preferred (*damma Tuufoo*) Guizotia honey for consumption. Croton honey, white in color as croton flowers are white, is diluted may be due to high availability of water during the rainy season

when the plant flowers (June-July). This honey type could not be stored for long because it condenses and gets decayed and hence not preferred one. The honey production calendar and species of importance complies with what Abebe etal.(2004) found in their study in West Wollega. Nevertheless, it is well known to give the highest volume of honey when compared with other species. Therefore, the quality, appearance and availability of honey at one time or the other generally depend on flowering seasons of trees, rather than on conscious decision of venders to sale one honey type over the other during a particular time.

5.2.3. Spices

The production of spices has long been a livelihood strategy in many parts of south western Ethiopia such as Sheka, Kafa, Bench Maji, South Omo and GamoGofa (Jansen, 1981). Spice cultivation would also be a promising sector for the improvement of rural livelihood in Jimma area where land shortage is a pressing problem for the cultivation of cereals or other crops. What makes spice cultivation important in this case is their shade loving nature allowing intercropping with other NTFPs such as coffee and fruits. Regardless of these potentials, the survey conducted revealed that less than half (43.3%) of the sample households produce spices. The spices being cultivated in the study area includes ginger, pepper, turmeric, and *korerima* in decreasing order of the volume of production. A bit more than $3/4^{th}$ of (75.5) spices producing households cultivate ginger ; where as those producing pepper and turmeric constituted 51% and 17.7%, respectively. And only two households started producing '*Korerima*' (Cardamom).

Different factors were reported by the respondent households to reason out how they started spice production. About 43.5% of the respondents said that they started to produce spices in response to the increased awareness to supplement household income from other NTFPs such as coffee. This group became aware of the possibility of intercropping spices with coffee. A bit more than a quarter (26.1%) of spice producers began spices cultivation in response to coffee disease or market failure for coffee. Those households encouraged by the high market demand for spices and those who started spice production to meet direct home consumption requirement constituted 21.7% and 6.5%, respectively.

All spices cultivating households have the objective of meeting their home consumption and benefiting from the sale of their produce.

Spice non-producing households, on the other hand, have got different reasons for not producing spices. Those households which lack know how about the possibility of spice cultivation through intercropping and those who complain for the remoteness of coffee farm from home and hence damage by wild animals and fear of theft constituted 26 and 32%, respectively. About 18.5% complained for the inappropriateness of soil and climate particularly for not cultivating *korerima,* which the respondents said, is moisture loving and best suites in swampy areas or under irrigable water.

Table 5.8 Reasons for not producing spices

	No. of response	% of cases
Lack of know how	17	26.0
Lack of market information	11	17.0
Low market demand	4	6.2
Inappropriate soil/climate	12	18.5
Lack of input/seeds	8	12.3
Remoteness of coffee farm, damage by animals	21	32.3
Total	73	112.3

Source: Field Survey, 2008

5.2.3.1. Modes of Spice production

The mode of spices production in the study area differs with a spice type. Ginger is commonly intercropped with coffee in the field. It could be cultivated well under coffee shade and hoeing for coffee also benefits ginger as it helps the infiltration of water and aeration of the root of ginger. The other mutual advantage of both crops, as learnt from the FGD, is that ginger could be collected by digging out during winter while coffee is harvested; it is at the same time hoeing (*goma'uu*) for coffee helping infiltration of rain water and aeration of coffee roots. Those farmers were, however, resistant to introduce *Korerima* as; they believed, intercropping it with coffee definitely undermines coffee productivity. This is because the root of *Korerima* intensively spreads horizontally prohibiting hoeing for coffee, which cuts the roots of *korerima*, if practiced otherwise.

Moreover, key informants disclosed that these two crops could not be intercropped as the berries of korerima are eaten by wild animals in general and snakes in particular. This does not hold true for ginger that has burning taste and hence can not easily be damaged by wild animals except the damage by the foot of the cattle (trampling).

On the other hand, green pepper for consumption is cultivated in home garden either separately or intercropped with chat because most home gardens were under chat cultivation very often with enset and fruits particularly in Hiriyo Got of Ganji lubu and Chidero Suse kebeles. About 31.8% of spice cultivating households intercrops ginger and turmeric with coffee. And only 2.3% of the spice cultivating households intercrop korerima with coffee while the other 2.3% practices intercropping with turmeric alone. Both spice cultivating and non cultivating households have different reasons for not intercropping some or all of the spices with coffee. Lack of know how, wild animals damage, and considering coffee shade as inappropriate for intercropping were reported as reasons for not intercropping spices with coffee by 54, 46, and 41%, respectively. Problem of theft in coffee fields and fear of decline in coffee productivity were reported by 36 and 31% of the respondents.

Table 5. 9 Reasons for not intercropping spices with coffee

	No. of responses	% of cases
undermines coffee productivity	12	30.8
Coffee shades do not allow intercropping	16	41.0
lack of know how	21	54.0
wild animals damage	18	46.0
theft due to remoteness of coffee farm	14	36.0
lack of water	1	2.6
Total	81	210.0

Source: Field survey, 2008

5.2.4. Root Crops

Trees in general and roots and tubers in particular have always been serving important purposes in ensuring food security for the forest adjacent rural poor. The use of roots and tubers greatly increases during emergency periods, especially in times of drought, famine and wars (Vivero, 2002). Consistent with the above proposition, it was realized in the study area that the importance of roots in providing food for consumption increases at times of hardship say when crop fails as well as other products to generate cash income to buy cereals. This also complies with the idea that the importance of NTFPS lies in its *timing* than its *magnitude*. Moreover, wild roots like (Dioscoria spp.) yam, taro and *enset* are energy rich and are more appropriate food sources. The cultivation of some of the important roots is well under way in the study area as one of their livelihood coping strategies.

It was found from the survey that about 68% of the sample households cultivated *enset* in their home garden for the purpose of either home consumption or to benefit from income gained through sale or both. Nearly half (49%) of the respondents also produce *godare* (taro) which is another nutritious root crop. One thing that makes Taro interesting famine food on top of being energy rich crop is that it can be stored for long with out any deterioration in quality and could be used out of storage when need arises. Those households that produce *wacino* (yam), sweet potato and *kote-harre* make up 34%, 11% and 4% and 4% of the total respondents, respectively.

An interplay of different factors contributed to the practice of cultivating these root crops. Nearly half (49%) of the respondents began the cultivation of Enset and Taro to meet home consumption requirements during off-peak periods; where as, 28% of the respondents, started cultivating roots in response to shortage of land to produce cereals. This holds true for roots like Taro which allows intercropping with coffee thereby maximizing productivity per unit area. The rest 23% of the root crop cultivating households said that root crops are their important source of food during slack periods when neither cereals to eat nor income from other NTFPs such as coffee are available. Hence, root crops are used as transitory food that some households rely on for their consumption until other crops would be harvested. This complies with the idea of Ellis

(2000) which asserts that 'the prime motive and consequence of successful diversification is to reduce vulnerability. Hence, the bulk of the poorer sections of the rural population diversify as a response to reduce vulnerabilities rather than choice.

5.2.4.1. Modes of Production of Root Crops

It seems that land shortage in general and wild animals' damage in particular have forced farmers in the study area to cultivate a number of crops in a small home garden land. Like wise root crops and tubers such as e*nset*, yam, taro, etc are cultivated in a home garden. e*nsete* is planted in the garden with chat or fruit trees while yam and k*ote-harre* are planted along home garden fence because the latter is considered as aggressive weed which undermines the productivity of other crops, if intercropped.

Taro is cultivated both in home garden and in a field depending on whether adequate land is available to do so. It is grown in the field separately and often intercropped with coffee. It was realized from the FGD held with key informants that the nature of coffee dictates whether to do intercropping. As to the group, intercropping is not advisable with (*bagajja*) (old/mother coffee); where as it could be done with young newly maturing coffee trees. It was also found from the survey that only 24% of the sample households use to intercrop Taro with coffee.

Different factors were identified that constrain intensive cultivation of root crops via the practice of intercropping. Indeed the issue of undermining coffee productivity is not the only reason for the reluctance of farming households to cultivate root crops, particularly taro to diversify their livelihood base; there were rather other reasons. About 38% of the respondents said that remoteness of the coffee farm makes intercropping of taro hardly possible due to damage by wild life and problem of theft.

Table: 5.10 *Reasons for not intercropping root crops with coffee*

Description	No. of response	% of cases
Undermines coffee productivity	41	39
Damage by wild animals	40	38.1
Damage by cattle (trampling)	16	15.2
Lack of know how	21	20
Problem of theft	19	18.1
Lack of seeds	29	27.6
Total	166	158

Source: Field survey, 2008

5.3. Management of NTFPs

5.3.1. Farmers' Experience

Despite a fairly long experience that farmers had in NTFP production, the culture of intercropping other NTFPs, with coffee is not developed yet. Sample households have along tradition of producing some of the major NTFPs as their livlihood strategy while they have recently embarked on producing some others. For instance, fruit cultivation experience of about 63.3% of the farmers dates back to 15 years ago and 27.6 of them have at least 10 years of experience with only 9% of the respondent fruit producers started fruit production five years ago. As opposed to the experience in fruit cultivation, only 20.5% of honey producing households had 15 years or more experience in beekeeping; where as 75% started beekeeping during the last five years. The production of other NTFPs like spices and root crops are relatively a recent development in the area. Accordingly, only 9% of the respondents produced ginger five years ago. Roots and tubers such as Yam (*'wacino'*) and *Enset* are of age old experience for the farmers while taro (*godare*) is recently being worked on through the districts' agricultural extension.

Table: 5.11 *Experiences of households in the production of Major NTFPs*

Types of NTFP	Years of experience					
	15 years ago		10 Years ago		5 years ago	
	No.	%	No.	%	No.	%
Fruit	62	63.3	27	27.6	9	9.2
Honey (beekeeping)	9	20.5	2	4.5	33	75

Source: -Field survey, 2008

5.3.2. Input Utilization

The farming household employee different farm management practices and utilizes different inputs. A fairly good number of respondents use their own seedlings for coffee; where as seedlings for fruits are not often grown. About 85% of the households practice weeding stumping, hoeing, and shade management (for coffee); for fruits and root crops, about 10% apply compost. On the other hand, about 44.8% and 29% of the respondents do not utilize pesticide and fertilizer, respectively. And 25% do not apply both inorganic fertilizer and pesticide. Problem of affordability, inapplicability and lack of know how were reported to be reasons for not applying inorganic fertilizer and pesticide by 32%, 40% and 20% of the respondents, respectively. The farmers also feel that application of such inorganic chemicals might reduce coffee quality when applied for other NTFPs grown along with coffee.

5.3.3. Extension Service

About 60% of the sample households have received extension service on coffee production and resource management in general. And those who have had extension contact specific to fruits, beekeeping, spices and root crops constitute 40, 30.5, 25.7 and 20%, respectively. Those who received extension service pertinent to beekeeping and fruits, and spices alone constitute 18% and 13%, respectively. The extension service includes training and advice concerning the production and processing of NTFPs. As regards the frequency of extension contact with extension agents and experts, it was

found to be minimal as about 60% of the respondents reported to have had such contact once in more than three months time.

Table: 5.12 Areas *of extension service and frequency of extension contact*

Area of extension contact	No. of beneficiaries	% of cases	Frequency of extension contact					
			Once in 3 months		Once in 6 months		Rarely (once a year)	
			N	%	N	%	N	%
Coffee	64	61	28	26.7	35	33.3	1	0.95
Beekeeping	32	30.5	17	16	12	11.4	3	2.9
Fruits	42	40	16	15.3	18	17	8	7.6
Roots	21	20	9	8.6	7	6.7	4	3.8
Spices	27	25.7	11	10.5	11	10.5	5	4.8

Source: Field survey, 2008

5.3.4. Input supply

Input supply in this regard includes the provision of seeds for root crops and spices, improved variety seedlings for fruits and fully furnished modern hives for honey production. The fruit varieties in the area are traditional ones. According to the discussion held with Gomma woreda agriculture and rural development officer, 300 grafted avocado seedlings were already distributed by 2008 raised by Upper Awash Agro-Industrial Enterprise. The woreda agricultural office has also made ready for distribution about 700 grafted mango species. However, the degree of intervention is very minimal compared to the size of the farming households. Moreover, these improved varieties brought from upper Awash Agro-Enterprise at a cost of 32 birr/seedling for avocado, were distributed only for the rich - 'Model' farmers free of charge.

Concerning input supply for honey production; Gomma wereda distributed 800 modern hives in 2006/07 and Haro kebele distributed 554 modern hives for 244 households and 243 additional locally made modern beehives. Seeds for spices particularly ginger were also under provision. Haro kebele distributed nine Quintals of ginger seed while Gomma

district distributed about 28 Quintals. Seed for Taro were also being distributed. The provision of all these seed (inputs) was on credit basis. With regard to the availability of credit service for inputs; 84% of the sample households had no access to credits. Of the beneficiaries of credit service; seven households used it to purchase modern beehives and others used it for coffee berry drier.

5.4. Trends in the Production of NTFPs

The production trend for major NTFPs is increasing. The trend shows mixed results for fruits. The data produced from the survey of the number of fruit trees possessed by the respondent households in 2002 (5 years ago) and in 2006/07 showed an increasing trend for banana, avocado, mango, orange and coke though the change was statistically insignificant at 95%. However, the trend is decreasing for papaya and guava. This fall in the number of guava and papaya was in response to wild animal damage as apes and monkeys prefer them. The FGD held with key informants revealed that many elder households used to possess many more number of mango, orange, guava, *gesho* and *chat* before the 1980. There after, the villagization program relocated the farmers and all the fruit trees were cut down and changed to other alternative land uses because of damage by apes and monkeys. Table (5.14) below summarizes the average number of fruit trees possessed by sample households before five years (in 2002) and in 2006/07.

Table: 5.13 *Number of major fruit trees possessed by respondents*

Type of fruit	In 2002			In 2006/07			t-value
	No.	Mean	SD	No.	Mean	SD	
Avocado	55	6.7	15.8	88	7.9	17.6	0.39
Mango	60	3.8	5.5	90	4.2	4.1	0.383
Banana	31	9.9	15	48	16.8	36.7	0.881
Orange	58	3.2	2.7	66	3.2	2.5	0.124
Guava	32	2.7	1.8	38	2.1	1.0	0.94
Papaya	28	7	18.6	41	4	3.8	0.321

Source: Field survey, 2008

Despite the prevalence of challenges of land scarcity and damage of fruits by wild animals, about 83.7% of the respondents have the intention to plant some of the fruit trees such as avocado, mango, banana, and to introduce to their field fruits like jack fruit, apple and pineapple.

With regard to beekeeping, the number of modern hives is increasing and is progressively replacing the traditional ones. Modern bee hive was distributed to both kebeles of (Ganji Ilbu and Chidero Suse) in 2006/07.

Table: 5.14 *The number of modern and traditional beehives owned by sample households*

Type of Bee hive	In 2002			In 2006/07			t-value
	N	Mean	SD	N	Mean	SD	
Traditional	12	11.08	9.49	8	5.25	2.49	0.356
Modern	10	4.9	3.28	41	5.54	5.31	0.502

Source: Field survey, 2008

Honey is becoming a valuable NTFP in the area in response to the improving market price and about 76.7% of the respondents have a plan to use/ increase modern bee hives. About 6.7% of the households producing honey have a plan to decrease the number of hives for they found it difficult to manage on a small home garden and due to insect infestation.

Some of the spices and root crops are also progressively being adopted in some kebeles (Chidero Suse and Haro) though it is too early to speak about the trend. Ginger and pepper are being produced among many households though not beyond subsistence in most of the cases. From the root crops, taro is getting recognized by Gomma woreda agricultural office and Jimma agricultural research center that are jointly assisting the farmers to adopt it through the provision of seeds. The trend is fairly increasing for other root crops such as enset, and yam (wacino) which the households found to be important livelihood coping strategy at times of hardships/ off-peak periods. The difference is however statistically insignificant at 95% confidence interval.

Table: 5.15 *Spices production by sample households in kg during 2002 and 2006/07*

Type of spice	In 2002			In 2006/07			t-value
	N	Mean	SD	N	Mean	SD	
Korerima	0	0	0	2	65	77.9	
Ginger	10	7890	21928	36	2011	10307	0.229
Turmeric	4	12	18.7	7	54	110.4	0.423
Pepper	9	40	61.8	22	60.8	90.3	0.088

Source: Field survey, 2008

5.5. Other NTFPs and services used in Jimma area

5.5.1. Medicine

Traditional medicine has always been playing central role in supplying the rural communities with preventive and curative medicines against human and livestock ailments (Getachew and Wubalem, 2004; Vivero, 2002). The forests are good source of production with medicinal values and often considered as 'rural pharmacies' (Daba, 2002). The use of medicinal plants for curing different human and livestock diseases is common among the people in Jimma area. These traditions of using herbal medicines to treat various diseases have been inherited from the forefathers and ancestors. It was realized from key informants that farmers in the area use different parts of various plant species as traditional medicine to treat different diseases.

Table: 5.16 *Some medicinal plants, parts used and diseases treated*

Plant species	Local name	Parts used	Diseases treated
Calpurina subdecadndra	*Ceekaa*	Leaves	Stomachache
	Hancabbii	Leaves	
Croton macrostachys	*Bakkaniisa*	Leaves and bark	Malaria, dermal disease
Ocimum suave	*Hanquu*	Fruit seed	Tape worm
	Baaruda	Root	Tape worm
Vernonia	*Dheebicha Dhumuugaa*	leaves	Inflammation of the leg
Cordia africana	*Badeessa*	Stem/branch late bark	Toothache
	Ameeraa		Wound
	Reejjii	leaves	Wound
	Gizaawwaa	leaves	Evil eye
Rhamnus prinoids	*Geeshoo, loomii*	Berry and juice	Dermal disease
Citrus lemon	*Waleensuu*	Tip (leaves) Bark	Eye disease stomach/ intestinal disease
Premna resinosa	*Urgeessaa*	Leaves	Hepatitis
Carica papaya	*papayya*	Leaves & root	malaria

Source: Field survey, 2008

In addition to these, plants and herbs used as medicines include 'Togoo', 'xenadaamii' (tape warm), 'baggee' (eye disease) and jinjibila (ginger) (for tonsil). These are some of the widely used medicinal herbs by the communities in the area. It was realized from the

FGD that these medicinal plants are familiar to most households and are usually used before visiting the nearby health centers or clinics. However, the list of medicinal plants in Jimma area can not be complete because of problems related to local patent issues owing to the unwillingness of traditional healers or elders' to tell all they know. The above listing rather contains medical name of what most households commonly use and collect, and hence are not "core competencies" of specialized healers. It seems very difficult to make exhaustive list of the traditional knowledge embedded in the people only from few individuals.

5.5.2. Fences

It was observed during the field survey that farmers in Jimma are has a tradition of using both live and dead fences with the former commonly used in homesteads while the later is common in the field (coffee farm areas). Even in the field area live trees are used intermixed with dead one indicating that live fences are progressively replacing dead fences.

The commonly used live fence in all the three kebles include (Beroo) 'waleensuu' with '*Cadaa*' and often 'dhumuugaa'. *Waleesuu* is some how woody where as *Cadaa* is a shrub with thread leaves/branches that virtually close all openings between consecutive *'Waleensuu'* trees. Both are easily planted by cutting. In addition, *Cadaa* is a protective fence as it releases milky substance which is acidic (poisonous) when dropped on animals' skin.

Picture 5.1 ***Live fences made of 'Cadaa' and 'Waleensuu' in home garden areas of Ilbu and Suse***

Source: *Snap shot Photo taken during field survey, 2008*

5.5.3. Shade and Shelter

The households in the study area are almost entirely dependent on coffee as their livelihood base. The income from the sale of coffee plays a significant role in helping the households buy cereals for their consumption because of land scarcity to produce cereals by themselves. This perennial crop is shade loving and the respondent households have a practice of growing different trees as coffee shade. They thus have different preference of trees as shade

Table: 5.17. ***Farmers' preference ranking of trees as coffee shade***

Species	Vernacular name rank	Remark
Albizia gummifera	*Hambabeessa*	Fast growing, long age, fine leaves and enriches the soil (nitrogen fixing)
Acacia abyssinica	*Laaftoo*	Grows slow, enrich the soil, high coffee yield but suddenly uprooted does not long last)
Cordia africana	*Wadeessa*	Broad leaves, blocks sunlight
Crton macrostachys	*Bakkanisa*	Broad leaves, blocks sunlight
Veronia amygdalina	*Dheebicha*	Preferred only as temporary shade
Sapium ellipticum	*Bosoqa*	

Source: Field survey, 2008

An 80 year old man explained his dependence on coffee and how coffee is better cultivated under shade management.

> *Our existence is entirely based on the cultivation of coffee. We can't survive without coffee. We don't have equally important alternative income sources that would enable us buy cereals (food items) and other basic necessities as coffee does. Coffee trees can no longer stay productive unless sheltered with shade trees. Hambabeessa is the best coffee shade tree. we value and conserve' Hambabeessa' as our first son for this matter. We also plant it in the coffee farm, as you can see it even now. (Picture 5.2)*

Abyssinia is preferred second to A. gummifera for its fine leaves that not only allows ease penetration of sun light to reach the coffee tree but also does not cover (drop on) coffee berry when it shades a way its leaves. However, it is not fast growing like *Albizia gummifera* and often gets uprooted suddenly. The coffee produced under the shade of *Acacia abyssinica* has got special quality and weight and is preferred for sale. But Acacia trees are not fast growing and often get suddenly uprooted. *Cordia africana*, on the other hand, is preferred for they offer dual advantage; that is, shade and lumber any time in the future.

Other trees preferred for coffee shade are broad leaved which not only blocks the amounts of sunlight that reaches the coffee tree but also drops on the coffee berry and degrades coffee quality. Nevertheless, they are used as temporary shade until appropriate shade trees grow large enough to serve the purpose. It was reported that shade improve, the quality of coffee by slowing down cherry maturation rate and allowing the bean to accumulate much amount of sucrose (Steiman, 2003, Herzog, 1994 in Abeba etal. 2004)

Picture5.2 Coffee as under storey trees under forest shade

Source: *Snapshot photo taken during field survey, 2008*

5.5.4. Soil Conservation

The FGD held with key informants and the field visit revealed that there are various traditional agro forestry practices integrating agriculture-crops and livestock with forestry trees and shrubs on a single plot of land. Farmers either plant or deliberately retain some trees over the other on croplands. As was discussed under shade tree preference of the farmers, species like *Cordial africana* and *Alibizia gummifera*, and *'waleensuu'* were believed to replenish soil fertility and hence preferred by farmers. Moreover, tree species like Croton, Acacia and Vernonia, were also preferred in the area and grown in homesteads and around farm gates by the farmers.

5.5.5. Farm implements and household utensils

It was also realized from the key informant interview that farmers in the study area use traditional farm implements such as plough and yoke for crop production as is true for the rest parts of the country. The community in Jimma area obtains these materials from different available tree species. Among others, *E.* cymosa *('ulaagaa')*; *A. gummifera ('hambabeessa')* and *C. subdecandra ('ceekaa')* are important tree species from which the farm implements are made. *C. africana, E. camaldulensis* and *'ulaagaa'* are mainly used to make plough while *'ulaagaa'*, *C africana* and *'Mukarbaa'* are used for yoke.

These farm implements are used by those households who have oxen and practice cereal production.

Household utensils and tools were also obtained form the available tree species either to be used at home or sold to earn cash income. For instance, *Cordial africana* is used to produce a number of valuable household utensils such as table, chair, and 'barcuma' while *'ulaagaa' 'bayaa'*, *'zaytuna'*, *'laaftoo'*, and *C. subdecandra* (*'ceekaa'*) are commonly used for hand tools such as axe, hoe, *'gasoo', 'gajamoo'* and *'zappa'*.

5.5.6. Fuel wood

The other non-negligible use of the forest in Jimma area is its provision of fuel wood particularly firewood that constitutes the basis of energy source for the local community. Charcoal making is not a common business in the study area. Firewood is a single most important source of energy usually, collected by women and children. Men were not involved in gathering fuel wood except in few cases that they help in cutting branches form big trees, which may be beyond the capacity of women and children.

It was found from the FGD that *Albizia, Croton, Vernonia, and Calpurina* are the commonly used species for firewood. Moreover, crop residues are also found to be an important source of fuel in the study are .The stocks of maize and sorghum were used as a source of fuel especially in Chidero Suse kebele.

5.6. The Role of Gender in NTFP Related Activities

5.6.1 Gender role in Fruits and Honey Production and Marketing

Household members have got their own role to play in the different phases of NTFPs production and processing. It was found from the survey that nearly half (50.5%) of the respondents assigned fruit production related activities to men where as 15.5% of the households prioritized the role of female. The other 25.8% responded that all household members including sons and daughters participate in fruit production and management. The sample households grow fruit trees in their homesteads where women can look after it especially during maturity. Children also play an important role especially in hoeing and protecting fruits from vertebral pests.

Contrary to the predominance of the role of men in the production and management of fruits, the role of women is given more weight in its marketing. About 68% of the respondents attached higher weight for women's participation in fruit marketing where as men's and children's participation makes up 26% and 8%, respectively. It was realized that women use their back where as men carry a sizeable fruits in '*kesha*' on their shoulder for sale. It also seems important to mention that the gender role differs with different fruits. Fruits that are highly valued and often sold in mass like avocado were mostly sold by men while less marketed fruits that were frequently taken to markets in small quantity (guava, papaya, banana, etc) were usually sold by women. This in fact makes valuable contribution to rural women as some of these activities provide one of the means, through which rural women generate income independent of their male counter parts (Vivero, 2002). Moreover, this not only improves household welfare but also contributes to women's empowerment from social oppression, which often results from lack of economic independence from men.

Beekeeping seems to be the task of men. More than 87% of the households who practice beekeeping responded that men usually manage bees and only 2.2% of the respondents attached more weight to the participation of women. About 4.5% attached more weight to the participation of sons and daughters; where as, the remaining 6.5% said that all household members participate in managing bees. Men usually work on cleaning the hives (wax) and take out honey seasonally often confronting attacks launched by bees. Women and children unlike the case of fruit production, have relatively minimal role limited to cleaning the areas of beehives to protect bees from insect infestation. Men in addition consciously look after beehives at night to protect them against theft and from wild animal locally called *hamaa* which damages the bees in search for honey.

With regard to honey marketing, unlike the case with fruits, nearly 71% of the households that practice beekeeping responded that men were major participants. The participation of women and children were reported to constitute up 18% and 11%, respectively. The predominance of the participation of men in honey marketing is mainly due to the fact that honey is commonly sold at home (in the village) for consumers as well as traders. And only a portion of it is transported to the market which would still be

sold at a time to wholesalers, consumers or retailers. This shows a relatively high market demand for honey as compared to most fruits except avocado.

5.6.2 Gender Role in the Production and Marketing of Spices and Root crops

As is the case for other NTFPs, household members take part in various activities in the production and processing of spices in Jimma area. The survey revealed that slightly above half (51%) of spice producing households prioritize the participation of men, whereas 29% and 18% gave more weight to the role of women and all household members, respectively. The remaining 2% responded that hired labor plays important role in digging out ginger during harvest. The role of household members differs with the spice being cultivated. Women usually play an important role especially in cultivating pepper and often turmeric in home garden; whereas, the role of men takes precedence in planting and harvesting ginger.

The role of women takes predominance in the marketing of spices. The survey revealed that about 71% of spice producers attached importance to the participation of women in the marketing of spices; whereas 16% and 13% gave priority to the role of men and children in spice marketing. Women usually take spices to market which help them finance food items and its complements while men often involve in the sale of ginger in *'kesha'*. The production of root crops has also a gender dimension. It was found that 56% of he respondents gave priority to the role of women in the production and processing of roots and tubers. These respondents who underscored the role of men and children are 21% and 12%, respectively. The remaining 10% said that all household members equally participate. It is, however, important to point out that the participation of women sounds in the processing of *'enset'* where as their male counter parts mostly involve in cultivating roots like taro (*'godare'*) and yam (*'wacino'*).

In relation to marketing, the role of women was significant as is the case for fruits and spices. Women usually sale (take with them roots and tubers) such as taro, yam, *'kote-harre'* and sweet potato during every market visit to buy consumable items such as salt, oil, etc. Hence, the marketing of root crop almost entirely amplifies the role of women with the exception of few cases in which men participate in the sale of taro (*'godare'*) and sometimes sweet potato.

Generally, it was found from the survey that women takes a major part in the production and processing of NTFPs. Women also get their income independent from men from the sale of these NTFPs which to some extent not only improves the household welfare but also relieves the rural women from social oppression and economic dependence on men. Nevertheless, it is worth mentioning that highly valued and relatively marketable NTFPs such as honey, avocado, taro and ginger and the corresponding income from their sale is in the hands of men.

5.7. Marketing of NTFPs

The issue of marketing and its significance depends on the nature of the commodity being marketed. Fruits, root crops and some spices are perishable in nature among other NTFPs, and hence their marketing system matters most. This requires considerable attention as their production system. On top of their perishability, most NTFPs have got considerably smaller share in household consumption and are considered as cash crop by producer farmers. As discussed earlier sample households cultivate most of the NTFPs for both consumption and income generation. It is therefore, believed important to discuss issues pertinent to market access and nature, transportation and the marketing channels for some marketable NTFPs such as fruits, honey and spices.

5.7.1. Market Type and Access

There are about five major markets that the sample households frequently use to sell their products and to buy what they need. By the some token they usually sale their NTFPs unless some of these products are sold at home like honey and avocado. These market include two district (Wereda) level markets; namely, Agaro and Yabbuu and three village level markets; namely, Haro, Gembee and Bashaasha. Haro is a Saturday market at the center of Haro keble. Gembee is another market day on Monday and is situated in Gembee town in between Haro and Chidero Suse. Both Haro and Gembee markets are found along the asphalted road form Jimma to Agaro passing across Haro and Chidero Suse kebles. The other market is Bashaasha, which is found past Ganji Ilbu keble. This market center is situated off the asphalt road joining Agaro to Jimma. It is, however, connected to Agaro by gravel road. This market is accessible to and very often used by communities around G. Ilbu

Table 5.18 Common Market centers frequently used by the households

Market Center	No. of responses	% of cases
Agaro	99	84.0
Gembe	9	8.6
Yabbuu	12	11.4
Haro	14	13.0
Bashasha	16	15.0
Total	150	142.0

Source: Field survey, 2008

With regard to accessibility, almost all the five markets are some how accessed by the nearby kebeles. It was found that the average time taken by the households to travel to the nearest market on foot is 36 minutes. Most of the households sell their products (NTFPs) in nearby major markets even though the sale of some NTFPs like honey and fruits (avocado) are often carried out at the village by few households

5.7.2. Transportation and Processing

There is no significant problem related to transportation facility in the area. Two of the sample kebles, namely Haro and Chidero Suse are situated along the main asphalt road running through Jimma and Agaro. Hence, these two kebeles have a relatively ease access to both Jimma and Agaro markets though they both mostly use the latter. Moreover, Chidero Suse is the closest kebele to Agaro town with about 4 km distance form the center of the town, where as Haro is at about 15km distance from Agaro and 30km from Jimma.

The respondents however rarely use Jimma for the marketing of NTFPs but to buy different farm implements. Different from the first two, Ganji Ilbu kebele is found off the asphalt road running through Jimma and Agaro to Mattu. Ganji Ilbu is however connected to Agaro by a gravel road that runs through the kebele joining Agaro to Bshaasha. The problem with this kebele's transportation rests in the absence of regular transporting vehicle except those which transports between Agaro and Bashaasha. The

community in Ganji Ilbu kebele are hence, forced to stand along those road waiting for vehicles to- or- from Agaro for marketing their products to either markets of Agaro or Bashaasha. Getting bored of standing for long along the road, some prefer to go on foot to the nearest market center.

Table 5.19 *Households using different modes of transport*

Mode of transport	Frequency	Percent of cases
Head/back loading	61	58.5
Pack animals	16	15.0
Animal cart	2	1.5
Vehicle	56	53.0
Total	135	128.0

Source: Field survey, 2008

The households interviewed also responded that there is a practice of hiring donkeys and /or horses to transport marketable NTFPs such as coffee and fruits only when the product to be marketed is large enough. On the other hand, the farmers themselves take some products to the market when they are small enough to carry at their back or shoulder. Hence, the size of specific product marketed at any given time dictates the mode of transpiration to be used.

It was also realized from the discussion held with key informants that some NTFPs could be maintained until market days or until relatively suitable period for their marketing. It was also discovered that fruits like avocado can be kept on the tree until needed for sale or to wait for appropriate time as pre harvest storage. Fruits like banana and orange could also be kept this way if the farmers are not willing to sell at a particular time. For instance if a farmer does not like to sale banana, a green (raw) banana stalk can be kept for some time before cut down or even after and usually put under a cover to ripen until it get yellow in color. However, the problem with these last two fruits is that they are easily damaged by wild animals for they are preferred by vertebral pests such as apes and monkeys. This issue of storage is not much a problem with other NTFPs such as honey,

spices and roots. Honey can easily be stored until the desired market period except for croton honey which the respondents said 'gets decayed and solidified' when stored. For spices such as ginger and turmeric storage is not a problem .The discussion with spice producers revealed that ginger can uniquely be kept in place (in the soil) up to the desired market period or even year. Ginger gets more and more thick and matured as it is kept in the soil for more years. Moreover, ginger is not eaten by wild animals. Turmeric can also be stored in a similar manner in both pre-and-post harvests. Roots and tubers, as the discussants revealed, could be stored well. This particularly holds true for '*Enset*' and taro. The span of the former can be elongated as is perceived necessary; where as the latter can be stored for up to over six months period with out any damage either for consumption or for sale. This quality makes taro a highly valued root crop for it could be stored to meet food security needs whenever need arises.

With regard to grading and standardization, it was found from the FGD that the farmers do not standardize while selling their products. There are, however, situations under which they offer different variety of products especially fruits. There is what they call local and Kenya type for banana where the later is considered to be of low quality and often low price and is not preferred. Avocado has also a large seed bearing and small one where the former is preferred to the later in the market. The quality and the corresponding preference for honey is of course not guided by the farmers conscious decision to supply one type over the other but by the seasonal variation of flower types. Accordingly, Vernonia honey *('damma dheebichaa')* is the preferred quality honey followed by guizota honey *('damma keelloo').*

It was also realized that farmers in the area commonly use the unit-*'Feresulla'* equivalent to 17kg when they sell their products to customers. They often use number and estimation of units per birr (for fruits, spices and roots) when they sell the smallest possible unit of a given product to final consumer. This is a common practice in small market days –*'qocee'/'gulit*[4]*'*.

[4] Guilt= is a small village market available through out the week on daily basis.

5.7.3 Marketing Channels for Major NTFPs

It was found from the study that NTFP producers in Jimma area have got different options or outlets to sale their products. Even though the sample households produced different NTFPs as their livelihood strategies which include fruits, honey, spices, and root crops. However, the marketability of these products varies and the latter two are primarily produced for direct home consumption and not beyond subsistence, and less marketed, as a result. The former two were relatively marketed the marketing channels of which were found worth discussion.

Fruit and honey producer households sale their products through different outlets; namely, to consumers in the village and processors at local markets, to local assemblers in their village or home, to local market assemblers, to retailers and wholesalers buying at the district market (Agaro) and in their village. Local processors and consumers channel about 23 and 32% of fruits and honey sold by producers. Consumers buying both fruits and honey include rural households and urban inhabitants. Key informants revealed that a fairly good proportion of honey is sold in the village to honey non-producer farmer households who do not possess beehives. They usually buy honey during peak periods with prevailing market price and it is usual for honey producer households to prioritize the demand of their neighbors and sale it at market afterwards.

About 21.4 and 18.6% of fruits and honey sold was channeled through retailers in the district to consumers. Retailers bought all types of fruits including avocado, mango, banana, papaya, orange, and guava from farmers on weekly market days and retail in the daily markets called *'Qocee'/'Gullet'*. Wholesalers buying out of the district constituted for about 19.63 and 14.3% of fruits and honey marketed from the district, respectively. The fruit types marketed through wholesalers usually included avocado, banana and mango. It was realized that wholesalers transporting it to Addis Ababa market bought avocado in the field (on the tree) and producers in most of the cases need not transport it to any market given their fruit is large enough. As a result, avocado was much valued fruit with a relatively fair price which most households intended to plant. The rest fruits were not considered valuable and less marketed. For instance, the irregularity of mango

fruit to ripen and preference by apes and monkeys undermined its marketability despite a fairly large volume of production compared to others.

Local village assemblers and local market assemblers together assemble about 35% of both fruits and honey marketed in the area. They buy fruits such as avocado, mango, orange and banana, and honey to sale to final consumers and/or wholesalers buying out of the district. A considerably high proportion of honey was sold through village level assemblers and farmers were quite conscious of the profit margin that would be gained when it is sold at district level market. It was realized that farmers usually sale fruits and honey to village assemblers when they found their commodity not worth taking to the market due to smallness in size. The farmers had also mutual agreement with the assemblers to negotiate over prices to make readjustment any time in cases of changes in prevailing market price during that particular time.

Table: 5.20 *Marketing channels for Fruits and Honey by number of sellers and market share of customers*

Type of customers	Fruits			Honey		
	N	**% of cases**	**Market share of cases (%)**	**N**	**% of cases**	**Market share of cases (%)**
Local village assemblers	21	26.9	17.8	7	18.4	19.3
Local market assemblers	17	22.4	17	9	23.7	15.7
Retailers	34	44.7	21.4	16	42	18.6
Wholesalers	5	6.6	19.63	1	2.6	14.3
Processors/consumers	55	73	24	35	92	32

Source: Field survey, 2008

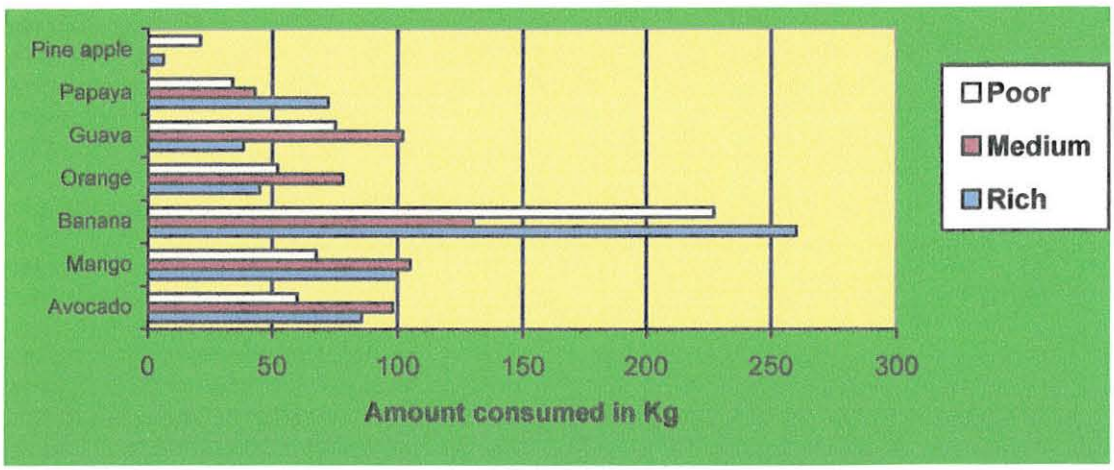
5.8 NTFPs and Rural Livelihood Diversification

5.8.1 The role of NTFPs in household food security

It was realized from this survey that different NTFPs play an important role in a household consumption pattern contributing substantially to the households' nutrition.

Different fruits, roots and tubers, honey and spices were found to play central role in household consumption among all the three wealth classes. All the three livelihood categories were found to supplement their household consumption from different NTFPs from their own farm (home gardens). An estimated average consumption of these NTFPs showed slight variation between the 'Rich' and 'Medium' classes, where as it substantially dropped for the 'poor' almost for all NTFPs, but for less valued ones.

Figure 5.1 *Average fruits consumed from own farm in kg/year in 2006/07 by wealth group*

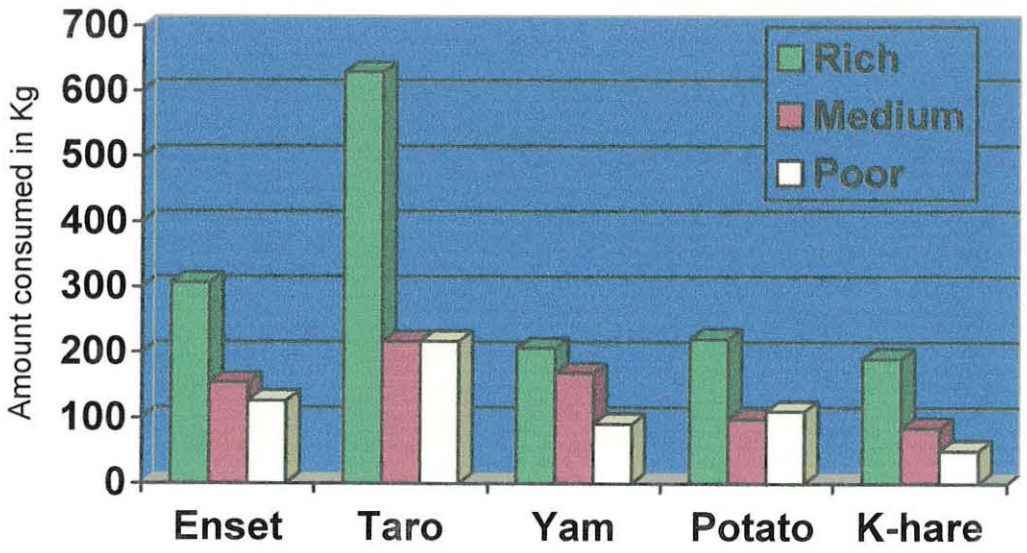


Source: Field survey, 2008

The rich consumed per year on average about 260, 100, 86, 72, 45, 38, and 6kgs of banana, mango, avocado, papaya, orange, guava and pineapple, respectively. Whereas, mean consumption of this same fruits for the medium class amounted to 130, 106, 98, 43, 78, 103 and none, in the same order. Average consumption of fruits by the poor category was substantially lower for some fruits such as avocado (60kg), mango (67.5) and papaya (34.kg) while the amount for other fruits were found to be even higher than the corresponding means for the rich and the medium categories. It was also realized that the average consumption of fruits such as orange, guava and banana are higher because of discouraging market prices and farmers' preference of consumption over marketing for such fruits, as a result. The variation across the wealth groups in the amount of fruits consumed implies how the rich are better integrated in its production perhaps due to a large size of land.

Roots and Tubers: This group of NTFP was also found to make valuable contribution to the household food security. The importance of these products lies in their drought resistant and non-perishable nature. A good proportion of these products are consumed by most of the households from each of the three wealth classes. However, there was variation among the households across the three wealth classes in the degree of dependence on these products for their household nutrition. It was found from this survey that the rich category heavily relies, on roots and tubers than the medium and poor wealth classes. This contradicts with the findings of Vivero (2002) which attached more weight to the importance of wild roots (famine food) such as Yam to the poor as their coping strategies. The data produced from the survey showed that the average consumption for major roots and tuber such as *Enset*, Taro, Yam, sweet potato and *'Kote-Hare'* was 18 (plant), 628, 206, 220 and 190 kgs, respectively. Where as, the corresponding mean consumption for the medium class is 9 (piece), 216, 168, 98 and 84 kgs, in the same order. This was found to drop further for the poor which is 7.4 (piece), 217, 91,110 and 50kgs, for the aforementioned crops in the same order.

Figure 5.2 *Amount of roots consumed by wealth groups*

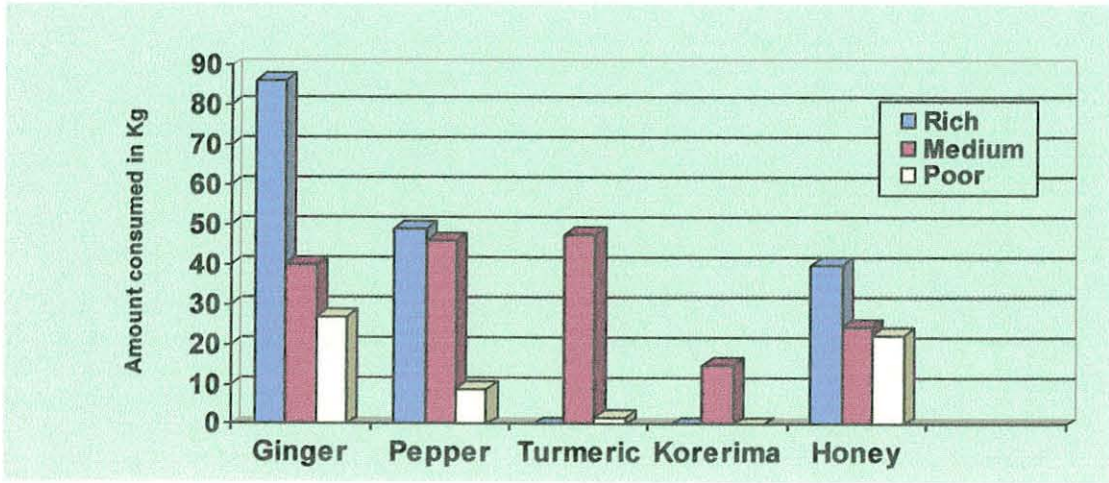


Source: Field survey, 2008

Honey and spices: It was found that honey is used for both direct consumption and income source. The rich usually possess more bee hives which are often modern and hence enjoy a good amount of their honey production for consumption purpose compared with the other two wealth classes. It was found that about 40, 25, and 22 kgs of honey were consumed by the rich, the medium and the poor, respectively. This may be due to differences in financial capital or access to credit and higher land possessed by the rich as opposed to the poor to own modern beehives

The sample households were also found to produce different spices for their own direct consumption and often for sale. The spices produced by respondents include ginger, pepper, turmeric, and cardamom (*'korerima'*). The latter two were produced by a few households and were rarely marketed. The rich consume on average 86 kg of ginger, whereas that consumed by the medium and the poor classes were 40 and 24kgs, respectively. Turmeric on the other hand, is consumed from own farm by the medium and the poor classes and the rich do not produce it. This might be due to the low market demand for turmeric. Pepper is consumed from own farm by all the three wealth classes the average mean consumption being 49, 46, and 9kgs for rich, medium and poor classes, respectively.

Figure 5.3 Spices and the amount of Honey consumed from own production by wealth groups



Source: Field survey, 2008

5.8.2 NTFPs - based income generation

It was found from this survey that the sample households were engaged in multiple activities and rely on diversified income portfolios. Sample households generate their income from diverse sources with varying extent of contribution by every activity to a household income. As discussed earlier those NTFPs of central importance in a household consumption were also found to be important income generating mechanisms for the respondents particularly in off-peak periods when income from coffee is non-existent.

Fruits: the different types of fruits produced in the area play important role in the household economy as both sources of income and household nutrition. A good number of respondents make their livelihood out of fruits often with varying degree of contribution by various types of fruits. For instance, the data produced from this survey revealed that 31.5% of the respondents earn on average ETB 1,155 from avocado alone. And about 33.3% earn ETB 211 from mango.

Table 5.21 *Estimated average income from fruits/year in 2006/07*

	N	Min	Max	Mean	SD
Avocado	33	45	25000	1155.00	4325.780
Mango	35	10	600	211.03	165.070
Pineapple	4	30	1250	407.50	574.940
Banana	32	15	560	141.84	136.320
Orange	32	30	600	205.22	163.260
Coke	1	50	50	50.00	.
Guava	8	20	160	55.00	46.590
Papaya	15	10	150	65.00	47.020

Source: Field survey, 2008

Honey: is another NTFP that was found to play an important role in supplementing rural household income from other sources. Households who practiced beekeeping constitute 35% of all the respondents and earn on average ETB 897. Key informants disclosed that income from honey plays an important role in a household livelihood security because it is obtained in off-peak periods when other incomes from coffee and fruits are rarely available. This complies with the findings of Mohammed etal (2002) which acknowledges the importance of income from NTFPs in its timing than its magnitude.

Table: 5.22 *Amount of honey produced, consumed, sold in Kg and average income gained in 2006/07*

	N	Min	Max	Mean	SD
Total honey produced	43	10	250	81	58.6
Total honey consumed	42	5	120	30	30.1
Total honey sold	38	10	200	51.3	43.2
Annual average income gained	37	200	3500	897.3	753.4

Source: Field Survey, 2008

***Root Crops and Spices*:** Even though roots and tubers were given more Weight for their role in the household food security through direct consumption, some of them were also found to be important income sources for few households which produced it beyond subsistence. Accordingly, these were marketed by few households for roots were primarily produced for home consumption than income generation. For instance, only 10.5% of the respondents market *taro* and earn on average ETB 865 from its sale. The rest roots and tubers such as *yam*, sweet potato and *enset*[5] were marketed by less than 5% of the total respondents and less than 20% of root crop cultivating households.

As regards spices, most spices producing households consume their spices directly and only a few of them produce beyond own consumption to generate income through marketing. About 60% of ginger producers gained an estimated average income of ETB 522 and 46% of pepper cultivating household earned an average income of ETB 1,057.

[5] Enset: a Plant of false banana is estimated to yield about 25 kg of qocco after fully processed.

Table 5.23 Amount of income earned from roots and spices in ETB

	N	Mini	Max	Mean	SD
Qocco	2	100	300	200.0	141.4
Taro	11	150	4200	864.6	1150.8
Yam	5	30	120	82.0	39.6
Sweet Potato	5	120	800	364.0	265.5
Kote-Harre	1	30	30	30.0	.
Ginger	22	40	4600	522	1006.3
Turmeric	1	30	30	30.0	.
Pepper	9	40	7000	1056.7	2257.4

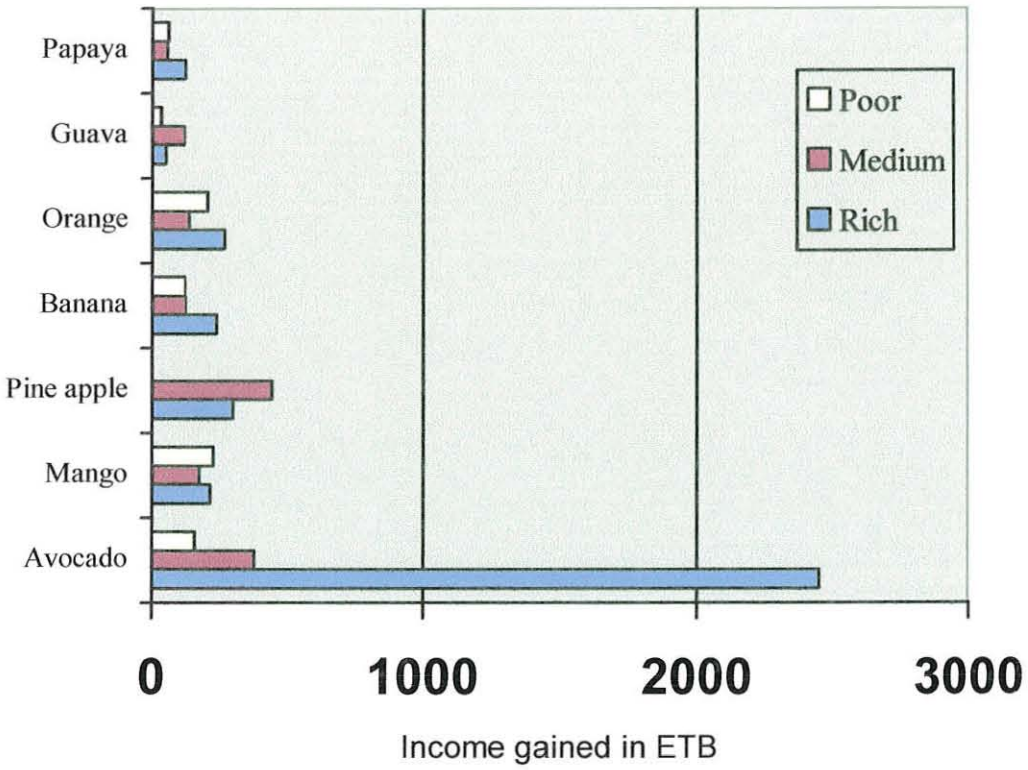
Source: Field survey, 2008

5.8.3 Wealth categories and their specific relation to NTFPs

It was found that the sample households in the different livelihood categories depend on NTFPs as their livelihood strategies. The different wealth classes were identified to depend on NTFP to varying degrees. Hence, it is important to examine the livelihood categories and their specific relations to NTFPs.

Fruits: avocado is the most valuable fruit in the area owing to the income it generates. The rich, medium and poor categories generate from the sale of avocado alone an average income of ETB 2451, 378 and 159, respectively. The income from mango was found to be 216, 177 and 228 for the rich, medium and poor categories; where as, the income earned from banana was 240, 125 and 123, in the same order. The income generated from different marketable fruits showed a declining trend for the medium and poor; where as, the rich earned the highest of all.

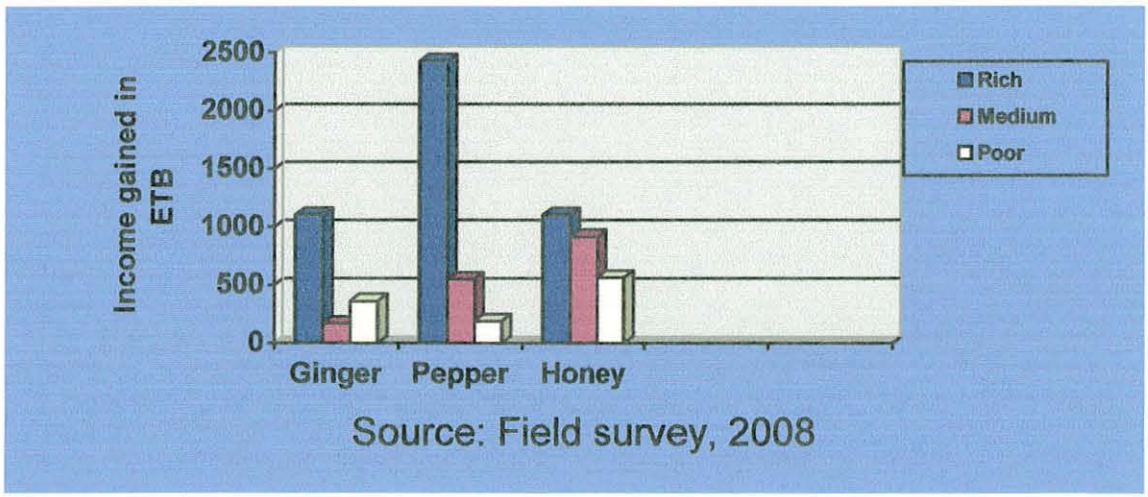
Figure 5.4 *Income earned from fruits by wealth groups in ETB*



Source: Field survey, 2008

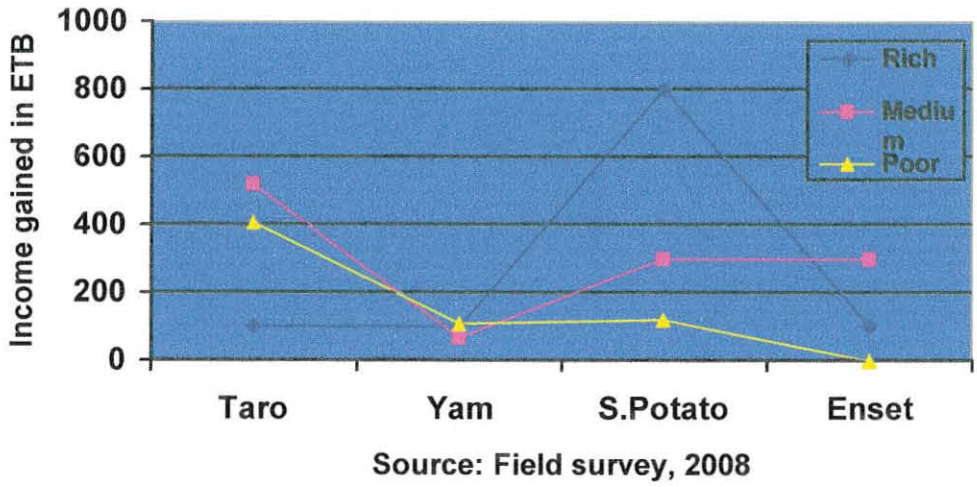
Species and Honey: ginger among other spices, and honey were also another income source identified among the sample households. And the rich, medium and poor earned on average ETB of 1,106, 171 and 365, respectively; whereas, 2430, 550 and 190 was earned from the sale of pepper in the same order. Honey was found to be an important source of income for the sample house holds. The rich, medium and poor earned from the sale of honey an average ETB 1105, 915 and 564, respectively. This implies that the rich group generates more income in almost all the cases of NTFPs considered with declining share of income by the medium and poor.

Figure 5.5 *Income earned from spices, and honey by wealth groups*



Roots and Tubers: Are basically produced for direct home consumption and little is marketed by few households in the three wealth groups. The medium and poor earned relatively higher income from roots as opposed to the income earned from other NTFPs in which the rich have always earned higher income than the two groups. For instance, the income from Taro was 100, 520, and 407 for the rich, medium and poor classes, respectively. This implies the importance of roots for the livelihood security of low income groups.

Figure 5.6 *Income earned from roots and tubers by wealth groups*



In general, the major NTFPs considered (fruits, honey, roots, and spices) on top of making invaluable contribution to household direct consumption also play equally important role in the household income. The income portfolio of the wealth groups showed that 35, 42, and 38% being generated from these NTFPs for the rich, medium, and poor. This income from NTFPs might be significant for the poor in terms of the household well being while they are small in actual terms when compared with other groups. Moreover, the income the poor generates from other sources; that is, coffee, cereals, chat, etc is small which makes the income from NTFPs more valuable. This also complies with the assertion of Belcher etal (2003) which categorizes such economy where income from NTFPs makes less than 50% of household income under *integrated group.* This analysis, however, excludes coffee which in this case is the single most important NTFP often constituting more than 50% of the total household income. The rich group most often accumulates such income as 78% of respondents from the rich category responded that they save and reinvest. Where as only 12% of the medium group and none from the poor use saving. 61% of the poor rather experience three food deficit months. This is consistent with the livelihood categorization of Angelson etal (2003) where hanging on, linking in and stepping out are strategies followed by the poor, medium, and rich groups in forest based livelihoods. This holds true for the community in the study area.

In addition to these NTFPs, Chat was also found to be an important source of income for the sampled households often taking a good share in household income. Chat contributed about 2,152, 823 and 428 ETB for the rich, medium and poor, respectively. This reflects the usual trend for the rich making the highest income out of the sale of NTFPs. However, this crop is not shade loving and can not be grown with other NTFPs through intercropping. It is competing crop that is expanding at the expense of other NTFPs as most home gardens are often under the predominance of chat in response to the high income it generates.

Picture 5.3 *Chat crop in home garden at Hiriyo Got in G. Ilbu kebele*

Source: Snapshot photo taken during field survey, 2008

This shows that NTFPs such as fruits, roots and spices which can be mutually grown with coffee are being banned out by expanding chat crop cultivation which is fueled by the relatively encouraging income it fetches for the rural households. One of the farmers in Hiriyo Got of Ganji Ilbu kebele explained the importance of chat to his household income as follows:

> *You can imagine how small the land under chat in my garden is. I have got a coffee farm in the field which is of course larger than the home garden land by many folds. I earned from the sale of my chat 20,000 ETB, during the last three months alone. Had there been rainfall just for a day or two I would have bought a Minibus from the sale of chat alone. But if you come to coffee it gives me a good yield once in three years period and income from its sale does not exceed what could be earned from chat from a single turn as chat can be harvested not less than three times a year. Hence, what hindered me from converting my coffee farm in to chat is only its remoteness and the accompanying problem of theft as timely supervision in field sites is hardly possible.*

This shows how the cultivation of chat is aggressively replacing other NTFPs including coffee which threatens not only the economically important NTFPs but also the ecologically valuable forest shades. It is, therefore, imperative to promote both production and commercialization of those NTFPs which could be produced in an integrated forest ecosystem.

5.8.4 NTFPs and Changes in Livelihood Assets

The livelihood of the community in the study area depends on different NTFPs particularly coffee. Other NTFPs were also found to play important roles in the livelihood security of the respondents for they contribute to household income diversity in both dimensions of time and magnitude. Some of the NTFPs were found to be important sources of income; where as, others proved to play valuable role in the household food security through direct consumption. Coffee was an important source of income for almost all households surveyed. The different fruits were also important income source and basis for direct home consumption for 60% of the respondent and about 35% of the respondents relied on honey to supplement their livelihood through direct consumption and income generation. Spices and roots were also found to supplement the livelihood base of 24 and 15% of the respondents, respectively and about 70% of the respondents depended on '*enset*' for direct home consumption and '*chat*' for both direct consumption and income generation through sale.

This being the case, a change in livelihood asset was realized for some of the households across the wealth groups. The respondents were asked whether the important livelihood assets they possessed have improved for two points of time over the past five years (2002-2007) with the corresponding source of income for increment in their livelihood asset, if any. It was to examine whether income generated from NTFPs were meant for the improvement of livelihood assets and eventually rural livelihood security. And it was found that livestock assets increased for 40% of the respondents; and about 53% have built corrugated iron roofed houses. Coffee and fruit trees also showed increment for 55 and 53% of the respondents, respectively. The number of beehives also increased for about 43% and purchased farm implements showed increment for about 45% of the respondents. Physical assets such as tape recorder, and TV/Sofa/Dish were gained by

about 47 and 37% of the sample households, respectively. Moreover, about 55% of the sample households showed improvement in schooling their children.

It was also realized that the change in the livelihood assets has shown variation among the different wealth groups. In all the cases of assets considered, higher proportion of the rich households showed improvement in their livelihood assets; where as, those households which saw improvement in their livelihood asset significantly fall for the medium and poor households. This has to do with the share of income each of the wealth group generates from NTFPs. It was found that the poor households have usually generated lower income from the sale of NTFPs, when compared with the rich and medium groups. Consequently, many of the rich were found to have improved their livelihood assets more followed by the medium households, where as livelihood asset for most of the poor have either stagnated or declined.

Table: 5.24 *Changes in Livelihood Asset over the past five years by wealth groups (2002-2007)*

Livelihood Assets gained	Wealth Category						Pearson chi-square	df	Asymp sign. (2 sided)
	Rich		Medium		Poor				
	YES	NO	YES	NO	YES	NO			
Livestock	14	11	16	20	10	31	7.148	2	.028
Iron roof house	21	4	19	17	16	25	14.6	2	.001
Beehives	19	6	17	19	9	32	18.6	2	.000
Coffee trees	21	4	22	14	15	26	14.6	2	.001
Tape recorder	18	7	17	17	14	27	12.1	2	.017
TV/Sofa/Dish	19	6	16	17	4	37	32.0	2	.000
Fruit trees	19	6	22	15	14	29	14.7	2	.001
Farm implements	17	7	18	18	14	27	8.20	2	.017
Schooling children	22	3	21	15	15	26	16.786	2	.000

Source: Field survey, 2008

5.9. Challenges and Opportunities in the Production and Marketing of NTFPs

The sample households were found to face different challenges in the production and marketing processes of NTFPs. The major challenges identified are summarized as follows:

5.9.1. Production challenges

Pest incidence: prevalence of different types of pests was found to be the most important challenge in the production of NTFPs in Jimma area. The incidence of pest is serious on orange which the respondents call "*cholera*". Experts of the district Agricultural and Rural Development Office said that orange in the district is being attacked by "*Fungi*". He also added that chemical spray is needed during every harvest on orange trees which was found to be costly and uneconomical as compared with the expected return. The survey also revealed that farmers were getting very minimal return out of orange fruits for it gets dried early (before maturity) and the farmers are shifting from orange to other trees. It was also realized from the survey and FGD that vertebral pests are another potential challenge to the production of NTFPs. These include vertebral pests such as apes and monkeys damaging fruits; pigs and *kerkero* damaging root corps; and '*Hamaa*', birds and insects damaging bees. The farmers in the area responded that they have tried to control these pests by killing using traditional weapons as the use of guns against wild life is officially forbidden by the government. Key informants disclosed that farmers in the area organize themselves in group to hire skilled traditional hunters by contributing money.

Lack of inputs: there is serious problem in supplying various inputs such as seeds, seedlings, and beehives. The district's agricultural and rural development officer said that only 300 grafted avocados has been distributed for few model farmers in the district and 700 mango seedlings are to be distributed. And 80 modern beehives were distributed in 1996. It was also found that efforts made in supplying seeds for spices and root crops production is insignificant. The farmers responded that they have always been asking for improved varieties, but they could not get it. As a result, the respondents were entirely

limited to the production of traditional varieties of fruits and *Ensets* from their own nurseries and often by buying from other farmers. The traditional *Enset* variety that the farmers have is suffering from bacterial disease and there is no improved adaptive variety put in place. Hence, the production of NTFPs in the area has been constrained by lack of input supply. As regards beekeeping, the modern bee hives distributed so far lacks basic parts as honey squeezer and queen bee scudder which significantly reduce honey productivity.

Shortage of land: Land scarcity in both field and home garden areas is a serous challenge in the study area. Inappropriateness of most fruit trees for coffee shade in the study area coupled with wild life damage forced the respondents to use their home garden for cultivating a mixture various NTFPs as fruits, roots and tubers, species and beehives among others. The smallness of land size and competition of the different product limited a households' production capacity. Honey production is particularly constrained by this challenge for the respondents feel that bee hives abuse land use and often attack children and cattle when put together in a small home garden area.

Limited skilled personnel: Extension agents and experts assigned at the different kebeles were found to be inadequate. There was also a bias to wards promoting coffee alone and experts available do not pay due emphasis to NTFPs other than coffee may be ignorant of their contribution to the household nutrition and/or income or due to training biases. This is revealed by the respondents that they received little or no extension contact and trainings (if at all) for most of the NTFPs other than coffee.

Invasion of Chat: the cultivation of chat, owing to the high market demand, is aggressively replacing other NTFPs such as coffee, fruits, and roots for the fact that chat can not be cultivated under shade management. The growing trend for chat cultivation is therefore a potential threat for other NTFPs and requires immense effort to tackle before it is too late reverse the trend. It is also worth note that eucalyptus tree is sharing the path with chat as it is getting the attention of most farmers because of the high market demand. The problem with this plant is the fact that it does not permit other species to grow in its surrounding and would let other NTFPs vanish.

5.9.2. Marketing Challenges

Lack of transportation facility: the households often transport NTFPs particularly fruits and spices by themselves or by hired pack animal. They mostly transport it by themselves on foot which might reduce the amount that would have been marketed, if otherwise.

Absence of Standardized measurement: some NTFPs (fruits and spices) are sold either by counting or using non-standardized unit like '*kesha*[6]' or '*madabara*' as standard. These inefficient measurements might have affected market performance by distorting the flow of relevant market information such as price and unit of a particular NTFP among the stakeholders.

Lack of developed processing technology: Some valuable NTFPs. Such as honey and fruits could be processed and packed in a different fashion for various purposes both in the country and overseas. Unfortunately, there is no such development in Ethiopia with the exception of simple processing of honey in *tej* houses, fruits in juice houses, spices as '*Baltena*', etc often confined to urban settings. Hence, it is relevant to further process high valued NTFPs both for national and international markets.

Absence of wholesalers: There are no wholesalers buying out of the district so that producers would enjoy much of the benefit. As a result, the respondents sell their NTFPs such as honey, fruits, and spice (ginger) to local consumers, retailers and other middle men in the absence of fair-trade.

Limited export market: for the betterment of the livelihood of NTFPs producers' and sustainable utilization of forest resources in the area; not only maximizing productivity is important, but also marketing should cross national boarder. It would only be then that the farmers get reasonable price for their produce. Nevertheless, none of the NTFPs produced in the area joined the export market so far.

5.9.3. Production and Marketing Opportunities for NTFPs

Physical endowments: the area has good endowment of the physical resources such as climate and biodiversity. The climate in the study area is quite suitable for the production

[6] Kesha= is a local measuring unit mainly used for marketing fruits and taro and estimated to weigh on average 80kg

of a variety of NTFPs such as fruits, honey, root crops and tubers, and spices. The adequate annual rainfall ranging from 1,400-1650 mm and the elevation of the district (highland) provides it with a promising potential for the production of important NTFPs in pursuit of the improvement of both people's livelihood and the environment.

Availability of diverse plant species: the area is also endowed with varied high nectar yielding plant species that flower during different seasons of the year. This could be a good potential for the apiculture industry which is a highly conservational economic sector.

Organic nature of the products: the use of inorganic inputs such as fertilizer and pesticides is not common because of the non-degraded/self replenishing soil and a well managed ecology. This helps to maintain the chemical free nature of the products like honey and fruits which would potentially be organically certified. This would eventually help to promote both production and marketing of valuable NTFPs.

Introduction of modern beehives: Modern beehives, which are by far better than traditional hives in many aspects as productivity, and better bee management, are progressively replacing the latter due to the growing awareness of the farmers and extension works in its provision. This could be regarded as another potential.

Farmers experience and developing culture of diversification: Farmers in the area are increasingly diversifying their livelihood basis through intensification. Home gardens of most of the households were found accommodating a variety of NTFPs. This is another potential which help development agents to bring the intended change with minimal effort.

Shade loving nature of some NTFPs: NTFPs such as coffee, spices and roots like taro and yam are shade loving which enhances the culture of intercropping. This could be another opportunity to enhance the production and productivity of NTFPs per household in the face of increasing problem of land scarcity.

Proximity to research center: The presence of Jimma Agricultural Research Center in the area may help the identification of production and marketing challenges of NTFPs, and promote pre-extension service of research outputs. The research center often uses

some kebeles as its pilot area to test research out puts and hence, making the study area a site where innovations are introduced prior to other areas. For instance, pine apple and taro have received research attention by this center and are being tested in the pilot kebeles around it.

Road Access : the district in general and the sample kebeles in particular are along the road passing thorough Jimma and Agaro and only one kebele is connected to this asphalt road by gravel road. The first two kebles: Haro and Chidero Suse are at 35 and 45 kms distance form Jimma in the same order; where as Ganji Ilbu is about 65 km away from jmma. They all are, however, with road access, which would help better market integration.

Establishment of IPMS: the establishment of improved product marketing system is under way. It is a non- governmental origination designed to make the area fair-trade zone for honey. It is working to establish honey producers' cooperative there by directly exporting and seeking certification with a label 'Gomma Honey'.

5.10 Bi- variate Analysis

Chi square test of association was used to examine whether the hypothesized predictor variables affect the dependent variable. The dependent variable assumed to be influenced by a set of demographic and socio-economic variables is the production of NTFPs; that is, fruits, honey and spices. Roots and tubers other than taro are less marketed but produced by most households for direct home consumption, and are hence excluded from the analysis. Access to irrigation, perception on the price of NTFPs, perception on fruit trees' drought and pest resistance received similar response by almost all respondents and were excluded from the analysis. The results are summarized in annex 2. Level of education of the head, size of land, access to credit, and extension contact were found to be significant ($P<0.05$)

Family size, one of the demographic variables, was assumed to affect the decision to produce NTFPs. From those households with a family size of less than six, 60% have planted fruit trees, 39% produce spices and 41% are honey producers. The corresponding figure for those households with a family size of six and above was 62%, 48% and 43 %.

This shows that family size is less likely to influence the decision to produce NTFPs. The chi square test also showed insignificant difference among the two groups of households in terms of family size. But, it was found to be significant at 90% level of confidence for spice production ($p<O.1$). This might be related to the labor demanding nature of spices production particularly ginger as its harvest time overlaps with that of coffee.

Age of the household, though assumed to affect the decision to produce fruits, spices and/ or honey, was found to have no significant relation with NTFPs production decision ($p> 0.1$) in all the cases. This complies with neither finding of James (2003) who found mixed effect of age on technological adoption nor Teressa (2003) who found negative relation.

Literacy status of the household head, one of the human capitals, hypothesized to influence the decision of the head. It was, however, found to have no significant association with fruit tree plantation decision and spice production. It was found to have significant association with honey production. The chi square test of association between level education and spices and honey production was found to be statistically significant at 90 and 99% level of confidence, respectively. This is consistent with the idea that education effects land managements, likelihood strategies, and outcomes in a complex ways and trade like agricultural intensification, improved in comes and sustainable land use (Pender, 2005)

Leadership role of the head, one of the social capitals, was found to have no significant association with the decision of household's to diversify their livelihood base through the production of different NTFPs. The chi-square test however revealed negative association between leadership role and fruit tree plantation decision at 90% level of confidence and no association for the rest of the households. This contradicts with the idea that leaders of a society can have better access to information and hence became early adopters (Degnet etal., 2001)

The number of household members attending formal education, one of the human capitals, was found to have no statistically significant association with the decision to produce NTFPs to diversify household income source. This also contravenes with the findings of Kedja and Bezabih (2003) who found positive contribution of children

education on the final decision of the household head. Size of land, which is a vital asset for the rural people, did have significant association with honey production decision ($P<0.1$) and spices production, but not with fruit tree plantation decision that is 33% of those who own land size <1 ha and 56% those having a land size of > 1ha produce honey. This might be due to the feeling that bee hives in home garden abuse land use and households with small land size tend not to produce honey often contrary to the role of apiculture to reduce the problem of land shortage as livelihood is earned through honey bee flora in this case.

The association between financial capital and NTFPs production decision is also presented. Significant association was observed between access to credit and honey production ($p<0.01$) as about 75% of those who have received credit produce honey where as 36% those who had no credit produce honey. However, access to credit and fruit tree plantation decision and spices production had no association. This might be due to the relatively easily available/ affordable inputs for fruits and spices as comported to expensive modern beehives which necessitate credit service, especially for the poor.

Sex of the head was also considered in the light of NTFPs production decision even though the number of female heads was only nine. Sex was found to have significant association with fruits and spices production decision. However, it was found to have a significant association ($P<0.01$) with honey production as none of the female heads practiced beekeeping. This might be partly due to lack of labor as bee management is considered the task of men and female rarely involve. Distance from market was also considered and the chi-square test proved no significant association between distance from the nearby market and the production of those NTFPs. Extension contact was also considered and found to have weak association ($P<0.1$) with honey production. This is due to the negligence of NTFPs by extension service and bias towards coffee alone.

The chi-square test was used again to see whether there exists significant difference among the wealth group in relation to the important livelihood assets gained over the last five years (2002-2006/07). The test showed statistically significant difference among the wealth groups in improving their livelihood asset at 95% level of confidence for livestock assets gained and at 99% ($P<0.01$) for all other assets considered. The frequency

distribution shows that the percentages of those households, who have gained more assets, were significantly high for the rich, followed by the medium and low for the poor. This corresponds to the proportion of income they earn from NTFPs which has always been the highest for the rich followed by medium and the lowest for poor for most of the marketable NTFPs such as honey and fruits.

Chapter Six

6. Conclusion and Recommendations

6.1 Conclusion

Jimma zone in general and the surveyed kebeles in particular have untapped potential for the production of NTFPs such as fruits (avocado, mango, orange, banana, papaya, guava, jack fruit, lemon etc), roots and tubers (taro, yam, *enset*, and *kote-hare*), spices (ginger, *korerima*, turmeric and pepper) and honey among others. The production and commercialization of these NTFPs have an important implication to improve rural livelihoods and sustainability of forest resource use in the study area.

These NTFPs play an important role in the livelihood security of the community through both direct consumption and income generation. Some of these products are more important for consumption where as others are more valued for cash generation to the different groups. Fruits and root crops constitute important basis of household consumption, especially for the poor. Honey, fruits, and spices complement household consumption and income. Chat is also another perennial crop that significantly adds to household income. But it is competing with other NTFPs such as coffee, and fruits and is expanding at the expense of other NTFPs in response to the growing market demand for it. Moreover, forests in the area provide important services as medicine, shade, fences, fuel and household utensils and farm implements among others.

Among the NTFPs produced in the area fruits and honey are well produced beyond subsistence mainly by the rich wealth group and are relatively better marketed. Root crops constitute the major NTFPs on which community relies in off-peak periods as coping strategies, particularly for the poor. Farmers market these products through local village assemblers, local market assemblers, wholesalers, processors and consumers which are the major identified marketing channels. Because of the negligible share of wholesalers buying out of the districts farmers usually sell their products to retailers and local market assemblers. The producer's share in the consumer's price is very low, as a result.

These NTFPs therefore play crucial role in rural livelihood diversification with the rich households well benefiting from its marketing while other groups produce rarely in excess of their consumption. Many of the households producing NTFPs improved their livelihood asset over the last five years with the income they earned from NTFPs with significant variation among the wealth groups.

The study area is endowed with different potentialities and opportunities which include favorable climatic condition quite suitable for the production of a verity of NTFPs; availability of diverse plant species , organic nature of the products as chemicals are rarely utilized, introduction of modern beehives, farmers experience and the developing culture of diversification, shade loving nature of most NTFPs, proximity to research center and Jimma College of Agriculture, access to road, and establishment of IPMS to make the area fair trade zone , particularly for honey. These ample potentialities are however not yet utilized for the betterment of both rural livelihoods and the environment. This is attributed to the minimal extension service in providing improved adaptive varieties of NTFPs; poor credit and marketing arrangements. Hence NTFPs in the region was not well integrated in to household livelihood strategies, particularly for the poor.

The major challenges in the production of NTFPs identified include wild animal damage, lack of inputs, land shortage, limited skilled personnel and invasion of chat and eucalyptus which threatens other valuable NTFPs. The major marketing challenges, on the other hand, include lack of transportation facility, absence of standardized measurement, lack of developed processing technology, absence of wholesalers, and limited export market for NTFPs produced in the area. As a result, production remains to be subsistent and most households do not benefit from income gain from NTFPs marketing.

The test of association between socio-economic variables such as family size, sex of the head, level of education of the head, leadership role of the head, size of land holding, access to credit and, extension contact and NTFPs production were found to be significant. Therefore it is imperative to target the poor and female headed households who are benefiting the least from NTFPs through better access to credit, extension contact and input supply, farmers' field school and provision of formal education.

6.2 RECOMMENDATIONS

Based on the information gathered from key informants, FGD filed observation and structured interview, the following research, development, extension and institutional recommendations are given.

- The production of most NTFPs was found traditional and subsistence oriented. Hence, strengthening the extension service would be better for the expansion of NTFP production beyond subsistence to generate income through the provision of improved and adaptive variety of fruits, spices and roots.
- Wild animal damage was a serious problem and it would be better if the government emphasize on helping the community over come the damage caused by wild animals on fruits, roots and spices, especially in Ganji Ilbu kebele. This may be through selective hunting of the over populated species such as apes, pigs and monkeys.
- It would also be advisable to pay due emphasis by the concerned body not only in the production of fruits, root, and honey but also in the protection of diseases in cost effective manner because the orange diseases in the area was said to have been ignored claiming that the chemical spray is not affordable compared to returns expected from the sale of such fruits.
- It is better to promote farmers' field school to help them further develop the culture of intercropping fruits, roots and spices with coffee in the face of pressing land shortage problem.
- Promoting credit arrangement is advisable in helping the poor access inputs like improved varieties of seeds and roots and modern bee hives. This is because, the improved grafted mango and avocado seedlings brought from the upper, Awash agro processing enterprise has been distributed for the model farmers which are already rich disregarding the poor. Modern beehives are mostly owned by the richer households who have access to credit while the poor did not.
- It would be better to train farmers for skill development to enable them construct/ produce modern hives locally and providing the necessary accessories (squeezer and queen bee scudder). Because, modern beehives provided on credit basis are

not only expensive (unaffordable to the poor) but also unfurnished with the necessary accessories (squeezes and queen bee scudder).

- It is advisable to develop irrigation schemes from traditional to medium scale using potential rivers to promote the production of cardamom (*'korerima'*) and own seedling for fruits. Because *'korerima'* particularly needs continuous water supply which necessitate the development of irrigation shemes.
- Adaptation and distribution of pest resistant improved varieties of fruits, particularly orange and of roots. For instance *enset* that makes the livelihood for the majority and the poor in particular is a traditional variety which needs to be improved.
- Development and expansion of fruit nurseries and provision of seedling at different centers proxy to farmers is also important as most households complained for its inadequate provision.
- Adaptation of different fruits such as jack fruit, apples and pineapples which are valuable both in terms of income generation and environmental benefits needs to be encouraged as the ecology of the area is virtually conducive for all highland fruits.
- Most fruit and honey producers complained for low return from their sale in local market. Hence, it is better if fruits and honey producers are organized in cooperatives by reforming the traditional community based organizations to help them fetch reasonable price from their sales and enabling them to have market access to local agro-processing industries
- Attention should be given to the introduction of appropriate post harvest technology such as storage, transportation, and processing.
- Limited local demand constrains the potential of NTFPs to improve livelihood. Hence, it is advisable to promote those investors who are engaged in the processing of NTFPs and creation of both forward and backward linkages between urban and rural sectors so that potential urban demands access the rural produce. Documentation of relevant information pertinent to marketing like prices, volumes of different NTFPs sold and their destinations to support future research, development and extension recommendations.

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Appendix 1. *Chi square test of Association between Socio-economic variables and production of NTFPs*

Variables	NTFPs Production Decision		Pearson chi-square	df	Sig.(2 sided)
	YES	**NO**			
Family size	Have planted fruit trees				
<6	26	18	1.381	2	.501
6-12	37	23			
Family size	Spices production				
<6	16	27	4.579	2	.101*
6-12	29	31			
Family size	Honey production				
<6	18	26	.334	2	.846
6-12	26	34			
Age of the head	Have planted fruit trees				
20-40	18	17	3.797	2	.150*
41-60	35	23			
61-80	10	2			
Age of the head	Spices production				
20-40	11	24	2.812	2	.245
41-60	28	30			
61-80	6	6			
Age of the head	Honey production				
20-40	19	16	3.339	2	.188*
41-60	21	37			
61-80	4	8			
Level of education of the H.	Have planted fruit trees				
Illiterate	19	13	4.188	4	.381
Grade 1-4	9	12			
Grade 5-8	24	12			
Grade 9-12	11	5			
Level of education of the H.	Spices production				
Illiterate	10	22	7.966	4	.093*
Grade 1-4	8	13			
Grade 5-8	16	20			
Grade 9-12	11	4			
Level of education of the H.	Honey production				
Illiterate	5	27	19.666	4	.001**
Grade 1-4	7	14			
Grade 5-8	22	14			
Grade 9-12	10	6			
Leadership role of the head	Have planted fruit trees				
YES	22	20	1.693	1	.193*
NO	41	22			
Leadership role of the H.	Spices production				
YES	19	23	.162	1	.687
NO	26	37			
Leadership role of the H.	Honey production				
YES	19	23	.319	1	.572
NO	25	38			
No. of school attendants	Have planted fruit trees				
0-3	40	35	1.513	1	.219
4-6	16	14			
No. of school attendants	Spices production				
0-3	29	31	1.102	1	.294

4-6	11	19			
No. of school attendants	Honey production				
0-3	24	36	.364	1	.546
4-6	14	16			
Size of land (ha.)	Have planted fruit trees				
<1	36	29	1.514	1	.218
>1	27	13			
Size of land (ha.)	Spices production				
<1	24	41	2.453	1	.117*
>1	21	19			
Size of land (ha.)	Honey production				
<1	22	43	4.552	3	.033**
>1	22	18			
Access to credit	Have planted fruit trees				
YES	10	6	.010	1	.921
NO	52	33			
Access to credit	Spices production				
YES	15	9	6.694	1	.281
NO	29	49			
Access to credit	Honey production				
YES	12	4	8.176	1	.004**
NO	31	54			
Sex of the Head	Have planted fruit trees				
Male	58	38	.081	1	.776
Female	5	4			
Sex of the Head	Spices production				
Male	43	52	1.778	1	.182*
Female	2	7			
Sex of the Head	Honey production				
Male	44	52	7.100	1	.008**
Female	0	9			
Distance from market	Have planted fruit trees				
<45 minutes	47	27	1.289	1	.256
>45 minutes	16	15			
Distance from market	Spices production				
<45 minutes	33	46	.309	1	.578
>45 minutes	12	19			
Distance from market	Honey production				
<45 minutes	28	43	1.703	1	.192*
>45 minutes	16	15			
Extension contact	Have planted fruit trees				
YES	34	23	.006	1	.936
NO	29	19			
Extension contact	Spices production				
YES	28	29	1.999	1	.157*
NO	17	31			
Extension contact	Honey production				
YES	30	27	5.893	1	.015**
NO	14	34			

*, ** there exists relation at 0.1 and 0.05 significance level, respectively.

Appendix 2

SURVEY QUESTIONNAIRE

Questionnaire for household survey on the study of "production and commercialization of NTFPs in Jimma Area: Implications for Rural Livelihood and the environment.

The objective of this questionnaire is to gather information on the production and commercialization of NTFPs and their implications to rural livelihood and the environment in Jimma area. The study is conducted as a partial fulfillment for the MA degree in RLDS. Hence, I kindly request you to frankly, honestly and responsibly fill up this questionnaire.

1. GENERAL

Woreda------	Got----------	Interviewer's Name-------	
Kebele-----		Questionnaire Code-------	Date----------

2. HOUSEHOLD AND FARM CHARACTERISTICS

2.1. Sex of Household Head: 1= Male 2= Female

2.2. Age of the respondent _____

2.3. Marital status of Household Head:

1= Married 2=Never married 3= Divorced 4= Widowed

2.4. Level of Education 1) Illiterate 2) Grade 1-4 3) Grade 5-8

4) Grade 9-12 5) Post Secondary

2.5. Religion 1=Christian 2= Muslim 3= others (specify) -----

2.6. Ethnic group 1=Oromo 2= Yem 3= others (specify) -----

2.7. Household size: _____

2.8. Maximum level of education attained by the household members

HH members	Sex *	Age **	Level of education ***
1.			
2.			
3.			
4.			
5.			
6			
7			
8			
	*1) Male 2)Female	** 1) <14 yrs 2) 15-60 3) Over 60	*** 1) Illiterate 2) Can read and write only 3) Attended/ing primary level 4) Post primary

2.9. What is the leadership role of the household head in the community?

1=Religious leader 3=Village/social (non religious) leader

2=political administrative leader 4=No leadership role

2.10. What is the total size of?

2.10.1. Your farm holding (in Facaasaa) ------

2.10.2. Land rented from others (in Facaasaa) ------

2.10.3. Land rented to others (in Facaasaa) --------

2.11. The size of land accessible to irrigation (in Facaasaa) ----------

2.12. What is the total livestock owned by the household?

Livestock	Qty	Livestock	Qty	Livestock	Qty
2.12.1. Cattle		2.12.2.large Ruminant		2.12.3 Small ruminant	
* Ox	------	* Horse	------	• Sheep	------
* Cow	------	* Donkey	------	• Goat	------
* Bull	------	* Mule	------	2.12.3.poultry	------
* Heifer	------	* Camel	------	2.12.4.Beehives	------
* Calf	------				

2.13. What are the most important bases /sources of income for your livelihood? (Multiple answer)

1=Farming 2= Wage labor 3= Petty trading 4=Handcraft

2.14. Production characteristics of major crops as of 1999 production year (September-August)

Crop category		Type of crop	Production per year in local unit	Qty consumed	Qty Sold	Average Annual income
Perennial crops	Coffee	Coffee				
	Chat	Chat				
Vegetables		Onion				
		Tomato				
		Cabbage				
		Carrot				
Cereals		Maize				
		Sorghum				
		Teff				
Root Crops		Qocco /Enset				
		Godere				
		Taro				
		Sweet/ potato				
		Wacino				
		Kote-harre				
		others				

3. Fruit production

3.1. Have you had fruit trees (planted or naturally) grown? 1= Yes 2=No

3.2. Which fruits do you collect from forests/semi-forests or cultivate?

Fruit types	No/Size. of fruit trees owned		Amount of production (in1999)		Annual Income
	1994	1999	Amt consumed	Amount Sold	
Avocado					
Mango					
Pineapple					
Banana					
Orange					
coke					
Guava					
Mandarin					
Others---					

3.4. When did you start fruit cultivation? ---------.

3.5. If you don't grow fruit trees, why?

1= Lack of irrigation access 2= lack of market access 3=lack of awareness 4=shortage of land

5= Problem of land security 6= in appropriate climate/soil 7=lack of inputs/Extension service

8= other (specify)

3.6. What is/are your objectives of planting fruit trees? (Multiple answer)

1= to supplement HH income 2= Land degradation control

3= Home consumption 4= to cope with coffee disease 5= others (specify) _____

3.7. Do you feel that there are good opportunities for fruit production in your Vicinity? 1=Yes 2= No

3.8. If 'yes', what are the potentials/ opportunities?

1=Good climate 2=High market demand 3=High awareness

4=Availability of extension service/improved varieties 5=other (specify)

3.9. Have you visited any demonstration site related to fruit trees and fruits before? 1= Yes 2= No

3.10. If you have visited any demonstration site, what is the impact on you?

1= Increased production 2=Improved variety

3=Increased awareness 4=No change 5=others (specify) ----------.

3.11 Do you feel fruit trees are drought resistant? 1=Yes 2=No

3.12. Do you feel fruit trees are disease resistant? 1=Yes 2=No

3.12. Do you feel your land will not be transferred to others with out your willingness? 1=Yes 2= No

3.13. How do you access land for cultivation as your family size increases? _____,

_____,_____,_____.

3.14. What measures do you use to control land degradation? (Multiple answer)

1=Intercropping coffee with fruits 4=Water way (ditch) 6=No control measure taken.

2=Terracing only 5=Check dams

3=Terracing with fruit trees 7=others (specify) ----------

3.15. Do you intend to plant more fruit trees in the future? 1=Yes 2=No

3.16. If yes, why? ----------.

3.17. If no (# 3.19) why not? ----------.

3.18. Who is primarily engaged in fruit production? (Multiple answers)

1=Men 2=Women 3= Children 4= Others----------

3.19. What are the major challenges in the production of fruits? ----------

----------.

3.20. What do you think would better solve these challenges in fruit production?----------

----------.

4. Fruit Marketing

4.1. To whom do you sell your fruits? * Yes (√) No (x)

Type of Buyers	* Customers	Share in %
Local village assemblers		
Local market assemblers		
Retailers		
Wholesalers		
Processors (consumers)		
Exporters		
Other (specify)		

4.2. Do you feel there is good opportunity for fruit marketing in your area? 1=Yes 2=No

4.3. If you feel there is good opportunity of fruit marketing in Jimma area, specify the opportunities. _____ , _____ , _____ , _____ _____.

4.4 Who is primarily engaged in fruit marketing? (Multiple answers)

1=Men 2=Women 3= Children 4= Others----------

4.5. What do you feel about the price of fruits, specify in order?

1= Satisfactory,,_____ , _____ , _____ , _____

2= Not satisfactory,,_____ , _____ , _____, _____

4.6 What are the major challenges in the marketing of fruits? Write (√) as appropriate

4.7 What are your recommendations to solve these challenges in the marketing of fruits? _____

_____ ,_____, _____

5. Production of Spices

5.1. Do you produce spices? 1. Yes 2. No

5.2. If yes for (# 5.1) what is the total production in 1999?

Spice type	Amount Cultivated/produced (Kg)		Amount (1999)		Price/Kg	Average Annual income
	1994	1999	Consumed	Sold		
Korerima						
Ginger						
Turmeric						
Pepper						

5.3. Where do you get the spices for your own home consumption?

1. From the forest 3. From the market
2. Own farm 4. Others (specify)

5.4. Do you have open access to the forest? 1=Yes 2= No

5.5. If you don't produce spices on your farm/home garden, why you do not?

1=Lack of know how 2=Lack of market information 3= Low market demand 4=Inappropriate soil/climate 5=others (specify) ----------.

5.6. When did you start production? ----------.

5.7. Why did you start the production of spices? (Multiple answer)

1=Crop failure 3=Increased awareness 5=Extension service 6=Coffee disease
2=Market failure for coffee 4=Increased market demand for Spices 7=others (specify)

5.8. For what purposes do you produce it? _____, _____,

5.9. How often you use them in your daily meal? 1. Regularly 2. Very often

5.10. Do you think there is good opportunity for increasing the production of spices for marketing in your village? 1. Yes 2. No

5.11. What are the good opportunities/potentials for the production of spices in your area?

1=Good climate 2=High market demand 3=High awareness
4=Availability of extension service/improved varieties 5=other (specify) ----------.

5.12. Which members of the household are primarily engaged in the production of spices? (Multiple)

1=Women 2= Men 3=Children 4=others (specify)

5.13. How many times you produce in a year? 1=Once 2=Twice 3=others (specify) --------

5.14. What are the Problems/constraints related to the production of spices? ----------, ----------, ----------, ----------, ----------

6. Marketing of Spices

6.1. Where do you sell your spices? * Yes (√) No (x)

Type of Buyers	* Customers	Share in %
Local village assemblers		
Local market assemblers		
Retailers		
Wholesalers		
Processors (consumers)		
Exporters		
Other (specify)		

6.2. What determines whom you sale to?

1=Real security (collateral) during hardships 2=Lack of market information

3=Problem of transportation 4= others (specify) ----------.

6.3. Is there any difference in price at different market levels, say local market and district markets?

1) Yes 2) No

6.4. If yes, what prohibits you from selling your spices at the center markets?

1=Transportation problem 2= Lack of market information

3=Advance loan from customers 4=Vehicle inaccessibility

5=others (specify) ----------.

6.5. What is happening to the price of spices since the last five years?

1 = Increasing 2 = Decreasing 3= No Change 4=don't know

6.6 Which members of the household are primarily engaged in the marketing of spices? (Multiple)

1=Women 2= Men 3=Children 4=others (specify)

6.7. When do you feel spice makes valuable contribution to secure your livelihood base?

1= market failure for coffee 2= Crop failure/bad harvest 3= Bad market for fruits

4=during food deficits season 5= other (specify) ----------.

6.8. What are the Problems/constraints related to the marketing of spices? ----------,--------
----------,----------,----------,----------.

7. Honey production

7.1. Do you produce honey? 1 = Yes 2 = No

7.2. Do you collect honey from the forest? 1 = Yes 2 = No

7.3. What proportion of your honey you obtain from: collection ____ %, Production_____ %.

7.4. When did you start honey production? -------

7.5. What was/were your primary objective? (Multiple answer)

1=House Hold consumption 3= Livelihood Asset maintenance

2= Source of income/ for sale 4=others (specify)...

7.6. What were your reasons to start bee keeping?

1=Crop failure 2=Increased awareness 3=Presence of extension service

4=Market failure for coffee/fruits 5=Increased market demand for Honey

6=others (specify)

7.7. What is the total number of beehives you possess?

Period	No of Beehives			Average Annual Honey produced as of 1999 (kg)			Average Annual Income (1999)
	Traditional	Modern	Total	Amt.Consumed	Amt.Sold	Price/kg	
1994							
1999							

7.8. If you do not have modern beehives, what is the reason?

1= Absence/lack of accessibility 2= problem of affordability

3= Lack of awareness 4= inadequate provision 5= others (specify) ----------.

7.9. If you use modern beehives why do you prefer it?

1= It avoids climbing large tree to hang beehive

2= Allows us to use large trees for other purposes 3= it is more productive

4= It is suitable for Bee management and reproduction 5=others (specify) ----------.

7.10. Do you feel there is good potential/opportunities for honey production? 1 = Yes 2 = No

7.11. If 'yes', what do you think are these potentials to increases your honey production?

1=Availability of flowering trees 3=High market demand

2=Availability of modern beehives 4= Increasing awareness about its contribution to HH income

5= others (specify) ----------.

7.12. How many times do you produce honey in a year?

1=Once 2=Twice 3=Three times 4= others (specify) ----------.

7.13. Is there seasonal variation in the quality of your honey? 1=Yes 2=No

7.14. If yes, what is the reason? ----------, ----------, ----------.

7.15. During which season you produce a quality honey? ----------, ----------, ----------.

7.16. What is your intention towards honey production in the future?

1= Number of modern beehives will increase 3=Remain constant

2=Number of modern beehives will decrease 4=don't know

7.17. Who is primarily engaged in the production and management of beehives? (Multiple answer)

1=Men 2=Women 3= Children 4= others (specify)

7.18. If you use honey for home consumption how often you use it in your daily meal?

1= Daily 2= Peak production periods 3= Occasionally 4= others (specify) ----------.

7.19. At what time do you find the role of honey most important to secure your livelihood?

1= market failure for coffee 2= Crop failure/bad harvest

3= Bad market for fruits 4= Bad market for spices

5=during food deficits seasons 6= other (specify) ----------.

7.20. What are the problems/constraints in the production of honey in Jimma area?

----------, ----------, ----------, ----------.

8. Honey Marketing

8.1. For whom did you mostly sell your honey? * Yes (√) No (x)

Type of Buyers	* Customers	Share in %
Local village assemblers		
Local market assemblers		
Retailers		
Wholesalers		
Processors (Tej-houses)		
Exporters		

8.2. Do you store honey? 1 = Yes 2 = No

8.3. If 'yes', for what purpose? (Multiple answer)

1= Expecting high price 2= Lack of market demand

3= Lack of transportation facility 4= Storage until market day

5= for continuous home consumption 6= other (specify) ----------.

8.4. If you don't store, why not?

1=Storage problem 2=Fear of market failure 3=Lack of awareness 4=others (specify) ---------.

8.5. What is happening to the price of honey since the last five years?

1 = Improving 2= Decreasing 3= No change 4=don't know

8.6. Do you feel the price of honey is fair? 1= Yes 2=No

8.7. If 'No' for (# 8.5) what would a fair price per Kg of quality honey be? ----------.

8.8. If 'yes' what is your future plan to increase your honey production capacity?_____

_____.

8.9. If 'No' for (#8.5) what should be done to improve the price of honey?

_____, _____, _____, _____.

8.10 Who is primarily engaged in honey marketing?

1=Men 2= Women 3=Children 4= Others

8.11. What are the major challenges in honey marketing? _____

9. Which root crops do you produce? 1=Taro 2= Yam 3=Enset 4= Kote-hare

9.1 What is your primary purpose? 1=Consumption 2=Cash income 3=Both 4= others

9.2 Who is primarily engaged in the production of root crops?

1=Men 2= Women 3=Children 4= Others

9.3 Who is primarily engaged in the marketing of root crops?

1=Men 2= Women 3=Children 4= Others

9.5 What are the challenges for the production of root crops? _____.

9.6 What are the opportunities for the production of root crops? _____.

10. Access to Institutions, Extension and External contact

10.1. What long it takes you to access the district nearby market center? ----- (Hour/Minutes)

10.2. How do you transport your products to market places? (Multiple answer)

1=Head/back loading 3=Animal cart

2=Pack animals (donkey, camel, mule) 4=Vehicle

10.3. Which of the following management practices do you use on your farm? (Multiple answer)

1) Weeding 4) Stumping 6) cultivation/hoeing

2) Fertilizer application 5) Shade management7) Pesticide application

3) Pruning 8) all the above 9) other (specify) ----------

10.4. Which of the above (# 9.3.) management practices you do not apply? ----------.

10.5. Why you do not apply these technologies?

1) Problem of affordability 2) Inaccessibility

3) Absence of extension service 4) Lack of credit service

5) Lack of know how 6) others (specify) ----------

10.6. Do you have contact with extension workers? 1) Yes 2) No

10.7. If yes for (# 10.6) Tick as appropriate * Yes (√) No (x)

Crop category	Extension contact*	Frequency of farm visit	Trainings received on*
Fruits			
Spices			
Honey			
Roots			
coffee			
		1= once in 3 months) 2= once in 6 months) 3=rarely (< once a year)	

10.8. Did you have access to credit and have a loan for fruit production? Yes (√) No (x)

Inputs	Access		Actual utilize for fruits production	
	In puts	Credit	Inputs	Credit
Fruit Seedling				
Spices				
Beehives				
Root crops				

11. Households Consumption and Income Utilization

11.1. Which crop types, constitute the basis of your household consumption/income source?

Crop category	*Basis of consumption	*Income source	Both income & consumption
Fruits			
Spices			
Root crops			
Honey			
Cereals			
Livestock			
Coffee			
Chat			
	*Yes (√) No (x)	*Yes (√) No (x)	*Yes (√) No (x)

11.2. Which months are food deficit, if any? ----------, ----------, ----------.

11.3. What do you think is the reason for the occurrence of food deficit periods?

1=Seasonality of NTFPs. 3= Lack/absence of saving 5= poor market information
2=Poor saving habit 4=Storage problem 6=others (specify)

11.4. Which of the following assets you gained/bought since the last five years?

Asset Category	**Increased/ Improved**	
	Yes (√)	No (x)
Livestock		
Agricultural implements		
Iron roof house built		
Tape recorder		
TV, Dish, Sofa,		
Coffee farm increased		
No. of fruit trees increased		
Schooling children		
Saving in cash		

11.6. If you don't save/invest much what is the reason? ----------
----------.

THANK YOU!

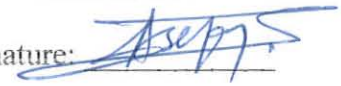
B/ Checklist for Focus Group Discussion

1. Major NTFPs available in the area
2. Purposes for which they are produced
3. Major forest uses and services
4. Important Species for various services: Medicine, shade, bee fodder, fences, etc
5. Opportunities for the production and commercialization of major NTFPs.
6. Major challenges faced in NTFP production and marketing

DECLARATION

I, the undersigned, declare that this thesis is my original work, has not been submitted for a degree in any other university, and that all sources of materials used for the thesis have been duly acknowledged.

Name: Asefa Teferi

Signature: 

Place: Addis Ababa

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