TRADE OF NON TIMBER FOREST PRODUCTS AND ITS CONTRIBUTION TO THE LIVELIHOOD IN NJOMBE DISTRICT, TANZANIA

PASIFIKI IRENEUS MHAPA

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT FOR THE DEGREE OF MASTER OF SCIENCE IN MANAGEMENT OF NATURAL RESOURCES AND SUSTAINABLE AGRICULTURE OF SOKOINE UNIVERSITY OF AGRICULTURE. MOROGORO, TANZANIA

2011

ABSTRACT

The study was conducted to assess the trade of non timber forest products (NTFPs) and its contribution to livelihood of households in selected parts of Njombe district, Tanzania. Data were collected using Participatory Rural Appraisal (PRA) techniques, questionnaire and market surveys. A total of 86 respondents both households and NTFPs stakeholders were interviewed. The Statistical Package for Social Sciences (SPSS) and MS Excel computer software tools were used to analyze data. Eleven economically valuable NTFPs and products were identified to be traded in the study area. Market chain analysis of four prioritized NTFPs (i.e. firewood, honey, wild fruits and medicinal plants) showed that each product was channeled differently. The main actors in NTFPs trade were producers; processors; wholesalers and consumers. Middlemen appeared to mediate producers and wholesalers or transporters within the chain. The NTFPs trade was found to be seasonal dependent and influenced by socio-economic factors. Traded NTFPs were found to be subsistence in terms of income contribution to households. The NTFPs trade seems to be male dominated and thus income generated benefits more men than women traders. The demand for most NTFPs and products ranged from moderate to high depending on consumers' awareness. Lack of marketing information, specified places for collection and marketing, poor road networks, low production, poor processing technologies and storage are among the constraints towards development of NTFPs trade in the area. Developmental plans like poverty reduction strategies, privatization or change in land use need to be emphasized. The benefit gap amongst NTFPs market players need to be minimized by improving infrastructures and processing technologies.

DECLARATION

I, Pasifiki Ireneus Mhapa, do hereby declare to the Senate of Sokoine University of Agriculture, that this dissertation is my original work and that it has neither been submitted nor being concurrently submitted for degree award in any other institution.

_____ _____

Pasifiki Ireneus Mhapa Date

(**Candidate**)

The above declaration is confirmed by:

_____ _____

Dr. Suzana Augustino Date

(**Supervisor**)

COPYRIGHT

ACKNOWLEDGEMENT

The completion of this work was made possible with a joint effort which included a lot of people who contributed to its success at SUA. I would like to express my profound gratitude and sincere appreciation to my supervisor Dr. Suzana Augustino of the Department of Wood Utilization, Faculty of Forestry and Nature Conservation for her tireless guidance, constructive criticisms and helpful comments throughout the preparation and write up of this dissertation. Despite of her having tight schedule, she always had time for my work, playing a unique role in shaping up this work.

I am also grateful to the Njombe District Council Executive Director (DED) for financial assistance; the District Council Agriculture and Livestock Officer (DALDO) for granting me transport during preliminary and actual data collection and the District Human Resource Officer (DHRO) for granting me permission to pursue my MSc studies. The District Council Beekeeping Officer (DCBO) is also thanked for conversation which led to the success of this study.

I would like to thank Mr. Loid Masangula and Mr. Kulwa Mawona for introducing me to the village leaders and the entire village communities during data collection. I also thank the leaders of Mambegu, Masaulwa, Ilembula, Makambako, Mjimwema and Mwembetogwa for their cooperation during data collection period.

I’m also exceptionally indebted to my family that has been frequently missing my presence at varied endeavors however, remained a constant source of love, support, encouragement and inspiration during the whole period of my study.

I would also like to thank my fellow students, friends, workmates and all people for their cooperation, support, encouragement till successful completion of this work. All in all I thank the Almighty God for his protection and blessings which brought me up to this moment.

DEDICATION

To my parents Ireneus H. Mhapa and Yustina Kweya who nursed me and laid the foundation of my education with a lot of sacrifice. Also to my wife Shukurani B. Mgaya who encouraged, supported and cared for myself and our children tirelessly. To my children Hildegunda, Sigrid, Dionisius and Silvia who constantly missed my love and presence.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATION AND ACRONYMS

CHAPOSA	-	Charcoal Potential in Southern Africa
CIFOR	-	Center for International Forestry Research
CITES	-	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DALDO	-	District Council Agriculture and Livestock Officer
DED	-	District Council Executive Director
DEWA	-	Division of Early Warning and Assessment
DHRO	-	District Human Resource Officer
FAO	-	Food and Agriculture Organization of the United Nations
GTZ	-	*Deutsche Gesellschaft für Technische Zusammenarbeit*
HIV/AIDS	-	Human Immune Virus/ Acquired Immunal Deficiency Syndrome
IFAD	-	International Fund for Agricultural Development
MDGs	-	Millennium Development Goals
MSc	-	Master of Science
NEP	-	Njombe Environmental Profile
NGO	-	Non-Governmental Organization
NTFPs	-	Non Timber Forest Products
NWFPs	-	Non Wood Forest Products
PRA	-	Participatory Rural Appraisal
TZS	-	Tanzanian Shillings
SADC	-	Southern African Development Community
SDC	-	Swiss Agency for Development Cooperation
SIDA	-	Swedish International Development Cooperation Agency
SPSS	-	Statistical Package for Social Sciences

SUA	-	Sokoine University of Agriculture
UNAIDS	-	United Nations dealing with AIDS
UNDP	-	United Nations Development Programme
UNEP	-	United Nations Environmental Programme
URT	-	United Republic of Tanzania
USAID	-	United States Agency for International Development
VEOs	-	Village Executive Officers
WEOs	-	Ward Executive Officers
WHO	-	World Health Organization
WIEGO	-	Women in Informal Employment Globalizing and Organizing

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

The term Non Timber Forest Products (NTFPs) has several definitions, although several authors e.g. Gregory (1987), Wickens (1991) and Arnold and Ruiz-Perez (1998), have defined it based on their own views. However, according to FAO (1995), NTFPs include all goods of biological origin (both plants and animals) other than timber, as well as services for human and industrial consumption derived from forest resources and or any land under similar uses. NTFPs include all tangible products, natural, crafted or processed, derived from forests or any other land under similar use, other than timber. They include foods, medicines, oils, resins, gums, tannins, bamboos, fuelwood, charcoal, and game meat sold and consumed either at local, national, regional or international levels.

NTFPs can be regarded as a sustainable livelihoods gateway, diversifying sources of income and sometimes providing a stepping-stone to non-poor life (Marshall *et al*., 2006; Chemonics International Inc., 2008). In most tropical countries, NTFPs play an important role in the daily lives and well being of the local communities. Rural and poor people depend on NTFPs *inter alia* as sources of food, fodder, medicines, gums, resins and construction material (Shackleton *et al*., 2000; Martin and Killmann**,** 2005**;** Puustjärvi *et al.*, 2005). NTFPs also provide job opportunities and income for households both in Africa and Latin America (Scherr *et al*., 2004; 2007). Local communities often extract NTFPs for both trade and household consumption. Some NTFPs such as medicinal plants can be symbolically and culturally important, providing livelihood benefits through their social significance; where their value is not limited to financial assets (Coad *et al*., 2008).

1.2 Problem Statement and Justification

About 75- 80% of Tanzanians' population live in rural areas and overwhelmingly depend on agriculture and other natural resource for their livelihoods and survival (World Bank, 2002 cited by Kallonga *et al.*, 2003; Msuya, 2007). From biological natural resources one can harvest timber and non-timber forest products (NTFPs). In this research concentration will paid on NTFPs. The contribution of NTFPs to households' income and food security has been substantially documented in Tanzania (Nyingili, 2003; Tengule, 2007; Paullo, 2007; Njana, 2008; Chemonics International Inc., 2008). Akinnifesi *et al*. (2005) stated that millions of rural tropical dwellers relied on forests for income, through gathering, processing and utilization of tree products for many generations.

It has been argued that, the market value of NTFPs is often underestimated or sometimes unknown (Martin and Killmann**,** 2005), though they potentially offer significant returns both in terms of cash, direct or indirect use values and thus pose developmental challenges (Shackleton, 2004). The returns are important in livelihoods sustainability as they are being met by both valued and non valued resources particularly NTFPs. Thus there is a considerable potential for economic development through trading of NTFPs. The strategy has been used by numerous rural development projects to divert dependence away from agriculture, increase the income of women and facilitate the conservation of natural resources (Chettleborough *et al*., 2000).

Njombe district is endowed with natural resources both flora and fauna, and her people rely on the natural forests for NTFPs. Furthermore NTFPs are commonly found being sold in the local markets of Ilembula and Makambako centers in Njombe district. Their markets seem to grow daily. Despite this, the role of trade in NTFPs to income generation and socioeconomic drivers are not known and well documented in the area. According to Lo'pez and Shanley (2004) many researches in Africa had focused on NTFPs but there is still a lack of knowledge, on part of both the general public and policy makers, regarding the importance of these forest products for both subsistence livelihood and trade. Therefore there is a need to conduct this study through identification of NTFPs, prioritization, market chain analysis, to preview on efforts for commercializing NTFPs trade so as to understand their income contribution to households and communities and deduce constraints and ways to remove constraints in the study area. Information from this study will contribute towards efforts targeted to address poverty alleviation strategies in the country as stipulated in the Millennium Development Goals (Thaxton, 2007).

Realization of financial contribution of NTFPs to households will also help in prioritization of these resources utilized in Njombe, formulating and developing individual projects on harvesting and marketing and assist villagers to organize themselves into product’s categories. Furthermore a complete understanding of NTFPs situation is central to the task of planning for conservation and management of forests in sustainable manner for the welfare of people. It is in this context that a study to contribution of NTFPs trade to livelihood income in Njombe stays important. The information from market chain analysis will also help to identify the critical constraints and opportunities and the entry point in trade.

1.3 Objectives

1.3.1 Overall objective

To assess the trade of non timber forest products and its contribution to the livelihood income of household's in selected parts of Njombe district, Tanzania.

1.3.2 Specific objectives

i. To identify NTFPs which are economically valuable and traded in the study area,
ii. To examine the market chain of prioritized economically valuable NTFPs in the study area,
iii. To assess the socio-economic factors associated with the trade of NTFPs in the study area,
iv. To determine the contribution of prioritized economically valuable and traded NTFPs to livelihood household income in the study area.

1.4 Research Questions

i. What NTFPs are economically valuable and traded in the study area?
ii. What is the market chain of prioritized economically valuable NTFPs in the study area?
iii. What socio-economic factors are associated or influence the NTFPs trade in the study area?
iv. In what ways do the prioritized economically valuable and traded NTFPs contribute to household income in the study area?

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 General Overview

The terms Non-timber forest products (NTFPs) and Non wood forest products (NWFP) are sometimes used interchangeably as if they mean the same thing. Non-timber forest products (NTFPs) are wild plant and animal products harvested from forests, such as wild fruits, vegetables, nuts, edible roots, honey, palm leaves, medicinal plants, poisons and bush meat. This definition includes the use of wood for canoes, woodcarvings, local house construction, fencing materials and firewood, but excludes industrial timber (de Beer and McDermott, 1989; van Andel, 2006). NTFPs are also defined as biological resources derived from natural forests, agroforestry systems and plantations including medicinal and edible plants, fruits, nuts, resins, latex, essential oils, fiber, fodder, fungi, fauna and small diameter wood used for crafts (Shackleton, 2004; Shanley *et al.*, 2008).

Non wood forest products (NWFPs) on the other hand are defined as ‘goods of biological origin other than wood derived from forests, other wooded lands and trees outside forests (FAO, 1999). According to FAO (1999), NWFPs excluded all woody raw materials such as timber, chips, charcoal and fuelwood and small woods used for tools, household equipment and carvings; yet included products derived from both natural forests and plantations (Belcher, 2003). In this research NWFPs will be treated as a subset of NTFPs as the latter encompasses all biological materials from natural forests, agroforestry systems and plantations including wooded one but not timber.

2.2 Non Timber Forest Products Overview

The non-timber forest products include woodfuel (fuelwood and charcoal) and products that are not timber, like bamboo products, carvings, wild foods and fodder (FAO, 1999; Chettleborough *et al*., 2000). NTFPs may be gathered in the wild or from trees outside forests or produced in forest plantations and agroforestry schemes (Carr *et al*., 2008). The use values of NTFPs range from relatively high to very high in certain regions depending on modes of management as perceived by users and availability of substitute products (Adger *et al*., 2003). According to Chettleborough *et al*. (2000), NTFPs tend to provide an important non financial supplement to the livelihoods of rural people. In Tanzania NTFPs utilization tend to be of low intensity and rarely provide significant incomes (Chemonics International Inc., 2008).

Several million households worldwide depend heavily on NTFPs for subsistence or income (Akinnifesi *et al*., 2005; Chemonics International Inc., 2008). An estimated 80 per cent of the people in the developing world use NTFPs for health and nutritional needs (FAO, 1997). Women from poor households generally rely on them mostly for household use and income. NTFPs also provide raw materials for national, large-scale industrial processing and are important export commodities, with at least 150 significant products in terms of international trade (FAO, 1997). They have also attracted considerable global interest in recent years for their contribution to environmental objectives, including the conservation of biological diversity (Carr *et al*., 2008). Ndoye *et al*. (1998) observed that urbanization was a good driver that expanded the size of local NTFPs markets as it damped rural consumers in urban who have to buy rather than gather. Thus expanded markets employed enough traders and technology to supply consumers with appropriate NTFPs (Campbell *et al.*, undated).

2.3 NTFPs Marketing

The word “market” has many connotations. It includes place and institution where people are interested in selling or purchasing a given product or service (Banana, 1996). A market is a meeting point of buyers and sellers, a place where sellers and buyers meet and exchange takes place, an area for which there is a demand for goods, an area for which price determining forces (demand and supply) operates. Market is another name for demand. It can further be defined as a system or an atmosphere or a mechanism that facilitate price fixation and thereby exchange of goods and services (Kotler, 2003).

Marketing encompasses all activities involved in determining and meeting the needs and interests of customers to maximize profits. Marketing involves 'finding out what the customer wants and helping to set up the production/marketing system which supplies that demand and maximizes income (Dixie, 1989). Kotler (1985; 2003) defined marketing as a social and managerial process by which individuals and groups obtain what they need and want through creating and exchanging products and values with others. Marketing has an economic value as it gives form, time, and place utility to products and services (Tesfahun, 2007). As products definition it is the performance of all the transactions and services (business activities) associated with the flow of good from the point of initial production to the final consumer (Saleemi, 1999). Marketing includes all activities of exchange conducted by producers and middlemen in exchange for the purpose of satisfying consumers’ demands (Abebe, 2009).

Marketing information (Banana, 1996) includes all data that help those involved in production and selling to determine and meet the needs and interests of the consumer. Marketing information system (MIS) is an organized procedure for gathering and analysing information. It involves collecting, analysing and distributing predetermined

types of marketing information for informed decision-making and increased bargaining power (Banana, 1996; Ismail, 2011). According to Kotler (2003) marketing information should include prices for products; price differences (marketing margin)—retail, wholesale, farm gate; explanations for changes in price or demand; the names and locations of traders; the volume, quality and packaging requirements of various markets and traders for different products; price variations by market for products; sales and marketing channel alternatives (direct sales, middlemen, cooperatives, wholesalers, retailers, marketing boards); distribution channels that exist (transportation alternatives, storage facilities); promotion opportunities (product shows, advertisements, incentives, packaging) and terms of payment alternatives (barter, credit, cash, labour).

NTFPs marketing involve the largest number of low-income producers compared to all forest market segments. In Cameroon, for example, one fifth of the population (3million people) is estimated to earn income from NTFPs (Scherr *et al.*, 2003). NTFPs are collected for a great variety of market types including local, small-scale markets which are concerned with products for direct consumption e.g. fruits, fish and meat, vegetable and spices or home industries; regional or national markets and emerging urban markets (Michon, 2005; van Andel, 2006). Regional markets are not uniform. Like local markets, they may directly sell forest products to urban consumers' e.g. fresh or processed fruits and medicinal plants. Many of these markets are growing in importance as urban centres and the urban demand for forest products increase (Ndoye *et al*., 1998; Michon, 2005).

In Africa, many NTFPs have been traded for ages (Sunderland *et al*., 2004). For example, Shea butter has been traded since the fourteenth century (Schreckenberg, 2004) while *Aframomum spp*. began to be transported to Europe as a spice and condiment in the early medieval period (Sunderlin *et al*., 2006). The commercialisation of NTFPs according to

Ndoye (2005), is important for several reasons: (i) It enables rural dwellers and poor urban households to diversify their source of incomes and reduce level of poverty; (ii) it increases the economic value of NTFPs thereby increasing the awareness and incentives for local communities to conserve forest resources; (iii) at the local level, it increases rural employment, especially for women and minorities and (iv) provides more opportunities for regional trade within and between Africa, Europe and North America.

2.4 Market Chain Analysis

Marketing channel (value chain) is a business structure of interdependent organizations that reach from the point of product origin to the consumer with the purpose of moving products to their final consumer destination (Koler and Amsrog, 2003 cited by Abebe, 2009). Vasquez and Buttolph (2010) defined a value chain of a product as a path that a product flows from collecting the things needed to make it (production) through delivery to the final customer. A channel is the route, path, or conduit through which products of value flow, as they move from the manufacturer to the ultimate user of the product (Mehta *et al*., 2002). The analysis of marketing channels is intended to provide a systematic knowledge of the flow of goods and services from the producer to consumer. It starts with identification of participants, their functions in value addition (Schreckenberg *et al*., 2006), and price accrued to each stage (Kotler, 2003).

An NTFP value chain can be broken into several sub-sets of activities including production, collection, processing, storage, transport, marketing and sale. The intensity, frequency and sequence of these activities may differ from product to product (Belcher and Schreckenberg, 2007). In locally traded products value chains tend to be short and simple (supply driven), with harvesters selling their products direct to consumers; and becomes more complex (demand driven) when extends beyond the local level (Marshall *et al*., 2006;

Shackleton *et al*., 2007). For example in Kenya local marketing for crude honey was directly from beekeepers to retailers (processors) and then to consumers; while shorter channels run from beekeepers to local consumers (Lengarite *et al*., 2007). The treatments like storage, processing and transport, determines complexity depending on location, nature of the product, the degree of processing, and the requirements of the consumer (Belcher and Schreckenberg, 2007). For instance a study by Andargatchew (2008) in Ethiopia bamboo trading chain found five groups of dealers' viz., bamboo sellers, intermediaries (transporting from market to other famous towns), transporters (transporting and identifying for grading), producers, consumers and tax collectors.

2.5 NTFPs and Livelihood Income

A livelihood comprises the capabilities or entitlements, assets (including natural, social, human, physical and financial) and activities required for a means of living (Singh and Lawrence, 1997; DEWA, 2006). Livelihood approaches have focused on how the resources can be used as assets for improved human well-being and promoting development. Decisions like increased investment, employment creation in processing, trade and related services, and small and micro natural resources-based entrepreneurship are means to achieve livelihood demands (DEWA, 2006). Income offers a measure of direct interest in marketing process because of its clear interpretation as a welfare outcome. Individuals have varied diversification of choices to allocate assets on activities for income generation to avert life hardships in various times (Barrett *et al.,* 2001). Diversification patterns reflect individuals' willingness to exchange assets and activities so as to optimize incomes (Barrett *et al.,* 2001).

Many local and external factors influence livelihoods, including markets, the physical, social and political environments (Mazur *et al*., 2007). It is best exemplified using the

family (household), rather than the individual, as the livelihood unit. The role of NTFPs is therefore to provide a range of products (assets) which are integrated into livelihood strategies to reduce vulnerability to risks in poor societies and households (Neumann and Hirsch, 2000; Ambrose-Oji, 2003). NTFPs provide basic needs and are sold in range of markets to generate cash and serves as safety-nets in sudden change in the economic, social and or climatic conditions (Shackleton, 2004; Paumgarten, 2005).

Experience shows that savannas and forest communities live in high levels of poverty and limited livelihood opportunities irrespective to the forest wealth (Wunder, 2001; Sunderlin *et al*., 2006 cited by Shackleton *et al*., 2009) in terms of valuable NTFPs. Most of the time local people extract NTFPs for consumption in their families plus little for the market (Chettleborough *et al*., 2000; Pinto, 2007). Thus NTFPs are critical to rural livelihoods as they provide communities with important subsistence resources like medicine, food and shelter, and a source of cash income (Akinnifesi *et al.*, 2006; Chemonics International Inc., 2008; Shanley *et al.*, 2008). For instance Shanley *et al.* (2008) estimated about one billion people to extract about 25 percent of their income from NTFPs. Also Singh *et al*. (2010) observed that honey and wax collection was major livelihood activities of Sundarban dwellers although its income contribution was low (25%) but it served as additional source of income as it persisted for only 15 days per annum.

2.6 Constraints towards Commercialization of NTFPs

NTFPs commercialization can be expressed as an approach that opens opportunities to exploit them and their products for maximal profit by sacrificing quality. NTFPs commercialization acts as a driver for rural growth and contributing to improved national incomes (Kelly, 2007). DEWA (2006) noted that commercialization of wild resources created important opportunities for improving income and other aspects of well-being. It

widens opportunities for rural poor to capture a greater share of the value generated through better market access, less bureaucratic restraints on trade and better access to capital and other resources combined. NTFPs commercialization starts with understanding what and who is involved in the production-to-consumption system (value chain). It has to deal with the key functions being carried out in NTFPs-based value chains, the different actors involved, and the relationships between them (Belcher and Schreckenberg, 2007).

It has been noted that inadequate awareness, lack of infrastructure in the rural areas, lack of access to markets, and low volume of products, poor handling and storage capabilities are the major constraints to the formal development of markets for NTFPs (Martin and Killmann, 2005). Due to limited experience and the lack of processing technology and marketing information, NTFPs are mostly sold as raw material which benefits the middlemen, processors and traders from outside including foreign countries (Martin and Killmann, 2005**;** Welford and Le Breton, 2008).

According to Ndoye (2005) there are several shortcomings that are related to the commercialisation of NTFPs, with an increased pressure on the resource base due to higher demand and unsustainable harvesting methods. For example over harvesting of medicinal plant resources have led to some species becoming scarcer thus increasing costs of treating common ailments. The implication is that the poor may no longer gain access to medicinal cures as need arises (Welford and Le Breton, 2008). Furthermore, CIFOR (2005) showed that “informal taxes” can represent up to 20% of the traders’ gross revenue. This creates a disincentive for traders who are obliged to transfer these costs in the form of lower prices to farmers and higher prices to consumers.

Improving the marketing strategies and incomes of rural dwellers involved in NTFPs production and commercialisation is an important task in line with the Millennium Development Goals (MDGs), through stimulating cost effective small-scale forest based enterprises that will use labour intensive technologies based on selected NTFPs.

CHAPTER THREE

3.0 METHODOLOGY

3.1 The Study Area

3.1.1 Geographical location and size

The study was conducted in two villages of Mambegu (Luduga) and Masaulwa (Imalinyi) and two market centers of Ilembula and Makambako in Njombe district, Iringa region. The area lies in the Southern highlands of Tanzania, between latitudes 8^0 40' and 9^0 35'South and longitudes 34^0 30' to 35^0 30'East of Greenwich. The area borders Ludewa district and Ruvuma region to the South; Morogoro region in the East; Makete district and Mbeya region in the West and Mufindi district in the North. It covers an area of 10 668 km^2 equivalent to 18% of the total area of the region (Njombe Environmental Profile, 2007). The selection of the study area was based on the richness of forest resources diversity and the dependency of local communities on NTFPs for livelihood income security especially in villages close to the potential local markets of Ilembula and Makambako.

3.1.2 Climate

The variation of topography contributes to diversity of climate in Njombe ranging from mild-hot lower zone and humid in upland zones. In November to March, the whole district experiences rain season which stops in the lower lands during April and May in the uplands. The district has only one rainfall season between November and March. High altitudes have temperatures ranging between 14ºC and 20ºC and rainfall 1200-1400mm; medium altitude with temperature 15ºC- 21ºC and low lands has long dry seasons with rainfall 900-950 mm and temperature 25ºC (URT, 1997 and Njombe Environmental Profile, 2007).

3.1.3 Topography and soils

Njombe district relief features range from lower to upper lands. The Wanging'ombe, Mdandu and Makambako divisions lie within altitude 1000m-2000m. The Lupembe and Igominyi and part of Imalinyi divisions are uplands located within 2000m-2500m while, Njombe and Imalinyi divisions are in medium altitude 1200m-2200m (Njombe Environmental Profile, 2007). Soils are poor in cation exchange capacity and harder to cultivate in lowlands. In highlands soils are water eroded, low pH, high clay and iron or aluminium oxide and low fertility. They compose (ultisols and oxisols) which are characterized by good drainage, aluminium toxicity, and high phosphorus fixation (URT, 1997; Njombe Environmental Profile, 2007).

3.1.4 Vegetation

The uplands vegetation is characterized by soft wood (*Pine* and *Cypress*), *Eucalyptus* and Wattle plantations, extensive grasslands and miombo woodlands; medium altitudes are covered by miombo woodlands, apple-ring *Acacia*, winter thorn, *Parinari* species, Snot apple, *Uapaca kirkiana* and extensive grasslands; lowlands constitute bush trees, shrubs and grasslands (URT, 1997; Njombe Environmental Profile, 2007).

3.1.5 Population and socio-economic activities

The population of Njombe district was 420 348 as per 2002 census, where male were 196 130 and females were 224 218. The major socio-economic activities included agriculture, livestock keeping (indigenous cattle, goats, sheep, swine and local chicken); beekeeping in medium and low altitudes; tourism, forest products business and processing industries for tea and wattle barks (Njombe Environmental Profile, 2007).

3.2 Research Design and Sampling Procedure

A cross sectional design was used for data collection. According to Bailey (1994), such a design allowed data to be collected at a single point in time without repetitions. The design was selected based on its advantage of minimizing time and resources (Schmidt *et al.,* 2004). It allowed longitudinal conclusions to be drawn from cross-sectional data. Mann (2003) asserts that under cross-sectional design, subjects (respondents) are neither deliberately exposed nor treated. One group was used, data were collected only once and multiple outcomes were studied. Thus the respondents were sampled randomly regardless of whether they were trading and reaping income from NTFPs trade.

The villages of Masaulwa and Mambegu were selected purposively. The sampling units were households and other NTFPs stakeholders such as collectors, traders, village leaders and government officials (beekeeping officer and village extension officers). A sampling intensity of at least 5% was employed as recommended by Boyd *et al*. (1981) for social science studies.

3.2.1 Data collection methods

The study was carried out in two phases. Phase one constituted a preliminary survey in the two villages, Masaulwa and Mambegu; and Ilembula and Makambako market centers. The survey was crucial so as to get used to the study area, pre-testing of the questionnaire, group discussions and identification of NTFPs markets. The second phase involved use of PRA techniques and questionnaire surveys with households, key informants (traditional healers, beekeeping officer, traders at marketing centres and group leaders) and retailers' interviews (Appendix 4, 5 and 6) to solicit primary data. Interviews were conducted in Swahili language but with provision for use of vernacular languages whenever difficulties in communication were encountered. A respondent was interviewed only once, due to

resource constraints. However, to ensure that answers were provided under consistent conditions, completed questionnaires were cross-checked at the end of each day.

Secondary data were used to supplement the primary data, by extracting information on what has been done in relation to NTFPs and trade. These data were obtained from the district Natural Resources Department records in the study area. Furthermore, publications, journals, books and electronic databases were accessed through SUA National Agricultural Library and other local libraries e.g. Njombe district library.

3.2.1.1 Participatory Rural Appraisal

The technique was based on intensive, interactive learning and shared knowledge and flexibility. The PRA methods used for data collection involved free listing, preference ranking and group discussions. Those activities required free sharing of knowledge and experience during discussion amongst group members, and individuals with the researcher as it was supported by Gosselink and Strosser (1995) who mentioned that participatory meant to allow local people to apply their knowledge, experiences and capacity to share information. A group of selected participants (of different age groups, ethnicity and sex) were involved. The whole exercise was guided by a PRA checklist (Appendix 3) to understand local people's preferences and choices in utilizing and marketing NTFPs for improving their livelihood income. A list of key informants was made based on that priority in both villages and centers. The information on market chain of prioritized NTFPs in the study area was also collected depending on the nature of the product.

3.2.1.2 Questionnaire survey

Structured and semi structured questionnaires with closed and open-ended questions (Appendix 4) were used to collect socio-economic information from respondents. The

information collected involved data on diversity of NTFPs extracted, used and sold, costs, parts used, season of collection, quantity of NTFPs gathered and other market information. With open-ended questions respondents were free to give their own answers and maximum discussion was encouraged. For closed-ended questions a number of alternative answers were provided for respondents to make selection. This two-sided approach (closed and open ended questions) aimed at obtaining clearly focused responses while at the same time deriving reasons and supporting arguments.

3.2.1.3 NTFPs market survey

Market survey was conducted in Ilembula and Makambako centers as these were closer to the selected two villages. A trader survey (at the markets) was done to understand the market functioning prior to questionnaire administration. It was then supplemented by key informants, household and retailers' interviews (Appendixes 4, 5 and 6). The two were both important as they complement each other.

NTFPs trading locations in villages and market centres were identified by a group of respondents and local leaders (who have general knowledge of the local economy). Information on types, prices, and amounts of NTFPs supplied and sold were recorded (Appendix 6). Total sales per year were also determined so as to obtain the total income. The market chain information was also collected, where identification of production sites, links to markets, and actors in the trade was done through questionnaire and PRA checklist.

3.3 Data Analysis

The SPSS and MS Excel computer software tools were used to analyze both qualitative and quantitative data. Qualitative data were coded before analysis using SPSS to

summarize data into percentages and frequencies for construction of tables and figures. MS Excel was used to determine the averages of income, their summation from all sources and charts were drawn from the data. The qualitative data were also subjected to categorization and content analysis and presented in graphical and tabular forms. Inferential statistics mainly cross tabulation was done to determine relationships between NTFPs variables and associated socio economic variables.

In market related data profit margins or levels of success at each stage in the value chain were computed using SPSS. Simple market chains analysis to assess the conduct and performance of actors and services involved in producing, handling, and selling NTFPs to a range of markets (e.g. around popular areas in villages such as road side, pubs, bus stand, schools and clinic places/days) for each product was also done. In this research value distribution approach (VDA) was used. This approach recognizes the final retail-price as success for the division of value-added or economic surplus. It ignores differences in production costs and other uncertainties that a retailer may have encountered. To accomplish this market chain analysis functions carried to the products; constraints in each stage and possible solutions were identified.

The Chi-square (χ^2) test was performed to test the significance of NTFPs trade contribution to household total income. Dependence categories were used as class intervals to summarize the observed and expected frequencies. The categories of independent (<5%), Weak dependent (5-25%), Moderate dependent (25-45%), Dependent (45-85%) and strongly dependent (85% and above) were used to group respondents according to income from NTFPs relative to total income.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Characteristics of Respondents

4.1.1 Gender

The distribution of NTFPs traders in the study area was gender sensitive. They were dealing with collection, processing, transportation and marketing of NTFPs. Table 1 indicates that 65% of NTFPs traders were male and 35% were female. This implies that trading of NTFPs is male dominated which might be caused by male dominance which tend to overshadow female on activities which provides premium income.

Table 1: Percentage distribution of NTFPs traders by sex of respondents in the study area

Gender	**%(n)**
Male	65(35)
Female	35(19)
Total	**100(54)**

n = sample size

Different results have been reported as far as gender in trading NTFPs is concerned. Research in Meatu district, Tanzania revealed that collection, processing and sale of forest vegetables, fruits and medicinal plants (of low quality) were done by women while men sold high valued products like honey and medicinal plants due to their ability to travel for the products (Kagya, 2002). In Same district, Kilimanjaro region it was found that women were mainly involved in selling honey which were collected by men. Their full involvement was limited by long distances; need to climb trees and use of honey for medical and religious ceremonies which demanded purity. Women were traditionally seen as impure (Royal Tropical Institute *et al.*, 2006).

Ndoye *et al*. (1998) in the Humid Forest Zone of Cameroon found that 94% of NTFPs traders were women. NTFPs handlers and traders in Southern Nigeria showed that 38.19% were male, while 61.81% were female (Egbule and Omolola, 2005). In Tamale Ghana the wholesalers of shea butter 90-95% were women and 10-5% were men (Carette *et al.*, 2009). 96% of NTFPs traders interviewed in Cameroon were women (Awono *et al.*, 2010). Choudhury *et al*. (undated) in gender focused studies on NTFP in Ethiopia highlighted 40-50% incidence of women's involvement in NTFPs trade. In the villages of Gumla, Hazaribagh and Simdega districts of Jharkhand, India women were reported to be the main collectors, processors and marketing agents of NTFPs (Gharai and Chakrabarti, 2009).

This means that majority of NTFPs traders in Njombe are male. This could probably be due to patriarchy system which has been reflected in economic related activities e.g. NTFPs trade by masculinity in male as they need to travel long distances to look for NTFPs, it was clear for firewood traders who rode bicycles from Mambegu to Ilembula; also valuable medicinal plants and honey were brought to the marketing centres by men. Another reason could be trade popularity of NTFPs which attracts more men who eventually monopolized the trade as it was true for honey.

4.1.2 Marital status

In the study area majority (83%) of NTFPs traders were married, followed by 11% who were single, widowed 4%, divorced 2% and none separated (Table 2). This implies that NTFPs traders in Njombe were married thus trading NTFPs was important for income that sustained households' economy.

Table 2: Percentage distribution of marital status of respondents in the study area

Marital status category	%(n)
Single	11(6)
Married	83(45)
Widowed	4(2)
Divorced	2(1)
Separated	nr
Total	**100(54)**

n = sample size; nr = no response

The dominance of the married by in NTFPs trade was reported by various researchers in Africa. Abebe (2009) in Ethiopia found that 97% of honey traders were married males with only 2.5% divorced. In Southern Nigeria 34% of the male NTFPs dealers (marketing inclusive) were single, 65% of them were married while 16% of the female were single, 84% of them were married (Egbule and Omolola, 2005).

Different from the above findings Kajoba (2002) found that widowed and divorced women in Zambia were dependent on trade of NTFPs (charcoal and grass brooms) as they rarely have inheritance or separation rights from their husband's assets. These managed livelihood by increased hunting, fishing and charcoal-making for trade as mothers and grandmothers try to survive with their children. In Njombe NTFPs is regarded as important activity for sustaining life. This probably results from the fact that trading NTFPs added premium income to the household economy in both village and sub-urban regions.

4.1.3 Age group distribution

About 55% of NTFPs traders in the study area were aged between 30-50 years, followed by 30% who were above 50 years and 15% were aged between 18-30 years (Table 3). This means that the middle aged group was dominating the trading population. This could

probably have been influenced by being energetic, educated, experienced and having great roles of meeting household and societal developmental needs.

Table 3: Percentage distribution of age groups of NTFPs traders in the study area

Age groups (years)	%(n)
18-30	15(8)
30-50	55(30)
50 and above	30(16)
Total	**100(54)**

n= sample size

Shackleton and Shackleton (2004) in South Africa found that *Marula* beer and brush (NTFPs) traders were less than 35 years, although some older women were involved. Egbule and Omolola (2005) in Southern Nigeria found that 65% of the forest dealers (marketing and other activities prior to marketing) were between 31-50 years of age (middle aged). Awono *et al*. (2010) noted that the average age of NTFP traders in Cameroon was 36 years. The age range for bamboo traders among interviewees in Ethiopia was 16 – 51 years (Andargatchew, 2008). Abebe (2009) done a Market Chain Analysis on Honey Production in Atsbi Wemberta District, Eastern Zone of Tigray National Regional State in Ethiopia found that 50% of honey traders were in the age group of 26-44, and a few (7%) fall in the age range of 63-80 years. It can further be interpreted that age class between 30-50 years have more responsibilities, decision making and able to travel long distances compared to elders. The youth below 30 years were less involved due to one or more of the following reasons: (1) committed to other societal roles including schooling; (2) rural migration to urban and peri-urban areas in search of employment; (3) lack of basic entrepreneurial skills such that they fear uncertainties and risks.

4.1.4 Education

In this research the results revealed that 76% of respondents have attained primary levels of education with a few (4%) attained secondary school education (Table 4). Thus most of the NTFPs traders in Njombe had attained basic knowledge and skills of managing livelihood responsibilities as they were literate. This could be implying that success in trading NTFPs in Njombe was influenced by formal education that one has attained.

Table 4: Percentage distribution of education of respondents in the study area

Education level	**%(n)**
None	4(2)
Adult Education	11(6)
Primary Education	76(41)
Secondary Education	4(2)
Tertiary Education	5(3)
Total	**100(54)**

n = sample size

According to Lema (2003) education level improves ones knowledge on utilization, availability and conservation of NTFPs. Ndoye *et al*. (1998) in Cameroon found that 84% of NTFP traders were able to read and write. Also Awono *et al*. (2010) found that 50% of NTFPs traders had primary education while 39% attended secondary school in Cameroon. Furthermore Ndoye *et al*. (1998), Mhinte (2000) and Nyingili (2003) urged that skills and education increases working efficiency and productivity with more years in formal education leading to more efficient entrepreneurs who can keep records and run business owing to the trade on NTFPs.

An increased educational level diversifies livelihood opportunities and reduces direct reliance on biodiversity goods. Mbwilo (2002) stressed that people attended schools in order to increase capacity for earning income, capabilities, and develop an understanding and appreciation of how the physical world and human societies interact. Kamwenda (1999) argued that ones level of education has impact on natural resource utilization and

conservation. Edmond (2008) in Nepal noted positive conservation attitudes among the better educated. The results suggested that educational development enables entrepreneurs to flourish in trading NTFPs in a sustainable manner. This was noted to honey and medicinal plants' traders at Makambako and Masaulwa who established gardens around there residential and nearby villages for consistent harvesting and trading NTFPs.

4.1.5 Livelihood strategies

In the context of this study, livelihood strategies were meant to include all activities which a household undertakes to generate income. The activities were grouped into four categories namely agriculture and livestock, NTFPs trading, other trading careers; and remittance from relatives and or the combination of two or more activities to maximize income (Table 5). 50% of respondents preferred trading NTFPs in integration with agriculture, livestock keeping and other trading activities; and 42% relied on NTFPs trade combined with agriculture and livestock keeping while only 2% relied on sole NTFPs trade for income. The results might be reflecting to efforts of NTFPs traders to cope with uncertainties and risks caused by unpredictable weather. Also NTFPs collection was done mostly in non restricted land (common pool resources).

Table 5: Distribution of NTFPs traders' income generating activities in the study area

	Responses on Income generating activities						
Parameter	1	2	3	4	5	6	Total
Frequency	nr	27	1	nr	23	3	54
Percentage	nr	50	2	nr	42	5	100

Keys: 1- Agriculture and livestock; 2- Agriculture, livestock, NTFPs trade and other trading activities; 3- NTFPs trade; 4- Other trading activities and remittance from relatives; 5- Agriculture, livestock and NTFPs trade and 6- NTFPs trade, other trading activities and remittance from relatives; nr - no response.

The results are more or less similar to Gharai and Chakrabarti (2009) who found 60% of the NTFPs traders in India preferred multiple means of livelihood as NTFPs trading was felt unpredictable thus cannot stand alone. On the other hand different results have been

reported in Bihar, Madhya Pradesh, Orissa, and Andhra Pradesh where the contribution of NTFPs trade to total household income range from 10– 55% (Regional Centre for Development Cooperation - RCDC and Tropical Forest Research Institute – TFRI, 2008). The difference might be caused by spatial difference, entrepreneurial experience, availability of NTFPs and policy controlling the access to forests that influence trading diversification though in all cases diversification seemed helpful with varied success levels (dependence).

4.2 Non-timber Forest Products (NTFPs) Trade

4.2.1 Economically valuable and traded NTFPs

A total of ten (10) economically valuable NTFPs were identified in the study area. These were firewood, honey, thatch grass, medicinal plants, mushroom, carvings, charcoal, wild fruits, edible insects and wild meat. It was noted also during household survey that bamboo juice could contribute income to households although it was not mentioned during group discussion. Preference ranking results based on three criteria namely; availability in a year, amount of income (financial) generated per season of the product and specified dealers for the product as mentioned by the respondents during group discussion; indicated six NTFPs at Mambegu and ten NTFPs at Masaulwa (Table 6).

Table 6: NTFPs preference ranking of tradable NTFPs in Mambegu and Masaulwa villages

NTFPs	Period length	Income	Dealers	Total score

	per year			
Mambegu village				
Firewood	v	v	v	3
Honey	x	v	v	2
Thatch grass	x	v	v	2
Medicinal plants	v	v	v	3
Mushroom	x	v	x	1
Carvings	v	v	x	2
Masaulwa village				
Honey	v	v	v	3
Charcoal	x	v	x	1
Thatch grass	x	v	v	2
Firewood	v	v	v	3
Mushroom	x	v	x	1
Carvings	v	v	x	2
Wild fruits	x	v	v	2
Medicinal plants	v	v	v	3
Edible insects	x	v	v	2
Wild meat	v	v	x	2

Note: v- important, x- not important

Further pair wise ranking from Mambegu and Masaulwa villages showed that only three NTFPs i.e. firewood, honey and medicinal plants (Table 7) and four (4) NTFPs i.e. honey, firewood, medicinal plants and wild fruits (Table 8) were sold for household income generation in the two villages respectively.

Table 7: Pair wise ranking of tradable NTFPs in Mambegu village

	F	H	Tg	Md	Ms	Car	Frequency	Rank
F		F	F	F	F	F	10	1
H	F		H	H	H	H	8	2
Tg	F	H		Md	Tg	Tg	4	4
Md	F	H	Md		Md	Md	6	3
Ms	F	H	Tg	Md		Ms	2	5
Car	F	H	Tg	Md	Ms		0	6

Keys: H – Honey, C – Charcoal, Tg – Thatch grass, F – Firewood, Ms – Mushroom, Car – Carvings, Wf – Wild fruits, Md – Medicinal plants, Ins – Edible insects, Meat – Wild meat.

Table 8: Pair wise ranking of tradable NTFPs in Masaulwa village

	H	**C**	**Tg**	**F**	**Ms**	**Car**	**Wf**	**Md**	**Ins**	**Meat**	**Freq.**	**Rank**
H		H	H	H	H	H	H	H	H	H	18	1
C	H		Tg	F	Ms	Car	Wf	Md	Ins	C	2	9
Tg	H	Tg		F	Tg	Tg	Wf	Md	Tg	Tg	10	5
F	H	F	F		F	F	F	F	F	F	16	2
Ms	H	Ms	Tg	F		Ms	Wf	Md	Ins	Ms	6	7
Car	H	Car	Tg	F	Ms		Wf	md	Ins	Car	4	8
Wf	H	Wf	Wf	F	Wf	Wf		Md	Wf	Wf	12	4
Md	H	Md	Md	F	Md	Md	Md		Md	Md	14	3
Ins	H	Ins	Tg	F	Ins	Ins	Wf	Md		Ins	8	6
Meat	H	C	Tg	F	Ms	Car	Wf	Md	Ins		0	10

Keys: H – Honey, C – Charcoal, Tg – Thatch grass, F – Firewood, Ms – Mushroom, Car – Carvings, Wf – Wild fruits, Md – Medicinal plants, Ins – Edible insects, Meat – Wild meat.

Combining the pair wise ranking results (i.e.1 to 3 products) from Mambegu and (1 to 4 products) from Masaulwa a total of four (4) NTFPs were identified as priority valuable products for income generation in Njombe and hence their market chain was analysed. These were firewood, honey and its products, medicinal plants, and wild fruits.

4.2.2 NTFPs trading population

NTFPs trade in the study area was perceived to range from potential to very potential source of livelihood. About 63% (54 respondents) of both men and women in the study area agreed to be involved in trading NTFPs (Table 9).

Table 9: Population of respondents trading NTFPs

Category	Frequency	Percent
Yes	54	63
No	32	37
Total	**86**	**100**

Basically 63% of respondents in the study area were involved in trading NTFPs and products in the study area, though the proportion of gender involvement in each NTFP was too small to make comparisons. However, the observations are essential in analyzing the market chain to show the various actors and their responsibilities.

The results obtained in NTFPs trade involvement are lower than what was observed by Paullo (2007) in Kilwa district where 83% of respondents were involved in NTFPs trade; Andargatchew (2008) in Shedem Kebele, Bale Zone (Ethiopia) where estimated 85 – 90% of population depended on bamboo trade. Falconer (1994) found that 68% of the households in Kumasi were involved in NTFPs marketing. A lower percentage (22%) of the population trading NTFPs was noted by Lema (2003) in Morogoro Rural District different to the above. Townson (1995) observed that 38% of the households in Ghana traded NTFPs. The difference might probably be due to geographical location of respondents as well as knowledge and accessibility of valuable NTFPs especially to women who tend to be resources handicapped.

4.3 Market Chain Analysis of Traded NTFPs

From the analysis of NTFPs trade; transactions were found to flow in two directions i.e. the vertical chain from producer to consumer and horizontal chain between collector and collector; trader and trader as well as processor and processor. The flow of NTFPs products along the market chain, from production to consumer were deduced from diverse points of view. The key players in NTFPs trading were producers who gathered the products from forests at different locations in and outside Njombe at varied distances. There were transporters (sometimes acted as wholesalers) who brought the goods from producers to marketing centres. The means of carrying NTFPs varied from heads to cars (lorries) depending on distances from forest to market places, quantity of the products, nature of the terrain and capital. Processing was carried out to some NTFPs which aimed at adding value by reducing bulkiness, packaging and ease handling. There were also retailers as the final destination to all of the transactions. Middlemen linked producers and retailers to mediate the transactions. They were aware of the marketing situation (market information) which the producers were not informed due to temporal and spatial separation. Consumers obtained the products at various points in the cycle. The market chain for each of the priority traded NTFPs in the study area are described in details below.

4.3.1 Firewood

Firewood was dealt by small and large traders at both Makambako and Ilembula markets. While small traders collected, transported and sold firewood direct from the villages to market centres carrying on bicycles; large traders solicited firewood from small traders in Njombe and in some places of Mufindi district (Maduma village) using vans and lorries as transport media. Large traders were noted to be important as they supplied the products throughout the year though with dwindling supply and consumption in rainy seasons. The

main actors in the market chain of firewood included collectors, middlemen, transporters and wholesalers (at Makambako), retailers and finally the consumers (Fig. 1).

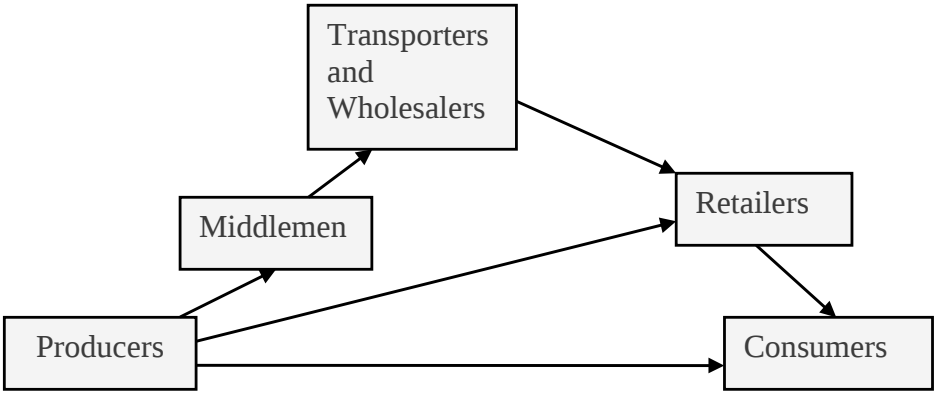

Figure 1: Market chain for traded firewood in the in Njombe district

The producers did the collection, bundling and primary transportation to home villages. The middlemen were important in case of large quantities to be sent to Makambako where they normally gathered the products from collectors before they sale to transporters and wholesalers. Large quantity transporters owned lorries and vans such that they moved in all locations with available products while lower quantity transporters used varied transport means from head loads to hired cars depending on the amount of firewood and distances one needed to travel before the products reach the consumer centres.

Similar findings were reported by Gharai and Chakrabarti (2009) in India where the main means of transport for firewood from forests to the market was found to be bicycles, head-loading and sometimes automobiles. The retailers were not mobile, owned large stocks at Makambako, split the loads into small sized bundles and wait for the consumers to buy.

Demand and supply

Demand for firewood was reported to vary from moderate during rainy seasons; in dry seasons customers' interests changed to high at both Ilembula and Makambako markets.

Supply was sometimes low especially at Ilembula as they relied on bicycles and head loads for transportation while the great consumers were people at Ilembula Lutheran Hospital mainly for heat generation. The implication of demand and supply variations suggests that if there will be improved transport infrastructures, transport media, possibly improved fuelwood stoves and managed collection locations; firewood could bring appreciable income to trading households and their societies.

Marketing

Firewood is the cheapest source of energy for cooking, heating and lighting. They were measured in head loads which was sold from 1000-2000 TZS at the villages. The bicycle riders sold at 2000 TZS per head load to the retailers who divided into six small bundles which were sold to the final consumers at 500 TZS each at Ilembula and 1000 TZS at Makambako. This made one head load to be equivalent to 3000 and 6000 TZS at the two marketing centres respectively.

The price for firewood was found to be a function of location. It was transportation costs and place values which enabled the traders at Makambako to benefit twice than their colleagues at Ilembula. According to Tesfahun (2007) availability of transportation networks and trucks were important elements for the movement of products in a market chain. Thus transport creates a place utility.

4.3.2 Wild fruits

In wild fruits trade dealers were both male and female who did both collection and sometimes processing. The traded wild fruits included *Uapaca kirkiana* (*mikusu*), *Vitex mombassae* (*misasati*), *Azanza garckeana* (*vitowo*) and *Parinari spp* (*saulwa*); and were sold from within the villages of harvest to nearby market centers. Only a few were then

transported to Mbarali and Mbeya City in Mbeya region. Large quantities however, were sold within Njombe town. The main actors were producers and processors who either sold direct to consumers or to middlemen/transporters and other retailers (Fig. 2).

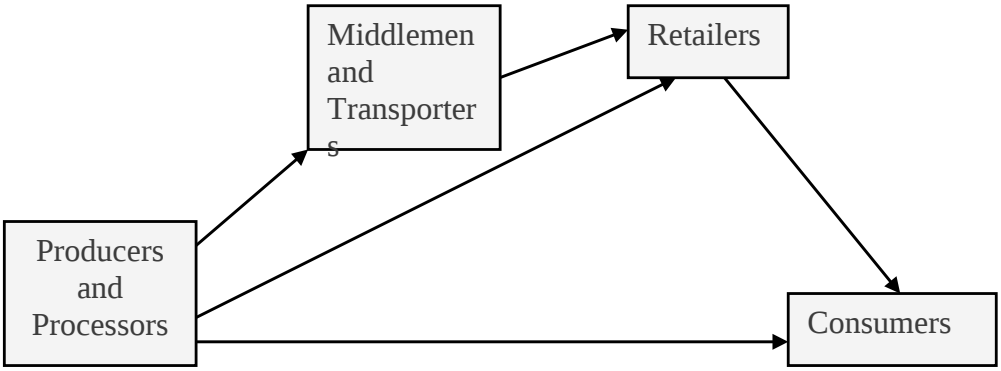

Figure 2: Market chain for traded wild fruits in the in Njombe district

Processing mainly into wine was low and constrained by expensive technology in terms of packaging and labeling. A study by Akinnifesi *et al*. (2005) on market and supply chain analysis of indigenous fruits in Zimbabwe, Zambia and Tanzania noted that wild fruits had short and uncoordinated supply chains as they were mainly directed at local markets already familiar with the products and consumption habits.

It was noted further that trade of wild fruits especially *U. Kirkiana* was mostly done by women assisted by children in off school hours and days. According to Carr *et al*. (2008) often women take various transactions towards fruits trading although they receive meager benefits from retailers. This gender differentiation could probably be a result of perishability where men perhaps due to long distance traveling couldn’t prefer trading easily perishable goods to avoid the risk of losing quality before reaching the markets.

Demand and supply

Demand of wild fruits was ranked moderate to high and supply was considered abundant in the peak months at village level where the forests were closer to residential areas. In market centers supply was lower than demand especially at Makambako where restriction was set to keep the environments clean.

Processing

The study found that wild fruits were occasionally made into wine by a group of women entrepreneurs, though the business was hampered by lack of fruits supply, unreliable market and packaging materials. According to Akinnifesi *et al*. (2005) efficiency of fruit processing industries was hampered by seasonal supply of primary products (raw materials), processing equipment and skills. In South Africa Makhado *et al*. (2009) found that *Marula* beer which is a product of wild fruits was affected by seasonality of fruits. Thus processing as a means of increasing shelf life and value-addition for perishable fruits need to be considered seriously in the study area if interventions to support women entrepreneurs is to be implemented by interested stakeholders.

Marketing

Observations on marketing of wild fruits noted that they were sold fresh and were susceptible to short shelf life. It was *Uapaca kirkiana* fruits which were traded more from within the village populations to outside markets like Ilembula, Makambako and Mbeya. Its availability was reported to have decreased due to farming activities. The village leaders stated that conservation initiatives at village's level had increased production by controlling accessibility. In marketing wild fruits litres, tins and heaps were used as units of measurement. The prices varied according to locality and consumers' concentration e.g.

a tin of 20 litres volume was sold from 2000 to 3000 TZS at villages and 6000-10 000 TZS at both market centres.

Akinnifesi *et al*. (2005) found that wild fruits' prices varied with time of season (availability) and location which could have resulted from other market. Supply forces tend to shift the prices due to boom and burst which tend to overpower the consumers' capacity. This is also affected by lacking possession of appropriate processing technologies which were reported to be cost full at household level.

4.3.3 Honey and honey products

In the study area honey related activities are carried out by males only. Gender orientation could have been caused by the nature of the activity as it involves climbing trees, needs stinging tolerance as the harvesters use traditional technology hence partially protected and done in late evening to night when women are at their homes doing domestic activities (meal preparation and nursing children). For that reason men in Njombe were left at farms till evening or else they left their wives caring for children at home while going for honey harvesting. That was backed by traditions of Njombe natives that women were cultured to be at there homes before sunset while men could stay out of there homes till midnight. The sources of honey was both within (from villages) and outside Njombe (outskirts of the market centres).

The gender centered nature of beekeeping studied by Robinson and Kajembe (2009) found that only men were responsible for collecting honey in Morogoro region. Also the Royal Tropical Institute *et al.* (2006) in Arusha region found that the beekeeping activity was associated with traditions and purity constraints to women. Carr *et al*. (2008) and Husselman *et al*. (2010) noted that honey-hunting was traditionally a male activity, as it

involved climbing trees, which is not culturally suitable for most rural women, it requires hard work and skills and it involves more risks.

Biswal (2009) found that beekeeping skills were passed to adolescent boys aged 14 onwards by following other adult men in their own or neighbouring houses. The Institute of Community and Organizational Development (2009) noted that women in Uganda managed the apiaries which included water retrieval, field clearing, planting; and hive and apiary cleaning. Abebe (2009) in Ethiopia indicated that, all the honey traders were males. In Mwinilunga and Solwezi in Zambia more than 75% of the brewers (with honey) were women (Husselman *et al.*, 2010), while in Lusaka revealed that the majority of honey traders were women.

The actors in honey trade in Njombe were producers responsible for processing then sold to middlemen, retailers and directly to consumers (Fig. 3). The main activities were done by the producers and processors who did the beekeeping, harvesting, transportation to home villages and processing (separation of honey and combs). Middlemen (linked producers and retailers) gathered honey in large quantities (bulking) from producers then sold to retailers. The retailers were also transporters to marketing centres. The retailers refined the processing, packed in various units of different weights then sold to consumers. The consumers used honey as table food, ingredient in local brew and medicinal ingredient to accomplish a doze mixture.

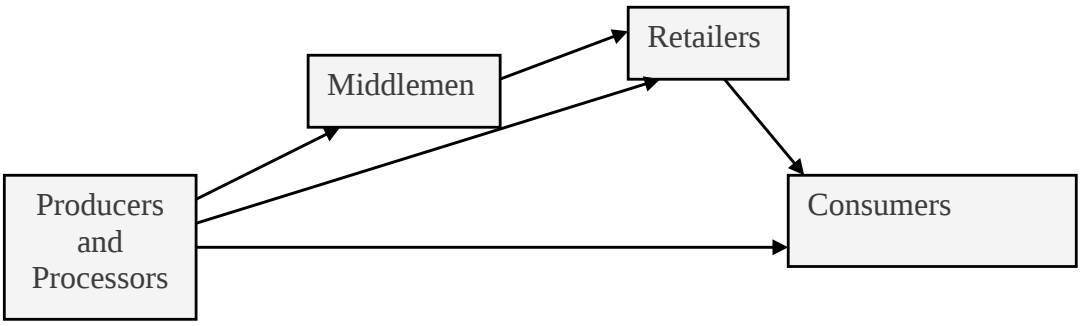

Figure 3: Market chain for traded honey in the in Njombe district

According to the Institute of Community and Organizational Development (2009) honey dealers are often local consumers, middlemen, traditional liquor brewers, traders, non governmental organizations and cooperatives depending on chain length. The Royal Tropical Institute *et al*. (2006) found that a large honey distribution in Kenya was dominated by middlemen, moving honey to the markets from distant areas, especially during periods of scarcity.

In Njombe honey marketing chain received more technological investment from production to processing than any other NTFP market chain. The respondents proclaimed that they learnt on conserving environment to safeguard forage and shade for beehives; there was an introduction of improved hives which were capable of tapping up to 21 honey combs instead of 8 from traditional ones; harvesting technologies which needed no smoke; processing and storage at high hygienic observations. Honey harvesting was done twice a year (May- June and November- December). A study by Abebe (2009) in Ethiopia found honey harvesting was done twice within a year. It was reported that any production obtained in the remaining periods of the year would be left as food for the colon to strengthen it till next harvest. Profit was determined by maximized production as it was easily stored at farmer's costs and technology.

Demand and supply

Honey has got high demand in the study area such that the present production was wealth nothing. This was explained by first the producers who mentioned that honey in their locality was seasonal although its shelf life was longer than a year; secondly the traditional healers reported to lack it as an important ingredient for curing the sick such that they ought to buy at the time of harvest and stored for future use; and thirdly the liquor (*kangara*) consumers mentioned to use the brew for few months in a year (June to August). Also honey traders at marketing centres lacked the product from September to November and January to May. Beeswax lacked consumers at all levels as one respondent reported to have some rolls with nobody willing to buy.

Similar findings were reported by Mapolu (2002) in Tabora where only 50% of honey produced was sold locally for honey beer and honey wine production. Different results are reported by the Royal Tropical Institute *et al*. (2006) who observed that in Kenya the suppliers failed to meet the demands and volumes required therefore they traveled to Tanzania and Southern Sudan to buy extra honey. Therefore there are variations in terms of honey demand in different localities probably due to lack of business skills including failure to access marketing information. These issues need to be considered when designing strategies to develop the honey trade in the study area.

Honey availability in the study area was fluctuating with change in weather as it tends to fall tremendously in drought years and increases in wetter years due to increasing bees' foraging resources. An example was sited in 2006 where one beekeeper and beekeeping officer mentioned at different occasions that production was zero. At village level honey was used for brewing, medicinal and table food.

Marketing

The main market was within Njombe with little sold to passersby who were thought to be outsiders. The marketing process was done at all levels though the population concentrated centres were found to be more successful. The units of measurement were spoons and litres at retailing levels. The prices varied considerably; at villages ranged from 2000-3000 TZS while in market centres ranged between 3000 and 10 500 TZS per litre depending on location (place utility), processing, grading and packaging which was backed by tech know how (knowledge and skills) and ones capital invested on the technology. The procedures for honey marketing concurred with findings by the Institute of Community and Organizational Development (2009) where at villages in Rwanda only semi processing (grinding honey combs and filtering) was done while in towns thorough processing (re-filtering and cleaning), weighing and packaging increased market value.

According to Mickels-Kokwe (2006) in Zambia 90% of honey assumed to be used for brewing beer (*mbote*) which was marketed in both rural and urban areas. Only minor portion of honey reached the market for food. Husselman *et al*. (2010) in African miombo woodlands (Angola, Democratic Republic of Congo, Malawi, Mozambique, Tanzania, Zambia and Zimbabwe) observed that in areas where honey was scarce it was sold predominantly within the community and nearby urban areas for consumption and processing into locally brewed honey beer. In surplus seasons urban traders, intermediaries and company agents travel to the communities to purchase it. In Kenya and Tanzania it was found that the informal market dominated the formal one with producer groups' not properly organized (Royal Tropical Institute *et al.,* 2006), hence the price of purified honey got higher than three times of the unpurified.

For more income earning honey processing was necessary at all levels. Honey combs were separated from pollen, jelly and liquid honey to make it measurable (liquid form as it is

measured in litres). The processed honey fetched more value. One trader at Makambako was capable of separating and grading, had tools (pressing machine) and packaging materials. He was capable of processing and grading the products into honey, pollen and jelly thus priced differently.

According to the Royal Tropical Institute *et al*. (2006) in Arusha region honey processing was hygienically standardized as the beekeepers avoid unnecessary mixing of hive contents. Okiria (undated) along Umba River in Lushoto district Tanzania found farmers process and pack honey to increase income. A similar strategy should be encouraged in the study area to improve the quality of honey and its products and in turn increase income at households.

4.3.4 Medicinal plants

In the study area only 6% of respondents dealt with medicinal plants trade despite the product being mentioned to be among the potential NTFPs for income generation. Medicinal plants were traded by traditional healers mostly men (80%) and women (20%). Augustino (2002) noted varied relationships in Morogoro and Iringa regions where male were 83% and female 74% and male 68% and female 70% respectively. The causes suggested were high diversity of plant species at nearby forests and easy accessibility to both sexes and also good market for medicinal products in Iringa thus attracting both men and women. The results could perhaps be related to the fact reported by Pokharel *et al*. (2000) cited by Carr *et al*. (2008) that women often collected medicinal plants of lower value available at forests closer to their homes in order to carry out other activities such as collecting firewood and fodder; while men are capable of traveling long distances to find higher-value plants hence dominating the trade. On the other hand, for Njombe district less participation of both men and women in medicinal plants' trade could be influenced by

religious restrictions as one widow explained to have abandoned the trade for about three years back because she was spiritually saved. Also the issue of capital constraint to travel to high value plants like *Acacia* was low thus favouring men who tend to meet their demand by traveling long distances while women harvested from nearby locations.

Demand and supply

Demand for medicinal plants was ranked or valued moderate (health problems that were curable) to high (difficultly curable or non curable diseases) due to presence of chronic and non curable health problems. The supply of medicinal plants was found shifting from normal and plenty to all to low such that it needed extra effort and time to find enough for meeting customers' demands due to expansion of people's dwellings, farms and restricted access to the conserved forests. This led to collectors to travel and walk long distances from less than a kilometer to far localities like Lupembe, Igima, Ludewa, Mufindi, Ruvuma, Tanga, Arusha, Morogoro and Dodoma. According to Wondergem *et al*. (1989) in Ghana the demand for products such as medicines in natural and processed forms was growing due to rising costs of Western drugs (conventional medicine) and negative experience of disillusion with modern drugs and modern health system. A similar case could apply to the study area despite other socio-cultural factors interference to business.

Processing

Medicinal plants processing involved cutting into small portable pieces, drying and grinding. Soaking and boiling were additional to those who wanted the extracts. The extracts to be more curatively ingredients like honey were added. Only one who invested in packaging using bottles and packets, sealing, labeling with descriptions and address. According to Augustino (2002) most herbalists in Morogoro and Iringa were using poor, tiresome and time consuming grinding techniques. Salum (2006) in Lindi Rural

District noted that traditional healers were grinding (powdering) or pounding and squeezing to obtain liquid extracts. He also found boiling, soaking in water, burning dried parts into charcoal or ash, scratching and squeezing of medicinal plants before use and or storage as additional methods. Mujillah (2007) noted that processing of medicinal products was accomplished by drying, grounding into powder and also by boiling and soaking in water. Thus processing of medicinal plants was still receiving low technology investment in Njombe.

Marketing

The market for medicinal plants was very potential. This was further aggravated by commercialization of health services in conventional health centers and their allies. There was no trade coordination amongst traditional healers but the healed individuals communicated with their relatives when was necessary. This lead to have no specified measurement units as well as prices but pay in-kind sometimes in loan basis except for those who owned pharmacies for medicinal plants established fixed prices and sold by cash. The difference in income was a function of location, means of communication (phones), specification and investment in processing technology. According to Abraham (2003) pricing mechanism for medicinal plants in Kerala India was not clear-cut as at first level of transaction, the buyer fixed the rates as the collectors were socially and economically poor.

The diseases which were sending patients to traditional healers were reported to be HIV/AIDS and their complications, cancer and side effects due to over use of artificial/conventional drugs to mention a few. UNAIDS (2006) observed that AIDS victims in rural households traded medicinal plants as safety net income. Suich (2006) in Mozambique asserted that high costs of modern medicine turned about 80% of population

of miombo woodlands to natural products for medicines. Cured victims and relatives were good information disseminators who influenced new customers from far distances like Mbeya, Songea, Iringa, Dar-es-salaam and else where.

The traditional healers in trading centres were located along the main roads and around people's concentration places like bus stands and markets. Owning cell phones with phone numbers written on doors and posters was that made communication ease as medicine trading was their major source of income and career even though they were having no proper tools for processing, packaging and labeling. In this business the dealers were collectors and processors; and consumers sometimes mediated by retailers (Maasai traders) especially medicinal plants originating in far locations like Arusha (Fig. 4).

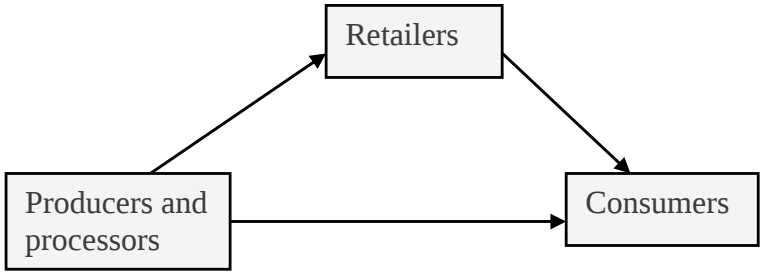

Figure 4: Market chain for traded medicinal plants in Njombe district

4.4 Socio-economic Factors Influencing NTFPs Trade

According to responses provided by the respondents as to why they entered into NTFPs trading and have taken it as livelihood activity, there were three main reasons which have been treated as factors influencing NTFPs trade in Njombe. These were (1) income generation and satisfaction, (2) low investment costs and low technological requirements and (3) medicinal interests. Table 10 indicates that combination of the factors was more preferred in the study area.

Table 10: Distribution of responses on socio economic factors influencing NTFPs trade in Njombe

	Responses on factors to NTFPs trade (%)				
Category	**A**	**B**	**C**	**D**	**Total**
Male	17(6)	11(4)	32(11)	40(14)	100(35)
Female	5(1)	5(1)	84(16)	5(1)	100(19)
Total	**13(7)**	**9(5)**	**50(27)**	**28(15)**	**100(54)**

Note: A = Income and satisfaction; B = Investment and technology; C = Income, satisfaction and medicine; D = Investment, technology and medicine

Source of income, satisfaction and medicinal interests were leading socio-economic factors as explained by 50% of respondents (Table 9). This means that NTFPs trade was mainly done to maximize household income, provide curative effect to patients at the same time pleasing heartfelt interests of the traditional healers. According to Makhado (2004) in Podoland South Africa about 65% of respondents traded NTFPs to supplement the income already in existence, while 35% needed something to depend on for income and another 26% were driven by poverty. Most of them were widows and were involved in other livelihood activities. Paumgarten and Shackleton (undated) noted that the loss of income/retrenchment; demand/available market; poverty, and insufficient primary income to purchase food and household goods were among the reasons for selling NTFPs. It could be concluded that NTFPs trading in Njombe was as good as income generating activity, safety net (alternative economic activities when others do not work) in economic crisis and a poverty relief.

Low investment costs and technology requirements was another driving factor as it was explained that trading NTFPs required low initial capital compared to ones who thought of having other businesses like selling kiosks. For the case of technology it was found in the

study area that NTFPs were easily consumed even if they were not processed or just pre-processed and cleaned.

In Southwest Ethiopia the small-scale farmers traded NTFPs because of low management effort, low investment (only a knife was used) and the high efficiency (Chowdhury *et al*., 2005). According to Scherr *et al*. (2003) in Washington it was observed that NTFPs had a low cost of market entry and low income elasticity, although offering only marginal economic benefits that attracted low income earners to trade on it. Thus NTFPs trading was an economic career for the low income earners as they opt to trade off other capital and technological cost full activities.

The World Bank (2008) pointed out that trade of NTFPs in Sub Saharan Africa countries is accelerated by growing urban populations hence increased demand for charcoal, medicinal plants, wild meat and construction wood, among other products. That is to say medicinal plants gained more recognition due to increasing population (customers) and as alternative curative strategy to cope with increasing costs of Western drugs. From the results it can be concluded that trading NTFPs could be a livelihood coping strategy for the poor. This needs to be relatively cheap (initial capital and technology) and available resource as a means to sustain life.

4.5 Contribution of Traded NTFPs to Household Income

4.5.1 Income generating activities in Njombe

The NTFPs trade was found to be significantly contributing to total household income ($p>0.001$, df 4) as Chi-square (χ^2) test indicated (Appendix 3). Therefore the main sources of income for the household in the study area is NTFPs trade contributing 32% with an average of 419 295 TZS of total household income, followed by non farm labour (29%) and agriculture (19%). The rest of the responses are as shown in Table 11.

Table 11: NTFPs trade contribution per annum at household income in the study area

Activity	Average contribution (TZS)	Contribution (%)
Agriculture	250 849	19
Livestock	116 686	9
NTFPs	419 295	32
Farm labour	36 779	3
Non farm labour	369 012	29
Other trades	94 029	7
Remittance	6890	1
Total	**1 293 540**	**100**

The results indicates that NTFPs contribute significantly to household income such that it out ways agriculture and livestock, probably due to the population of respondents in market centres that were found not to rely on agricultural activities for income due to crop and livestock farming restrictions. In Makambako it was forbidden to cultivate crops that grown to 60cm above the ground for security. Also livestock husbandry was abandoned in the same centre for environmental cleanliness.

Research findings in various parts of Tanzania show variations in terms of reported household income contribution from NTFPs. According to Kagya (2002) in Meatu District 21% of household income was reported to be derived from NTFPs trade lower than what

has been found in this study. Similarly lower contributions were reported by Ibrahim (2007) in Lindi Rural District where income from sold honey, firewood, mushroom, wild fruits, edible roots and tubers and medicinal plants was only 14%. Robinson and Kajembe (2009) in Morogoro where, NTFPs household annual wealth contribution averaged 12% and Nyingili (2003) where 7.5% of income in Mbozi district was contributed by NTFPs trade.

Higher contributions compared to the present study are reported by Hamza and Msalilwa (2004) in villages around Mgori forest reserve in Singida rural district where NTFPs contributed 35% of income. Similar results are reported by Paullo (2007) in Kilwa district where 38% of the household income was generated from NTFPs trade. Similarly Research by CIFOR (1999) in Tanzania found that farmers were deriving up to 58% of their cash income from the sale of honey, charcoal, fuel wood, wild fruits and vegetables. Monela *et al*. (2000) observed that more than 50% of income for households living in Miombo Woodlands was generated by selling honey, wild fruits, charcoal and firewood. A study in the Eastern Tanzania's dry miombo forests showed that rural households derived more than 50% of their cash income from sale of forest products such as charcoal, honey, wild fruits and fuel wood while peri-urban households derived almost 70% of their income from the woodlands (CHAPOSA, 2002).

In Africa 14 out of 17 case studies have found that NTFPs contributed less than 50% to household incomes, with 9 cases being less than 25% and only 3 cases exceeded 70% of the household income (Sunderland *et al.,* 2004). Prasad (1999) observed that small-scale forest based enterprises, many of which rely on NTFPs, provide up to 50% of the income for about 25% of India's rural labour force. Panigrahi (2001) found in areas of Western Orrisa, India that more than 60% of the respondents depended on forests' income ranging

from 25% to 75% every year. The average annual income from bamboo in Shedem Kebele, Bale Zone in Ethiopia was 47% (Andargatchew, 2008). In Takamanda Cameroon, bush mango and eru contributed 82.2% of household income (Sunderland *et al*., 2002). Piya *et al*. (2011) found that NTFPs trade contributed 13.2% on average to households of Chepang Community in Nepal. This signifies that in Njombe NTFPs trade can contribute more income if transport infrastructures, processing facilities, marketing facilities and domestication of wild products get improved.

Results on the other hand showed that individual household incomes from trading NTFPs and dependence varied much as influenced by specialization, investment in production and processing and location (village or market centre). This was different from the study made in Nuba Mountains in South Kordofan in Sudan where exposure to large markets led to less dependence on NTFPs trade but yet similar dependence due to remoteness of the area and richness of species (El Tahir and Gebauer, 2004). Babalola (2009) found that producing and trading NTFPs by farmers in Southwest Nigeria was a means to meet financial needs. It provided substantial revenues to producers, traders and processors who tried to specialize and invest on production, processing and trading (Shackleton *et al*., 2007).

The difference in NTFPs income contribution to households as reported in various localities may be due to richness of NTFPs; unpredictable markets; weather changes; location and status of alternative income activities. The income from NTFPs trade works from supplemental to high potential revenues depending on ones entrepreneurial capacity, location and whether having alternative income generating activities or not. From that output it can be deduced that in a given facilitative environment to traders of NTFPs; the business can be a good livelihood option.

4.5.2 Gender related dependence on NTFPs income

Results showed that 32% of male and female traders obtained 45-85% of their total income from NTFPs trade (Table 12); followed by 30% of respondents who mentioned weak dependence and only a few (4%) mentioned the strong dependence of above 85%. That means independence was dominated by women (21%) and strongly dependence was dominated by men (6%). This could have been caused by the fact that NTFPs resources are found far from the resident areas thus favouring men who can travel long distances, climb trees and use transportation media like bicycles which are unfriendly to women.

Table 12: Gender distribution of responses regarding household dependence on NTFPs trade

	Responses on dependence to NTFPs trade (%)					
Category	**A**	**B**	**C**	**D**	**E**	**Total**
Male	nr	20(7)	31(11)	43(15)	6(2)	100(35)
Female	21(4)	47(9)	21(4)	11(2)	nr	100(19)
Total	**7(4)**	**30(16)**	**28(15)**	**32(17)**	**4(2)**	**100(54)**

Note: nr- no response; A = Independent (5%); B = Weak dependence (5 – 25%);
C = Moderate dependence (25% - 45%); D = Dependence (45% - 85%);
E = Strongly dependent (above 85%)

Singh *et al*. (2010) categorized dependence on NTFPs based on their contribution to annual household income and came with three classes, namely: (i) highly dependent >60% in annual household income; (ii) moderately dependent with 40-60% contribution; and (iii) low dependent with <40% contribution. Based on Singh *et al*. (2010) classification, results from this study entail low NTFPs trade dependence.

The variation in dependence could be attributed to various factors like reliance on other sources of income hence NTFPs trading becomes supplementary and vice versa (Shillington, 2002). Also restricting bylaws on trading wild fruits at Makambako could have reduced reliance of residents on the trade; and rent houses were limiting use of

firewood as energy sources due to soot bi-product. Further more the difference could probably be caused by mobility of males looking for harvests and tolerance to difficult transport mechanisms (bicycle) common in Njombe.

4.5.3 Uses of income from sold NTFPs

In the study area income from sold NTFPs was used for purchasing food and other household supplies (Fig. 5) including sugar, salt and cooking oils. It was further found to be used for paying educational costs for both primary and secondary school children. Apart from that it was used for investment in building houses for living, house rent for trading NTFPs and buying more tradable materials to accumulate more capital. This indicates that income from NTFPs trade is more for subsistence as food, laundries, kerosene and matchboxes took the lead while investment and education took the minimum portions.

Similar observations have been reported in other parts of Tanzania e.g. the Hadzabe around Lake Eyasi sell honey and wild meat then purchase maize for staple food (Chemonics International Inc., 2008). According to Husselman *et al*. (2010) and Biswal (2009) income from honey trade was important for purchasing agricultural goods (seeds and fertilizers), school expenses for children, household goods (food, clothes and health care) and investment in small businesses at a critical time of the year (November and June). In South Africa, Namibia and Guyana it was noted that extra income from the sale of NTFPs (*Marula* and Crabwood) was being diverted into schooling and increased physical capital holdings (Bennett, 2005).

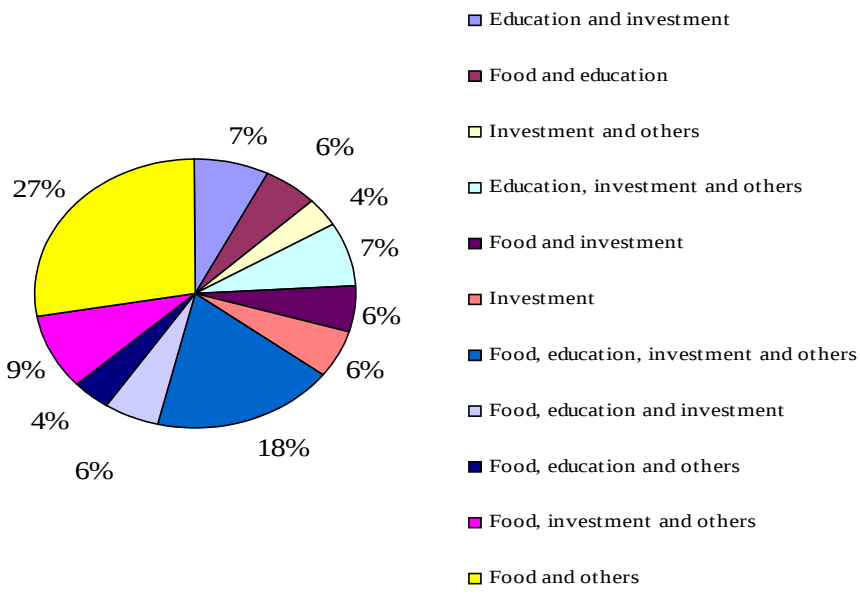

Figure 5: Distribution of responses on use of income obtained from NTFPs trade in Njombe district

According to Le Breton and Nemarundwe (2009) incomes from mountain forest products in Southern African countries (Swaziland and Namibia) have been used to purchase basic food stuffs in drought years, cosmetics, payment of school fees, invest in small enterprises such as livestock rearing, groceries and sewing. Awono *et al*. (2010) found that income from NTFPs was used in education for children (30%), food (27%), family health (25%) with low investments made in home improvements, household goods, phones, radios and televisions. Income from NTFPs was important as it was obtained at times of economic need and or provided seasonal incomes when agricultural labour needs were low (Sunderland *et al.*, 2004). Therefore, income from NTFPs trade in Njombe was important for common goods and services.

4.6 Efforts towards commercialization of NTFPs trade

The NTFPs traders in the study area have shown deliberate ambition towards specification, introduction of new skills and technologies of production, processing, packaging and

branding. At Mambegu village one women group processed wild and cultivated fruits into wine, jam and juices then bottled and sold to passersby. In Makambako there was a group of herbalists who collected, transported, processed by grinding machine, packed and labeled on their produce. At Masaulwa there was an NGO which made a link with honey producers and conducted training on beekeeping and environmental conservation. All these are approaches were made by Njombe residents trying to improve NTFPs trade for achieving premium income.

4.6.1 Constraints towards commercialization of non-timber forest products

The respondents mentioned various limitations towards success in commercialization of NTFPs in their locality. These are summarized in Fig. 6. They were grouped into four main categories: those related to marketing, based on production and processing (value addition), transportation and storage and others which included psychosocial, managerial and human capital restrictions. Appendix 2 show the constraints as mentioned by the respondents in each sub category. Uncertain with 30% this was important as it entails that the people know nothing or not sure of NTFPs trading constraints with respect to income. About 24% mentioned marketing constraints as the main hindrance to NTFPs commercialization. The rest of constraints although mentioned the response was non significant to make consideration.

According to the responses in the study area, market constraints included lack of reliable sources for NTFPs to make sustainable supply to the market; unreliable market place for some NTFPs mentioned e.g. wild fruits at Makambako were abandoned from off loading at the present market place; seasonality meaning NTFPs abundance in some periods of the year and reduced to nothing in others; low prices without regulating mechanisms; customers regarded natural products as inferior goods; lack of training and awareness

(promotion) to consumers especially on benefits over NTFPs; high taxes regardless of consumption rates and seasonal fluctuation of customers' population as market residents move from towns to villages for farming and also reduced firewood consumption in rainy seasons due to residence rent restrictions.

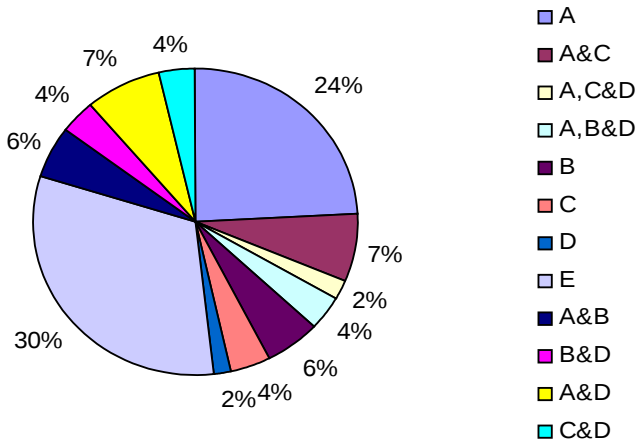

Figure 6 : Distribution of responses on constraints towards commercialization of NTFPs trade in Njombe district

Keys: A- Market constraints; B- Production and processing constraints; C- Transportation and storage constraints; D- Other constraints; E- Uncertain; A&B- Market constraints and Production and processing constraints; A&C- Market constraints and Transportation and storage constraints; A&D- Market constraints and Other constraints; A,B&D- Market constraints, Production and processing constraints and Other constraints; A,C&D- Market constraints, Transportation and storage constraints and Other constraints; B&D- Market constraints and Other constraints; C&4D- Transportation and storage constraints and other constraints.

Results obtained seem to concur with other findings reported by other researchers regarding NTFPs trade in Tanzania. For example, according to Franzel *et al*. (2007) the trade on *Leucaena* leaves for animal feeds in Tanga, was constrained by lack of capital and unstable prices and supplies, especially during the rainy season making its business less effective. Similarly, inadequate marketing of honey products has been reported by Mwakatobe and Mlingwa (2007) in Tanzania caused by inaccessibility to markets, lack of market information, inadequate entrepreneurship skills and joint efforts in marketing among beekeepers.

Elsewhere in the world e.g. in Nepal, medicinal plants' collectors were reported to lack scientific knowledge on collection as recommended by the market forces (Acharya *et al.*, 2009). According to Russell and Franzel (2004) cited by Akinnifesi *et al*. (2006) in Southern Africa the major constraints towards commercialization of indigenous fruit was reported to be largely informal, small, and volatile markets; short seasoned products as well as lack of market information and networks among traders. In South Africa the *Marula* beer and brush traders were driven from the places where they sold their goods by adjoining shop owners, security personnel at shopping complexes and the police (Shackleton and Shackleton, 2004). A survey on honey market chain in Ethiopia (Abebe, 2009) noted great marketing problems to be quality adulteration, competition with unlicensed traders, shortage of credits and unorganized taxing system.

According to Bhattarai *et al*. (2003) market constraints aggravated many suppliers of NTFPs with small quantities of products at peak periods and limited competition on the demand side (few buyers) of the products at local level. It reduced the bargaining power of the poor harvesters supplying the products. Also there were few customers such that the seller took long time to finish the goods (Makhado, 2004). Poudel (undated) in Himalayan Kingdom of Nepal observed that irrational royalty rate for some of the NTFPs and multiple levying for the same products were setbacks to development and promotion of NTFPs trade. RISØ National Laboratory (2005) explained its experience on rapidly declining supply potential of wood fuel. Another problem was customers who buy on credit; some take too long to pay, while others pay in installments both leading to traders receiving meager amounts of money disrupting their use plan (Makhado, 2004).

Often markets are diverse and faddish, but product development is long such that NTFPs are considered 'luxury' items, meaning that change in demand is particularly difficult to

predict (Belcher and Schreckenberg 2007). Demand for many NTFPs may vary greatly from year to year because of the availability/price of other products, affecting the development of new products requiring about 5-10 years and a significant investment of resources thus NTFPs markets were vulnerable to substitution and competition with large-scale cultivation in other countries. In Indonesia a lack of market information regarding market demand and specification, price fluctuations, product quantity, quality and market channels have been noted (Tarigan *et al.,* 2010). Gharai and Chakrabarti (2009) found that NTFPs price paid to producers was much less than the actual market value due to availability of products everywhere in the same season, lack of transport, availability of manpower and sudden rainfall reduced demand thus disrupted markets.

Also market constraints were caused by unreliable transport especially to timely supply of appropriate quantities and quality of products e.g. honey trading in Tanzania (Mwakatobe and Mlingwa, 2007). Banjade and Paudel (2008) found that transportation of NTFPs discourage its trade especially in areas with high altitudes and far from road heads or city centres. Lack of communication, storage and transportation facilities made local harvesters and traders of NTFP blocked from reliable market information and storage facilities hence results in market inefficiency (Bhattarai *et al.,* 2003; Acharya *et al*., 2009; Poudel, undated). Moreover Belcher and Schreckenberg (2007) agreed that shipping of NTFPs constrained by poorly developed communications and transportation infrastructures making it difficult and costly to move products to market.

In the study area religious limitations (Christians) to church members were a barrier to use medicinal plants. Also unsatisfactory credits were given to beekeepers; these were accompanied by garments and beehives which were reported expensive and unavailable to individual village dwellers. Augustino (2002) noted that few people visited traditional

healers in Iringa due to religious believes that were against medicinal plants. According to Shackleton and Shackleton (2004) religious or legal sanction was practiced in South Africa on use of bush meat and medicinal plants. Also little support through credit and skills provision from the government and rural development agencies to the NTFP sector in South Africa led to producers lacking capital, contacts or skills to develop their businesses (Shackleton and Shackleton, 2004).

4.6.2 Views on Improving Commercialization of NTFPs

Four solutions were suggested to improve the commercialization of NTFPs in the study area (Fig. 7). Uncertain on improving commercialization constraints represented the responses on no answer and or not sure on constraints facing commercialization of NTFPs which were 30%. Marketing solutions (24%) were the main as they mentioned in constraints and their solutions.

The market solutions targeted on reducing the constraints related to marketing issues including: (a) Diversification of activities in trading; (b) training on customers and promotion of the products; (c) changing consumers' habits and NTFPs type for the same use with seasons; (d) the government to locate permanent locations for harvesting NTFPs and markets to sale NTFPs harvested; (e) need for recognized and specific dealers in trading NTFPs.

The Royal Tropical Institute *et al*. (2006) found that in an unpredictable markets provision of market information was potentially a successful intervention in Same district, Kilimanjaro region. Banana (1996) in Uganda noted that marketing information system improved the ability to respond to consumer's interests (market transparency) where traders understood and changed the products and product attributes that customers'

desired like the range of products offered, introducing and eliminating some products, specification of products, requesting items from producers and the level of quality demanded.

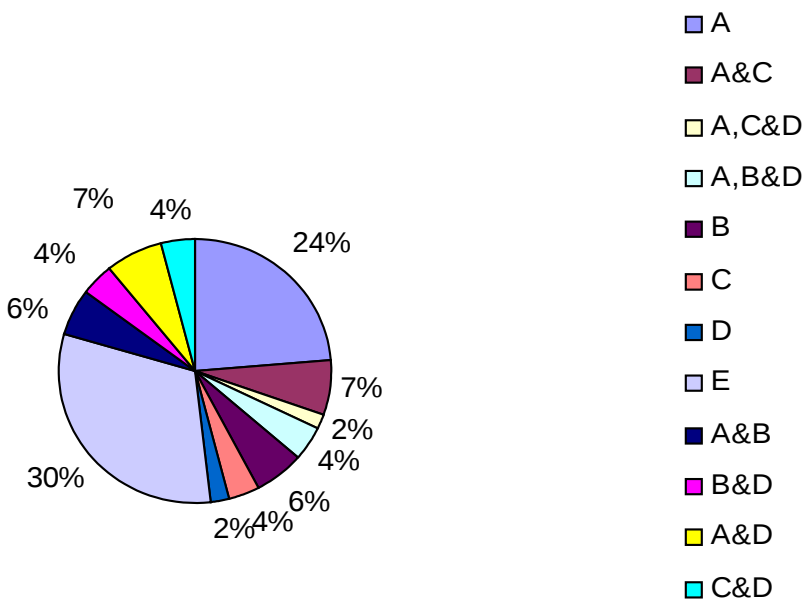

Figure 7: Views to tackle the constraints towards commercialization of NTFPs trade in Njombe district

Keys: A- Marketing Solutions; B- Production and processing solutions; C- Transportation and storage solutions; D Other solutions; E- Uncertain; A&B- Marketing Solutions and Production and processing solutions; A,B,C&D- Marketing Solutions, Production and processing solutions, Transportation and storage solutions and Other solutions; A,B&D- Marketing Solutions, Production and processing solutions and Other solutions; A&C- Marketing Solutions and Transportation and storage solutions; A,C&D- Marketing Solutions, Transportation and storage solutions and Other solutions; A&D- Marketing Solutions and Other solutions.

Tarigan *et al*. (2010) suggested on enabling producers to access accurate market information so that they formulate new marketing strategies. That can help producers to identify production opportunities and information on technology availability (Puustjärvi *et al.*, 2005; van Andel, 2006) to support NTFPs production that meets market demand and specification.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

i. A total of eleven NTFPs namely firewood, honey, thatch grass, medicinal plants, mushroom, carvings, charcoal, wild fruits, edible insects, bamboo juice and wild meat were identified as economically potential products for income generation in the study area.

ii. The market chain analysis of prioritized valuable NTFPs (i.e. firewood, honey, wild fruits and medicinal plants) indicated producers, processors, wholesalers and transporters, middlemen, retailers and consumers to be main actors in the trade. NTFPs transactions however, were found to flow in two directions i.e. the vertical chain from producer to consumer and horizontal chain between collector and collector; trader and trader as well as processor and processor.

iii. NTFPs trade was leading in household income contribution followed by non farm labour income, agriculture, livestock and other trades.

iv. Socio-economic factors mainly income generation and satisfaction, low investment costs and low technological requirements and medicinal interests were found to influence NTFPs trade in the study area. On the other hand, it seems to be male dominated with few participation of female.

v. Efforts for commercialization through groups forming partnership with NGOs capitalizing on production, processing and packaging skills and technologies were observed on honey, medicinal plants and wild fruits.

vi. Diversification of activities in NTFPs trading, training on customers and promotion of the products, change habits and products with seasons, provision of permanent locations/markets for NTFPs harvesting and marketing and need for recognized and specific dealers in trading NTFPs to be among factors hindering commercialization of NTFPs trade in the study area.

5.2 Recommendations

i. Cultivation and conservation of NTFPs resources is important so as to sustain availability which was reported to diminish, causing the dealers to travel long distances before they trade. The participants should be rural residents in collaboration with forest and agricultural extension officers.

ii. Promotion of NTFPs trade was important to create awareness to local residents and guests. This will widen the use of NTFPs e.g. honey which was rarely used as table food in villages and medicinal plants which was perceived insignificant to some groups. The promotion has to be contacted by the government using her extension officers together with traditional dealers from both villages and urban and or sub-urban centres.

iii. The government, non governmental organizations, community institutions, financial institutions, and interested individuals to recognize and facilitate NTFPs dealers access proper technologies so that production, processing and packaging get

conducted according to consumer's preferences, increase shelf life and also add new products to the market.

iv. Train entrepreneurs emerging to trade on NTFPs so that they operate formally and legally. In so doing new skills and technologies, environmental protection packages, market requirements to mention a few will be imparted to participants.

v. Both government (Central and Local authorities) and private organizations have to be advised to participate in solving constraints related to transportation networks, marketing infrastructures and group formation that accompanies training on new technologies, financial accessibility and introduction of market niches.

vi. Further research can be conducted on other NTFPs and services contribution to livelihood as the present study due to resource constraints has dealt with NTFPs which had market values.

REFERENCES

Abebe, A. (2009). Market chain analysis of honey production in Atsbi Wemberta district, Eastern Zone of Tigray National Regional State. Thesis for Award of MSc Degree at College of Agriculture, School of Graduate Studies, Haramaya University, Ethiopia. 85pp.

Abraham, A. S. (2003). Sustainability of medicinal plants in Kerala, economic considerations in domestication and conservation of forest resources. Thesis for Award of PhD Degree Economics at Cochin University of Science and Technology, India. 163pp.

Acharya, G. R., Koirala, P. N., Neupane, L. and Devkota, S. C. (2009). Livelihood option from Minor Forest Produce: context of Non Timber Forest Product and poverty reduction in Mid Hills of Nepal. *Journal of Wetlands Ecology* 2: 57-66.

Adger, N., Brown, K., Cervigni, R. and Moran, D. (2003). *Towards estimating total economic value of forests in Mexico*. Centre for Social and Economic Research on the Global Environment, University of East Anglia. 40pp.

Akinnifesi, F. K., Jordaan, D. and Ham, C. (2005). Building opportunities for smallholder farmers to commoditize indigenous fruit trees and products in Southern Africa: 2. processing, markets and rural livelihoods. In: *Proceeding of the Conference on International Agricultural Research for Development*, 11-13 October 2005, 1 Tropentag Stuttgart-Hohenheim. 10pp.

Akinnifesi, F. K., Kwesiga, F., Mhango. J., Chilanga, T., Mkonda, A., Kadu, C. A. C., Kadzere, I., Mithofer, D., Saka, J. D. K., Sileshi, G., Ramadhani, T. and Dhliwayo, P. (2006). Towards the development of Miombo fruit trees as commercial tree crops in Southern Africa. *Forests, Trees* and *Livelihoods* 16: 103–121.

Ambrose-Oji, B. (2003). Contribution of NTFPs to the livelihoods of the 'forest poor': evidence from the tropical forest zone of south-west Cameroon. *International Forestry Review* 5(2): 106-117.

Andargatchew, A. (2008). Value chain analysis for Bamboo originating from Shedem Kebele, Bale Zone. A Project report for Award of MBA Degree at the School of Graduate Studies, Addis Ababa University, Ethiopia. 94pp.

Arnold, J. E. M. and Ruiz Pérez, M. (1998). The role of non-timber forest products in conservation and development. In: *Incomes from the forest: methods for the development and conservation of forest products for local communities.* (Edited by Wollenberg, E. and Ingles, A.), Center for International Forestry Research (CIFOR), Bogor, Indonesia. pp.17–42.

Augustino, S. (2002). Gender roles in sustainable use and practice of medicinal plants in urban districts of Morogoro and Iringa Tanzania. Dissertation for Award of MSc. Forestry Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 116pp.

Awono, A., Ndoye, O. And Preece, L. (2010). Empowering women's capacity for improved livelihoods in non-timber forest product trade in Cameroon. *International Journal of Social Forestry (IJSF)* 3(2):151-163.

Babalola, F. D. (2009). Prospects and challenges of production and marketing of non-timber forest products (NTFPs) by rural farmers in Southwest Nigeria. *Academic Journal of Plant Sciences* 2(4): 222-230.

Bailey, N. T. J. (1994). *Statistical Methods in Biology*. Cambridge, Cambridge University Press. 255pp.

Banana, A. Y. (1996). Non-timber forest products marketing: field testing of the marketing information system methodology. In: *Proceedings of An International Conference on Non-Wood Forest Products 9. Domestication and Commercialization of Non-Timber Forest Products in Agroforestry Systems.* (Edited by Leakey, R. R. B., Temu, A. B., Melnyk, M. and Vantomme, P.), 19-23 February 1996, Nairobi, Kenya. pp. 218 - 225.

Banjade, M. R. and Paudel, N. S. (2008). Economic potential of non-timber forest products in Nepal: Myth or reality? *Journal of Forest and Livelihood* 7(1): 36-48.

Barrett, C. B., Reardon, T. and Webb, P. (2001). Non farm income diversification and household livelihood strategies in rural Africa: concepts, dynamics, and policy implications. Department of Applied Economics and Management, Cornell University, Ithaca, New York. 31pp.

Belcher, B. and Schreckenberg, K. (2007). Commercialization of non-timber forest products: a reality check. *Development Policy Review* 25(3): 355-377.

Belcher, B. M. (2003). “What isn’t an NTFP?” *International Forestry Review* 5(2): 161-168.

Bennett, E. (2005). *Gender and the DFID renewable natural resources research strategy: a synthesis final draft*. DFID Gender Synthesis, University of Stirling, Scotland, UK, 39pp.

Bhattarai, B., Ojha, H., Banjade, M. R. and Luintel, H. I. (2003). *The Effect of NTFP market expansion on sustainable local livelihoods. A case of Nepal*. Forest Action, Ekantakuna, Lalitpur, Nepal. 23pp.

Biswal, R. (2009). Exploring the contribution of NTFPs to rural livelihoods: The case of Nilgiri Biosphere Reserve, India. Dissertation for Award of MA Degree at the School of Development Studies, University of East Anglia, India. 61pp.

Boyd, H. K., Westfall, R. and Stasch, S. F. (1981). *Marketing Research, Texts and Cases.* Richard D, Illinois, Irwin, Inc. USA. 813pp.

Campbell, B. M., Angelsen, A., Cunningham, A., Katerere, Y., Sitoe, A. and Wunder, S. (undated). *Miombo woodlands – opportunities and barriers to sustainable forest management*. Centre for International Forestry Research (CIFOR), Bogor. 41pp.

Carette, C., Malotaux, M., van Leeuwen, M. and Tolkamp, M. (2009). *Shea nut and butter in Ghana Opportunities and constraints for local processing*. Wageningen University, the Netherlands, and the Resilience Foundation, Wageningen University. 88pp.

Carr, M., Hartl, M., Lubbock, A., Mwanundu, S. and Firmian, I. (2008). Promoting food security and economic empowerment. In: *Gender and desertification: expanding roles of women to restore dry lands*. Rao, R., Motukuri, B., Schreckenberg, K., Kanji, N., Grouwels, S. and Biggs, S. (eds). International Fund for Agricultural Development (IFAD), Rome, Italy. 42pp.

CHAPOSA (2002). *Charcoal Production Potential in Southern Africa. Final report.* International Cooperation with Developing Countries. 88pp.

Chemonics International Inc. (2008). *Preliminary rural livelihood zoning Tanzania: A Special Report by the Famine Early Warning System Network (FEWS NET)*. United States Agency for International Development (USAID), Dar es salaam, Tanzania. 49pp.

Chettleborough, J., Lumeta, J. and Magesa, S. (2000). *Community use of non timber forest products. A case study from the Kilombero Valley. Kilombero Valley Integrated Environmental Management Programme*. The Society for Environmental Exploration, UK and University of Dar es Salaam, Tanzania, 22pp.

Choudhury, P. R. (undated). *Forest-route to poverty alleviation - myths and realities: analysis of NTFPs livelihood linkages in some Indian states*. IRC Village, Bhubaneswar, India, 17pp.

Chowdhury, Q., van de Graaf, R., Hazenberg, S., Erniwati, E., Maris, W. and Tesfaye, P. (2005). *Poverty alleviation through NTFPs development in South West Ethiopia:*

options for certification of coffee and honey for poverty alleviation and forest conservation. Wageningen University, 56pp.

CIFOR (1999). *Managing miombo woodlands to benefit African communities Annual Report*. The Communications Unit, CIFOR, Bogor, Indonesia. 18pp.

CIFOR (2005). Non-Timber Forest Products between poverty alleviation and market forces. In: *Trees and Forests in Development Cooperation*. (Edited by Pfund, J. and Robinson, P.), Interco operation, Bern, Switzerland. pp.1- 50.

Coad, L., Campbell, A., Miles, L. and Humphries, K. (2008). *The costs and benefits of protected areas for local livelihoods: a review of the current literature*. *Working paper*. UNEP World Conservation Monitoring Centre, Cambridge, 42pp.

de Beer, J. H. and McDermott, M. (1989). *The economic value of non-timber forest products in South- East Asia*. The Netherlands Committee for IUCN, Amsterdam, 175pp.

Division of Early Warning and Assessment –DEWA. (2006). Africa Environment Outlook (AEO-2). Our Environment Our Wealth. United Nations Environment Programme, Nairobi, Kenya. 542pp.

Dixie, G. (1989). Horticultural marketing: a resource and training manual for extension officers. FAO agricultural services bulletin No. 76. FAO, Rome, Italy.

Edmond, J. (2008). *Incorporating gender into PHE strategies: experiences from Conservation International*. United States Agency for International Development (USAID), USA, 23pp.

Egbule, P. E. and Omolola, O. (2005). Information and training needs of non-timber forest products' operators in Southern Nigeria. *Journal of Sustainable Forestry* 20(1): 43-52.

El Tahir, B. A. and Gebauer, J. (2004). *Non-timber Forest Products: opportunities and constraints for poverty reduction in the Nuba Mountains, South Kordofan, Sudan*. Conference on International Agricultural Research for Development, Berlin, 5-7 October, 2004. 10pp.

Falconer, J. (1994). *Non-timber forest products in southern Ghana: main report*. Republic of Ghana Forestry Department and Overseas Development Administration and Natural Resources Institute, Chatham, Republic of Ghana. 81pp.

FAO (1995). *Non wood forest product 3. Report of the International Expert Consultations on non wood forest products*. FAO, Yogyakarta, Indonesia. 465pp.

FAO (1997). *Agricultural and Food Marketing Management*. Food and Agriculture Organization, Rome, Italy. 344pp.

FAO (1999). Towards a harmonized definition of non wood forest products. *Unasylva* 198: 63 – 64.

Franzel, S., Wambugu, C., Nanok, T., Kavana, P., Njau, T., Aithal, A., Muriuki, J. and Kitalyi, A. (2007). *The production and marketing of leaf meal from fodder shrubs in Tanga, Tanzania: a pro-poor enterprise for improving livestock productivity. ICRAF Working paper No. 50*. World Agroforestry Centre, Nairobi, 24pp.

Gharai, A. K. and Chakrabarti, S. (2009). *A study on NTFP-related livelihood dependency and people's perception of the commercialization potential of selected NTFPs in selected locations of Gumla, Hazaribagh and Simdega districts of Jharkhand*. Centre for People's Forestry, India, 34pp.

Gosselink, P. and Strosser, P. (1995). *Participatory rural appraisal for irrigation management research: lessons from IIMI's experience. IIMI working paper no.38l*. International Irrigation Management Institute, Colombo, Sri Lanka, 67pp.

Gregory, G. R. (1987). *Resource economics for foresters*. John Wiley and Sons. 477pp.

Hamza, K. F. S. and Msalilwa, U. L. (2004). Contribution of some non-timber forest products (NTFPs) to household food security and income generation: a case of villages around Mgori forest reserve, Singida, Tanzania. In: *Proceeding of the second Worldwide Symposium on Gender and Forestry*. 1-10 August 2005. College of African Wildlife Management, Mweka, Kilimanjaro, Tanzania.

Husselman, M., Moeliono, M. and Paumgarten, F. (2010). Bees in the miombo buzzing toward the Millennium Development Goals. Info brief No. 23. CIFOR, Bogor, Indonesia, 6pp.

Ibrahim, H. L. (2007). The contribution of participatory forest management to sustainable forest management and poverty reduction in Lindi Rural District, Tanzania. Dissertation for Award of MSc MNRSA Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 123pp.

Ismail, S. T. (2011). The Role of Marketing Information System on Decision Making "An Applied study on Royal Jordanian Air Lines (RJA)". *International Journal of Business and Social Science* 2(3): 175-185.

Kagya, M. A. N. (2002). Contribution of non wood forest products to household economy and welfare of women in Meatu District, Shinyanga, Tanzania. Dissertation for Award of MSc MNRSA Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 141pp.

Kajoba, G. (2002). Women and land in Zambia: a case study of small-scale farmers in Chenena village, Chibombo district, Central Zambia. *Eastern Africa Social Science Research Review* 18: 35-61.

Kallonga, E., Rodgers, A., Nelson, F., Ndoinyo, Y. and Nshala, R. (2003). Reforming environmental governance in Tanzania: Natural resource management and the rural economy. A paper presented at the inaugural Tanzanian biennial development forum at the Golden Tulip Hotel, Dar es Salaam, Tanzania, 24–25 April, 2003. 16pp.

Kamwenda, G. J. (1999). Analysis of ngitiri as a traditional silvopastoral system among the agro pastoralists of Meatu, Shinyanga, Tanzania. Dissertation for Award of MSc. Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 134pp.

Kelly, S. (2007). *Closing the gap between the rural poor and the market approaches for developing market-led livelihoods strategies*. FAO's Livelihood Support Programme, United Kingdom's Department for International Development, United Kingdoms, 12pp.

Koler, P. and Amsrog, G. (2003). *Principle of marketing*. (Tenth Ed.), Hall of India Pvt. Ltd., New Delhi. pp. 5-12.

Kotler, P. (1985). *Principles of marketing*. (Second Ed.), Prentice hall of India Private limited, New Delhi. 676pp.

Kotler, P. (2003). *Marketing management*. (Eleventh Ed.), Pearson Education, Inc. Printice hall, New Jersey, USA. 768 pp.

Le Breton, G. and Nemarundwe, N. (2009). Linking Southern African producers of non-timber forest products to Global Markets. *A paper presented at XIII World Forestry Congress Buenos Aires, Argentina,* 18 – 23 October, 2009. 7pp.

Lengarite, M., Kagunyu, A. and Wayua, F. (2007). *Honey production, processing, quality, and marketing in the Mountains of Northern Kenya*. National Arid Lands Research Center (KARI) – Marsabit, Kenya. 4pp.

López, C. and Shanley, P. (eds). (2004). *Riches of the Forest: For Health, Life and Spirit in Africa*. CIFOR, Bogor, Indonesia. 115pp.

Makhado, R. A., von Maltitz, G. P., Potgieter, M. J. and Wessels, D. C. J. (2009). Contribution of woodland products to rural livelihoods in the Northeast of Limpopo Province, South Africa. *South African Geographical Journal* 91(1): 46 – 53.

Makhado, Z. (2004). Crafting a livelihood: local-level trade in mats and baskets in Pondoland, South Africa. Thesis for Award of MPh Degree at University of the Western Cape (UWC), South Africa. 94pp.

Mann, C. J. (2003). Observational research methods. Research design II: cohort, cross sectional and case-control studies. Research Series. *Emergency Medicine Journal* 20: 54–60.

Mapolu, M. (2002). Contribution of non wood forest products to household food security. A case of Tabora district, Tanzania. Dissertation for Award of MSc MNRSA Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 157pp.

Marshall, E., Schreckenberg, K. and Newton, A.C. (2006). *Commercialization of Non-timber Forest Products: factors influencing success. Lessons learned from Mexico and Bolivia and policy implications for decision-makers*. UNEP World Conservation Monitoring Centre, Cambridge, United Kingdom. 136pp.

Martin, R. M. and Killmann, W. (2005). *Microfinance and forest-based small-scale enterprises. FAO Forestry Paper 146*. Publishing Management Service Info division, FAO. Rome, 104pp.

Mazur, R. E., Sseguya, H. and Masinde D. M. (2007). *"Sustainable livelihoods and community capitals frameworks – application and implications." Presented at the annual meeting of the Agriculture, Food, and Human Values Society (AFHVS) and the Association for the Study of Food and Society (ASFS)*. Victoria, British Columbia.

Mbwilo, A. J. T. (2002). The role of local institutions in regulating resource use and conflict management. The case of Usangu plains, Mbarali district, Tanzania. Thesis for Award of MSc Degree at Agricultural University of Norway, Norway. 130pp.

Mehta, R., Dubinsky, A. J. and Anderson, R. E. (2002). Marketing channel management and the sales manager. *Industrial Marketing Management* 31: 429– 439.

Mhinte, A. R. (2000). Analysis of rural household coping strategies against seasonal food insecurity in Kilosa district. Dissertation for Award of MSc Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 121pp.

Michon, G. (2005). NTFPs developments and poverty alleviation: is the policy context favourable? In: *NTFPs between Poverty Alleviation and Market Forces*. (Edited by Pfund, J. L. and Robinson, P.), Inter-cooperation, Bern. pp.20 – 27.

Mickels-Kokwe, G. (2006). *Small-scale woodland-based enterprises with outstanding economic potential: the case of honey in Zambia*. CIFOR, Bogor, Indonesia, 82pp.

Monela, G. C., Kajembe, G. C., Kaoneka, A. R. S. and Kowero, G. (2000). Household livelihood strategies in the miombo woodlands of Tanzania: Emerging trends. *Tanzania Journal of Forestry and Nature Conservation* 73: 17-33.

Msuya, E. (2007). *The Impact of Foreign Direct Investment on Agricultural Productivity and Poverty Reduction in Tanzania. MPRA Paper No. 3671*. Kyoto University, Japan, 15pp.

Mujillah, E. L. J. (2007). Assessment of the contribution of edible wild plants from miombo woodlands to the rural livelihoods in Kilosa district, Morogoro, Tanzania. Dissertation for award of MSc Degree of Forestry, Sokoine University of Agriculture, Morogoro, Tanzania. 196pp.

Mwakatobe, A. and Mlingwa, C. (2007). *The status of Tanzanian honey trade- Domestic and International Markets*. Tanzania Wildlife Research Institute, Arusha, Tanzania. 13pp.

Ndoye, O. (2005). Commercial issues related to non timber forest products. In: *NTFPs between Poverty Alleviation and Market Forces*. (Edited by Pfund, J. L. and Robinson, P.), Inter-cooperation, Bern. pp.14 – 19.

Ndoye, O., Ruiz Pérez, M. and Eyebe, A. (1998). *The markets of non-timber forest products in the Humid Forest Zone of Cameroon. Network Paper 22c Winter*. Rural Development Forestry Network Overseas Development Institute, Portland House, London, UK, 20pp.

Ndoye, O., Ruiz Pérez, M. and Eyebe, A. (1999). Non-wood forest products markets and potential forest resource degradation in Central Africa. In: *Current Research Issues and Prospects for Conservation*. (Edited by Sunderland, T. C. H., Clark, L. E. and Vantomme, P.), FAO, Rome. pp.183–206.

Neumann, R. P. and Hirsch, E. (2000). *Commercialization of non-timber forest products: review and analysis of research*. CIFOR, Bogor, Indonesia, 187pp.

Njana, M. A. (2008). Arborescent species diversity and stocking in Miombo woodland of Urumwa Forest Reserve and their contribution to livelihoods, Tabora, Tanzania. Dissertation for Award of MSc MNRSA Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 193pp.

Njombe Environmental Profile, (2007). *Socio-Economic Profile*. Njombe District Council, Njombe, Tanzania. 76pp.

Nyingili, R. B. (2003). Contribution of non wood forest products to household food security in Mbozi district. Dissertation for Award of MSc MNRSA Degree at Sokoine University of Agriculture, Morogoro, Tanzania, 118pp.

Okiria, J. A. (undated). *Beekeeping for restoration of degraded ecosystems and improving livelihoods in East Africa*. Natural Resources Managment and Biodiversity Programme, Lushoto, Tanzania. 5pp.

Omolo, J. (2010). *Youth unemployment in Kenya*. Republic of Kenya. 26pp.

Panigrahi, R. (2001). Compulsion and options, relating to livelihood alternatives of the poor in the Forestry Sector in Orissa. Paper Presented at the Conference on Livelihood and Poverty reduction: Lessons from Eastern India, 25-27 September 2001. [http://www.anthrobase.com/txt/P/Panigrahi] site visited on 20/09/2010.

Paullo, T. (2007). Contribution of non timber forest products in improving livelihood of rural community in Kilwa district. Dissertation for Award of MSc MNRSA Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 149pp.

Paumgarten, F. (2005). The role of non-timber forest products as safety-nets: a review of evidence with a focus on South Africa. *GeoJournal* 64:189–197.

Paumgarten, F. and Shackleton, C. M. (undated). *Wealth differentiation in household use and trade in non-timber forest products in South Africa*. Rhodes University, South Africa, 32pp.

Pinto, F. (2007). Creating space and connections for NTFP development. Non-timber Forest Products Exchange Programme for South and South Asia. *Voice from the Forest* 12: 1-12.

Piya, L., Maharjan, K. L., Joshi, N. P. and Dangol, D. R. (2011). Collection and Marketing of Non-Timber Forest Products by Chepang Community in Nepal. Technical Paper. *The Journal Of Agriculture And Environment* 12: 10-21.

Pokharel, R. (2000). From practice to policy—squatters as forest protectors in Nepal: an experience from Shrijana Forest User Group. *Forests, Trees, and People Newsletter* 42: 31–35.

Poudel, K. L. (undated). *Trade potentility and ecological analysis of NTFPs in Himalayan Kingdom of Nepal*. Himalayan College of Agricultural Sciences and Technology, Nepal, 35pp.

Prasad, R. (1999). Joint forest management in India and the impact of state control over non-wood forest products. *Unasylva* 50(3): 58-62.

Puustjärvi, E., Mickels-Kokwe, G. and Chakanga, M. (2005). *The contribution of the Forest Sector to the National Economy and Poverty Reduction in Forestry*. Department and Ministry for Foreign Affairs of Finland in Zambia, Lusaka, Zambia. 17pp.

Regional Centre for Development Cooperation - RCDC and Tropical Forest Research Institute – TFRI, (2008). *Report of the national workshop on sustainable management of NTFPs. Final report*. Regional Centre for Development Cooperation, Bhubaneswar. 46pp.

RISØ National Laboratory, (2005). *Development and Energy in Africa (DEA) Project Tanzania Background Paper*. The Energy Research Center of the Netherlands (ECN) and Six African NGO Centers, Denmark, 10pp.

Robinson, E. J. Z. and Kajembe, G. C. (2009). *Changing access to forest resources in Tanzania. Environment for Development Discussion Paper Series*. Swedish International Development Cooperation Agency (SIDA), University of Gothenburg, Sweden, 21pp.

Russell, D. and Franzel, S. (2004). Trees of prosperity: agroforestry, markets and the African smallholder. *Agroforestry Systems* 61: 345–355.

Saleemi, N. A. (1985). *Marketing simplified*. (Second Ed.), Saleemi Publications limited, Nairobi, Kenya. 487pp.

Salum, M. A. (2006). The contribution of medicinal and wild food plants to the well-being of rural communities in Lindi Rural District. Dissertation for Award of MSc MNRSA Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 112pp.

Scherr, S. J., Milder, J. C. and Bracer, C. (2007). *How important will different types of compensation and reward mechanisms be in shaping poverty and ecosystem services across Africa, Asia and Latin America over the next two decades? CES Scoping Study Issue Paper 5. ICRAF Working Paper no*. 40. World Agroforestry Centre, Nairobi, Kenya, 50pp.

Scherr, S. J., White, A. and Kaimowitz, D. (2003). *A New Agenda for Forest Conservation and Poverty Reduction: Making Forest Markets Work for Low-Income Producers*. Forest Trends, Washington, 90pp.

Scherr, S; White, A. and Kaimowitz, D. (2004). *A new agenda for forest conservation and poverty reduction: making markets work for low-income producers.* Forest Trends, Washington, 90pp.

Schmidt, T., Robinson, K. and Teti, D. M. (2004). "Issues in the Use of Longitudinal and Cross-Sectional Designs."In: *Handbook of Research Methods in Developmental Science*. (Edited by Teti, D. M.), [http://www.Blackwellreference.com/ subscriber/tocnode] site visited on 07/02/2011.

Schreckenberg, K. (2004). 'The Contribution of Shea Butter (*Vitellaria paradoxa*) to Local Livelihoods in Benin. In: *Forest Products, Livelihoods and Conservation: Case-studies of Non-Timber Forest Product Systems*. (Edited by Sunderland, T. C. H. and Ndoye, O.), CIFOR, Bogor, Indonesia. pp. 21-24.

Schreckenberg, K., Marshall, E., Newton, A., te Velde, D. W., Rushton, J. and Edouard, F. (2006). Commercialization of non-timber forest products: What determines success? *Forest Briefing* 10: 1-6.

Shackleton, C. and Shackleton, S. (2004). The importance of non-timber forest products in rural livelihood security and as safety nets: A review of evidence from South Africa. *South African Journal of Science* 100: 658-664.

Shackleton, C. M. (2004). *Assessment of the livelihoods importance of forestry, forests and forest products in South Africa*. Rhodes University, Grahamstown, South Africa, 43pp.

Shackleton, C. M., Shackleton, S. E., Buiten, E. and Bird, N. (2009). *The importance of dry woodlands and forests in rural livelihoods and poverty alleviation in South Africa*. Rhodes University, South Africa, 29pp.

Shackleton, S., Shackleton, C. and Cousins, B. (2000). *Re-valuing the communal lands of Southern Africa: new understandings of rural livelihoods. Number 62, natural resource perspectives*. The Overseas Development Institute, London, 4pp.

Shackleton, S., Shanley, P. and Ndoye, O. (2007). Invisible but viable: recognizing local markets for non-timber forest products. *International Forestry Review* 9(3): 697-712.

Shanley, P., Pierce, A., Laird, S. and Robinson, D. (2008). *Beyond timber: certification and management of non-timber forest products*. CIFOR, Bogor, Indonesia, 144p.

Shillington, L. J. (2002). Non-timber forest products, gender, and households in Nicaragua: A commodity chain analysis. Dissertation for Award of MSc Degree at the Faculty of Virginia Polytechnic Institute and State University in Blacksburg, Virginia. 137pp.

Singh, A., Bhattacharya, P., Vyas, P. and Roy, S. (2010). Contribution of NTFPs in the livelihood of Mangrove forest dwellers of Sundarban. *Journal of Human Ecology* 29(3): 191-200.

Singh, N. C. and Lawrence, J. (1997). *Promoting sustainable livelihoods: a note submitted to the executive committee*. UNDP, 5pp.

Suich, H. (2006). *Economic Valuation of Natural Resources in Mozambique*. WWF Mozambique Coordination Office, Mozambique. 47pp.

Sunderland, T. C. H., Besong, S. and Ayeni, J. O. S. (2002). *Distribution, Utilization and Sustainability of the Non-timber forest products of the Takamanda Forest Reserve, A consultancy report for the Project: "Protection of the forests around Akwaya" (PROFA)*. The Biodiversity of an African Rainforest of Takamanda, Cameroon. 18pp.

Sunderland, T. C. H., Harrison, S. T. and Ndoye, O. (2004). Commercialization of non-timber forest products in Africa: history, context and prospects. In: *Forest Products, Livelihoods and Conservation: Case Studies of Non-Timber Forest Product Systems Volume 2- Africa*. (Edited by Sunderland, T.C.H. and Ndoye, O.), CIFOR, Bogor, Indonesia. pp.1-24.

Sunderlin, W. D., Dewi, S. and Puntodewo, A. (2006). Forests, poverty, and poverty alleviation policies. In: *Policies for Development, Poverty Alleviation, and Environment in the World's Tropical Forests* (Edited by Chomitz, K.), CIFOR, Bogor, Indonesia. pp.1-54.

Tarigan, J., Roshetko, J. M., Martini, E. and Ekadinata, A. (2010). *Non-timber forest products as a source of livelihood diversification for local communities in the Batang Toru Orangutan Conservation Program*. *Working paper 118.* World Agroforestry Centre (ICRAF) Southeast Asia Program, Bogor, Indonesia, 15pp.

Tengule, M. M. (2007). Assessment of woodfuel consumption and its future demand in Bunda and Nansio Towns. Dissertation for Award of MSc MNRSA Degree at Sokoine University of Agriculture, Morogoro, Tanzania. 88pp.

Tesfahun, K. A. (2007). Sesame market chain analysis: the case of Metema Woreda, North Gondar Zone, Amhara National Regional State. Thesis for Award of MSc Degree at School of Graduate Studies, Haramaya University, Ethiopia. 123pp.

Thaxton, M. (2007). *Population reference bureau: integrating population, health, and environment in Tanzania*. U.S. Agency for International Development and the BRIDGE Project, Washington, DC. 12pp.

The Institute of Community and Organizational Development (ICOD), (2009). *Beekeeping/honey value chain financing study report*. Netherlands Development Organization, Rwanda. 49pp.

The Royal Tropical Institute (KIT)., Faida Market Link Company (Faida MaLi) and International Institute of Rural Reconstruction (IIRR). (2006). *Chain empowerment: Supporting African farmers to develop markets*. Royal Tropical Institute, Amsterdam; Faida Market Link, Arusha; and International Institute of Rural Reconstruction, Nairobi, 212pp.

The World Bank, (2002). *Tanzania at the turn of the century: background papers and statistics*. The World Bank Publications, Washington, DC, 370pp.

The World Bank, (2008). *Managing the miombo woodlands of Southern Africa policies, incentives and options for the rural poor. Draft- prior to final publication.* Sustainable Development Department, Environment and Natural Resources Management Unit, Africa Region, 58pp.

Townson I. M. (1995). *Patterns of non-timber forest products enterprise activity in the forest zone of southern Ghana. Report to the Overseas Development Administration (ODA) Forestry Research Programme*. Oxford Forestry Institute, UK. 21pp.

UNAIDS (2006). *National report on the follow-up to the United Nations General Assembly Special Session (UNGASS) Declaration of Commitment on HIV/AIDS*. Ghana AIDS Commission, Republic of Ghana. 35pp.

URT (1997). *Iringa region Socio-Economic Profile*. Ministry of State Planning and Parastatal Sector Reform, Dar -es-Salaam, Tanzania. 179pp.

van Andel, T. (2006). *Non-timber forest products the value of wild plants*. Agromisa Foundation and CTA, Wageningen. 69pp.

Vasquez, S. and Buttolph, L. (2010). *Huckleberry Market Analysis. A Business Planning Guide for Small Woodland Owners*. United States Department of Agriculture, USA. 36pp.

Welford, L. and Le Breton, G. (2008). Bridging the gap: Phyto trade Africa's experience of the certification of natural products. *Forests, Trees and Livelihoods* 18: 69–79.

Wickens, G. E. (1991). Management issues for development of non timber forest products. *International Journal of Forestry and Forest industries* 42: 151 – 170.

Wondergem, P. K., Senah, A. and Glover, E. K. (1989). *Herbal drugs in primary health care (PHC), Ghana: an assessment of the relevance of herbal drugs in PHC and some suggestions for strengthening PHC*. Royal Tropical Institute, Amsterdam, Netherlands, 342pp.

Wunder, S. (2001). Poverty alleviation and tropical forest – what scope for synergies? *World Development* 29: 1817- 1833.

APPENDICES

Appendix 1: Economically important NTFPs in Njombe

NTFPs	Common/ local names	Scientific names	Parts used	Uses
Honey	Honey		Forage extract	Food, brewing and medicine
Charcoal	Charcoal	*Brachystegia spiciformis*	Tree stems	Heating
Thatch grass	Lipelele Likuvi	*Hyparrhenia rufa* *Hyperrhanea schimperi*	Entire plant Entire plant	Roofing and shading
Firewood	Firewood	*Brachystegia spiciformis, Julbenardia globiflora Julbenardia paniculata*	Trees and branches	Heating and cooking
Mushroom	Mushroom	*Cantharellus platyphyllus*	Entire plant	Food
Carvings	Carvings	*Brachystegia spiciformis, Acacis tortilis, Oxytenenthera braunii, Piliostigma thonningi,*	Tree stems	Tool handles, bee hives, pestles and mortars
Wild fruits	Mikusu Misasati Vitowo Saulwa	*Uapaca kirkiana* *Vitex mombassae* *Azanza garckeana* *Parinari curatellifolia*	Ripen fruits	Food and medicine
Medicinal plants	Medicinal plants	*Uapaca kirkiana, Azanza garckeana, Parinari curatellifolia, Targetes minuta, Tephrosia vorgerii, Datura scalaram, Terminalia sericea, Acacia senegal, Acacia seyal, Adansonia digitata, Sclerocarya birrea, Vitellaria paradoxa, Ximenia americana Ximenia caffra, Jatropha curcas Prunus africana*	Roots, stems, leaves, flowers, fruits and barks	Medicine to humans, crops and livestock
Edible insects	Long horned grasshoppers Termites	*Ruspolia nitidula* *Macrotermes bellicosus* *Macrotermes notalensis* *Macrotermes subhyalinus*	Entire organism	Food
Wild meat	Giant rats African hare Impala Bush pigs Hildebrandt's Francolin Hilmented guinea fowl	*Cricetomys gambianus* *Lepus canensis* *Aepyceros melompus* *Potamochoerus larvatus* *Francolinus hildebrandti* *Numida meleagris*	Flesh parts/meat	Food
Bamboo juice	Bamboo	*Oxytenenthera braunii*	Liquid extract (Ulanzi)	Alcoholic drink

Appendix 2: Constraints and suggested solutions to commercialization of NTFPs trade in Njombe

Appendix 3: Chi-square (χ^2) test results

χ^2 = (observed- expected) ^{2}/expected

Constraints	Solutions
Market constraints	**Market solutions**
Lack of reliable sources for NTFPs	Diversification of activities in trading
No reliable market for some NTFPs	Training of customers and promotion of the products
Seasonality	Change habits and products with seasons
Low prices	The government to locate permanent locations for NTFPs harvesting and marketing
Customers regarded natural products as inferior goods	To be tolerant and persistent
Lack of training and awareness to consumers	Have recognized and specific dealers in trading NTFPs
High taxes	The suppliers should provide the recommended products
Seasonal fluctuation of customers' population in market centres	
Production and processing constraints	**Production and processing solutions**
Lack of appropriate tools and technology for production and processing NTFPs	Import appropriate technology for growing, harvesting and processing NTFPs
Inversion of pests and diseases	Wait for the products to rejuvenate
	Have own farms as source of NTFPs
Transportation and storage constraints	**Transportation and storage solutions**
Too far to walk for the products	Own houses and improved transport means
Spoilage	Use motorized bicycles and hire tractors
Dirty or lack of transportation infrastructures	
Other constraints	**Other solutions**
None	None
Religious and belief complications	Seek legal permission
Injury due to insect bites and accidents	Consult legal officers for help
Protecting regulations	Accumulate enough capital for NTFPs trading flexibility
Double pay (to local authorities and land owners)	Cooperation among local researchers, professionals and leaders
Non satisfactory loans	Pay respect to god, environment and entrepreneurs
Corrupted ideas, leaders and traders	
Offloading after 18 hours is compromised	
Bureaucratic registration process	
Gap existing among local researchers, professionals and leaders	

= $[(4-10.8)^2+ (16-10.8)^2+ (15-10.8)^2+ (17-10.8)^2+ (2-10.8)^2]/10.8$

$= [(-6.8)^2 + (5.2)^2 + (4.2)^2 + (6.2)^2 + (-8.8)^2]/10.8$

$= 206.8/10.8$

$= 19.14815$

Chi-square test on significance of NTFPs trade to household income in Njombe

	Household dependence on NTFPs income (Test Statistics)
Chi-Square	19.148[a]
df	4
Asymp. Sig.	0.001

Note: 0 cells (0%) have expected frequencies less than 5. The minimum expected cell frequency is 10.8.

Expected Chi- Square is 18.47. The observed $\chi^2 = 19.148$ is significant at the minimal 0.001 level and 4 degree of freedom (df).

Appendix 4: PRA checklist

1. How can you group households according to their wealth possession?
2. What types of NTFPs do the households use in seasonal or daily lives?
3. From each product you mentioned what parts are important for use?
4. How can you rank the products according to their importance?
5. Which products and or parts you highly preferred are locally traded?
6. When (season) do you collect a specified product in a year?
7. When NTFPs did become a business amongst your people?
8. What units/measurement units are used in estimating the quantity and prices for respective NTFPs?
9. Where do they harvest the NTFPs?
10. Who are involved in the process of collecting, processing, storing, and packaging? transporting and trading?
11. How many stages for transporting the NTFPs to the large market centers?
12. How do the various market chain actors transport their NTFPs?
13. Where the NTFPs are highly sold?
14. What do you commend on the important of NTFPs which are locally traded?
15. What are other socioeconomic activities do the village dwellers do?
16. How do they spend the money they get through selling crop, animal, NTFPs and sources of income?

Appendix 5: Questionnaire to households on the role of NTFPs trade to livelihood income in Njombe District, Tanzania

A. Background information

Village …… Ward……Division…….....

District…… Region……. Date...…….

1. Name of the respondent…….

2. Gender : 01. Male…… 02. Female……

3. Age of respondent: 01. 18-30 years 02. 30-50 years 03. Above 50 years

4. Education level: 01. None 02. Adult education 03. Primary education 04. Secondary education 05. College (Specify)……

5. Occupation: 01 Employed 02. Peasant farmer 03. Businessman 04. Others (Specify)…...

6. Marital status: 01. Single 02. Married 03. Widowed 04. Divorced 05. Separated

7. Religion: 01.Traditional 02.Muslim 03.Christian 04.Others (Specify)……

8. Tribe: 01. Bena 02. Kinga 03. Pangwa 04. Hehe 05. Others (specify)……

9. Household size: 01. Below 5 people 02. 5 – 10 people 03. Above 10 people

10. What are the sources of income for your household? .....

11. How much do you earn per month from each source? .....

Section B: Availability and utilization of NTFPS in the village

1. For how long have you lived in this village? …….. years

2. What types of NTFPs do you collect from the forests? (Tick which mentioned).

3. Firewood, wild fruits, mushroom, honey, thatch grass, carvings, medicinal plants, edible insects, wild meat, ropes, and charcoal and bamboo products.

4. Have you ever used NTFPs? 01. Yes 02. No

5. If yes what types of NTFPs have you used from December 2008 to November 2009?

6. How do you obtain them? ……...

7. How frequently do you collect and use NTFPs? 01. Daily 02. Weekly 03. Monthly 04. Occasionally.

8. What factors drives you to go for NTFPs collection? ……

9. How much do you collect/obtain? 01. Enough for a meal 02. Enough for two meals 03.

10. Enough for four meals 04. more than four meals

11. How long does the NTFP last in a year? Specify the products and there calendar ……

12. What kind of transport do you use in carrying NTFPs? 01. head-loading 02. Cycles 03. Automobile 04. Others (specify) ……

13. Do you sell NTFPs collected? 01. Yes 02. No

14. If yes, what types of products do you sell? (Stress on honey, charcoal, thatch grass, firewood, mushroom, carvings, wild fruits, medicinal plants, insects (*kumbikumbi*) and wild meat. .....

15. To whom do you sell? 01. Local consumers 02. Middle men 03. Processors 04. Others (specify)……

16. What kind of measuring units do you use? 01. Tins 02. Heaps 03. Head lots 04. Estimated 05. Other units (specify)……

17. How many units do you sell per day ……, per week …, per month …, per year ……..

18. How much do you sell per units you mentioned in question number 13 above? ……

19. What have you bought with money you obtain after trading NTFPs between December 2008 and November 2009?

20. What is the marketing situation of NTFPs in this village?

……

21. What are the constraints towards trading of NTFPs in your village?

……

Section C: Agriculture and Livestock production

1. Do you own land? 01. Yes 02. No

2. If yes what agricultural crops do you produce? 01. Maize 02. Beans 03. Sunflower 04. Groundnuts 05. Cow peas 06. All crops 07. None

3. Do you sell some of the agricultural products you harvest? 01. Yes 02. No

4. If yes, what are those products?

5. How much have you earned from agricultural activities between December 2008 and November 2009? .....

6. Do the farm products satisfy your annual household requirements? 01. Yes 02. No

7. If no what do you do to fill the deficit? 01. Purchase goods 02. Collect wild goods 03. Others (specify)……

8. Do you own livestock? 01. Yes 02. No

9. If yes which kind of livestock?

10. What livestock products are important for your daily use?

…….

11. How much do you earned from livestock you have between December 2008 and November 2009 ……

Section D: Other sources of income in the household

1. What other income generating activities do you engage yourself? ……
2. Classify the other activities into temporal and permanent.
3. If temporal how long did they last? (Time in months) …..……
4. If permanent quantify the income as per respondent's perception.
5. How much do you earn per month from these activities?
6. How much do you spend on average per month?

Appendix 6: Questionnaire to Key informants on the role of NTFPs trade to livelihood income in Njombe District

A. Background information

Village/center ……Ward…… Division…….....

District…… Region……. Date...…….

Name/title of the key informant: ……

B. Information related to NTFPs

1. Mention types of NTFPs used and /or sold at this village/center

Name of NTFPs	Parts used	Importance	Consumed (put V)	Sold (put V)

Note: Use a separate sheet if the list is long

2. Name the sites where you get the NTFPs, distance (km) from your residential area……

3. How long does one spend for going, collecting, carrying and backing to the residential site? Units in hours……

4. What does it cost (Tshs) for one to complete the process of going, collecting and coming back with the NTFPs before consumption or selling? .....

5. What kind of transport do you use in carrying NTFPs? 01. head-loading 02. Cycles 03. Automobile 04. Others (specify)……

6. What is the market price of NTFPs at the residential sites?.....

7. Who are the customers of NTFPs sold at your village? .....

8. What are other sources of income do the residents depend?

Source Earning per month

……. ……..

9. How do you use the income obtained from sale of NTFPs?

a) Buy food during food scarcity period (….)

b) Paying school fees (….)

c) Building houses (….)

d) All of the above (….)

e) Expanding investment (….)

f) Other (Specify)…… (….)

10. What are the constraints towards commercialization of NTFPs in your area? ……

11. What are your own views to improve the constraints you have mentioned above? ……

Appendix 7: Questionnaire to NTFPs wholesaler/retailer in markets around the study area

A. Background information

Name of the market…… Village……

Name of wholesaler/retailer…… Date…….

Gender: Fe (…)/Me (…) (Please put a tick (□) on appropriate answer).

Age……. (Years).

Type of stall: Permanent (….)/Temporary (….). (Please put a tick (□) on appropriate answer).

B. Information related to NTFPs

1. Mention the type of NTFPs and products you are selling, uses and prices per units using the following guide table.

Type of NTFPs/products	Unit(s) [1]	Unit price[2]	Customer demand[3]	Availability[4]

Keys: [1] Daily, weekly, monthly or yearly, [2] Give price units of each NTFP sold per bag, tin, spoonful, liter etc, [3] Explain the customer demand per product sold if highly demanded, moderate or low, [4] Show if the sold NTFP products are increasing, persistence or decreasing in terms of availability

2. Where do you obtain the NTFPs you are selling?...……

3. How do you get the NTFPs you are selling?.....

4. What kind of transport do you use in carrying NTFPs? 01. head-loading 02. Cycles 03. Automobile 04. Others (specify)……

5. How do you rank the NTFPs and their products in terms of their potential to household income in your village/center?

a) Very potential (….)

b) Potential (….)

c) Insignificant (….)

d) Uncertain (….)

6. Do you have other sources of income apart from selling of NTFPs) (Yes/No). If yes, what are those and their earnings per month?

Source	Earning per month
…….	…….

7. How much do you earn per month from selling NTFPs and their products?

NTFPs type/product	Earning per month
……..	……..

8. How do you use the income obtained from sale of NTFPs?

a) Buy food during food scarcity period (….)

b) Paying school fees (….)

c) Building houses (….)

d) Buying more goods for trading (….)

e) All of the above (….)

f) Other (Specify)…… (….)

9. What are the constraints towards commercialization of NTFPs in your area?

……

10. What are your own views to improve the constraints you have mentioned above?

……