THE SOCIO-ECONOMIC CONTRIBUTION OF NON-TIMBER FOREST PRODUCT TRADE TO HOUSEHOLDS IN FOUR VILLAGES IN ZOMBA AND MACHINGA DISTRICTS, MALAWI

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ABSTRACT

The principal aim of this study was to assess the socio-economic contribution of non-timber forest product (NTFP) trade to households in Zomba and Machinga, southern Malawi. Quantitative and qualitative data were collected through several methods, including a household survey using questionnaire interviews, focus group discussions, key informant interviews with individual traders, direct observations, and literature review. The quantitative data were analysed statistically using SPPS version 16.0 while the qualitative data were analysed thematically.

NTFP trade was the third important source of cash income for 15% of the households, although the level of use, buying and selling of NTFPs varied across the four study villages. All households in all the study villages used firewood (100%), and most used thatch grass (94%), bamboo (96%), wood for building (92%), largely as construction materials. However, the percentage of households buying NTFPs was lower, with the maximum percentage of households being 50%. The percent of households engaged in selling at least one NTFP was lower still at 39%. Substantial cash incomes were generated from firewood and edible orchids sales which provided up to a maximum of Mk180,000, equivalent to US$456, per year. Households joined the trade mostly for an alternative source of cash income due to poverty and to meet basic needs when other options were not available or feasible. Cash income generated from NTFP trade acted as a safety net and a coping strategy when other avenues supporting livelihoods were not accessible. The socio-economic benefits derived from NTFP trade were associated with the quantities collected, sold, market forces influenced by the law of demand and supply. The small amounts of cash income generated by most households were important as they supplemented household cash needs. There was a strong association between NTFP trade as one of the important sources of cash income and the number of months a household had food from their own garden in a year. There was a significant relationship though weak between ranking of NTFP trade and livestock ownership by households.

Value chain analysis was used as an analytical tool to understand the processes involved in NTFP trade. The value chains for the products under study were short, dominated by traders and some intermediaries. Most of the products were sold in local markets with little value addition. This study recommends that policy makers should integrate NTFPs into their development plans, emphasizing the establishment of

management strategies that will enhance availability and sustainability of the resource. NTFPs contributed to the livelihoods of the households socially and economically through provision of food, cash income, energy for cooking, medicine and construction materials.

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DEDICATION

To the loving memory of my father and mother, Henry and Martha Manchichi. To my husband George, for all his support and encouragement so that I could achieve my dream. To my daughter Chimwemwe and son Mayamiko, my brothers and sisters (Jane, Peter, Maria, Dominic & Sharleen) this thesis means you can achieve what you want in life.

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LIST OF ACRONYMS AND ABBREVIATIONS

NTFP	Non-Timber Forest Products
CIFOR	Centre for International Forest Research
CFM	Collaborative Forest Management
FAO	Food and Agriculture Organisation
FGDs	Focus Group Discussions
KIIs	Key Informant Interviews
PRA	Participatory Rural Appraisal
ASSETS	Attaining Sustainable Services from Ecosystems through Trade-Off Scenarios
ESPA	Ecosystem Services for Poverty Alleviation

CHAPTER ONE: INTRODUCTION

1.1 Background

Forests play a significant role in reducing poverty and providing increased security for rural communities (World Bank, 2004; Lowore, 2006; Angelsen et al., 2014). Millions of people from forest fringe communities across the world rely on Non-Timber Forest Products (NTFPs) as important sources of livelihoods (Shaanker et al., 2004). NTFPs contribute to meeting basic human needs such as food, medicine, energy and building materials (Kamanga et al., 2009; Ahenkan & Boon, 2011; Saha & Sundriyal 2012; Bruschi et al., 2014). Additionally, the World Bank (2004) indicates that more than 1.6 billion people depend to varying degrees on forests for their livelihoods, with about 60 million indigenous people depending fully on forests and some 350 million people who live within or adjacent to forests also depending on them for subsistence and income. The World Bank (2004) further reveals other forest related benefits in developing countries and worldwide where about 1.2 billion people rely on agroforestry farming systems; and some 1 billion people depend on drugs derived from forest plants for medicine. The environmental services of natural ecosystems provide as much as 30 to 50% of total incomes to the poor people who often depend heavily on these resources (World Bank, 2004).

Miombo woodlands play an important role in the livelihood of people living in the sub-equatorial African countries (Chidumayo & Marunda, 2010; Bruschi et al., 2014). In Malawi, the miombo woodlands are the main source of forest products with communities living in and around these woodlands relying directly upon a diversity of NTFPs, ecosystem services for daily survival, income, religious and cultural sustenance (Ngulube et al., 1999; Lowore, 2006). Malawi's forests provide basic human needs such as fuel wood, construction materials, agricultural tools and employment for rural communities who comprise 80% of the population (CEPA et al., 2010). Additionally, forests are important sources of various NTFPs such as bush meat, fruits, juices, fibres, honey, and medicines (Yaron et al., 2011). These products are frequently used in the informal sector therefore, reliable estimates of quantities produced and their values needs to be up to date

(Yaron et al., 2011). The contribution of NTFPs to rural livelihood economies cannot be overemphasised because approximately 80% of Malawians depend on renewable natural resources for their subsistence and household income (Kamanga et al., 2009; Yaron et al., 2011), yet, the potential contribution of NTFPs to reducing poverty through sustainable trade and income generation is not fully appreciated (Marshall et al., 2006a).

Measuring the value of NTFPs is complicated because not all NTFPs that have potential to be used are actually used and many products that are used are not marketed (Neumann & Hirsch, 2000). The commercial benefits of forests are frequently undervalued and usually bypass the poor due to existing tenure and participation conditions (World Bank, 2004). If forest resources are threatened due to deforestation and unsustainable use, it may impact the livelihoods of communities which depend on them. For example, in Malawi, deforestation is a result of land use change due to removal of trees in a forest area to create land for agriculture and settlement (GOM, 2010). Land clearing for agriculture to feed the growing population threatens remaining forest resources and groups of people who depend on them (Kamanga et al., 2009). Therefore, if all people who benefit from the natural resources use them sustainably rural communities will maintain the benefits forests provide over time (Kaimowitz, 2003).

NTFPs play significant roles during food shortages in traditional livelihood systems where they are gathered as resources for the poor (Avocevou-Ayisso et al., 2009). The main actors in NTFP extraction are often the socially marginalised people (Ros-Tonen & Wiersum, 2005), although the wealthy also make substantial use of NTFPs (Ambrose-Oji, 2003; Shackleton & Shackleton, 2006). Therefore, NTFPs are important in the lives of the rural poor through the contribution of income though the levels of earnings vary greatly between households (Marshall et al., 2006b). Marshall et al. (2006b) and Shackleton et al. (2008) noted that NTFP activities can be particularly important by offering income generating opportunities for women in marginalised rural communities.

1.2 NTFP trade and markets

NTFPs are traded commercially in local, regional or international markets (Belcher et al., 2005). Nkem et al. (2010) noted that there is illegal and unregulated trade in many NTFPs, e.g. bush meat in so called "black" local markets. In most cases NTFPs are gathered by primary collectors, and sold to secondary traders who are local community members who sell the products to tertiary traders in nearby towns (Saha & Sundriyal, 2012).

A number of NTFP products are traded in Malawi, e.g. mats, baskets, firewood, fruits, bamboo furniture, and mushrooms (Lowore, 2006). Securing a fair market for NTFPs is often not achievable due to obstacles faced by subsistence farmers, local processors and traders (Marshall et al., 2006a). These obstacles include; inadequate capacity to produce and access markets, lack of information, poor road networks, declining traditional markets and lack of access to vehicles (Marshall et al., 2006a). NTFP collectors in Cameroon also faced similar challenges such as limited access to processing technologies, marketing strategies and information (Awono et al., 2010). Furthermore, marketing of NTFPs is also constrained by long distances, limited market outlets and access, high transport costs, short shelf-life of many products, taxes, and corruption practices or bribery (Shackleton et al., 2007; Nkem et al., 2010). Additionally, the quantity supplied to a particular market depends on good road and communication networks with other parts of the country (Saha & Sundriyal, 2012).

This study focused on NTFP trade and markets in southern Malawi, where value chain analysis was used as an analytical tool in determining the importance of key individuals in driving entrepreneurship, their specific activities, and different routes to trade NTFPs (Marshall et al., 2006b). In a value chain there are vertical and horizontal dimensions (Bolwig et al., 2011). Bolwig et al. (2011) describe vertical coordination as being when two or more actors at different nodes obtain a better deal through closer and longer term business ties, while horizontal coordination occurs between actors at the same node. A node, as defined by Bolwig et al. (2011:23), is a point in a value chain where a product is exchanged or goes through a major transformation or process. Although NTFP trade generates cash income, Nkem et al. (2010) note that the share of income along a value

chain can still leave the producer who does the actual collection highly vulnerable because of low income shares.

Many NTFP traders have little knowledge of where their product goes, what it is used for, the quantities required and the prices paid downstream (Belcher & Schreckenberg, 2007). Nkem et al. (2010) note that for longer value chains the distribution of market revenue frequently leaves local people with proceeds lower than the value of the commodity, while wholesalers and retailers get most of the benefits and profit. Some NTFPs lack national or international markets where higher prices could be offered than those of local markets (Adam et al., 2013). Much NTFP trade is done by poor people as a subsistence activity motivated by poverty rather than profit, making it difficult to upgrade the activity from an income generating activity into a real business (Lowore, 2006). Yet, for some, specialisation in NTFP trade can be a viable and profitable livelihood option (Belcher & Schreckenberg, 2007; Shackleton et al., 2008)

1.3 Definitions and concepts of Non-Timber Forest Products

The study of NTFPs is undertaken within various fields such as forestry, ethnobiology, economic botany, social development, natural resource economics, conservation biology, protected area management, agroforestry, marketing, community development, ecological anthropology, cultural geography and human ecology (Shackleton et al., 2011). Therefore, the term NTFP and underlying concepts have different meanings to different people resulting in there being no one generally accepted definition. Consequently, Shackleton et al. (2011) note that there have been many debates globally on a universally acceptable definition of NTFPs. The arguments have revolved around the following key issues; (i) nature and scale of extraction and the interests, i.e. focusing on subsistence and local extraction versus commercialised markets, (ii) the biological nature of the NTFPs or inclusion of non-biological products such as water, soil and carbon dioxide, (iii) the source of the product, is it only from the wild, (i.e. relatively unmanaged landscapes) or also from more managed landscapes, and is it only from forests or also from non-forested landscapes and (iv) the indigenous (or not) nature of the species concerned for the benefit of local consumers or traders. Therefore, the concept of NTFPs is not only biological but also takes into account socio-economic dimensions

(Wong, 2000; Shackleton et al., 2011). Different individuals and organisations use the same term but with a modified definition to suit their needs (Belcher, 2003). The term Non-Timber Forest Products (NTFPs) as defined by De Beer and McDermott (1989), encompasses all biological materials, other than timber, which are extracted from forests for human use. The Center for International Forest Research (CIFOR) expands upon this definition by including "any product or service, i.e. watershed function, carbon sequestration and ecotourism (Belcher, 2003) that is produced in forests, other than timber", including wood products, e.g. for wood carving or fuel (CIFOR, 2008). Similarly, Delang (2006) defines them as all biological materials, except timber, that are found in the forest. Unlike the CIFOR definition, FAO (2009) focus on "products of biological origin excluding wood but derived from forest, other wooded land and trees outside forest". This includes products gathered from any unmanaged areas, forest plantations and agroforestry schemes.

For the purpose of this study NTFPs were defined inclusively as "products of biological origin, other than commercial timber, including wood products such as wood for carving or fuel, derived from forest, other wooded land and trees outside the forest" a modification of the definitions by CIFOR, FAO, De Beer and McDermott (1989) and Delang (2006).

1.4 NTFP contribution to household livelihood strategies

NTFPs contribute to household livelihood strategies in many ways for both poor and rich households. The products are helpful to rural communities since they are used for subsistence (for households' own consumption), acting as a "safety net" or "emergency net" (a resource that households can turn to in times of need), as a cash income source for a household and cultural uses and values (Shackleton & Shackleton, 2004; Belcher & Schreckenberg, 2007; CIFOR, 2008; Babulu et al., 2009; Paumgarten & Shackleton, 2011; Kim et al., 2012). Some NTFPs generate large incomes and provide employment while others generate marginal income but are critically important to people as sources of food during hard times or as a source of cash income (CIFOR, 2008). For example, in Malawi, NTFPs may prevent poverty by supplementing income and functioning as safety nets (Fisher, 2004). Additionally, in northern Benin wealthier households extract more

NTFPs in quantitative terms and have significantly higher cash incomes than poorer ones due to considerably greater land holdings (Heubach et al., 2011). Poor households benefits from NTFPs in terms of cash and non-cash income which makes a greater contribution to overall livelihoods because it represents a higher proportion of all income streams (Shackleton & Shackleton, 2006). In Malawi, Kamanga et al. (2009) found that income from forest resources was 22% among poor and medium households and only 9% among the less poor. Adam et al. (2013), in Sudan, revealed that forest-based cash income at household level is spent on food, education, health care, and for capital accumulation hence improving the socio-economic status of the household.

1.4.1 Subsistence household use

Forest products are important in such a way that they help in maintaining the current levels of consumption and may prevent a household from falling into poverty (Vedeld et al., 2007). Many NTFPs are consumed directly providing a subsistence function at household level (World Bank 2004; Belcher et al., 2005; Belcher & Schreckenberg, 2007; Hoare, 2007; Uprety et al., 2010). There is an association between NTFP use and household food security during the lean season, when most of the households' food reserves have run out (Ahenkan & Boon, 2011). Shackleton et al. (2011) also found that the use of NTFPs by rural communities for subsistence is partly due to geographic constraints, since many NTFPs users live far from market towns. Distance to market affects household decisions to collect and sell NTFPs (Melaku et al., 2014). A number of NTFPs are used for direct consumption goods, e.g. wild foods and medicine (Cavendish, 2000; Bruschi et al., 2014). For example, in Mozambique 45 species were identified as food plants (Bruschi et al., 2014) and 90% of the sampled households in two districts in Ghana used plant medicines to cure various diseases, e.g. malaria, typhoid, fever, diarrhoea and snake bites (Ahenkan & Boon, 2011). A total of 50 of the 65 plant species collected by households in Ghana had medicinal properties to cure various diseases (Ahenkan & Boon, 2011).

Household dependence on NTFPs is also dependent on their location in relation to forests, proximity to transport routes and markets (Timko et al., 2010). Kamanga et al. (2009) found that poor households in Chiradzulu district, Malawi, with access to forests

had much higher forest incomes than those without. Additionally, Kamanga et al. (2009) also noted high levels of dependence on forests for income, with households deriving 15% of their incomes from forest products in Malawi, while in Tanzania households derived on average 20% of total household income (cash and non-cash) from NTFPs (Schaafsma et al., 2014). Additionally, 65.2% of the households in a study conducted in the Sefwi Wiawso District, Ghana derive some cash income from farming and harvesting of NTFPs to supplement income and the poor (32%) earned more than half of their total cash income on NTFPs (Ahenkan & Boon, 2010). Furthermore, NTFPs in Ghana contributed 35% of households total annual income (Ahenkan & Boon, 2010).

1.4.2 Safety nets

Forest products are also used as safety nets to overcome unexpected income shortfalls or cash needs (Vedeld et al., 2007; Nkem et al., 2010). First, NTFPs provide rural households with a safety net when other sources of income fail (Völker & Waibel, 2010). Second, when households involved in the trade do it not as a matter of choice but necessity as a coping strategy (Shackleton & Shackleton, 2004; Babulo et al., 2009). Where communities are involved in the sale of NTFPs on local and regional markets, including within communities and between neighbouring households, any sudden changes in the economic, social or biophysical environment can result in increased use of NTFPs as a coping strategy with the products providing a 'safety' or 'emergency net' (Shackleton & Shackleton, 2004; Marshall et al., 2006a; Nkem et al., 2010). Correspondingly, Neumann & Hirsch (2000) and Shackleton et al. (2008) noted that many NTFPs are important to poor people because they are accessible and act as buffers during times of hardship. Shackleton & Shackleton (2004) argued that NTFPs assist households when the breadwinner has been retrenched, droughts, frosts or disease result in low crop yields or death of livestock, unexpected increases in prices of staple foods and goods among others. The safety net function may take three forms (Shackleton & Shackleton, 2004): first, households may resort to infrequently used NTFPs; second, households may increase consumption of products that are already part of their livelihood by harvesting these directly instead of purchasing them (e.g. wild spinaches and fuel wood); third, households may engage in temporary trade of NTFPs (Shackleton & Shackleton, 2004). The use of NTFPs was one of the coping strategies adopted by

households (82%) in South Africa when exposed to a range of shocks, and reduced spending was associated with the increased use of NTFP substitutes (Paumgarten & Shackleton, 2011).

1.4.3 Income generation from NTFP trade

People often enter the NTFP trade due to lack of alternative income generating opportunities, retrenchment, and poverty and opt for NTFP trade as a source of cash income (Shackleton & Shackleton, 2004). Shackleton & Shackleton (2006) found that more than 30% of poor households were engaged in selling a variety of NTFPs as a means of income generation compared with less than 10% of wealthy households. Although a number of non-financial benefits of NTFP trade are commonly overlooked, most NTFPs can be sold to raise income (Cavendish, 2000; Shackleton & Shackleton, 2004). This trade provides an opportunity for self-employment with minimal capital costs, freely available raw materials, already existing local markets, and many people who already have the skills required to collect and process the products (Shackleton et al., 2008). A variety of plants and animal products are collected and sold (Saha & Sundriyal, 2012), and contribute to household annual income (Adam et al., 2013). Forest products provide an opportunity to increase household income sustainably as a "stepping out and stepping up" strategy through accumulation of capital and specialisation in existing activities as a pathway out of poverty (Vedeld et al., 2007). However, income earned from NTFPs varies greatly, even between households engaged in the same activity (Marshall et al., 2006a; Fu et al., 2009).

Drawing on several studies in Mexico and Bolivia, Marshall et al. (2006a) found that NTFP trade contributed between 7% and 95% of a household's annual cash income. Nkem et al. (2010) further reported that in Equateur Povince of Democratic Republic of Congo the selling of six NTFPs earned an average monthly revenue of US$225, an amount comparable to elementary school teacher salaries of US$80-120. Kar & Jacobson (2012a) noted that overall NTFP income sometimes is much higher than income from timber, highlighting the extent to which households depend on NTFPs. However, the trade is often constrained by low prices because most of the households engaged in the trade remain poor and live on a day-to-day subsistence basis and remain vulnerable

(Shackleton & Shackleton, 2004). They are 'price takers' and usually accept low and unrealistic prices for their goods to meet basic needs (Shackleton & Shackleton, 2004). Nonetheless, for some, trade in NTFPs can provide substantial income, represent a meaningful livelihood strategy, especially when compared to other options in rural and under-developed communities (Shackleton & Shackleton, 2004).

The case studies commissioned by CIFOR from Africa revealed that most of the products (14 out 17) contributed less than 50% to household incomes, while in nine cases, less than 25% and in only three cases the particular NTFP contributed more than 70% to household income (Sunderland et al., 2004). Although the contribution may look small from most NTFPs they are important in times of economic need (Sunderland et al., 2004). Nonetheless, it is important to recognise that NTFP traders have been able to look after their families (Shackleton & Shackleton, 2004). Therefore, it is vital not to underestimate the role that NTFPs can play as additional options for income generation and reducing poverty (Shackleton & Shackleton, 2004), especially in the context of limited other opportunities available in highly populated under-developed, rural villages.

1.4.4 Cultural uses and values of NTFPs

NTFPs have been highlighted as natural and cultural resources to local people and means of passing traditional knowledge from generation to generation (Kim et al., 2012). Some NTFPs are used as materials for rituals, hence providing cultural and spiritual benefits to local communities (Cocks et al., 2011; Kim et al., 2012). Furthermore, they are used during ceremonial rites, making of cultural products and spiritual practices (Kim et al., 2012). Additionally, NTFPs are commonly used for cultural purposes by Xhosa people in South Africa (Cocks et al., 2008).

NTFPs are also used for basketry and traditional clothing using cedar bark and roots, tree sap for waxing fish knives and resin for pictographs and waterproofing boats by Sts'ailes people in Asia. They also use specific species for ceremonial rites, e.g. cedar branches, ferns and reeds for their winter dance ceremonies (Kim et al., 2012). Spiritually, cedar branches are used to brush the body and purify the spirit while other leaves and mosses are used for bathing and fasting (Kim et al., 2012). Some products made from NTFPs also signify cultural benefits associated with the products. Cocks & Wiersum (2003)

observed that the majority of the households in Eastern Cape province, South Africa, purchased a grass broom for cultural purposes as a traditional wedding gift, protective talisman against lightning and as an implement for the application of traditional protective medicine.

1.5 Market chains and NTFP value chains

The market chain concept has been adopted from agricultural and institutional economics and applied to NTFP enterprises (Belcher, 1998). The terms supply chain and market chains are synonymous as used by Neumann & Hirsch (2000) in their review of NTFP commercialisation. Market chains describe the several links that connect all the actors and transactions involved in the movement of NTFPs from the source to the final consumer, unveiling a sequence of stages through which a product is bought and sold from the harvesters, processors, traders, up to the final consumers (Belcher, 1998; Lundy et al., 2008). A value chain analysis helps to describe markets for NTFPs and assess how well the market chain is working (Kaplinsky & Morris, 2000; Marshall et al., 2006b; te Velde et al., 2006). A value chain approach is a diagnostic tool that guides the facilitation and identification of the actors within the chain, and the share of the final price that they secure. It is helpful because it allows one to understand why poor participants frequently do not benefit optimally from their productive activities and what can be done to improve the distributional outcomes of their participation (Mitchell et al., 2011).

Though most NTFP markets require few capital inputs, for many, especially in local markets, trading them tends to have low returns per unit (te Velde et al., 2006)., Reasonable incomes can only be achieved if high volumes are traded, which requires capital to buy, store and to transport the products (te Velde et al., 2006). However, there are exceptions, such as where the trade is in sought after niche items, such as cultural or high-value artistic artefacts, or where a third party agency like PhytoTrade Africa (a trade association in the natural products industry in southern Africa) helps promote fair and ethical trade or where national or export markets are tapped. PhytoTrade Africa was formed in 2001 with over 60 members drawn from Botswana, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe (Lombard & Leakey, 2010). The objective is to promote the sustainable use of indigenous resources, reduce poverty

by generating income and other livelihood benefits for the poorest rural producers (Lombard & Leakey, 2010).

PhytoTrade has developed sustainable and ethical supply chains for natural cosmetic and food ingredients that are sustainably harvested. These products include lipid oils from species of Baobab (*Adansonia digitata*), Kalahari melon (*Citrullus lanatus*), Mongongo (*Schinziophyton rautanenii*), Marula (*Sclerocarya birrea*), Sour plum (*Ximenia sp.*), Mafura (*Trichilia emetica*) and botanical extracts from African sausage tree (*Kigelia africana*) and Baobab (Welford & Le Breton, 2008). For example, Eudafano Women's Cooperative in Central Namibia has been supported by the government and an NGO to develop marula oil for use in the cosmetics sector and the approval to use Baobab dried fruit pulp as a food ingredient in Europe applies only to members of PhytoTrade Africa (Lombard & Leakey, 2010).

1.5.1 Analysing NTFP value chains

There are a number of factors to be considered in analysing NTFP value chains, such as transparency and flow of information, the types of actors within and outside the chain, the presence of dominant individuals in the value chain, the distance between producer and consumer as explained below (te Velde et al., 2006; Lundy et al., 2008; Bolwig et al., 2011).

1.5.1.1 Types of actors

Bolwig et al. (2011:29) identify four types of actors, including those not within the chain, who need to be considered in value chain analysis as described below:

- Chain actors who are directly involved in within-chain exchanges of products, for example estates or small producers, processors, exporters, importers and retailers (traders) and final consumers (also in Belcher, 1998);
- External actors, as individuals or organisations that do not directly handle the product but provide services, expertise and exert influence, for example NGOs, financial institutions, advisers among others (also in Belcher, 1998; Marshall et al., 2006b);
- Expelled actors, those actors or workers who have withdrawn from the value chain due to pressure or coercion; and

- Non-participants or excluded actors, those who never participated in the value chain, by choice or for lack of capability.

1.5.1.2 Value chain length

Value chains vary in length (Belcher & Schreckenberg, 2007). Some NTFP value chains are short and simple especially for locally traded products which are sold directly to consumers (Belcher & Schreckenberg, 2007). Occasionally the same individuals perform all functions along the supply chain from harvesting to final sales due to informal markets with relatively short but not necessarily simple, supply chains (Shackleton et al., 2007). The marketing of the produce may involve villagers selling at the roadside directly to urban-dwelling, passers-by or via a well-defined market chain consisting of collectors, traders and vendors (Lowore, 2006). In southern Africa most NTFPs are usually sold in local markets (Shackleton et al., 2007). Shackleton et al. (2007:700) described local NTFP markets as all immediate village markets, markets within neighbouring villages and local towns, roadside, harbour or junction selling points and markets in the nearest large urban centres and cities. Locally traded products may be consumed by local people, poor urban residents or 'outsiders' e.g. tourists (Shackleton et al., 2007). There are important features and characteristics that describe local markets such as involvement of consumers of locally marketed forest products, local people, poor urban residents or outsiders (Shackleton et al., 2008).

Some value chains have a single route. For example, of the case studies analysed by Marshall et al. (2006b), the value chain for Camedora palm (*Chamaedorae elegans, C.concodor, C. oblongata*) has a single route with involvement of men who collect the foliage and women who grade it, making bushels of 140 leaves that sell for US$1.30 locally. A second actor transports the product to a regional wholesaler, who manages a centre, accumulates, grades, packs and sells the product to wholesalers in Mexico City (Marshall et al., 2006b). Because few companies are dedicated to exporting palm in Mexico, it has resulted in monopolisation of the process by a single successful entrepreneur who had sufficient capital to invest in the refrigerated transport and storage facilities. Marshall et al. (2006b), note that reliance on selling to a single company makes communities vulnerable to exploitation as a result of monopoly. Although some products

have short value chains they are sold through many routes. For instance, Tepejilote (*Chamaedorea tepejilote*), which is traded in Oaxaca City, has a short value chain though with five routes with the product being consumed by the family as well as being sold to local traders who sell it in regional markets or via retailers distributing various nutritional products (Marshall et al., 2006b).

The value chains which extend beyond the local markets become complex due to issues of source of the products, nature of storage, processing and transportation (Belcher & Schreckenberg, 2007). Typically, processors and traders are the ones who make higher profits than collectors and cultivators unless the processing occurs within the collector household (Marshall et al., 2006b). Therefore, the price received by collectors may depend on the length of the market chain (Bista & Webb, 2006).

1.5.1.3 Transparency and Information

A transparent market chain allows producer households to have access to regular price information at key points in the chain; knowledge of all collectors, buyers and sellers in the chain also enables collectors to have stronger bargaining power with traders (Adam et al., 2013). The lack of marketing information and coordination along the market chain allows some actors to take unfair advantage of other actors. Therefore, understanding how an enterprise fits within a market chain permits an entrepreneur to make better decisions in finding better markets, reliable buyers and learning to value the quality that is required by consumers at the end of the market chain (Lundy et al., 2008). Improving the quality and quantity of products at competitive prices is a major constraint for producers trying to enter export markets (Belcher & Schreckenberg, 2007).

NTFP enterprises are not optimally profitable because the markets are hampered by poor infrastructure, storage, lack of market information and lack of organisation into viable trading entities (Banana, 2005; Hoare, 2007). Even the market information available, is not regularly known to the small-scale producers, which cause challenges in marketing the products (Banana, 2005). Information sharing may be important in situations where a product is traded internationally and entrepreneurs are expected to fulfill some import and export requirements such as quality standards, permits and taxes (Belcher & Schreckenberg, 2007). Thus, increasing access to NTFP selling outlets may be achieved

through information dissemination, empowerment of collectors and establishment of connections between collectors and traders (Bista & Webb, 2006). For instance, information on commercial NTFPs and collective marketing and bargaining strategies can increase income earned from the trade (Bista & Webb, 2006).

Additionally, in the Sugandhwal trade, reduction in the price paid by road-head traders was associated with the higher costs of transport to the road-head (Bista & Webb, 2006). If the transportation costs were lower, the road-head traders could have offered better prices resulting in increase of the profits to the traders. Kar & Jacobson (2012a) found that 98% of NTFP traders indicated they could acquire more if they knew more about NTFP markets, 58% would be able to sell to people offering better prices and 30% would organise themselves for collective marketing to increase the bargaining power.

1.5.1.4 Importance of entrepreneurs in value chains

te Velde et al. (2006)'s study revealed that in NTFP trade, entrepreneurship is also important where markets and consumers are often distant from collectors. Therefore, middlemen or entrepreneurs are required but demand a share of the value. It is necessary to find solutions to limit the potential negative aspects of their powerful positions within the value chain (te Velde et al., 2006). It is also important to consider improving the bargaining power of collectors or producers without necessarily replacing the entrepreneurs (Belcher & Schreckenberg, 2007). This is because entrepreneurs can perform important functions including; providing access to new markets, information about new processing technology and advance funding to producers (te Velde et al., 2006). Furthermore, middlemen traders (those who buy NTFPs from collectors) stabilise prices if fair trading practices are followed (Bista & Webb, 2006).

1.6 Factors that affect NTFP trade contribution to household income

A number of studies have shown the benefits which rural households accrue from NTFP collection in terms of incomes, subsistence use or safety nets (Shackleton & Shackleton, 2004; Belcher et al., 2005; Kamanga et al., 2009; Shackleton et al., 2011; Adam et al., 2013). For instance, in Orissa state (India), households involved in NTFP collection added approximately 20% to their income (Mahapatra & Shackleton, 2011), while in

northern Benin NTFPs on average contributed 39% of total household income (Heubach et al., 2011).

The contribution of NTFPs to household economies depends on the availability of the products to provide access to the cash economy (Sunderland et al., 2004). For instance, Shanley et al. (2002) noted that in Belém (Brazil) prices of medicinal plants vary depending on species availability and demand, where prices for bark are low to the consumer (US$.70-1.15 per 200 g packet) resulting in poor returns to collectors for their searching, labour and travel time. The quantity harvested will also determine the amount of income or benefits a household can gain from the NTFPs (Adam et al., 2013). However, the quantity harvested might be affected by depletion of NTFPs in the forest (Saha & Sundriyal, 2012). Therefore, for households to continually benefit from NTFPs, sustainable harvesting approaches should be in place so that ecosystem functions and the communities which depend on them are not negatively affected (Ticktin & Shackleton 2011).

Moreover, NTFPs tend to be dispersed with seasonal and annual fluctuations in quantity and quality of supply. Noted in other studies, as a result, they are highly susceptible to overexploitation, especially when they are produced in open access regimes (Sunderlin et al., 2005), and especially those with high or increasing commercial demand (Kar & Jacobson, 2012b). The scope for NTFP trade to lift people out of poverty is limited due to the small markets available (Sunderlin et al., 2005). Marshall et al. (2006b) found that the poor often lack the necessary knowledge, capital or legal rights to be able to exploit market opportunities where they exist for increased benefits. Additionally, some NTFPs have large, diversified and stable markets; but others face unstable markets or demand that is seasonal and subject to price fluctuations (Arnold & Ruiz Peréz, 2001). These result in marginal returns to those engaged in harvesting and preparation of the products (Arnold & Ruiz Peréz, 2001).

In some situations, as noted by Belcher and Schreckenberg (2007), if more people get involved and/or prices have dropped, harvesters are bound to increase their harvesting so that they at least break even because there is too much competition and sellers are willing to reduce the price when their products are perishable or the market is thin, resulting in

less income than expected. This is because NTFP markets follow the law of demand and supply like other agricultural commodities (Sunderland et al., 2004). As a result, the number of NTFPs collected and the overall contribution of NTFPs to household income depends on NTFP selling outlets accessed by collectors (Bista & Webb, 2006). Sunderland et al. (2004) indicated that the supply is the function of the quantities of NTFPs harvested and quantity stored because of the seasonal nature of NTFP production. Therefore, processing and storage become important to ensure availability throughout the year and continued income from the product (Sunderland et al., 2004).

1.7 Rationale for the study

Forest and woodlands provide social, economic and environmental benefits globally, nationally and locally. They sustain livelihoods through the provision of shelter, energy, shade, medicinal plants and food. Furthermore, they contribute to the economy of the country through timber exports, creating jobs in the forestry sector and local trade in a variety of NTFPs. In Malawi, there is a wider gap between the harvested and rehabilitated areas (FAO, 2010). Human pressure on forests is severe, and forests are declining due to deforestation (GoM, 2010). In 1990 Malawi's total forest resources covered 3.51million hectares, representing 37.2% of the total land area (Nyirenda, 1993).

Forest loss is attributed to direct and indirect drivers which include unsustainable harvesting for energy and timber, agricultural expansion, uncontrolled bush fires, population growth and human settlement (GoM, 2010). Correspondingly, the population and housing census report indicates that between 1998 and 2008, the population of Malawi increased by 32%, equivalent to 2.8% per annum (GoM, 2008). Therefore, forest resources are still under pressure, and from 1996 to 2008 an estimated 490,000 ha of forest and 148,000 ha of grasslands were permanently converted to agriculture (Openshaw, 2010).

Zulu (2008) revealed that forest resources in Malawi are declining due to management challenges. He showed that 65% of plantations had been encroached, over 81% of miombo and eucalyptus forests bore signs of illegal charcoal production, 68% of the sampled forests experienced severe forest fires in 2003. Around 68% of the sampled

plantations had been completely harvested and over 87% were overharvested (Zulu, 2008).

Various NTFPs are used by households (Ngulube et al., 1999; Lowore, 2006; Mukul et al., 2015), including wood for curios and implements, mushrooms, firewood, reeds, bamboo, insects, fruits, palms, medicines, tubers, honey, grass, game, poles, vegetables, and rope fibres which are collected from the forests, grasslands and other wooded areas. Furthermore, Ngulube et al. (1999) found that these products are used for consumption and as a source of income for households. They found that the importance of NTFPs varies due to socio-cultural factors such as the ethnic composition of the study sites (i.e. Chewa, Yao and Tumbuka); they noted that mushrooms were the most important in Machinga, firewood in Kasungu and regarded lowly in Dedza, while caterpillars and tubers were important in Kasungu but not in Machinga, and bamboo and curios were regarded as important products in Machinga but not in Kasungu (Ngulube et al., 1999).

Despite these deforestation challenges, it is clear that forests and woodlands represent important sources of timber and NTFPs for both rural and urban people in Malawi (Walker & Peters, 2001; Kamanga et al., 2009). Surprisingly, the forest and the environment still represent forgotten sources of rural income and few studies have focused on recording and addressing forest and environmental income in Malawi (Walker & Peters, 2001). Moreover, the commercial value of NTFPs is difficult to calculate (Thandani, 2001), because extraction rates of most NTFPs are not well documented, uncertainties of price and tenure are additional drawbacks that make economic valuations unreliable.

Valuing NTFP use by rural households helps to assess their quantitative contribution to rural livelihoods and the extent of dependency of rural people on forest products (Babulo et al., 2009). NTFP income generating potential tends to be masked; and in some situations this potential is limited as a result of low real values of these products,yet in other places, NTFP income can be substantial (Shackleton et. al., 2008). The market share that NTFP collectors receive in the total market value of commodities can often be increased by minimising the exploitation by intermediaries and through improved harvesting, storage, transport, processing and manufacturing technologies (Ngulube et al.,

1999). However, intermediaries are not always exploitative as observed by te Velde et al. (2006) as sometimes they play an important role in the development of innovative marketing of NTFPs and are usually key to spreading success throughout the value chain.

Although there have been some studies on utilisation, marketing of NTFPs, forest income and rural livelihoods, household welfare and forest dependence conducted in Malawi (e.g. Ngulube et al., 1999; Fisher, 2004; Fisher & Shively, 2005; Kamanga et al., 2009), additional and recent information will add to the views on NTFP trade, value chains and their socio-economic contribution to households. Additionally, there is considerable contextual variation with demands, such that generalisations should be treated with caution and country, regional, district and village context specific studies and information is required.

This study was conducted to determine use, marketing, and the socio-economic contribution of NTFP trade to households, through value chain analysis of selected NTFPs, along a deforestation gradient. The findings from the study shall contribute to the available information and support evidence based policy and decision making. Context specific information will be generated for the villages under study since NTFP use, marketing and how communities benefit may vary depending on location of the sites. The study also assessed whether value addition activities, such as grading, processing, sorting and packaging, were done on traded NTFPs and the associated benefits.

1.8 Research aim, objectives and key questions

1.8.1 Aim

The aim of the study was to determine the use and trade of selected NTFPs, their value chains and socio-economic benefits to households along a deforestation gradient.

1.8.2 Objectives

The study addressed the following specific objectives:

1. To assess household use and preferences for NTFPs;
2. To determine the types and quantities of NTFPs which are marketed by households;
3. To analyse the value chain for selected NTFPs in terms of quantity sold and monetary value, length, number of actors, and value addition;
4. To assess the contribution of NTFP trade to household income; and
5. To assess how the above vary in relation to deforestation status.

1.8.3 Research Questions

The following research questions were answered through the study:

1. What types of NTFPs are used and preferred at household level in relation to deforestation status?
2. What types of NTFPs are marketed in relation to deforestation status?
3. What quantities are marketed, where do they sell the NTFPs and why?
4. Who are the key actors in NTFP value chains and why?
5. What type of value addition is done along the chain?
6. How much income is generated from NTFP trade for traders?

1.9 Thesis Outline

The remaining part of this thesis is organised as follows: Chapter two discusses the research methodology used, sample size and sampling strategy, data collection, analysis methods and description of the study sites. Chapter three presents the results related to NTFP use, buying and selling by rural communities. It also discusses the findings in the context of NTFPs dynamics related to the benefits accrued from the use and selling of the products. Chapter four presents the findings on NTFP value chains and value addition, the data collection and analysis methods used to collect the qualitative data; and results of the NTFP value chain analysis. Chapter five further presents the synthesis, conclusion and recommendations based on the study findings. It has also highlighted the policy issues and areas for future research.

CHAPTER TWO: RESEARCH METHODOLOGY

2.0 Methods

The data were collected in four villages of Mtogolo, Kasonga, Mtuluma 1 and Mpheta along a deforestation gradient, different characteristics in terms of population size, number of male headed and female headed households and forest cover status (Table 1).

Table 1: Characteristics of the study villages

Characteristic	Village			
	Mtogolo	**Kasonga**	**Mtuluma 1**	**Mpheta**
Population size	112	548	227	1,733
Number of adults	42	255	93	682
Number of children <18 years old	70	293	134	1,051
Male headed households	15	96	38	307
Female headed households	12	33	17	90
Total households	27	129	55	397
Forest cover status	Low-medium	Medium -high	Medium-high	Low
Deforestation rate	High	High	Medium	Low

2.1 Participatory Rural Appraisal data

Qualitative data from the Attaining Sustainable Services from Ecosystems through Trade off Scenarios (ASSETS) project, Participatory Rural Appraisal (PRA) reports were used to understanding the background information and guide in the designing of the survey sampling strategy. These helped in generating an inventory of available NTFPs and understanding their sources and seasonality in the study villages. Additionally, the data provided an understanding of the types of forests available, main markets which the study villages rely on, and appreciate any changes in term of availability or distribution of the products. The coping strategies used by people within the villages during periods of food shortages were also noted. The list of ecosystem benefits which participants identified as the most important for income generation activities and any relationship between increased uses of land for cultivation, reduction in forest cover were noted. Finally, information on any changes in the condition of the forest and how that affected the capacity of households to collect, harvest or limit different forest resources was known.

The ASSETS data were collected focusing on the following three thematic areas; livelihoods and land use, food security and ecosystem services. Oral consent was granted by the participating members.

Various methods were used to generate information per specific theme. Seasonal calendars were done with two groups of men and women separately. Food discussions were held with women only including elderly women, food security focus groups were carried out with men and women separately. A focus group on ecosystem services was held with one group including a cross-section of community members. All participants, irrespective of their age, sex, education, or cultural background, were given a chance to participate by involving a cross-section of community members including the youth, elderly, poor, well-off, men and women. Some exercises needed a specific profile of participants, for example women's or men's groups' only (see Schreckenberg & Torres Vitolas, 2012). The exercises were conducted by a team of researchers, including the author of this dissertation, from April – June 2013 in all the ASSETS villages (Table 2).

Table 2: Summary of respondents by gender for the three PRA exercises done

No.	Exercise name	Kasonga		Mtogolo		Mtuluma 1		Mpheta	
		M	F	M	F	M	F	M	F
1	Seasonal calendar	6	0	6	9	4	8	4	5
2	Food discussion	0	5	0	7	0	10	0	5
3	Focus group discussion on ecosystem services benefits	2	3	0	4	3	3	0	0

2.2 Selected Participatory Rural Appraisal methods

2.2.1 NTFP preference and ranking

Additional qualitative data were collected by the author alone using an NTFP preference and scoring exercise with participants in the study villages. Participants were given a maximum of ten points, represented by stones in this study. They were requested to score against each NTFP type with reference to the criteria. This provided an indication of how well each product performs in relation to the valuation criteria (Schreckenberg et al., 2012).

2.2.2 Household Survey

A household survey was carried out to collect quantitative information on the types of NTFPs people use, buy, sell and the quantities which were sold. This helped to understand how often they buy, the cash income realised from the traded NTFPs, and the types of markets available for the products. The survey also helped to categorise the important sources of cash income at household level, educational level of the household head, the number of months a household had food from their own garden, whether they owned livestock or not. It also helped to appreciate if the products were subjected to any value addition such as grading, processing, packaging, and sorting to determine if there were any associated benefits.

2.2.3 Sample size and sampling strategy

A household was used as the basic unit of analysis. In this study a household was defined as people living under the same roof and eating from the same pot. A sample that contains at least 30 randomly selected elements or items is considered adequate and as the minimum (Edriss, 2013). In this study, to achieve the intended purpose of the household survey, 47% of the total households for each of the four villages were selected randomly via computer randomisation. The initial plan was to interview 50% (half the population) based on the nature of the study to help in identifying those households which are involved in NTFP trade for further research. However, the sample was reduced to 47% due to time and financial constraints (Table 3) and to avoid respondents' fatigue since the same study villages are under the broader ASSETS programme where data collection is being done at different times of the year until the end of the research programme (2016). Therefore, out of a total of 608 households in the four villages, 286 were selected randomly to be part of the household survey. A large sample was deliberately opted for to create room for identifying households involved in NTFP trade, who were later targeted for an in-depth survey to understand the value chains of four products which were selected based on the proportion of households involved in the trade (see Chapter 4). An in-depth survey involves conducting in-depth interviews using qualitative research techniques. Intensive individual interviews with a small number of respondents are conducted to explore their perspectives and experiences, on a particular

idea, programme or situation. This helps to collect detailed information about a person's thought and behaviours and to explore new issues in-depth (Boyce & Neale, 2006).

Table 3: Sample size per village

Village	Total number of households	Sampled households (47%)
Mtogolo	27	13
Kasonga	129	61
Mtuluma 1	55	26
Mpheta	397	186
Total	608	286

The majority of the sampled households were poor represented by 62%, followed by very poor category (21%), better of 45% and well off group only 4% (Table 4).

Table 4: Wealth categories of the sampled households in the study villages

Village	Gender of HH Head	Wealth category of the sampled households				
		Very Poor	Poor	Better off	Well off	Total
Kasonga	M	0	10	33	3	46
	F	0	9	6	0	15
Sub total		0	19	39	3	61
Mtogolo	M	0	5	3	0	8
	F	0	3	2	0	5
Sub total		0	8	5	0	13
Mtuluma 1	M	13	4	0	0	17
	F	9	0	0	0	9
Sub total		22	4	0	0	26
Mpheta	M	25	116	1	1	143
	F	13	30	0	0	43
Sub total		38	146	1	1	186
Total sample		60	177	45	4	286

2.2.4 Data analysis

The quantitative data obtained from the household survey were coded and analysed using Statistical Package for Social Science (SPSS) software version 16.0. Direct observations were also used to help in triangulating some of the information provided by respondents during the survey. Descriptive statistics were used to produce frequencies, percentages,

means, medians and graphs. If the data did not meet the conditions of parametric testing then non-parametric tests were used. Cross tabulations were also used with some variables statistically tested using the Pearson's Chi-Square analysis to discover if there was any significant relationship between two categorical variables. A Chi-square test was used to verify if there was any significant relationship between NTFP trade and farming as important source of cash income, number of months the household had food from their own garden in a year/season, livestock ownership and sex of household head. Phi and Cramer's V tests were used to appreciate the strength of the association where necessary. Post hoc test was used to know whether any two groups or more within the study were similar or different. Additionally, a Principal Component Analysis (PCA) was used to understand the overall proportion of variance between different variables with a focus on NTFP use, trade and broader livelihood activities of the interviewed households.

2.3 Study area

This study was conducted in Zomba and Machinga districts of southern Malawi. Three villages were selected from Zomba and one from Machinga for comparative purposes. This was because of the deforestation gradient where the two villages are located around the forest reserves, one within the reserve and the other in Machinga within the wetland. This aimed at providing a basis of comparing the three villages with different deforestation rates and one away from the forest reserves which are the major sources of most NTFPs. The characteristics of Zomba district as the focus area of the study where more villages were selected are presented below, followed by description of the four study villages.

2.3.1 Population

Zomba district has a total population of 583,167 resulting in a population density of 230 persons per km^2. The main tribes are the Mangánja/Yawo and Lomwe. Chinyanja is the native language spoken by most of the inhabitants. It is dominated by two religious groups; comprising of 78% Christians and 20% Muslims. The national literacy rate is 64% while for the district it is 61.9% (GoM, 2009) slightly lower by 2.1%.

2.3.2 Topography, geology and hydrology

The topography of Zomba district is characterised by mountainous and hilly regions of the Zomba plateau which forms the ridge dividing the upper Shire Valley in the western part of the district, from the broad flat plains of Lake Chilwa in the east. Elevation ranges from 2,085 meters above sea level on the Zomba plateau to 627 meters at Lake Chilwa. The geology of the district is composed of metamorphic rocks derived from sedimentary and igneous rocks of Precambrian origin. These zones contain mineral limestone, and gemstones such as amethyst, tourmaline and aegerine (GoM, 2009).

The major rivers in the district include: Shire, Likangala, Thondwe, Domasi, Mulunguzi, Naisi, Namadzi, Phalombe, Lintipe and Likwenu. These form part of the Lake Chilwa catchment and the Zomba plateau is their source except for the Shire and Phalombe rivers which originate in Lake Malawi and Mulanje Mountain, respectively. Lake Chilwa is an inland drainage lake and the main source of water and fish for many residents in Zomba and surrounding areas (GoM, 2009).

2.3.3 Biophysical characteristics

The district has two different biotic communities; the highlands with semi-evergreen forest, which receives medium to high rainfall, while the other part is savanna, turning into moderate wetlands towards Lake Chilwa (GoM, 2009). The vegetation type is described as *'Miombo'* woodlands (on the plateau, hills and escarpments), and *'Mopane'* woodlands, which are largely dominated by *Colophospermum mopane* open glades. The woodlands are associated with mopanosol soils and compact alkaline soils with unsuitable physical characteristics resulting in a low level of cultivation. The woodlands are comprised of indigenous tree species such as *Brachystegia stipulata*, *B.manga, B.speciformis* and *Julbernardia globiflora.* The wetland vegetation is dominated by perennial wet fringes (GoM, 2009). The soils are well drained, yellowish-brown to reddish-brown, medium to fine textured and slightly medium acidic. These soils are grouped as lithol soils for the higher areas and ferruginous soils for the low lying areas. The upland soils, which are categorised as less fertile are suitable for developments in agro-forestry and river-line farming. The district is also hosting the Zomba-Malosa Forest reserve on the Zomba plateau with a total protected area of 90 km^2 (GoM, 2009).

2.3.4 Climate

Zomba District experiences a tropical climate with three main seasons; cold dry (April – July), hot dry (August – October) and hot wet (November – March). The hottest months are September, October and November with average temperatures ranging between 28 and 30 °C. The months of June and July are the coldest months, with minimum temperatures as low as 10°C. The annual rainfall varies between 600 mm and 1 500 mm (1999-2005), with February as the wettest month. The eastern side of Zomba Mountain falls on the windward and receives more rainfall than the western side of the plateau (GoM, 2009).

2.3.5 Socio-economic characteristics, agricultural production and fisheries

Poverty is widespread in the district, with about 70% of the population falling below the national poverty line and almost 200,000 living in extreme poverty (GoM, 2009). Zomba is one of the three poorest districts in Malawi, with only Machinga (73%) and Nsanje district (76%) reporting higher poverty levels (GoM, 2002; GoM, 2009:15).

The major crops produced in the district are maize, rice, tobacco, beans, sorghum, cassava, cotton, sweet potato and ground nuts. The number of farm families in the district increased from 207,651 to 223,916 between 2004/05 and 2006/07 growing seasons but sharply decreased to 194,650 and 197,508 in 2007/08 and 2008/09 growing seasons, respectively (GoM, 2009) due to migration of the farming families. Tobacco is regarded as the main cash crop, while rice, beans, cassava, sweet potato, ground nuts, beans, and pigeon peas are also sold to supplement income at household level. Households in the district rely on rain fed production and irrigated farming to supplement their food basket. To irrigate the crops, various methods are used including; treadle pumps, motorised pumps, water cans, gravity fed, river impounding and dams (GoM, 2009). The district has 3,400 fishermen and the numbers fluctuate due to the seasonality of the activity. The main sources of fish include: ponds/dams as artificial habitats, rivers and Lake Chilwa as natural habitats and major sources. Fish production increased from 527 tonnes to 983 tonnes between 2004 and 2008 representing an 87% increase mainly through aquaculture production from ponds and dams. The main fish species are Makumba (*Oreochromis*

shiranus), Chilinguni (*Tilapia rendalli*) Chambo (*Oreochromis karongae*) and Mlamba (*Clarias gariepinus*) (GoM, 2009).

2.3.6 Land use and land cover

There have been changes in land use and cover in the study sites. The land use/cover images for the sites showed a decrease of vegetation from 1990 to 2010 (the past 20 years) with purple colour (cultivation areas) dominating in 2010; see land use/cover images Figure 1, (Tsirizeni, 2013). This indicates an increase in the rate of deforestation, cultivation of marginal areas and encroachment into protected areas to open up land for cultivation.

2.3.7 Study villages

The study was conducted in Zomba in three villages: Mtogolo, Kasonga, Mtuluma 1, and in Mpheta of Machinga district (Figure 2). These villages were selected based on their differences in forest cover, proximity to forest reserves, deforestation rates, differences in land use and their locations. The reason behind their selection was to understand and analyse the differences in NTFP availability, accessibility, marketability, and value chains associated with the selected NTFPs. Further, assess any difference in the number of NTFPs traded in the selected villages, in relation to deforestation status. The three villages in Zomba surrounded the Zomba-Malosa forest reserve with possibility of having better access to NTFPs than the one in Machinga within a wetland.

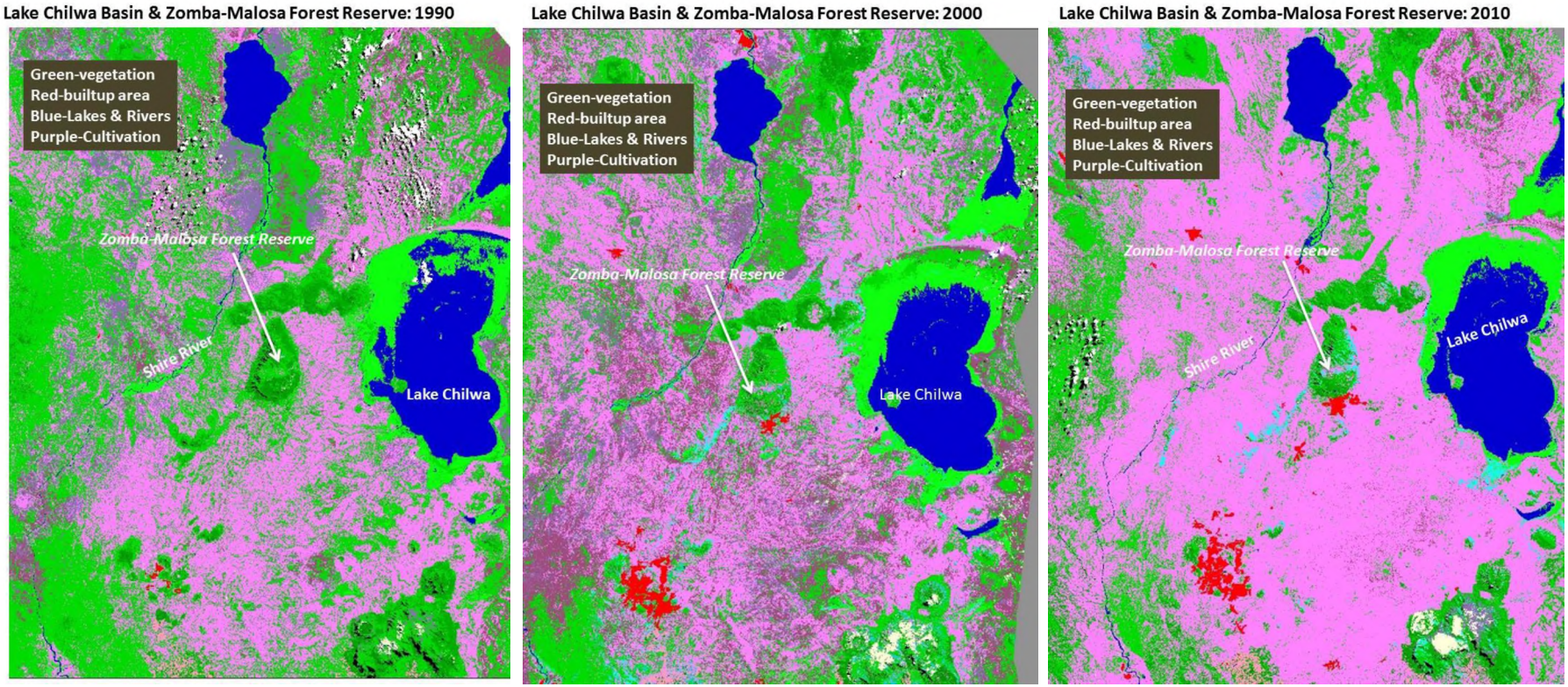

Figure 1: Land use/cover images (Tsirizeni, 2013)

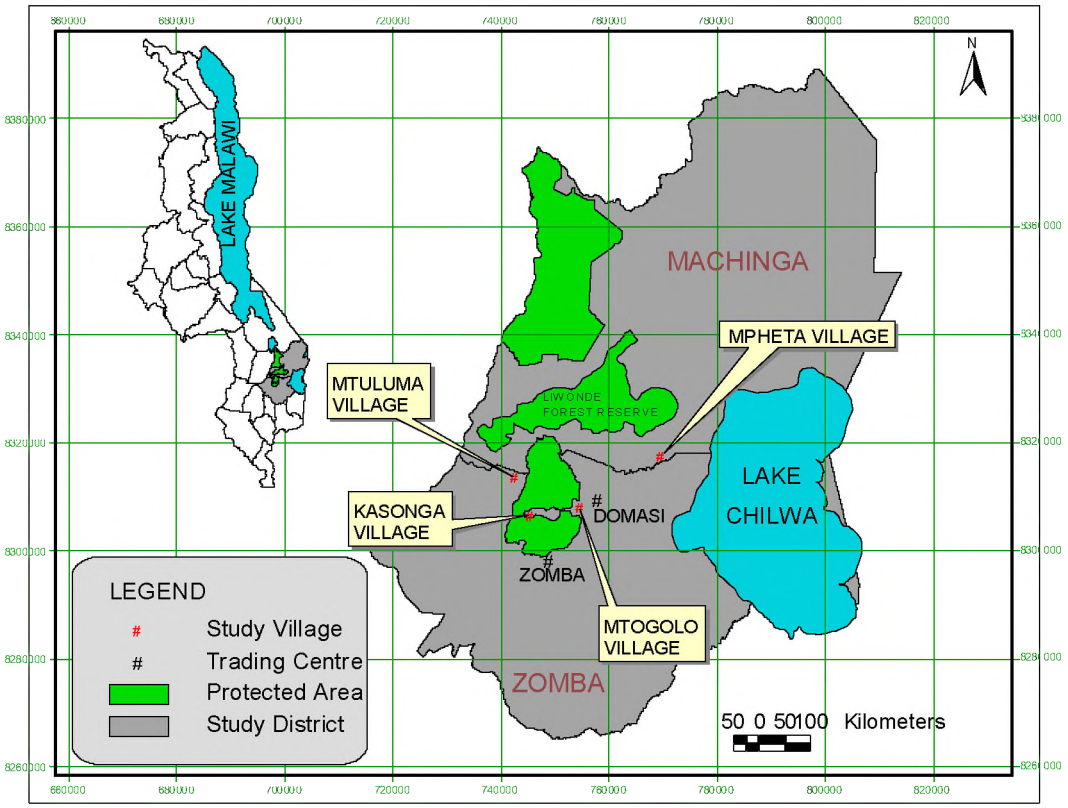

Figure 2: Location of the study sites

2.3.7.1 Population size

The study villages had different population sizes with Mpheta having the highest population of 1,733 people while Kasonga had 548, Mtuluma 1, 1,227 and Mtogolo as the smallest with 112 people (including adults and children).

2.3.7.2 Mtogolo village

Mtogolo village (-15.293°S, 35.375°E) at an altitude of 818 m above sea level is close to Zomba forest reserve and part of Malosa forest reserve within the catchment of Lake Chilwa East. The village has low-medium forest/vegetative cover with high deforestation rate (Tsirizeni, 2013). The village is approximately 2.5 km from Zomba forest reserve and 2 km from Malosa forest reserve (Figure 3). It is against this background that the site was selected considering the rate of deforestation within the Malosa and Zomba forest reverses and land use change. The high deforestation had been demonstrated by the

reduction in quantity of forest products harvested, both timber and non-timber, as recorded in the ASSETS PRA report on Participatory Land Use Mapping (Mahonya & Chirwa, 2013). There was diverse land use for rain fed agriculture, irrigated farming and fishing in wetlands, a village forest area, settlements and a grave yard. Mountain slopes were used for grazing livestock, and reserves were used to collect NTFPs (Tsirizeni, 2013). Some human activities were claiming land from the forest areas, mountain slopes and wetland areas. In Mtogolo Village residents established a block of land to facilitate co-management of the Zomba-Malosa forest reserves in collaboration with the Forestry Department. The block covers an area of 2,083 ha. It is in a regeneration condition, since most big indigenous trees were harvested illegally for charcoal and by other user groups. Furthermore, the lower part of the block was heavily encroached through opening of new land for cultivation (Forestry Department, 2013).

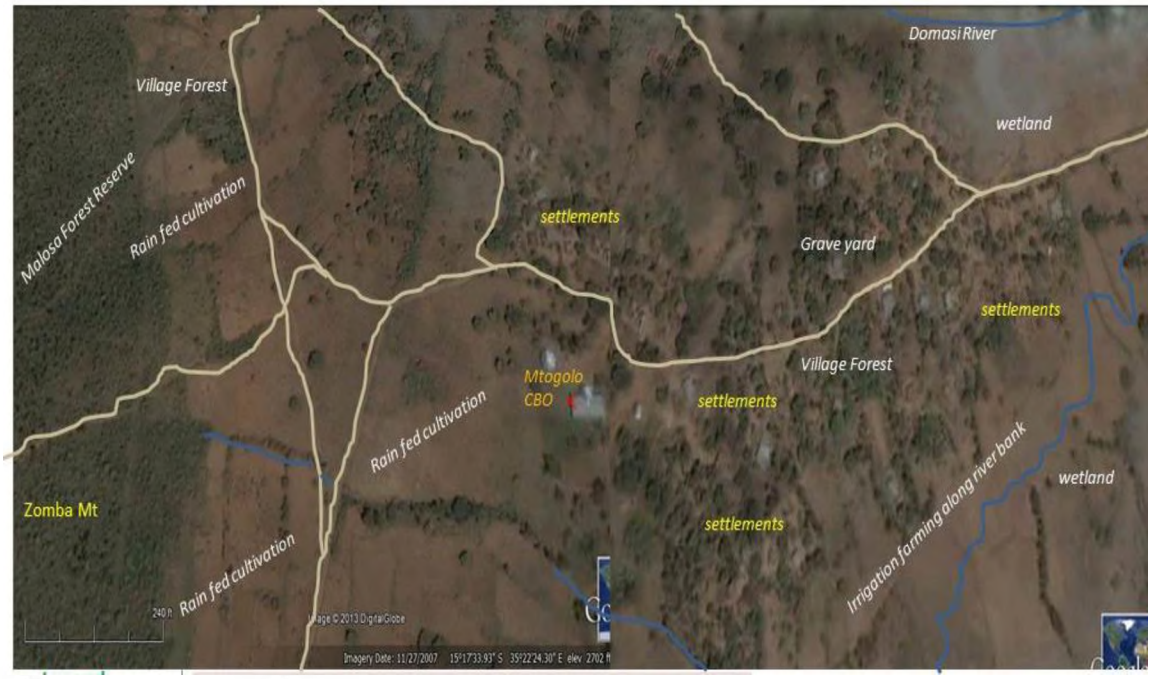

Figure 3: Mtogolo Village Map

Source: ASSETS study sites maps (Tsirizeni, 2013).

2.3.7.3 Kasonga village

Kasonga village (-15.305°S, 35.293°E) at an altitude of 1,431 m above sea level is located at the source of Domasi River on top of Zomba Mountain within Zomba Forest

Reserve (Zomba Forest Reserve Enclave) which forms part of the catchment for Domasi River (Figure 4). A lot of river bank and steep slope cultivation and activities within the village have an impact on Domasi River water quality. There was medium-high forest/vegetative cover associated with high deforestation rates (Tsirizeni, 2013). It is a forest boundary village which is approximately 0.3-1.25 km into Zomba forest reserve and 1.35-1.5 km into Malosa forest reserve. The area was chosen because residents collect a diversity of NTFPs from the forest reserve, trees outside the forest, other wooded lands, grasslands and cultivated landscapes (boundaries of the fields where there are trees and grasses). Forest utilisation in reserves is regulated where access and utilisation is monitored (GoM, 1997). Due to the co-management arrangement through Kasonga block in Malosa forest reserve, access to NTFPs was possible after getting a permit from the block management committee. The programme was facilitated by the Government through the Forestry Department with funding from the European Union (Forestry Department, 2014).

Figure 4: Kasonga Village Map*; Source: ASSETS study sites maps (Tsirizeni, 2013).*

2.3.7.4 Mtuluma 1 village

Mtuluma 1 village (-15.247°S, 35.2637°E) at an altitude of 698 m above sea level is located at the western side of Malosa forest reserve (Zomba Mountain) where there is a co-management programme with the Government through the Forestry Department with funding from the European Union (Figure 5). The village has put in place a committee driving the co-management arrangement of the forest reserve for effective implementation (Tsirizeni, 2013). The village is approximately 2 km away from Malosa forest reserve. There was remarkable achievement with this type of arrangement in terms of tree regeneration, with local institutional arrangements in place to assist in managing the forest reserve. The site was used to assess whether the village was better off than any other site in accessing a diversity of NTFPs with the availability of trees through regeneration, and any constraints faced by NTFP traders. Some of the NTFPs were collected from cultivated lands and grasslands therefore an understanding of any land use change in the area would also help to get a picture of how NTFPs availability has been affected or enhanced.

To enhance forest management the block of land was demarcated into three sections as follows; non- harvestable site, where harvesting was not allowed due to the terrain and resource availability; the middle section with moderate slope covered with indigenous trees where harvesting of forest based resources can be done; and the lower portion (regenerating site) where illegal cultivation of crops is taking place (Forestry Department, 2013).

2.3.7.5 Mpheta village

The fourth village is Mpheta (-15.209°S, 35.512°E). At an altitude of 626 m above sea level close to Domasi EPA headquarters and within the Lake Chilwa Wetland, Chilwa East (Tsirizeni, 2013). The main activity is irrigated farming through Chisoni River, a tributary of the Domasi River. Economic activities which community members rely on include; fishing, rice cultivation and selling within the Lake Chilwa wetland (Figure 6). The study area benefits from Domasi River drainage system, that originates from Kasonga village (Tsirizeni, 2013).

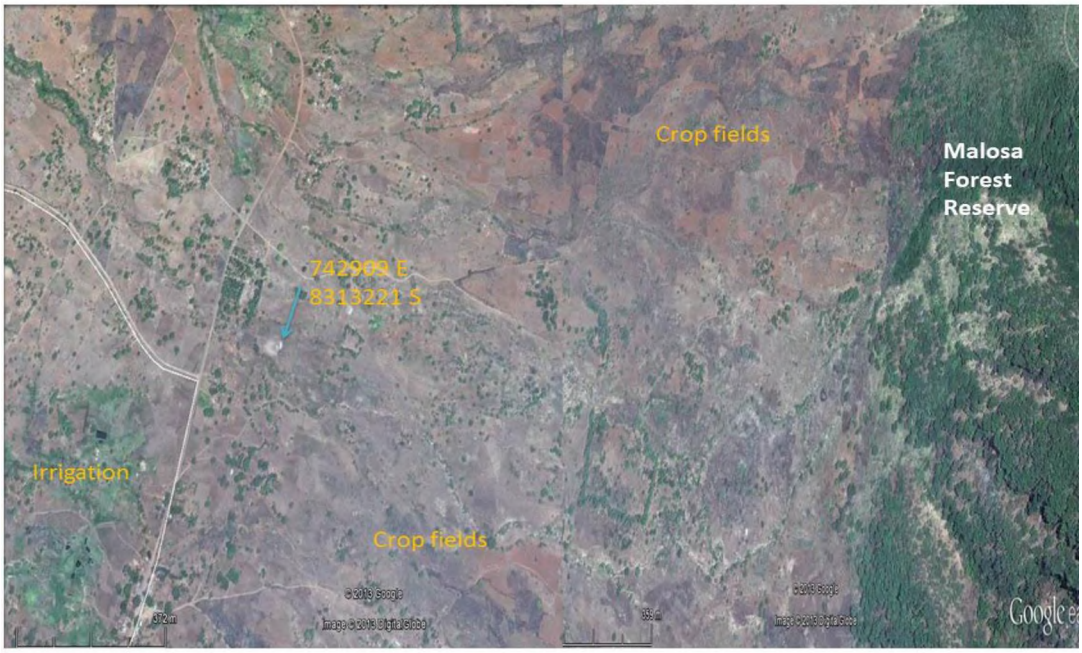

Figure 5: Mtuluma 1 Village Map

Source: ASSETS study sites maps (Tsirizeni, 2013).

The village was included to help in understanding any major differences in terms of the type of NTFPs used and traded in a village which has better access to a wetland than a forest reserve and other wooded areas. The village is approximately 15 km away from Malosa forest reserve and 5 km away from Liwonde forest reserve. Additionally, it is 14 km away from Chikala hills.

Figure 6: Mpheta Village Map

Source: ASSETS study sites maps (Tsirizeni, 2013)

CHAPTER THREE: HOUSEHOLD USE, BUYING AND SELLING OF NTFPS

3.1 Introduction

Dependence on forest resources by rural people is determined by where they are physically located in relation to forests and governing institutions that restrict or enable their access to the forests (Timko et al., 2010). NTFPs are important sources of livelihoods for rural and urban communities throughout the world. Gathering NTFPs near the home, on fallow lands and deep in forests is an activity common to forest dwellers (Levanga et al., 2015), to support their incomes and for subsistence (Zenteno et al., 2013). NTFPs are used for domestic consumption or small-scale trade, with no, or limited capital investment (Shackleton et al., 2007), and make an important contribution to the livelihoods of the households who gather and consume them (Delang, 2006). They support livelihoods through domestic material goods and energy, food, nutrition and health, trade and economic activity and environmental services (Lowore, 2006; Timko et al., 2010; Kar & Jacobson, 2012b).

Forest foods are used as substitutes for crops during poor weather events and are more commonly consumed during famines than when crops are abundant (Fisher et al., 2010). NTFPs also assist households by offering opportunities to earn cash to buy food (Fisher et al., 2010; Asfaw et al., 2013). NTFPs can also be considered income in kind rather than cash if they are consumed rather than sold in the market (Delang, 2006), and used as famine foods which are eaten out of necessity not by choice when there is nothing to eat (Lowore, 2006). In Malawi, forest products act as safety nets when forest foods help rural poor survive famine (Fisher et al., 2010), and earnings from forest-based occupations constitute considerable shares of household income (Fisher, 2004). NTFPs supplement income and may also improve the living standards of households that are able to enter into high-return forest occupations (Fisher, 2004). For instance, rural households in Chilimo, Ethiopia, had 39% of their household income generated from forest (Mamo et al., 2007).

NTFPs may be sold on local, national or even international markets (Shackleton et al., 2007). To exploit market opportunities where they exist, the poor should have necessary knowledge, capital and legal rights (Marshall et al., 2006b). Forest products collection

and sale, including NTFPs, support efforts of poor households to accumulate assets and investments towards a more secure livelihood (Awono et al., 2010). For instance, the income generated could be used for educating children, purchasing agricultural inputs or investing capital in businesses that would generate more income (Asfaw et al., 2013). NTFP income in Jelo Afromontane forest in Eastern Ethiopia was the second largest contributor (32.6%), while crop production was the highest contributor and contributed 40.7% of total annual household income (Asfaw et al., 2013).

Forest products are used domestically; they are 'free' goods to community members (Lowore, 2006), are also used as cultural and decorative items (Paumgarten & Shackleton, 2009). NTFP collection is a multitasking livelihood strategy (collection is done at your own time after or before doing other household productive activities) as noted by Zenteno et al. (2013) in Bolivia forest communities, with 33% of the households adopting the strategy. NTFPs are used by both wealthy and poor households. However, wealth differentiation determines the type of NTFP used by a particular household and the level of dependence (Paumgarten & Shackleton, 2009).

Households access NTFPs either through self-collection or by purchasing them. Paumgarten & Shackleton (2009) found that 94% of the households were purchasing at least one NTFP with wealthy households buying more NTFPs than the poor. High dependency on NTFPs by poor households for income indicates their importance in improvement of livelihoods (Ahenkan & Boon, 2011). Thus, the wealthy have capital and may be potentially labour constrained, while the poor buy those products which they cannot collect because they are not locally available (Paumgarten & Shackleton, 2009). Furthermore, educational level, gender, family size, the number of male or female members in a household and age of the household head are some determinants on the choices of which NTFPs to harvest, consume and sell (Asfaw et al., 2013). Asset poverty influences a household decision to use more NTFPs for coping as people with few assets have limited access to other options (Wunder et al., 2014b). Households with educated members reduce reliance on NTFPs (Wunder et al., 2014b).

This chapter provides an overview of the results from a household survey. The chapter will focus on NTFP use, buying and selling by households. The proportions of

households using, buying and selling NTFPs were analysed to appreciate any differences across the three categories. The study specifically aimed at assessing the use and trade of NTFPs, and the associated socio-economic benefits of NTFP trade to participating households through a value chain analysis. The results discussed in this chapter highlight the NTFP types which were used and preferred at household level, sold, and bought by the households with reference to the deforestation gradient. The study also determined the types of markets for NTFPs in the study sites, the amount of cash income generated from the trade and assessed if value addition was done on the products under study.

3.2 Results

3.2.1 Demographic and socio-economic characteristics of the households

The largest group of household heads was in the age range of 20-29 years represented by 26% (Figure 7). The mean household size was 5±1.9 persons ranging from one person up to a maximum of 14 persons. It was also noted that 15% of the interviewed households had only one adult member older >18 years, while the majority, 61% had at least two adults, 13% had three adults and 11% had more than three. The mean number for older people (> 18 years) was 2±0.96 per household, ranging between one and six adults per household.

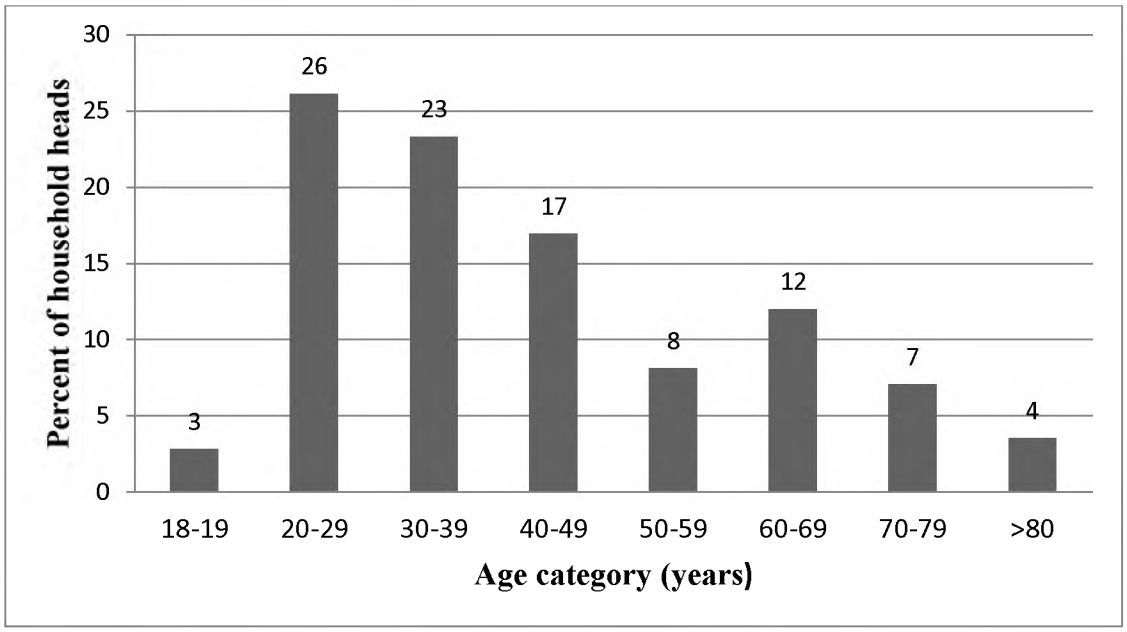

Figure 7: Age groups of household heads

Out of the interviewed households, 76% were male-headed while 24% were female-headed. However, there were variations in the number of male-headed and female-headed households across the villages. Mtuluma 1 had the highest proportion of female-headed households 42%, followed by Mtogolo with 31%, Kasonga 23% while Mpheta had the lowest with 21% of the households being female-headed.

There was no association between NTFP trade as one of the important sources of cash income for a household and gender of the household head ($\chi^2 = 3.1$; $p > 0.05$; Appendix 1). Whether the household was male-headed or female-headed did not determine the household's reliance on NTFP trade as one of the important sources of cash income.

The responses showed that, most of the household heads had junior or senior primary education levels. The percentage of household heads who had never been to school was 19%, junior primary 32%, senior primary 33% , junior secondary 10%, and 5% senior secondary. Among household heads, men constituted 93% of those who attained senior secondary level, 100% of tertiary level, and 83% for both senior primary and junior secondary levels. The majority of those who had never been to school were also males (59%). Among women heads of household, the largest group (26%) attained junior primary education and only 7% senior secondary level. Educational levels of the household heads varied across the villages in the different educational categories. However, in all the villages the majority of the household heads (80-85%) had only attained primary level or less.

Communities used various ways to earn cash income to meet their needs. Most households (82%) relied on farming as the most important (first) source of cash income, while 22% relied on business (opening mini shops or selling groceries, fritters, domesticated fruits, buying and selling agricultural produce other than selling their own harvest) as a second option, 15% engaged in NTFP trade, 4% relied on formal employment and only 2% on fishing (Figure 8). Furthermore, of the 15% of the households who relied on NTFP trade as an important cash income source, 6% were from Mtuluma 1 village, 5% from Kasonga, 3% from Mtogolo and 1% from Mpheta (Appendix 6).

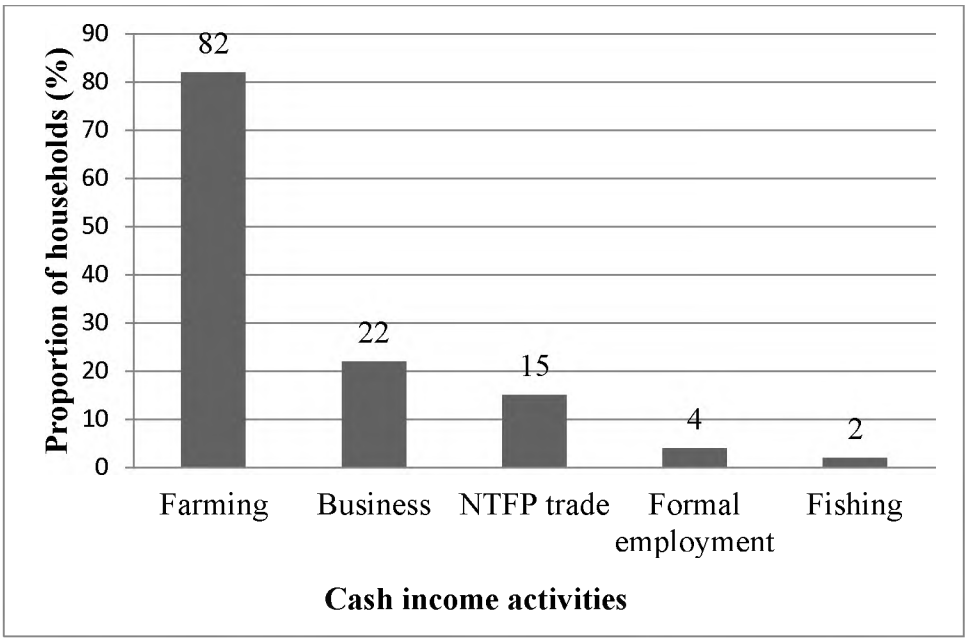

Figure 8: Proportion of households engaging in various cash income activities

The majority (95%) of the adults were not formally employed, while only 5% of the households indicated having one adult member in full time employment. However, 30% of the households had one adult employed on a part-time basis, 21% had two members while 5% had more than three members. Most (79%), of those adults who were employed on a full time basis were males while 21% were females. Similarly, 76% of those adults who were not employed on a full time basis were males while 24% were females. In all cases there were more males than females. Households who owned livestock were less than half (46%). Furthermore, a significant relationship was noted between NTFP trade as an important source of cash income and livestock ownership by the household (χ^2 = 5.1; $p < 0.05$; Appendix 2). A further analysis of the variables using the Phi and Cramer's V revealed a very weak association with a Phi value ($\varphi = 0.133$). Livestock ownership was used as a proxy wealth indicator for the households.

3.2.2 Land holding size and food production

Land holding estimates included total arable land for the household, together with the piece of land around the home of the respondents. The majority of the households (79%) had land holdings of between 0.1-2.0 hectares, while 16% had 2.1-4.0 hectares and 2% each between 4.1-6.0 and 6 hectares above, respectively (Figure 9). The majority of the

households (84%) did not use hired labour for cultivation as they solely depended on family labour because they did not had disposable income to hire labour.

The number of months in a year a household had food from their own garden varied. Using the cross tabulation results (Table 5), of those who had the smallest land holding (0.1-2.0 ha) only 18% were food secure. The majority of food secure households had at least 2.1 ha of land. The PCA showed a positive correlation between land holding size and number of months a household had food from their own garden. Households which had food for less than three months were 25% of the total, while 31% had food for 4-8 months, 22% had food for each of the following categories, 7-9 months and 10-12 months (all year round).

Table 5: Cross tabulation of number of months a household had food from their own garden versus land holding size

No. of months with food	Total land size (ha) and proportion (%) of households in each category			
	0.1-2.0	2.1-4.0	4.1-6.0	> 6
less 3 months	26	21	0	29
4 months - 6 months	34	17	20	14
7 months - 9 months	22	26	20	14
10 months - 12 months (all year round)	18	36	60	43
Total	100	100	100	100

The chi-square analysis revealed a significant relationship between NTFP trade as an important source of cash income and the number of months the household had food from their own garden in a year ($\chi^2 = 19.6$; $p < 0.001$; Appendix 3). To measure the strength of the association the Phi and Cramer's V measure of association were analysed for the NTFP trade and number of months the household had food from their own garden. The results revealed a moderately strong association with Cramer V value of 0.262. The exploration of the cross tabulation results between reliance on NTFP trade as an important source of cash income and the number of months a household had food from their own garden showed that 96% of those who were food insecure did not engage in

NTFP trade to earn cash income. Similarly, 69% of those who were food secure also did not engage in NTFP trade to earn cash income.

Those households which were food insecure (had their food reserves run out in less than three months); only 4% relied on NTFP trade as one of the most important source of cash income. Of those who were food secure at least 31% of the households relied on NTFP trade as a supplementary source of cash income.

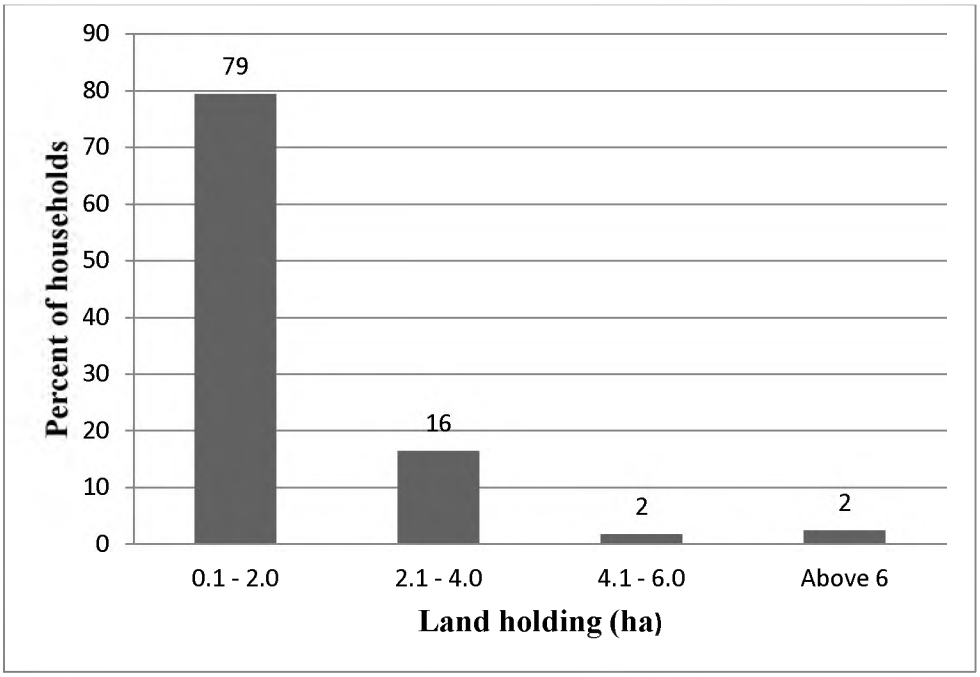

Figure 9: Estimated land holding size in hectares

3.2.3 Broader livelihoods activities

Using the PCA, the broader livelihood activities were analysed to appreciate any relationships between the variables. A positive correlation between household size and number of adults, and both associated with number of adults in part-time employment was observed. The village and engagement in NTFP trade or not also showed a positive correlation. A cross tabulation also showed that at village level 77% of the households within Mtogolo were involved in NTFP trade, 62% within Mtuluma 1, 25% within Kasonga and only 2% within Mpheta village (Appendix 5). Both village and NTFP trade were negatively correlated with farming as an important source of cash income and land area. Additionally, livestock ownership and land area also showed a negative correlation

since livestock ownership is also dependent on other social and economic factors of a household. These among others include; household composition, economic status which have a bearing on their capabilities to acquire and manage the livestock (Figure 10).

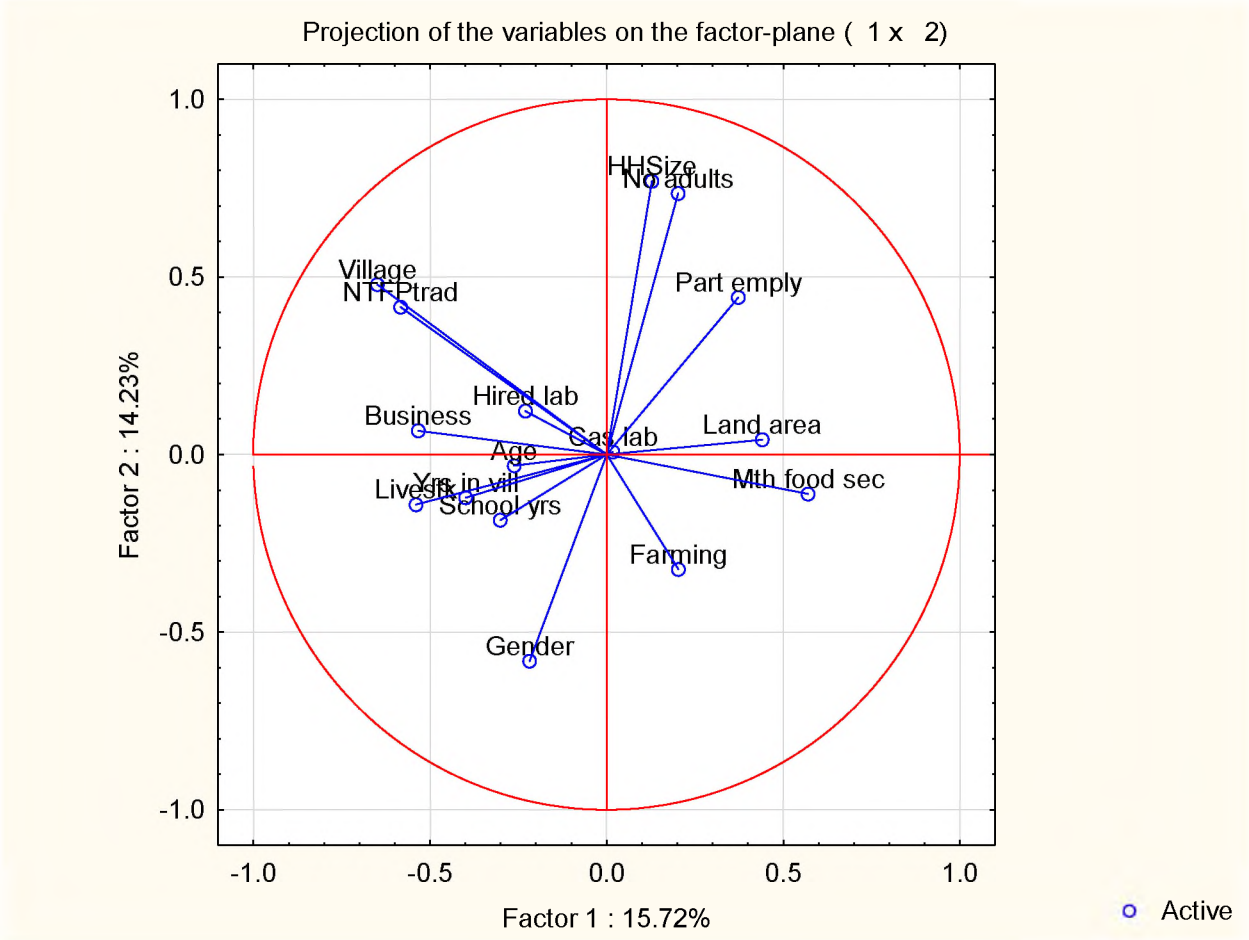

Figure 10: Principal component analysis for the broader livelihood activities

3.2.4 NTFP use, acquisition and selling

All households used a variety of NTFPs. Firewood was used by all of the households as a source of cooking fuel (Table 6). Other widely used NTFPs included thatch grass, bamboo, and wood for building. More than 75% of the households used thatch grass, wild fruits, wild vegetables, medicinal plants, rope fibre, bamboo, wood for building, and wood for fencing. Five products had less than 50% of the households using them;

including bush meat, honey, edible orchids, edible caterpillars and other NTFPs. All households (100%) used at least one NTFP.

Table 6: The proportion of households using, buying and selling NTFPs

PNTFP	Proportion (%) of households		
a	**Using**	**Buying**	**Selling**
rFirewood	100	42	10
tBamboo	96	40	7
. Thatch grass	94	30	14
lWood for building	92	50	7
cWood for fencing	78	26	3
i Wild vegetables	77	2	2
pWild fruits	76	30	16
Medicinal plants	71	46	3
aRope fibre	70	7	1
tMushrooms	62	15	13
¡ Honey	49	24	1
Bush meat	42	24	2
nEdible orchids	32	9	14
gEdible caterpillars	23	4	7
Other NTFPs	12	1	1
hHouseholds using, buying or selling at oleast one NTFP	100	89	39

Accessibility to the NTFPs was achieved through either harvesting or purchase. The majority (89%) of the households bought at least one product. The products were bought from various markets within the villages and outside the village. The proportion of households buying firewood was 42% while 100% were using it. Less than 50% of the households bought the following products; firewood, mushrooms, thatch grass, bush meat, honey, wild fruits, wild vegetables, medicinal plants, rope fibre, bamboo, wood for fencing, edible orchids, edible caterpillars and other NTFPs. At least 50% of the households bought wood for building.

Although most NTFPs were used within the household, some were sold by harvesters. More than 10% of households were involved in selling firewood, mushrooms, thatch

grass, wild fruits, and edible orchids. The other products (bush meat, wild vegetables, medicinal plants, bamboo, wood for fencing, wood for building and edible caterpillars) involved less than 10% of the households participating in the trade. Honey, other NTFPs and rope fibre were traded by only 1% of the households. Over a third (39%) of the households sold at least one product. Through probing, respondents indicated that rope fibre quantities harvested were only enough for household use and sometimes they supplemented through buying. This was associated with scarcity of the trees species or shrubs where they could harvest the rope fibre. Therefore, to meet demands for construction purposes wires from inside old tyres were used instead.

Despite that 61% of the respondents did not trade any NTFPs, those involved sold multiple products in various combinations, e.g. thatch grass, medicinal plants and wood for building, edible orchids and caterpillars, firewood and thatch grass, firewood, mushrooms, wild fruits and medicinal plants just to mention a few. Some sold only one product, others 2-4, 5-6 and (less than 1% of the respondents, i.e. 0.3%) sold more than six (Figure 11). The largest groups (19%) sold 2-4 products, followed by one product (14%) and less than 1% sold more than six products. The majority of NTFP sellers (64%) were selling two or more and almost 15% of them were selling five or more products.

There were variations regarding the proportion involved in selling in each of the study villages (Table 7). Kasonga had the largest proportion of households selling bush meat (44%), wild fruits (8%), wild vegetables (7%), rope fibre (2%), edible orchids (64%) and edible caterpillars (33%). Edible orchids were only traded by Kasonga households due to availability of the resource in the area as these are usually found in montane grasslands. Mtuluma 1 had a larger proportion of households trading firewood, mushrooms, thatch grass, and wood for building than any other village.

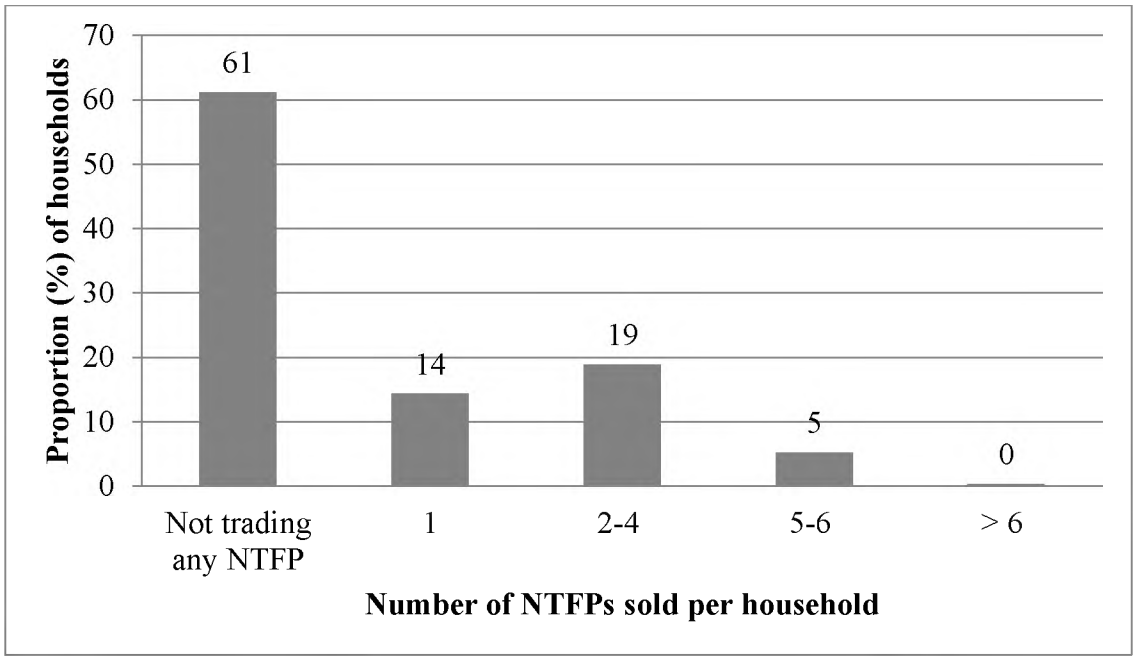

Figure 11: Proportion (%) of households trading multiple NTFPs

Mtogolo village had the largest proportion of households involved in bamboo and wood for fencing trade each represented by 23%. Comparisons between villages showed a significant effect (magnitude of the difference) in mean percentage selling per NTFP ($F=3.45$; $p<0.05$). Post-hoc test showed Mpheta was significantly lower than the other three, which were not significantly different to one another.

3.2.5 NTFP availability, abundance and seasonality

In all the villages the products' availability and abundance was perceived to have decreased over the last 10 years or more due to population growth, resulting in increased clearing of new land for agricultural production, wildfires, cultivation of marginal areas (steep slopes), encroachment of forest reserves, deforestation due to charcoal production and timber extraction, erratic rainfall, increasing number of traders and, in the case of wild fruit, competing with monkeys for the same products. Respondents indicated that there was a reduction in quantities available for harvesting for the majority of the products. In Mpheta they noted reduced collection for 13 products, Mtogolo and Kasonga 12 products for each village and Mtuluma 1 nine products (Table 8). Due to the changes, households involved in the trade collected smaller quantities and earned less income while at the same time reducing some of the non-monetary benefits.

Table 7: Proportion (%) of households selling different NTFPs per village and mean sale values per product

NTFP	Village				
	Mtogolo	**Kasonga**	**Mtuluma 1**	**Mpheta**	**Mean**
Firewood	31	13	35	4	20.8
Mushrooms	13	26	58	1	24.5
Thatch grass	39	15	54	7	26.3
Bush meat	0	7	4	0	2.8
Honey	8	2	8	0	4.5
Wild fruits	31	44	42	2	29.8
Wild vegetables	0	7	4	1	3.0
Medicinal plants	8	7	8	1	6.0
Rope fibre	0	2	0	1	0.8
Bamboo	23	7	15	6	12.8
Wood for fencing	23	3	12	1	9.8
Wood for building	15	13	23	2	13.3
Edible orchids	0	64	0	0	8.5
Edible caterpillars	0	33	0	0	8.3
Others	0	0	0	1	0.3
Mean	**12.7**	**13.5**	**17.5**	**1.8**	

Furthermore, parents noted that children who relied on wild fruits mostly during the lean period, suffered most as a result of reduced quantities and travelling long distances to collect the resources. Household capacity to rely on NTFP trade as a coping strategy was also reduced since the proceeds realised were dependent on the quantities sold, since these were used for purchasing food during lean periods of the year.

Table 8: Perceived trends in NTFP harvestable quantities over a period of 10 years

Village	Trends in NTFP quantities over the past 10 years	
	Number of products with no change	**Number of products with less collection**
Mtogolo	1	12
Kasonga	3	12
Mtuluma1	4	9
Mpheta	0	13

The products were available and traded at different times of the year widening income sources for those households trading multiple NTFPs. The season for wild fruits was

three months (October – December), mushrooms four months (November- February), edible orchids seven months (April – October) and thatch grass four months (June – September). The peak times for the products were November and December for wild fruits, mid-January for mushrooms, edible orchids May, June and July, and thatch grass June – August before wildfires destroyed the grass and edible orchid plants.

3.2.6 Household use and preferences for NTFPs

During the focus group and NTFP scoring exercise, household use of NTFPs and preference was assessed based on income contribution, subsistence use, availability and accessibility to the resources, easy harvesting, easy processing, quantities harvested, and marketability of the products. The total scores were calculated for each column for each product and the results were discussed with the participants to determine whether they were a true reflection of their preferences.

The most preferred products (represented by one (1)) in all the villages were medicinal plants, bamboo and thatch grass, while firewood was the most preferred product in three villages except for Kasonga. It was observed that Kasonga residents were involved in timber trade hence they used some timber pieces as firewood (Table 9). Two (2) represented the second preference and three (3) the third.

Almost every household used firewood, thatch grass, bamboo and wood for building. The PCA showed positive correlations between use of the different NTFPs such as mushrooms, bush meat, honey, wild fruits, wild vegetables, medicinal plants, rope fibre, wood for fencing, edible orchids, edible caterpillars and other NTFPs which were used within the study villages. However, a negative correlation was observed between farming as an important source of cash income for households and NTFP use (Figure 12).

Table 9: Summaries of NTFP preferences per village

NTFP	Village											
	Mtogolo			Kasonga			Mtuluma 1			Mpheta		
	1	2	3	1	2	3	1	2	3	1	2	3
Firewood	√				√		√			√		
Mushrooms		√			√		√				√	
Thatch grass	√			√			√			√		
Bush meat			√					√		√		
Honey			√					√			√	
Wild fruits		√			√		√			√		
Wild vegetables		√			√		√			√		
Medicinal plants	√			√			√			√		
Rope fibre		√				√		√			√	
Bamboo	√			√			√			√		
Wood for fencing		√			√			√		√		
Wood for building	√					√		√		√		
Edible orchids			√	√				√			√	
Edible caterpillars			√	√				√			√	
Others			√				√			√		

The proportion of households using various NTFPs varied across the villages (Table 10). All households within Mtogolo village used at least six products namely; firewood, thatch grass, wild fruits, wild vegetables, rope fibre and bamboo. Three products (firewood, wild vegetables and wood for building) were used by all households in Kasonga village while a further eight products were used by more than 80% of the households. In Mtuluma 1 village all interviewed households used at least six products. In contrast, Mpheta village had only one product (firewood) used by all households, more than 80% used only three products; thatch grass, bamboo and wood for building. This was significantly lower than the other three villages ($F=4.60$; $p<0.01$).

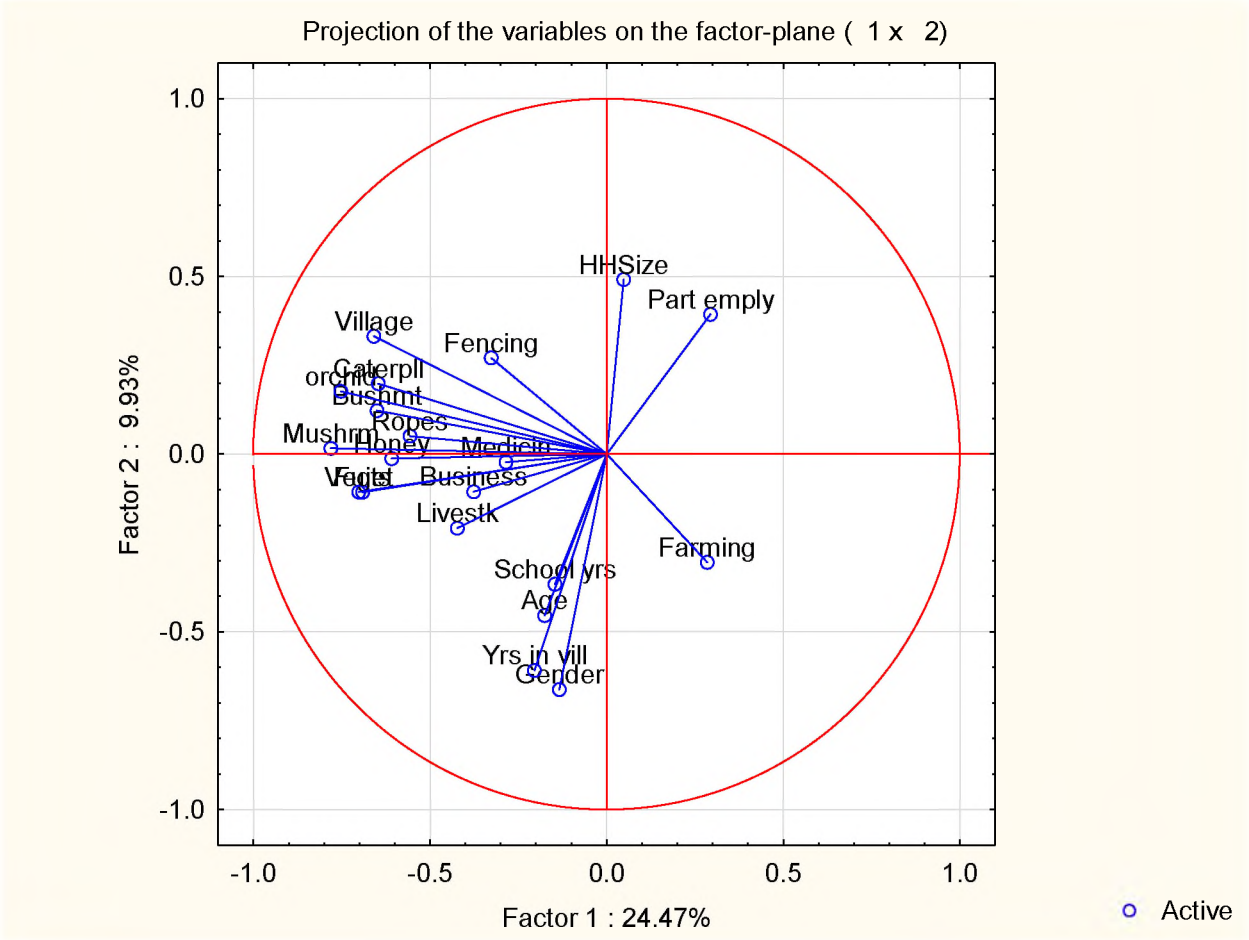

Figure 12: Principal component analysis on NTFP use

There were also differences in the proportion of households within a village buying NTFPs (Table 11). Mpheta village had the highest proportions of households buying a total of nine products (firewood, wood for building, thatch grass, wild fruits, medicinal plants, bamboo, fibre, wild vegetables, and wood for fencing). More than 60% of the interviewed households within Mpheta bought firewood and wood for building. Mtogolo had the highest proportions of households buying mushrooms (46%) and honey (31%), and more than 50% bought edible orchids and edible caterpillars. Mtuluma 1 village had a higher proportion buying bush meat (42%) than any other village. No single household within Mtuluma 1 village bought firewood since it was acquired through self-collection, while Kasonga village had only 2% of the its households buying the product. None of the households within Kasonga village bought thatch grass. Rope fibre and wild vegetables

were not bought in Mtogolo and Mtuluma 1, and Kasonga respondents indicated not buying wild vegetables. Other NTFPs were not bought in Mpheta village because they were available and accessible for self-collection within the wetland.

Table 10: Proportion (%) of households using different NTFPs per village and mean use values per product

	Village				
NTFP	**Mtogolo**	**Kasonga**	**Mtuluma 1**	**Mpheta**	**Mean**
Firewood	100	100	100	100	100
Mushrooms	92	98	88	45	80.8
Thatch grass	100	98	100	92	97.5
Bush meat	69	74	69	26	59.5
Honey	69	74	65	37	61.3
Wild fruits	100	97	100	64	90.3
Wild vegetables	100	100	100	64	91.0
Medicinal plants	85	72	92	67	79.0
Rope fibre	100	93	96	57	86.5
Bamboo	100	93	87	98	94.5
Wood for fencing	92	98	100	68	89.5
Wood for building	85	100	100	89	93.5
Edible orchids	62	97	54	6	54.8
Edible caterpillars	69	84	12	1	41.5
Others	23	44	4	2	18.3
Mean	**83.1**	**88.1**	**77.8**	**54.4**	

Mtuluma 1 village had none of the respondents buying edible caterpillars but few indicated self-collection when in season. Overall there was a significant difference ($F=3.52$; $p<0.05$) with Mpheta and Mtogolo buying more than Kasonga and Mtuluma 1, which were not significantly different to one another.

Overall, mean use and selling were the lowest in Mpheta village. On the contrary mean buying was the highest in Mpheta. This could be associated with the location of the villages as Mpheta had the longest distances to be travelled to reach the main sources of NTFPs, ranging from 5 - 15 km. The other three villages (Kasonga, Mtogolo and Mtuluma 1) were close to forest reserves and had access to the same sources within a range of 1.5 - 2.5 km.

Table 11: Proportion (%) of households buying different NTFPs per village and mean buying values per product

NTFP	Village				
	Mtogolo	**Kasonga**	**Mtuluma 1**	**Mpheta**	**Mean**
Firewood	31	2	0	62	23.8
Mushrooms	46	2	19	17	21.0
Thatch grass	8	0	4	45	14.3
Bush meat	39	34	42	17	33.0
Honey	31	23	23	25	25.5
Wild fruits	23	5	4	43	18.8
Wild vegetables	0	0	0	3	0.8
Medicinal plants	46	30	39	52	41.8
Rope fibre	0	2	0	11	3.3
Bamboo	23	12	8	55	24.5
Wood for fencing	8	17	4	33	15.5
Wood for building	15	33	4	65	29.3
Edible orchids	54	13	35	2	26.0
Edible caterpillars	62	5	0	0	16.8
Others	8	2	4	0	3.5
Mean	**26.3**	**12.0**	**12.4**	**28.7**	

3.2.7 Factors affecting NTFP preferences

A ranking matrix was used to identify the most important characteristics which influenced households to choose the type of NTFP to be traded. The following characteristics were used; income contribution, subsistence use, availability and accessibility, easy harvesting, quantities harvested and marketability. The results were based on how many times the attribute was preferred and arranged in order from the most preferred (Table 12).

There were some similarities and differences between choices of NTFP to be traded. Overall, the responses showed that NTFP easy availability and accessibility, quantities harvested were the criteria which households used. Easy harvesting and marketability came third and fourth respectively. This was based on the argument that even if the products could be available and accessible the amounts to be harvested will determine the amount of cash income which could be generated after sales.

Table 12: Attributes which influence a household decision on type of NTFP to be traded (ranking 1=high; 7=low)

Attribute	Village rank				
	Mtogolo	Kasonga	Mtuluma 1	Mpheta	Mean Rank
Easy availability and accessibility	1	1	4	1	1.8
High quantities harvested	2	3	2	3	2.5
Easy harvesting	3	2	4	2	2.8
Marketability	4	6	1	5	4.0
Easy processing	5	5	3	4	4.3
Subsistence use	4	4	4	6	4.5
Income contribution	4	7	5	7	5.8

Considering the storage challenges associated with some products, they considered easy processing as fifth important bearing in mind that not all products were sold on a single market day. The harvestable amount would determine how much cash income a trader can get from a particular product. Lastly, respondents felt that, despite the products providing monetary benefits they should also meet the subsistence demands of the participating households. Market availability was important for the households to realise the expected cash income from NTFP trade after collecting the products. Responses showed that there are products which could substitute NTFPs on the market including agricultural produce and domesticated fruits such as mangoes, avocado pears, peaches, paw paws and bananas among others. There was no indication of the products being substituted by artificial products, similar but not from the wild environments.

3.2.8 Means of NTFP acquisition and markets

The majority of the households bought the products within their villages, followed by neighbouring villages and local markets. Buying from town markets in Zomba was the last option and only for honey by 1% of the households. Edible caterpillars, thatch grass and other NTFPs were bought in the village. However, few households bought thatch grass from neighbouring villages and local markets. Wild vegetables, rope fibre and edible orchids were products which were mainly bought within the village and local markets, while 67% of the products were bought within the village, neighbouring villages and local markets (Table 13).

Selling of NTFPs was done in various markets almost similar to where they were purchased. The results showed that NTFP selling started right in the village and the product type and use determined the type of market. Eight products were only sold within the village namely; thatch grass, bush meat, medicinal plants, rope fibre, bamboo, wood for fencing, wood for building and other NTFPs. Five products reached town markets in Zomba which were firewood, mushrooms, wild fruits, wild vegetables and edible orchids. However, the only products which were sold across all types of markets were edible orchids and firewood. More than 85% of the households did not sell any NTFPs. At least 47% of the products were sold in local markets with edible orchids having the highest proportion (12%) of the households involved. Additionally, firewood, mushrooms, honey, wild fruits, wild vegetables, and edible caterpillars were also sold in local markets. Three products were sold in neighbouring villages these included; firewood, edible orchids and edible caterpillars. Thatch grass was the product with highest proportion (14%) of households selling the product within the village as a source of construction material.

3.2.9 NTFPs quantities sold and income generated

The quantities sold varied between different NTFPs and various products had different units of measurement (Table 14). The measures included bundles for thatch grass, rope fibre, wild vegetables, medicinal plants and other NTFPs, head loads for firewood (defined as a load of firewood which an adult can carry depending on his or her capability), plates (this refers to a medium sized plate locally known as *mbale ya phazi or nsima* which can hold at least 1.5 litres of water, for wild fruits, mushrooms and edible caterpillars, kilograms for bush meat, litres for honey, poles for wood for building, fencing and bamboo and pieces for processed edible orchids. Most of the households (90%) were not involved in selling firewood, bush meat, honey, wild vegetables, medicinal plants, rope fibre, bamboo, wood for fencing, wood for building, edible caterpillars and other NTFPs. At the same time, 85% of the household did not sell mushrooms, thatch grass, wild fruits and edible orchids. Less than 1% of the households sold the highest quantities of firewood (935 head loads), mushrooms (750 plates), thatch grass (150 bundles), bush meat (15 kg), honey (20 litres), wild vegetables (360 bundles), medicinal plants (40 bundles), bamboo (3,200 poles) and wood for building (600 poles).

Table 13: NTFP acquisition and markets, with proportion (%) of households buying and selling from different markets

NTFP	Proportion (%) of households							
	In the village		Neighbouring village		Local market		Town market (Zomba)	
	Buying	Selling	Buying	Selling	Buying	Selling	Buying	Selling
Firewood	23	6	9	1	10	2	0	1
Mushroom	4	3	1	0	10	7	0	3
Thatch grass	17	14	12	0	1	0	0	0
Bush meat	19	2	1	0	3	0	0	0
Honey	7	0	1	0	15	1	1	0
Wild fruits	6	2	1	0	24	9	0	3
Wild vegetables	1	1	0	0	1	1	0	1
Medicinal plants	18	2	10	0	17	0	0	0
Rope fibre	6	1	0	0	2	0	0	0
Bamboo	34	7	7	0	0	0	0	0
Wood for fencing	16	2	8	0	2	0	0	0
Wood for building	30	6	18	0	3	0	0	0
Edible orchids	5	1	0	1	5	12	0	1
Edible caterpillars	4	3	0	1	0	2	0	0
Others	1	1	0	0	0	0	0	0
Total number per market	**15**	**14**	**10**	**3**	**12**	**7**	**1**	**5**

Furthermore, wild fruits, rope fibre, wood for fencing, edible orchids, edible caterpillars and other NTFPs had 1% of the households for each product selling the highest quantities of 300 plates, 384 bundles, 144 poles, 1,600 pieces, 90 plates and 16 bundles, respectively.

Table 14: Quantities of NTFPs sold per household per year

Type of NTFP	Unit of measure	Median	Minimum	Maximum	Range
Firewood	Headload	10	1	936	935
Mushroom	Plate	10	1	750	749
Thatch grass	Bundles	13	2	150	148
Bush meat	Kg	5	1	15	14
Honey	Litres	2.8	0.4	20	19.6
Wild fruits	Plate	24	1	300	299
Wild vegetables	Bundles	32	10	360	350
Medicinal plants	Bundles	3	1	40	39
Rope fibre	Bundles	197	10	384	374
Bamboo	Poles	40	5	3,200	3,195
Wood for fencing	Poles	60	15	144	129
Wood for building	Poles	50	2	600	598
Edible orchids	Processed pieces	100	4	1,600	1,596
Edible caterpillars	Plate	7.5	1	90	89
Other NTFPs	Bundles	16	16	16	0

Income generated from NTFP trade varied according to the type of product and the quantities sold (Table 15). The highest income contributors to the households were firewood and edible orchids up to a maximum of Mk180,000 annually, while mushrooms were the second with Mk67,500 realised in a year. Thirdly, bamboo also contributed a notable amount of income of up to Mk64,000 per year. However, bush meat and other NTFPs contributed the lowest income annually of Mk9,000 and Mk8,000, respectively.

Table 15: Proportion (%) of households earning income from NTFPs (Mk/year)

NTFP	Income generated (Mk) per year and proportion (%) of households in each category					
	0-0	100-30,000	30,500-60,000	60,500-90,000	90,500-120,000	Above 120,000
Firewood	90	8	1	0.3	0.3	0.3
Mushrooms	87	13	0.3	0	0	0
Thatch grass	85	15	0	0	0	0
Bush meat	98	2	0	0	0	0
Honey	86	14	0	0	0	0
Wild vegetables	98	2	0	0	0	0
Medicinal plants	99	1	0	0	0	0
Bamboo	93	7	0.3	0.3	0	0
Wood for fencing	97	3	0	0	0	0
Wood for building	92	7	1	0	0	0
Edible caterpillars	93	7	0	0	0	0
Edible orchids	87	9	2	0.3	0.3	1
Other NTFPs	99	1	0	0	0	0

The lowest-earning worker's annual income in Malawi with the current minimum wage set at Mk551/day for a six days working week, gives a total weekly income of Mk3,306 translating into a monthly income of Mk14,326 (working for an average of 26 days/month) and annual income of Mk171,912. Overall, cash generated from one NTFP product in a year was lower than the lowest-earning worker's annual income in Malawi. The exceptions were firewood and edible orchids where a few households earned Mk180,000 (US$456) for each product (Table 16). This was 5% more cash generated annually than the lowest-earning worker's amount. Some households involved in selling firewood, mushrooms, bamboo and edible orchids earned between 18% - 52% of the lowest-earning worker's annual cash income. Most of the households involved in trading all the products, proportionally they earned less than half the lowest-earning worker's

annual income (1% - 35%). The traders were self-employed through NTFP trade despite the variations in amounts earned.

Table 16: Exchange rate United Stated Dollar to Malawi Kwacha

US$	Mw Kwacha equivalent	Month and Year
US$1	MK394.431	September, 2014

However, many households in the study villages were trading multiple products (Table 17). Generally, the more products were traded, the more cash income was earned (except for three products). At the top and end of the range, those who traded two and more than five products thus earned more than the annual minimum wage. However, the amounts realised were determined by the type of multiple products and quantities sold. There were cases where two products generated more cash income than four or three in this study. The two products were in different combinations for instance, firewood and thatch grass; mushrooms and edible orchids; and edible caterpillars and edible orchids.

Table 17: Cash income generated from selling multiple NTFPs (Mk/year)

No of NTFPs sold	Median[a]	Minimum	Maximum	Range	No. of cases (n)
One	3,675	100	126,000	125,900	40
Two	13,500	100	185,000	184,900	27
Three	8,500	3,300	50,500	47,200	11
Four	14,425	2,100	172,400	170,300	16
Five	23,200	3,800	118,850	115,050	7
More than five	29,300	5,400	196,300	190,900	9
Overall	7,900	100	196,300	196,200	110

[a]*Median was used instead of mean and standard deviation because of high variability of the data.*

Selling more than one product did not translate into earning more cash income, some generated lower cash compared to the lowest-earning worker's annual income. The differences could be attributed to the product type combined, availability and accessibility of the products associated with deforestation status and the level of experience among the opportunistic or specialist traders.

The median income in Malawi kwacha (Mk) was 4,000 for firewood, 1,500 for bamboo, 7,100 for edible orchids, and 2,000 for mushrooms (Table 18). Furthermore, the

minimum total incomes realised were Mk250 for firewood, Mk129 for bamboo, Mk200 for edible orchids and Mk100 for mushrooms. The income range was Mk179,750 for firewood, Mk63,880 for bamboo, Mk179,800 for orchids and Mk67,400 for mushrooms. The income range generated in US$ was 456, 394, 171, 162, 23 and 20 for firewood, edible orchids, mushroom, bamboo, honey and other NTFPs, respectively.

Table 18: Total income from NTFP per selling household (Mk/year)

Type of NTFP	Median	Minimum	Maximum	Range
Firewood	4,000	250	180,000	179,750
Mushrooms	2,000	100	67,500	67,400
Thatch grass	2,500	100	25,000	24,900
Bush meat	5,000	500	9,000	8,500
Honey	4,750	600	10,000	9,400
Wild fruits	2,000	200	10,000	9,800
Wild vegetables	1,600	400	18,000	17,600
Medicinal plants	1,800	100	20,000	19,900
Rope fibre	15,500	3,000	28,000	25,000
Bamboo	1,500	120	64,000	63,880
Wood for fencing	6,000	750	16,000	15,250
Wood for building	6,000	200	40,000	39,800
Edible orchids	7,100	200	180,000	179,800
Edible caterpillars	2,500	150	12,000	11,850
Other NTFPs	8,000	8,000	8,000	-

However, distance to markets did not affect the amount of cash income realised by the participating NTFP traders. This was evident from edible orchids traders from Kasonga who were among those realising substantial amounts of cash even though their main market was the furthest compared to the rest of the villages (Table 19). The most important aspects are quantities which can be sold regardless of where the markets are located. Availability and accessibility of the products are important in sustaining NTFP traders' cash income from various products.

Table 19: Main market (s) for the study villages and the estimated distances

Village	Main market (s)	Estimated distance (km)
Kasonga	Songani	14
Mtogolo	Songani	1.5
Mtuluma 1	Chinseu	7 - 9
	Msosa	5
Mpheta	Mpita	8 - 10

3.3 Discussion

3.3.1 The dynamics of NTFP use and trade

3.3.1.1 NTFP use

The study revealed that all households used, bought and sold NTFPs in various markets. These products were mostly used for energy, food, construction, fencing and for medicinal purposes as shown in other studies by Saha & Sundriyal (2012) in Northeast India and Lowore (2006) in Malawi. The socio-economic benefits from NTFPs are derived through consumption of forest goods and services (FAO, 2014). Forests in Malawi play an important role in alleviating poverty and helping rural communities meet their daily livelihood needs and as a coping strategy (Fisher, 2004; Kamanga et al., 2009; Fisher et al., 2010). The poor rely heavily on subsistence products such as NTFPs which are harvested from the natural areas as noted by Howell et al. (2010), that collection of the products at all three time periods was the highest for the absolute poverty group (26%) and Angelsen et al. (2014) in his comparative analysis study from 24 developing countries. Considering the education levels of the majority of the households' heads, dependence on NTFPs will still be there in the study villages. This will be exacerbated by the majority of them not employed either on full time or part time basis.

However, the proportion of households involved in using, selling and buying NTFPs varied among the villages and within the products. This study found that firewood was used by all interviewed households as also evident from the studies of Fisher (2004) and Saha & Sundriyal (2012) who also found that all households used firewood in tribal

communities of Northeast India and Malawi, respectively. This was not surprising because in Malawi the majority of households in rural areas use firewood, (NSO, 2011). Few households in rural areas have electricity with 2% only at national level (NSO, 2011). The study found that firewood was used as a major source of energy for cooking. Wood energy is normally the only energy source in most rural areas, especially for less developed countries and important for poor people, which is also the case in Malawi, and accounts for 27% of the main energy supply in Africa (FAO, 2014).

Additionally, households in the four villages used mushrooms, thatch grass, bush meat, honey, wild fruits, wild vegetables, medicinal plants, rope fibre, wood for fencing, wood for building, edible orchids, edible caterpillars and other NTFPs. In the study villages the majority of the households collected and used the products for self-consumption, also evident from the study of Mukul et al. (2015) conducted in Bangladesh, while some were sold. The study further revealed that the majority of the households used NTFPs since they were considered as free products supporting the findings of Paumgarten & Shackleton (2009) in South Africa also a country within southern Africa. In this study the most used products included firewood, wood for building, bamboo, and thatch grass, as shown in the findings by Saha & Sundriyal (2012) and Kaoma & Shackleton (2014). In their studies the use of thatch grass and bamboo as building materials was also high and most households (91%) used firewood, collected or purchased. Furthermore, the findings are also in accordance with the findings of Asfaw et al. (2013) in Ethiopia where firewood was used by 89% of the households. The common roofing materials in Malawi are grass (62%) and iron sheets (37%), (NSO, 2011). The study found that thatch grass was one of the widely used construction material for most of the houses in the study villages. The study further found that some NTFPs were consumed directly and thereby provided a subsistence function or strategy to the households, as also noted by Belcher et al. (2005) and Belcher & Schreckenberg (2007) in their case studies from around the world.

This study found that the proportion of households using different NTFPs varied across the villages with notable differences for those located close to the forest reserve boundaries and within the forest territory and those away from the sources, echoing the

findings of Ngeleza & Lokina (2014) in a neghbouring country, Tanzani. The households in the three villages closer to the forest resource had an opportunity to get most of the products through self-collection whereas households in Mpheta were more reliant on buying. NTFP collection was used as a means of coping with food supply and medicine to those households which collected, sold and bought them. Also, noted by Ahenkan & Boon (2011), that households living near forests are active collectors of NTFPs and more dependent on them. However, dependence of households on NTFPs increases with availability of the products in areas which are associated with less deforestation and reduces if quantities are reduced (Fisher et al., 2010). Despite Mtogolo, Kasonga and Mtuluma 1 villages being close to the sources and major forest reserves not all households used all NTFPs which they could get from the sources through self-collection and few were bought. This was attributed to the levels of deforestation and perhaps labour dynamics which in turn affect what is available and accessible to the communities.

Due to deforestation NTFPs could be available but not accessible because of where they need to be collected such as steep slopes and risky environments. Households choose not to use some of the products unless they access them through other means. Though the mentioned villages were close to the forest, the forest cover and deforestation were variable across the villages. This supports the findings by Lowore (2006) who found that deforestation is associated with product loss over time forcing collectors to walk long distances, or substitute the products with similar or different species. This study further found that less than half of the households (42%) used bush meat and only 2% had access to the resource for trade due to scarcity, also evident from the study of Lowore (2006) in Malawi, who found that sometimes if the situation is worse, where deforestation has resulted in scarcity of the products the communities decide to do without the products.

3.3.1.2 NTFP acquisition

This study found that apart from collecting the products from the forest, trees outside the forest and other wooded lands, households also acquired them through buying from different markets. All the products were bought within the village with the majority available in neighbouring villages and local markets. Most of the products in the study

were bought by some households. However, few households bought NTFPs compared with those who were using them, demonstrating more reliance on self-collection.

In the study villages the most widely bought NTFP was wood for building; Lowore (2006) also noted that some households which failed to collect on their own purchased the products, as did Shackleton & Shackleton (2004) in South Africa. NTFP collection may be labour intensive for some products and some households prefer not to engage in collecting them if there are higher incomes earning alternatives available as noted by Marshall et al. (2006a) in their study on lessons from Mexico and Bolivia in commercialisation of NTFPs. This study found that some households were not involved in buying certain NTFPs because they collected them on their own. In some cases households substituted rope fibre with wire from inside old tyres locally known as *(Linya)* for construction purposes due to challenges associated with availability and accessibility of the products, supporting the findings of Lowore (2006) in Malawi where products were substituted when accessibility was a challenge.

The results are context specific with the study differing from the findings of Shackleton and Shackleton (2006) that 98% of the rural households were engaged in the buying of NTFPs while in this study it was only 50% as the highest proportion. These could be attributed to different locations, labour requirements, economic wellbeing and local availability of the NTFPs. Location of the study villages and wealth category could also have an impact on behaviour of households in buying the products. Paumgarten & Shackleton (2009) noted that poor households bought NTFPs which they could not collect because they were not locally accessible and required participating households to acquire skills, whereas wealthy ones did because they had sufficient disposable cash income to purchase rather than collect. Different socio-economic groups utilise forest products and benefit differently (Vedeld et al., 2007).

This study found that not all the products were accessed through self-collection, some were purchased from markets. There were no formalised marketing systems in the study villages similar to the findings by Steele et al. (2015) for a study conducted in South Africa, as most of the products were bought from local markets, within the village, from neighbouring villages, and few town markets in Zomba. Households in Mpheta village,

which was located away from the main sources of NTFPs, bought a total of nine products, while in the other three villages fewer products were bought. Households within Mtuluma 1 did not buy any firewood, relying entirely on self-collection. This agrees with findings by Bandyopadhyay et al. (2011) that in Malawi 90% of poor households collect their own firewood. This was associated with the level of forest cover and deforestation and proximity to some of the major sources of the NTFPs which eased availability and accessibility of the products. This was a saving on the part of the household because the products were not bought and provided alternative use of the money to meet other household needs also noted by Shackleton & Shackleton (2004).

3.3.1.3 NTFP trade

The results showed that some households earned cash income from NTFPs apart from using them for consumption. The majority of the households were not involved in NTFP trade. Only five products had more than 10% of the households selling them, i.e. firewood, mushrooms, thatch grass, wild fruits and edible orchids. Few households traded bush meat, honey, wild vegetables, wild fruits, medicinal plants, rope fibre, bamboo, wood for fencing, wood for building, edible caterpillars and other NTFPs. This could be attributed to availability, accessibility and quantities harvested which were usually within the carrying capacity of the collector as noted by Saha & Sundriyal (2012). Other studies elsewhere have shown that NTFP trade forms an important part of rural income in many poor regions and countries (Vedeld et al., 2007; Wiersum et al., 2014). Furthermore, families with large labour resources can collect more NTFPs, in turn selling more than households with less time available (Adam et al., 2013).

Additionally, forest cover and deforestation rates determined the number and quantities of products to be sold by a household. However, despite the three villages being close to the major sources of NTFPs, Zomba and Malosa forest reserves, the number of products sold and proportion of households involved was influenced by the quantities available for harvesting. Over a third of the households in Mtuluma 1 village were engaged in trading four products, in Kasonga two products and Mtogolo only one product. This was associated with the forest cover status as Mtuluma 1 had medium-high forest cover associated with medium deforestation. Mpheta had the lowest proportions (less than

10%) of households engaged in NTFP trade for 11 products (firewood, mushroom, wild fruits, wild vegetables, medicinal plants, rope fibre, wood for fencing, wood for building, thatch grass, bamboo and other NTFPs) associated with low forest cover and distance to the sources. None of the households sold bush meat, honey and edible caterpillars. Although Mtogolo is a boundary village for Malosa forest reserve, its forest cover status is low-medium associated with high deforestation rate. This in turn affects the availability and accessibility of the products. In all villages, almost all the products were traded within the village with some reaching local markets, town markets and neighbouring villages. Also, noted by Saha & Sundriyal (2012) that most of the NTFPs are sold in local markets while providing cash income to the participating households. Most of the traders were working as individuals and not a group with other traders to increase their bargaining power in the market place as noted by Awono et al. (2010).

The findings showed that NTFPs were sold to contribute to household cash as a supplementary source to the other main sources of income and to meet food and household expenses, also noted by Vedeld et al. (2007) and Paumgarten & Shackleton (2009). For instance, fruit sales were noted as important for supplementing cash income during times of hardship or emergency in the study villages, supporting the existing past and present literature (Arnold & Ruiz Peréz, 2001; Schmidt, 2005; Adam et al., 2013). The study further revealed that most households relied on farming as an important source of cash income, while business and NTFP trade came second and third, respectively, mirroring the agricultural base of the broader economy of Malawi. NTFP trade helps households during tough economic situations e.g. crop failure, price reduction of the agricultural produce, price increase of agricultural inputs, floods or droughts, and inflation limiting households buying capacity (Mukul et al., 2015), similar to the situation in Bangladesh also a poor developing country. The quantities sold and cash incomes generated were different across the three study villages due to the deforestation status which were determined by the availability and accessibility of the products despite that there were close to forests. This confirms the findings by Kamanga et al. (2009) who found that in Malawi, Chiradzulu district households without access to forests had less income than those with access.

Households in the study sites participated in more than one income generating activity to supplement consumption and cash income to prevent them from falling into deeper poverty (Howell et al., 2010). For instance, in Bangladesh NTFPs supported livelihoods for about 18% of the sampled households and contributed 19% of household net annual income (Mukul et al., 2015) and 32% of the poor rural people in Ghana realised more than half of their total income from NTFPs (Ahenkan & Boon, 2011).

Varying levels of cash income were realised from different NTFPs. Firewood and edible orchids provided good revenue to the participating households, up to a maximum of US$ 456 (Mk180,000), while the lowest cash income was US$20 (Mk8,000) per year from other NTFPs. Despite the fact that only two products contributed the highest cash income to few households, the others were considered important as they contributed the cash when other sources were limited or not available. The study confirms findings of other studies by Vedeld et al. (2007) who noted that the main sources of NTFP income were firewood, wild fruits, and thatch grass, and Asfaw et al. (2013) also noted the same trend for communities around Jelo Afromontane forest where firewood provided the largest proportion of NTFP income. NTFP collection and trade becomes attractive when traders expect to obtain a rewarding return on their effort (Steele et al., 2015). Similarly, the price received from the market is important to sufficiently justify the trade-off between NTFP collection and other income generating activities (Steele et al., 2015). The quantities sold, prices on the market and types of markets available affect the amount of revenue from NTFP trade. Price received from the market for the products is important (Steele et al., 2015). Other studies found that price limits the opportunity of NTFP collectors to earn substantial income and as a result it is usually not an attractive source of income for wealthy households (Mujawamariya & Karimov, 2014; Mahapatra & Shackleton, 2012), unless there is significant specialisation and value addition (Belcher et al., 2005) There was a strong association between NTFP trade and farming as an important source of cash income for the household (Appendix 4), as well as a significant relationship between NTFP trade and number of months the household had food from their own garden. A household would decide to collect NTFP and participate in the trade when they run out of food. Availability and accessibility of the resource was important to meet the demand of the food insecure households. Cash income from NTFP trade

contributes to food purchases and helped in overcoming shortfalls. The findings validate some other findings in the literature (Ahanken & Boon, 2011:Adam et al., 2013) that NTFPs perform a variety of functions from assisting households to secure food supply and wealth accumulation.

In the study villages livestock ownership was weakly associated with NTFP trade, meaning households which owned livestock were less likely to collect NTFPs and sell them. Livestock are household assets which are usually sold during lean periods of the year by rural communities in Malawi to buy food. Therefore, livestock ownership and the household relying on NTFP trade represent similar strategies for cash income to help households in times of need as a safety net or coping strategy also evident from the finding of Shackleton & Shackleton (2004) and Babulo et al. (2009) in South Africa and Northern Ethiopia.

The limited number of product markets available is often a factor limiting cash income from NTFP trade (Adam et al., 2013). According to a meta-analysis study of 51 case studies from 17 countries, the results revealed that, even though the incomes may be considered small they may be the most important to families living close to the survival line (Vedeld et al., 2007) and supply supplemental cash when other sources failed to meet households needs, filling regular income gaps (Howell et al., 2010; Nasi et al., 2011). This study also found that the highest quantities which were harvested were from firewood and edible orchids resulted in substantial amount being realised by the traders, confirming the argument that the amount earned depends on the quantities harvested and sold.

Despite the annual income for a lowest waged worker being higher than the annual income of an NTFP trader for most of the products, the returns per hour for mushrooms, edible orchids, thatch grass and wild fruits were much higher than the returns per hour for the lowest-earning worker based on the national minimum wage in Malawi. This is important because in many areas such as rural Malawi casual work is limited or non-existent. The returns per hour were dependent on the type of product, with edible orchids giving the highest returns in Kasonga, mushrooms in Kasonga and Mpheta, thatch grass in Mpheta and wild fruits in Mtogolo. The key parameters determining the returns may

include, availability and accessibility of the resource, i.e. distance to be travelled or time required collecting, travelling to the market and selling the resource and the quantities to be harvested.

3.4 Conclusion

Harvesting of NTFPs was widespread by households in the four study villages. These were used for construction, energy source, consumption, as medicine and for income generation. However, the level of use, buying and selling is dependent on a number of factors including availability, accessibility which is affected by forest cover, deforestation status and distance to the sources. Whether or not a village is close to the sources, households will still use NTFPs by acquiring them using other means other than self-collection or use substitute products or do without them when scarce.

These had an impact on the number of products which a household could access through self-collection, buy or sell in the study villages. This influence was largely negative evident from the limited quantities and cash income generated after the sales. NTFP trade was noted as one of the important sources of cash income for some households, with the majority relying on farming, and NTFP trade coming third. Despite the fact that few households realised substantial amounts of income via NTFP trade, with the majority earning small amounts, the trade supplemented household cash income which helped to meet other household needs when the other options were not available. Few products provided considerable revenue to households which were associated with quantities collected, sold and the prices offered in the markets. Although the majority of the households were not benefiting through NTFP trade (cash income), they benefited directly through household consumption and demand for the products will remain despite the small harvestable amounts available.

CHAPTER FOUR: VALUE CHAIN ANALYSIS FOR MUSHROOMS, WILD FRUITS, EDIBLE ORCHIDS AND THATCH GRASS

4.1 Introduction

Value chain analysis has been used as a tool for understanding socio-economic benefits, challenges and risks for different actors (Booker et al., 2012). Value chains describe the transactions as NTFPs are harvested, processed, sold and used (Booker et al., 2012; Tieguhong et al., 2015). Most NTFP trade operates in informal micro-economic environments and has no, or only limited, access to larger markets or end-use value chains (Mahapatra & Shackleton, 2011). Yet successful commercialisation of NTFPs relies on the existence of an accessible market, promising demand and access by producers, processors and traders to markets and information (te Velde et al., 2006). NTFP cash income potential also depends on what is done to the products along the value chain until they reach final consumers (te Velde et al., 2006; Wiersum et al., 2014). Therefore, NTFP traders' returns can be increased if they add value to the products because this will influence their final share of the total value chain (Mahapatra & Shackleton, 2011). Additionally, the ability to negotiate prices in a value chain and prescribe the rules of trade helps in determining the satisfaction levels of all actors in the chain (Marshall et al., 2006a). Value chain analysis focuses on actors' relations and their complex networks (Schure et al., 2013) and assists in mapping and categorising the economic processes involved in the chain. Furthermore, a value chain analysis enables understanding of the length of the chains, quantities and prices, values at different stages, and the actors involved (Jensen, 2009), to help to identify points for interventions.

Different actors play different roles in value chains and intermediary traders can play a vital part by providing access to lucrative markets (Lowore, 2006). However, although intermediary traders play an important role, the distribution of income along the product value chain varies, often leaving the collectors highly vulnerable due to higher margins on prices received by different actors further up the chain (Nkem et al., 2010). It is important to recognise that, sometimes small suppliers depend on larger buyers to trade their products making them price takers and resulting in a captive value chain dominated by powerful individuals or companies (te Velde et al., 2006). For example, the *Camedora*

palm value chain in southern Mexico is dominated by one individual who contributed to the development of new markets outside the country, but whose action negatively affects other suppliers since he is both a buyer and a supplier (te Velde et al., 2006). Actors' characteristics and distance to the end consumer define markets for products in a value chain rather than geographically defined markets (Jensen, 2009).

The length of the chain, and the number of intermediaries, if large, influences the final prices offered, hence determining the value received by actors (Jensen, 2009). Some are short, e.g. in Oaxaca, Mexico, fresh mushrooms are sold directly to local consumers (te Velde et al., 2006). In contrast, the dried mushrooms have a longer national chain with the products being sold to consumers in several large Mexican cities (te Velde et al., 2006), as well as global value chains with the products being sold outside the country to Europe and Japan. The length of the value chain has an impact on the returns to NTFP traders. Short chains rely on markets within the village or local markets resulting in low returns due to oversupply as all traders meet at the same market (Jensen, 2009).

Jensen (2009) outlined three value chain phenomena indicative of a well-governed value chain; the presence of intra-trade (trade between actors, where harvesters were trading with other harvesters) resulting in price increases; large numbers of actors involved in the trade with differences in vertical integration; and the level to which knowledge and experiences in trade determines prices in individual transactions.

Different groups are involved in a value chain, e.g. men and women; they play different roles or similar ones at different stages depending on the type of the product and location (Shackleton et al., 2011). Notable differences can be seen between products based on tenure and governance arrangements, length of the value chain, degree of value addition, accessibility and technologies required to harvest or process it (Shackleton et al., 2011). Jensen (2009) also noted that there were differences in the number of actors, their characteristics and prices between products.

This chapter presents the results from an in-depth survey. The aim of this chapter was to analyse the value chains of selected NTFPs (objective three) to understand: (i) availability and access to the resource, (ii) who participates in the trade and why? (iii) the

structure of the value chain, and (iv) returns to labour for traders. The study analysed the value chains of mushrooms, wild fruits, thatch grass, and edible orchids.

4.2 Methods

4.2.1 Data collection

An in-depth survey was carried out to analyse the value chains of mushrooms, wild fruits, edible orchids and thatch grass. These four products were selected as they were the most commonly traded products, reported by more than 13% of households in the household survey discussed in Chapter 2. Mushrooms, wild fruits and thatch grass were collected and traded from all the four study villages. Although edible orchids were only found in Kasonga, they were included because the majority of the households (64%) were involved in the trade within the village (Table 20). The in-depth product survey used a range of rapid rural appraisal methods.

Table 20: Scientific names of selected wild fruits, mushrooms, edible orchids and thatching grass

Scientific name	Common name	Local name	Remark
Uapaca kirkiana	Wild loquat	Masuku	Widely traded
Flacourtia indica	Governor's plum	Nthema	Mostly consumed due to small quantities harvested
Vitex payos	Chocolate berry	Ntonongoli	
Parkia filicoidea	African locust bean	Mkundi	
Azanza garckeana	Snot apple	Matowo	
Ximenia caffra	Large sour plum	Mphinjipinji	
Strychnos spinosa	Monkey ball	Mateme	
Basidiomycota spp.	Mushrooms	Bowa	Common in miombo woodlands
Ascomycota spp.			
Disa robusta	Edible orchids	Chikande	Common species in Zomba which strive in montane grasslands
Disa zombica			
Satyrium ambylosaccos			
Hyparrhenia hirta	Thatching grass	Udzu	

Firstly, focus group discussions were held separately with a group of traders for each of the selected NTFPs in each village, resulting in a total of 13 focus groups. In this study a

trader is an individual who was involved in both harvesting and selling NTFPs. The focus group participants were mainly identified through the household survey (see Chapter 2); with all those who indicated that they sold NTFPs being contacted for a follow up in-depth survey (Appendix 7). In some situations snowballing was used to identify additional traders. This was necessitated by a situation where some households were trading multiple products and to avoid involving them in two or three interviews they were asked to identify others who were also involved in a similar trade.

The focus group discussions were in two sessions and guided by a checklist of questions (Appendix 9) aimed at understanding what motivated traders to participate in NTFP trade, the sources of the products, the value chain for mushrooms, wild fruits, edible orchids and thatch grass. The groups also produced value chain diagrams for the study products.

Secondly, a community timeline was undertaken in each of the four villages with men and women in one group for all products. This was done to understand the most important events which happened in the village and had an impact on NTFP availability. Selection of these focus group respondents was based on their engagement in NTFP trade identified through the household survey and participants of different age groups were involved.

Thirdly, key informant interviews (64) were conducted with NTFP traders (Appendix 8) and four with Department of Forestry staff (two Forestry Assistants, a District Forestry Officer and one Patrol Man), also guided by a checklist of questions. The aim was to get perceptions from the Forestry Staff on how NTFPs are benefiting households in the study villages, any changes on forest/vegetation cover and how they support the communities to promote NTFP trade. Additionally, these forestry staff held different positions at different levels which provided an opportunity to triangulate the information provided. Patrol Man was involved in patrols; implementation of the management plans at village level, Forestry Assistants facilitated all forestry related activities while the District Forestry Officer was at policy influencing level. A total of 21 wild fruit traders, 18 mushrooms traders, 20 thatch grass traders and five edible orchids' traders were interviewed as key informants (Table 21). Five edible orchids' traders were interviewed

because it was not found and harvested in any other village other than Kasonga. The study design targeted at least a minimum of five traders per product to be interviewed based on the time and resources available.

Lastly, direct observations were used to appreciate the estimated distances to the sources of the products, time spent to get the resource and triangulate information that was provided by the respondents. All focus groups and key informant interviews were recorded in note form together with digital recordings after obtaining oral consent from the participants. Quantitative data on value addition was collected through a household survey.

Table 21: Number of NTFP traders interviewed per village and product

Village	**Number of key informants interviews with traders /product**			
	Wild fruits	Mushrooms	Thatch grass	Edible orchids
Mtogolo	6	3	6	-
Kasonga	5	5	4	5
Mtuluma 1	5	5	4	-
Mpheta	5	5	6	-
Total	21	18	20	5

4.2.2 Data analysis

The qualitative data were analysed using thematic analysis. Firstly the data were transcribed; the field notes were typed based on the raw data. The data analysis involved reading, examining and identifying passages of the text which were linked by a common theme. This allowed categorisation of the information and establishment of a framework of thematic ideas which addressed the research objectives and questions (Gibbs, 2007). The themes were regarded as patterns across data sets that were important to the description of an event. Similarities and differences were analysed between different products and villages. The quantitative data was analysed using SPSS 16.0, to calculate the proportion (%) of households involved in value addition activities for the different products.

4.3 Results

4.3.1 Sources, access and management arrangements

The NTFPs under study were largely collected from forest reserves, wetlands, hills, cultivated lands, ant hills, river banks, fallows (uncultivated land) or cultivated, trees outside the forest, other wooded lands, graveyards and graveyard boundaries (Table 22). Collectors and traders from Kasonga village had to travel an estimated distance of 1.5 km into Zomba-Malosa forest reserve, while Mtogolo traders had to travel 2 km into Malosa forest reserve and 2.5 km into Zomba forest reserve. In Mtuluma 1 they had to travel 2 km into Malosa while those from Mpheta travelled an estimated distance of 5 km into Liwonde forest reserve and 14 km into Chikala hills. Mpheta village was noted to be away from the major source of the products. These were estimated as the minimum distance to be travelled into the forest reserves holding other factors such as terrain and routes constant. Across the four villages mean travel times were 1.1 hours in Mtuluma 1, 1.6 hours in Kasonga, 2.2 hours in Mtogolo and 3.8 hours in Mpheta.

Respondents stated that they relied heavily on the forest reserves as their major sources for most of the products where substantial amounts were collected, much more than any other source. The most reliable source of mushrooms and wild fruits was the forest reserve, while edible orchids were harvested from the grasslands within the Zomba-Malosa forest reserve. Most thatch grass was sourced in the forest reserves and fallows. Graveyards and their boundaries were observed to be some of the few places which had high tree species diversity outside the reserves since surrounding areas were deforested and cleared for agricultural production. These were used as easy alternative sources where traders could collect wild fruits though in smaller quantities than travelling long distances and working in risky environments for better quantities. Culturally, graveyards are respected and no one can cut down a tree without a directive from the village head; therefore conservation in these places is self-implemented.

Table 22: Summary of NTFP sources and estimated travel time to reach them

NTFP	Village	Sources	Travel time (hour)
Thatch grass	Kasonga	Hills, and cultivated areas	0.5-1
	Mpheta	Lake Chilwa wetland, river banks and fallow lands	0.01-1.5
	Mtuluma 1	Village forest area, river banks and fallow lands	0.1-1
	Mtogolo	Mulinda hill, Malosa forest reserve, river banks, fallow lands and graveyard boundaries	0.15-1.5
Wild fruits	Kasonga	Zomba-Malosa forest reserve	2
	Mpheta	Chikala hills	4-5
	Mtuluma 1	Zomba-Malosa forest reserve and river banks.	0.5-3
	Mtogolo	Malosa forest reserve, Mulinda hill, river banks and graveyards	0.15-8
Mushrooms	Kasonga	Zomba-Malosa forest reserve, cultivated lands, and fallow lands	0.1-3
	Mpheta	Mposa hill and ant-hills	4-8
	Mtuluma 1	Zomba forest reserve and ant-hills	1
	Mtogolo	Malosa forest reserve, Mulinda hill and ant-hills	0.3-3
Edible orchids	Kasonga	Zomba-Malosa forest reserve	2

Households enjoyed open and equitable access for all the products, i.e. mushrooms, wild fruits, edible orchids and thatch grass. However, in Kasonga and Mpheta villages, permission was required if thatch grass was to be collected from other peoples' fields. While wild fruits were regarded as products to be collected without getting any permits on open access lands, harvesters from Mpheta village had to pay fees to enter the forest reserve. Similarly, in Mtogolo village, they had to get permission from the village head if collection was to be done from graveyards.

To enhance management of some of the other forest areas respondents indicated involvement through co-management arrangements for forest reserves and establishment of village natural resources management committees for forest areas on customary land. Through co-management arrangements the forest reserves were divided into blocks of land assigned to villages which were directly benefiting from the reserves and a block management committee was elected to facilitate the management processes.

4.3.2 Value addition to NTFPs

Some of the NTFPs sold did not undergo any value addition processes as typified by thatch grass, bush meat, wild vegetables, rope fibre, and other NTFPs (Figure 13). However, 11 products were subjected to value addition though with a small proportion of households involved. Less than 5% of the households were involved in value addition for the following products firewood, wild fruits, wood for fencing, wood for building, medicinal plants, honey and bamboo. The main value addition activities done were grading according to size, processing and packaging, and making furniture from bamboo. The benefits were changes in prices especially for bamboo furniture while the other activities were simple and had small impact on the prices. In the case of mushrooms, 8% of the households were involved in adding value (grading), while 14% processed edible orchids and 5% processed edible caterpillars, both of which must be processed before sale. For edible caterpillars this involves boiling, salting and sun drying before taking them to the market.

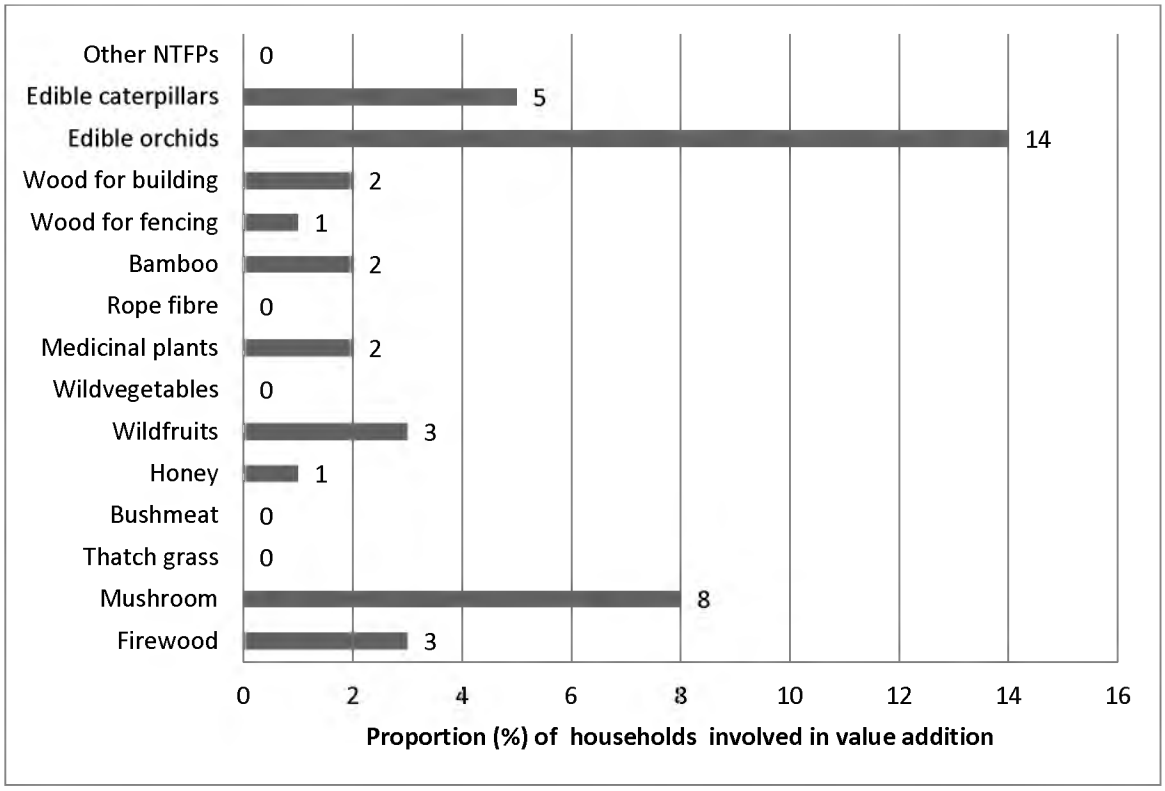

Figure 13: NTFPs and the proportion (%) of households involved in value addition

4.3.3 NTFP value chains

The study analysed the value chains of mushrooms, wild fruits, edible orchids and thatch grass to understand the coordination amongst the actors, projected relationships between the processes and how the participating households benefited. A stylised description of the value chains (Figure 14) highlights the fact that there were more similarities than differences between the chains for the four products, all of which have short value chains. The first step in the value chain is the harvesting. The products were then transported home before selling. Mushrooms and wild fruits were cleaned and graded according to size, while edible orchids were cleaned and further processed.

Processing edible orchids involved pounding the orchid tubers in a mortar and cooking them with *chidulo* – locally made baking powder. In Kasonga the best *chidulo* was collected from the ash of burned banana leaves. Chidulo was used as a source of sodium bicarbonate and was considered the best way of processing edible orchids. The mixture was poured into a winnowing basket (*lichelo*) to cool and solidify, before being cut into pieces of different sizes for sale in the village, neighbouring villages, local and town markets.

Some products were packaged simply in plastic bags of different sizes to attract buyers by making it easier for them to carry the product home. The prices were determined by the size of the product. Thatch grass was the only one of the four products that was stored, often being kept until the rainy season when it fetched better prices due to high demand.

The shortest chain ended with the products being sold within the village directly to end users or through intermediaries. All products were sold direct to users and/or intermediaries. However, thatch grass was largely sold within the village. While mushrooms, edible orchids and wild fruits entered the value chain and ended with consumers within the village, local and/or town markets.

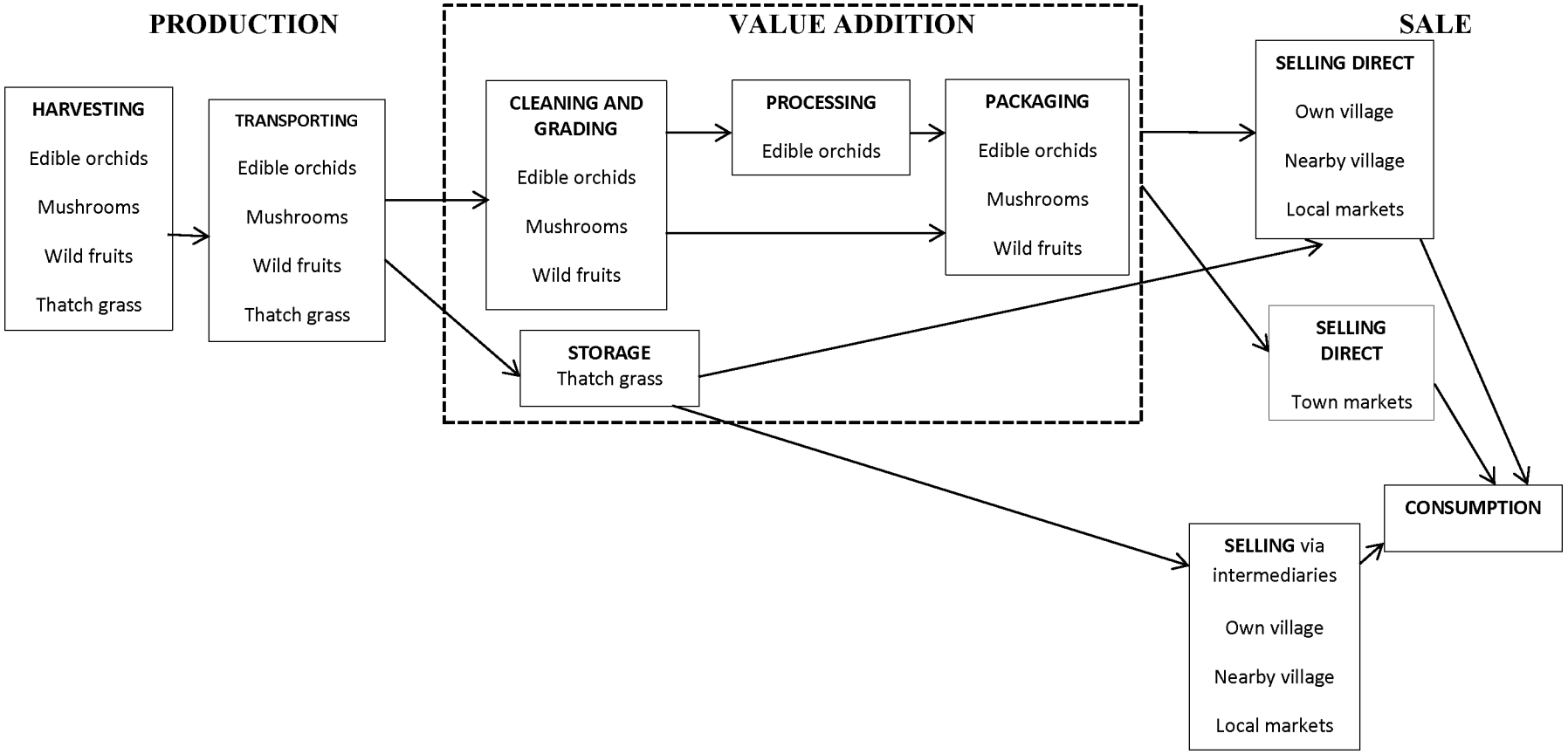

Figure 14: NTFP value chains for mushrooms, edible orchids, wild fruits and thatch grass

The total quantities which were sold per annum varied between products. A total of 750 plates of mushrooms, 300 plates of wild fruits, 1,600 pieces of processed edible orchids and 150 bundles of thatch grass were the highest quantities sold for each product cumulatively per household in the study villages. The highest quantities sold per product by a household per annum excludes quantities consumed The numbers of frequent traders (defined as those people who would still collect NTFPs no matter what challenges they faced, were experienced and hardworking). An estimate by respondents revealed 33 for mushrooms, 56 for wild fruits, five women for edible orchids and 44 for thatch grass across the four villages in the value chain (Table 23). The chain analysis also revealed differences in terms of total cash income generated after selling directly to consumers or to intermediaries. Prices offered by intermediaries were lower compared with what traders could earn from selling directly to consumers or in town markets.

Table 23: NTFP annual quantities, prices in different markets and number of frequent traders per product

	NTFP			
	Mushrooms	**Wild fruits**	**Edible orchids**	**Thatch grass**
Quantities p.a.	750 plates	300 plates	1,600 pieces	150 bundles
No. of frequent traders	33	56	5	44
Price within the village (Mk)	-	-	50-500/piece	150-300/bundle
Price to intermediary trader (Mk)	1,000-1,500/18 l pail[a]	2,000/20 l pail	1,800-3,000/winnowing basket	100/bundle
Price in local market (Mk)	1,500-2,500/18 l pail	3,200/20 l pail	4,000/winnowing basket[b]	-
Price in town market (Mk)	-	4,000/20 l pail	-	-

[a]*One pail of 18-20 litres is equivalent to 10-12 medium plates locally known as (mbale ya phazi or nsima)*
[b]*One winnowing basket (lichelo or thungwa) depending on size of the basket or piece, would take a range of 10-50 pieces of processed orchids. The average diameter of the winnowing baskets ranged from 46 – 51 cm for thungwa (slightly smaller) and lichelo (standard size) respectively.*

Differences in cash income generated were revealed for all the products. There was a reduction in cash income received by the traders if the products were sold to

intermediaries. This was because they offered wholesale prices to the intermediaries. Traders who took wild fruits to town to sell directly to consumers received a higher price. However, this may not translate into an increase in revenue because there were transportation costs and associated risks taking the product to town markets which may later reduce actual income. The intermediaries who bought the products in local markets covered transportation costs and took the risk of transport losses.

4.3.4 Different actors in the value chains and their roles

The key actors in the value chain were traders, transporters, intermediaries and consumers. In some cases, value chains were short and traders carried out all the activities within the chain up to marketing of the products to final consumers. Different groups of people played different roles in the value chain.

Women, men, boys and girls were involved in harvesting, selling, processing, cleaning, packaging and in the transportation of the products. However, their involvement at each stage was influenced by the distance to be covered to get the resource and the type of product. Thus, only men and boys were involved in harvesting mushrooms in Mpheta village because of long distances travelled to get the resource, between 5 -14 km. Thatch grass selling was done by men and women in Mpheta. In Mtogolo village both men and women were involved in harvesting mushrooms though with more female participation. Exceptionally, Mtuluma 1 village had women only involved who carried out all the activities such as collecting, transporting, and selling the product (mushrooms) to final consumers. Edible orchid's key harvesters and traders were women and girls who collected the product, transported, processed, sold to intermediaries and direct to consumers. The intermediaries sold the products to final consumers in various local and town markets. Wild fruits attracted the involvement of all groups (men, women, boys and girls) in Kasonga, Mpheta and Mtuluma 1. However, in Mtogolo village only men and women participated in the collection, transportation, cleaning, and selling with most participation by men. On the contrary, respondents indicated that there were few men participating in the wild fruits trade in Mtuluma 1 village.

4.3.5 Motivation to participate in NTFP trade and the associated socio-economic benefits

4.3.5.1 Safety net role of NTFPs and free resource

NTFP traders had similar reasons of their involvement in the trade for all the products. The main drivers into NTFP trade were poverty and lack of alternative cash income sources. The trade provided supplementary source of cash income for most households. Some joined because they had time, were interested, and the multiple benefits associated with the trade. The more quantities harvested allowed them to consume and sale some of the harvest. The opportunity of collecting two products during one visit, for instance firewood and mushrooms, provided a chance of widening income sources. Some started on their own due to demand for the products, while others were following what friends, parents, relatives and grandparents were doing. Others were inspired by the benefits associated with the trade.

The perception that NTFP trade does not require any capital investment in terms of cash (free resources) attracted additional households into the trade. Food insecurity and proximity to the mountain boundaries of Zomba and Malosa forest reserves encouraged some households in Mtogolo, Kasonga and Mtuluma 1 villages to be involved in the trade. Additionally, one respondent indicated joining the trade after the death of her husband (who used to do the trade) and another after she divorced her husband. These findings confirm that NTFP trade was used as an alternative source of income in times of trouble, i.e. when the household head (man), who is normally regarded as the bread winner, was absent and no longer available to provide the basic household needs.

However, some traders withdrew from the trade because they chose other businesses such as selling agricultural produce, timber, pig production and opening mini-shops. These were perceived as more profitable than NTFP trade and they could not endure the challenges which were faced by NTFP traders. Although only small amounts of cash income were generated, households appreciated it since they were able to meet daily basic needs. Some of the NTFP traders were trading multiple products as alternative sources of income when particular products were out of season. Different amounts of cash income realised from various products also drove them into trading multiple

products. Furthermore, some combined trade of NTFPs and of agricultural produce, which could be sold together.

4.3.5.2 Income generation for other investments (stepping up and stepping out)

Traders enjoyed a range of benefits from their involvement in the trade including meeting household basic needs such as buying food (especially maize during lean periods), groceries, and clothing. NTFP trade also provided income to some households for buying farm inputs (seed and fertiliser), household assets such as procurement of livestock (chickens, pigs), kitchen utensils, radios, carpentry tools, bicycles and spare parts. The cash income also supported school needs (uniform, fees, and rental payments for self-boarding students), transport to cities to look for jobs, payment of casual labourers who worked in traders' fields and assisted in hiring people to mould bricks for house construction. Some of the NTFP products were consumed by the households, used for construction and proceeds from the trade were used as capital for starting other businesses (e.g. buying and selling dry fish) and cultural functions (initiation ceremonies) or celebrations. Table 24 provides some examples of how the trade had contributed towards the livelihoods improvement of traders.

NTFP traders also enjoyed non-monetary benefits. For all four products, the traders mentioned their self-employed status; the trade had taught them business skills, using part of the product without purchasing, flexibility to undertake the trade, the ability to work with family members and to multitask with other productive works or household chores. For mushrooms, wild fruit and edible orchids, traders also saw their involvement in the trade as a way of keeping traditional products and knowledge alive for passing on to future generations.

Table 24: Examples of socio-economic benefits from NTFP trade

Village	NTFP	Respondents response
Mtuluma 1	Thatch grass	"I started selling thatch grass in 2001 because of food insecurity and to supplement cash income for the household. The proceeds from the trade are used to buy maize during lean period, i.e. January and February"
Mpheta	Mushrooms	"I started selling mushrooms in 1998; it is almost 16 years now. I followed a friend to Chikala Hills to collect the product and the proceeds are usually used for buying food and supporting school needs"
Mtogolo	Wild fruits	"I started selling wild fruits in 1975 (39 years being involved in the trade), because of primary school fees requirements which was Mk300.00 that time. Since I was staying with my grandmother she could not manage to raise this amount and I decided to venture into selling wild fruits to support myself when I was in standard six. I used to sell the wild fruits at the same school during break time and managed to raise the school fees up to standard eight. When my parents send the money later it was used to buy clothes and groceries. This assisted me to complete my primary education level"
Mtuluma 1	Wild fruits	"I have been in the trade since 2001. The proceeds from wild fruits sales over a period of 14 years have assisted me to buy clothes for the family members, food during lean period, ground nuts seed, and supported transport needs for my husband who travelled to the capital city to look for jobs"
Kasonga	Edible orchids	"I started selling edible orchids on my own to widen income sources after the other options failed to meet my household basic needs. I have been in the trade for 45 years"

4.3.6 Specialist and opportunist traders

NTFP traders devoted varying degrees of effort to the trade and thus they were categorised as specialists or opportunists. The number of specialist traders was lower for all products in all the villages except for Mpheta where thatch grass had more (Table 25). This was associated with the village location as it is within the Lake Chilwa Basin where grass was largely collected from the wetland and river banks and uncultivated fields within the wetland. Specialists were perceived to be earning higher cash incomes though they were few in most cases.

Table 25: Estimated number of traders for various categories

Product	Village and number of traders			
	Mtogolo	**Kasonga**	**Mtuluma 1**	**Mpheta**
Wild fruits				
• Regular traders	Not sure	30	8	10
• Occasional traders	20	20	20	15
• Frequent traders (specialists)	10	Not sure	12	4
Thatch grass				
• Regular traders	30	5	30	5
• Occasional traders	20	>half of the	20	10
• Frequent traders (specialists)	10	households 4	10	20
Mushrooms				
• Regular traders	4	20	Not sure	5
• Occasional traders	6	50	5	5
• Frequent traders (specialists)	3	30	2	8
Edible orchids				
• Regular traders		4		
• Occasional traders		25		
• Frequent traders (specialists)		5		

A number of characteristics differentiated them, such as income earned, links with customers, pricing of the products, levels of knowledge and level of commitment (Table 26). Specialists earned more cash income than opportunists because they harvested larger amounts as a result of their greater commitment and experience. In most cases specialists earned twice the income of the opportunists, with a few cases earning three times as much. It is possible that the presence of opportunists in the market depresses the price that specialists could charge. This was also influenced by the level of demand and supply and the perishability of the product.

The period of involvement in NTFP trade varied between products and villages. NTFP traders had been involved for a maximum of 45 years in edible orchids, 40 years in thatch grass, 39 years in wild fruits and 34 years in the mushroom trade. The minimum period of involvement in the trade was two years for edible orchids and one year for the other three products.

Table 26: Types of traders as characterised by individual NTFP traders

Characteristic	Type of trader	
	Specialist	**Opportunist**
Income earned	Usually earned more than Mk18,000/season.	Usually earned less than Mk7,000/season.
Links with customers (finding customers well in advance)	Able to identify buyers/customers well in advance for their products.	Had a weak link with customers (not able to find customers well in advance) since they were occasional traders.
Level of knowledge	Had knowledge of the products and the main sources resulting in collecting large quantities.	Limited knowledge of the products and their main sources and therefore collected low quantities.
Pricing	Knew how to set prices for their products depending on market forces.	Had challenges in setting prices and often reduced prices to dispose of the products.
Level of commitment	Made frequent visits to the sources, at least four times per month.	Made occasional visits to the sources, once or twice per month. Usually failed to cope with the challenges associated with the trade.

The primary requirement for involvement in edible orchid trade was knowledge to identify the tubers which was acquired from mothers. At village level Kasonga had households who had been participating in NTFP trade for 45 years, while the second longest involvement was 40 years in Mpheta, followed by 38 years in Mtogolo and 30 years in Mtuluma 1 village. The shortest duration of involvement by households was one year for all the villages, an indication of new people joining the trade.

4.3.7 Trading multiple products alongside NTFPs

Responses showed that some households were involved in trading multiple NTFPs simultaneously with agricultural produce. The agricultural produce sold alongside NTFPs on the market included ground nuts, sweet potatoes, cassava, potato, bananas, rice, beans,

sugar cane, green vegetables, avocado pears, pigeon peas, oranges and lemons. The need for trading multiple NTFPs was necessitated by the seasonality of the products and low profit margins. Ease of entry and market stability encouraged households to participate in the trade (Table 27). Two-thirds (66%) of the traders (n=62) traded more than one NTFP, while just under a third (31%) traded NTFPs alongside agricultural produce. This was perceived to be important because it widened cash income sources when other products were out of season. Instabilities in market demand for mushrooms and wild fruits affected how much could be sold and earned due to their storage challenges because sometimes not all quantities were sold at once.

Table 27: Reasons for trading multiple products

Primary NTFP sold	**Other products sold**	**Reasons**			
		Seasonal availability	Ease of entry	Stability of market demand	Good profit margin
Wild fruits (n=21)	Edible orchids, thatch grass, firewood, mushrooms and agricultural produce	√	√	x	√
Mushrooms (n=18)	Wild fruits, thatch grass, firewood, domesticated fruits and agricultural produce	√	√	x	√
Edible orchids (n=5)	Firewood, mushrooms agricultural produce and domesticated fruits	√	√	√	√
Thatch grass (n=20)	Firewood, mushrooms, wild fruits, domesticated fruits and agricultural produce	√	√	√	√

4.3.8 NTFP pricing and returns to labour

Pricing of the products was based on the quantity, the unit of measurement, the size of the products after grading (especially for wild fruits and mushrooms), and the types of buyers. The buyers included final consumers within the villages, in neighbouring villages, at the market, and vendors who acted as intermediary buyers. For instance, smaller wild fruits were priced at Mk10 for seven while bigger ones sold at five fruits for Mk20. Similarly, prices of edible orchids were set based on the size of the piece, with

smaller ones sold at Mk100-Mk150 while the larger ones ranged between Mk200-Mk500. In most cases, final consumers paid more than intermediaries for the same products. However, intermediaries could sometimes pay consumer prices and then still make a profit by reducing the quantities when re-selling the products for the same price. In some situations the unit price declined if all the products were bought at once (wholesale prices were offered). Demand and supply played a role in price determination for all the products though this was situational. During high supply and low demand market prices tend to decline, consequently, traders were compelled to reduce their prices further, especially for perishable products such as mushrooms and wild fruits. Seasonality and scarcity of the products had an influence on the prices, for example, thatch grass fetched higher prices out of season from October – February resulting in prices almost doubling for the same product and quantity. The length of time to collect the products and distance to the market had no influence on the prices as the products were regarded as free resources by most buyers with no capital investment while at the same time excluding labour costs.

Thatch grass was only sold in the village, while all other products were sold in four places: in the village, by the road side, in local and town markets. Mushroom traders also sold door to door due to storage challenges to make sure they sold the entire harvest. Usually NTFP traders set the prices for their products. However, some products prices were reduced through negotiations by buyers; reduction of the prices when demand was low and supply high. This was product specific, i.e. wild fruits and mushrooms because they are perishable products and storage is a challenge to the traders. Mpheta traders indicated not providing room for negotiations especially for thatch grass when the product was scarce. Mushroom traders had the power to determine the prices though intermediaries dominated in some cases due to the perishable nature of the product.

The main consumers and buyers of the products were from the traders' own village or neighbouring villages, intermediaries from local and town or district markets, who had to buy the products from wild fruits and mushroom traders in local markets. School children were also among the main buyers and consumers of wild fruits.

Most of the households indicated their returns not matching with labour because the income earned in relation to the time invested and transportation from the source to the markets was not satisfactory. To this had to be added variable, the time to collect, process and sell the products. Despite the small amounts of cash earned, the trade nevertheless played an important role during times of food shortages and as a coping strategy when the proceeds were used for buying food. The returns were further reduced due to low prices offered for the products despite traders having the power to decide on the price as prices were also influenced by supply and the demand for wild fruits and mushrooms. The setting of prices was influenced by the perception of the buyers, who considered NTFPs as products which were locally collected from the wild and other wooded areas forgetting the other requirements to bring the products to markets. Similarly, the benefits were also affected by the availability of the resource due to low quantities harvested resulting in low cash income. A few households appreciated the benefits from thatch grass trade especially when the product was scarce and on high demand during the rainy season.

After being asked the amount of money one can earn, for how many hours of work for the selected four products whose value chains were analysed, the responses showed that the highest returns per hour were from mushrooms for traders from Kasonga and Mpheta villages with Mk525 and Mk308, respectively. Returns for edible orchids were Mk323/hour. The highest returns for thatch grass were noted in Mpheta (Mk415/hr) followed by Mtuluma 1 village with Mk367/hour. Mtogolo had the highest returns per hour for wild fruits of Mk275 while Mtuluma 1 was also the second with Mk236/hour (Table 28). In Mtogolo village the highest returns per hour were from wild fruits: Kasonga and Mpheta were mushrooms while Mtuluma 1 it was thatch grass. The income earned per hour in all cases was twice or more, depending on the type of the product, than the current wage rate of Mk70/hour based on the national minimum wage in Malawi, where an employee who works six days during a week is expected to work for not more than eight hours on any day.

Table 28: Average income earned per hour worked per product (Mk/hr)

Village	NTFP			
	Wild fruits	Thatch grass	Edible orchids	Mushrooms
Mtogolo	275	140	-	211
Kasonga	170	146	323	525
Mtuluma 1	236	367	-	138
Mpheta	171	415	-	308

4.3.9 Perceived trends in number of traders and customer base

The respondents perceived a general upward increase in number of traders and customers over the past ten years, but with some variation by product in the study villages (Table 29). Mpheta was the only village with increases in traders and customers for all the three products traded in all the villages.

Table 29: Trends in number of traders and customers

Perceived trend	Thatch grass				Wild fruit				Mushrooms				Edible Orchids
	Mtogolo	Kasonga	Mtuluma 1	Mpheta	Mtogolo	Kasonga	Mtuluma 1	Mpheta	Mtogolo	Kasonga	Mtuluma 1	Mpheta	Kasonga
Number of traders	↑	↓	↑	↑	↓	↓	↑	↑	↓	↑	↑	↑	↑
Number of customers	↑	↓	↑	↑	↑	↑	↓	↑	↔	↑	↔	↑	↑

4.3.9.1 Thatch grass

Respondents indicated changes in the number of traders, customer base and demand for thatch grass over the past 10 years. The number of traders had increased in the past 10 years in Mpheta, Mtuluma 1 and Mtogolo villages. This was attributed to income earned from the trade which was used mainly for buying food during the lean period of the year (December, January and February), young people joining the trade and the ability to

market the product during the rainy season. Demand for thatch had increased for construction and roofing. Furthermore, the customer base was also increasing because of scarcity of thatch grass. However, in Kasonga village the number of traders, customer base and demand had reduced for the product because most of the households chose iron sheets for roofing. Therefore, thatch grass was used only for construction of small structures (kitchens, granaries and bathrooms, among others).

4.3.9.2 Wild fruits

The most widely traded wild fruit according to respondents was *Uapaca kirkiana,* Masuku or wild loquat because its availability was better than any of the following fruits: *Flacourtia indica,* Nthema; *Vitex payos,* Ntonongoli*; Parkia filicoidea,* Mkundi; *Azanza garckeana,* Matowo; *Ximenia caffra,* Mphinjipinji*;* and *Strychnos spinosa,* Mateme. Responses revealed that these wild fruits were scarce, available only in small quantities, and once collected by adults and children they were consumed with few sold. As a result they were not considered a potential income source. The study focused on *Uapaca kirkiana* as it was appreciated by many households for provision of cash income. The number of wild fruit traders had increased in two villages of Mpheta and Mtuluma 1 since it was regarded as a trade which does not require any capital investment (cash), while in Kasonga and Mtogolo the number declined because of reduced quantities available for harvesting. This was largely due to deforestation and the long distances travelled to collect the product. Despite some differences within the villages the customer base was considered to be increasing in three villages (not in Mtuluma 1) except for intermediaries whose numbers were reducing. The demand was still high in all the villages and some local markets (e.g. Songani) because they were indigenous fruits, tasty and liked by many people, including children.

4.3.9.3 Mushrooms

The number of traders had increased in three villages but not in Mtogolo where the numbers had reduced due to limited availability. Numbers increased because it was a source of income for the household and no capital investment was required. The customer base had increased in Mpheta and Kasonga because protein sources (meat, fish) were expensive and those households which consumed mushrooms used them as an alternative

(relish or side dish) for their meals. In Mtuluma 1 and Mtogolo villages the customer base was stable since some people do not consume mushrooms hence balancing the demand and low quantities available for collection.

4.3.9.4 Edible orchids

The number of traders had increased because of the high income generating potential and long harvesting season when the other products were not available. The customer base had also increased since some households within the village and neighbouring villages enjoyed eating the processed products as relish. This has increased demand for the product at local markets and within the village.

4.3.10 Challenges and barriers to entry into NTFP trade

Some of the challenges and barriers were common to all the products while others were product specific. The common challenges and barriers were travelling long distances to get the resource resulting in transportation problems, and working in hostile environments (i.e. wild animals, venomous snakes and steep slopes). However, knowledge was needed for mushrooms and edible orchids for proper species identification. Responses showed that there were no major barriers and no skills required for entry into thatch grass and wild fruits trade. However, scarcity of the products due to land use change, conversion of grassland into agricultural land, especially for thatch grass, mushrooms and wild fruits were barriers for new people to join the trade (Table 30).

Additional challenges included losses or wastage of wild fruits and mushrooms experienced during harvesting, transportation due to mechanical damage and value addition; cleaning and grading related to handling issues. This was associated with use of the wrong carriers and the fruits at the bottom being squashed by the weight of products above. Thatch grass traders experienced wastage especially during storage, due to termite damage if not well stored. The damaged edible products were consumed at home or their market value was reduced and sold at low prices.

Table 30: Summary of the challenges and barriers to entry into NTFP trade

NTFP			
Wild fruits	**Thatch grass**	**Edible orchids**	**Mushroom**
Scarcity of the product Marketing challenges (the law of demand and supply) Storage issues (perishable) Losses during transportation	Fires destroyed the grass before harvesting Scarcity of the product Storage issues due to termite damage	Marketing issues due to demand and supply Wildfires destroyed the plants	Low returns Storage issues (perishable) Losses during transportation
Travelling long distance to collect the product Working in hostile environments			

4.4 Discussion

This study analysed the value chains of four NTFPs that are widely traded from the four case study villages to understand product movement and the contribution of the trade to livelihoods. All four products could be used by the household for subsistence and/or sold to consumers. This chapter focuses on the sale of products, value addition; and discusses why people engaged in NTFP trade, the structure of the value chains and the constraints to participation and future sustainability of the chain. The study revealed household dependence on different NTFPs which were sold and used for consumption.

4.4.1 Availability, accessibility and management of NTFPs sources

The responses revealed that NTFP availability and abundance had decreased over the past 10 years. This was associated with land cover/use changes in the study sites as noted elsewhere in Malawi by Openshaw (2010). Despite the availability and abundance of the products declining over the years, the number of traders was increasing in most cases because of their income generating potential which was used as a coping strategy during lean periods of the year, youth joining the trade (thatch grass), high demand for some products during the rainy season (thatch grass) and no capital requirements to start the trade. While the number of traders declined in some villages due to reduced quantities

available for harvesting the customer base increased due to preferences for indigenous wild fruits. For example, *Uapaca kirkiana* was a commonly traded fruit because of its taste, echoing the work of Moombe et al. (2014) in Zambia a neighbouring country within southern Africa, who found that there was high demand for *Uapaca kirkiana* because of its sweetness and nutritional value.

The products in the study villages were collected from various sources on open access regimes with few restrictions as well as forest reserves. Households were free to collect various products in most of the sources. However, this may create problems in the long term because households compete for the few resources available. As shown in a comparative analysis of case studies from other developing countries by Belcher & Schreckenberg (2007) and Sunderlin et al. (2005) who noted that open access conditions may result in uncontrolled competition for resources, inefficiencies, damaging harvesting and over-exploitation.

Many households in the case study villages were involved in resource management through a forest co-management arrangement, the establishment of village natural resources management committees for forest areas under communal and customary land. The communities were organised as co-management blocks of land with external support from the Forestry Department. Mtogolo village had more products (four) which did not change in terms of quantities available for harvesting over the past 10 years; compared to any other village. This was linked to the changes in the forest status after the introduction of the forest co-management programme. Like Abdallah & Monela (2007)'s and Zenteno et al. (2013)'s studies in Bolivia another developing land locked country and Tanzania, a neighbouring country in southern Africa, that households belonging to a group within a community and participating in the implementation of forest management plans are likely to get higher incomes from NTFP trade through regenarating forests. Institutions that have better integrated traditional, socio-cultural characteristics and incentives; and are given moral and political legitimacy at local level, are more stable and sustainable as reported previously by Kayambazinthu et al. (2003). The Malawi national forestry policy (1996) aims at providing an enabling environment to promote the participation of local communities in forest conservation and management through the encouragement of co-

management of forests and forest resources. This study found that harvesting of most NTFPs was done in protected forest reserves as reported by Ndangalasi et al. (2007) for communities living adjacent to protected areas in developing countries in East Africa. In the current arrangement government and communities are all beneficiaries and share responsibilities, although ownership still remains with the government. Abdalla & Monela (2007) found similar results in Tanzania a neighbouring country, where communities were given the mandate to manage the forest on behalf or under joint management but the legal ownership of land remains with the government. Lack of political will at the centre to give powers to communities is a challenge to community based forest management as reported by (Abdallah & Monela, 2007). The study further found that few households were receiving substantial benefits from NTFP trade which may have implications on commitment to manage the sources. Similarly, findings by Abdallah & Monela (2007) showed that the benefits which participating communities get from this arrangement must be significant if they have to enforce rules about resource use. Communities also need to be trained, mobilised and see benefits from forests to build an incentive to protect the resource and manage it sustainably. A clear understanding of the roles and responsibilities related to the management of the sources, ownership, control, anticipated benefits of participants in the Collaborative Forest Management (CFM) arrangement is crucial for the successful implementation and sustainability of the programme (Dewees et al., 2010).

4.4.2 Value addition of NTFP products

There was little value addition to the NTFP products under study. The following products were not subjected to value addition: thatch grass, bush meat, wild vegetables, rope fibre, and other NTFPs. Limited value addition occurred for firewood, mushrooms, wild fruits, wood for fencing, wood for building, honey, bamboo, edible orchids, and edible caterpillars. According to Jensen, (2009), value addition is regarded as value increase due to processing (Jensen, 2009). Value addition to NTFPs such as semi-processing and grading, can improve the income earned by traders (Saha & Sundriyal, 2012).

The study revealed that mushrooms and wild fruits were sold raw supporting the findings by Lowore (2006) in Malawi that these products are rarely processed (preserved) when in

abundance and cheap during the season and often not available when not in season. This was a missed opportunity because products available off-season receives higher prices. This was also noted in another international study of Saha & Sundriyal (2012) in north East India, who found that most of the fruits were consumed raw due to storage challenges, with some fruits dried and sold while others were sold fresh at low prices in local markets. The products under study were subjected to grading according to size, processing, packaging, and producing bamboo furniture. Like Jensen (2009)'s study also mentioned that grading was important in valuation of NTFPs.

In the study villages value addition was done on a small-scale with only small proportions of households involved, i.e. 14% for edible orchids and 8% for mushrooms. The impact of the value addition processes on the prices was minimal. Most of the products were sold in local markets therefore, the type of markets available is crucial for traders to appreciate the potential of NTFP generated cash income due to value addition, also revealed in a study by Saha & Sundriyal (2012) in the humid tropics of northeast India. They found that 76 plant species were sold in local markets; this study found that most of the NTFPs were sold within the village with few reaching town markets. The quantities currently being harvested are low, with only a few households able to get more substantial benefits. The results support a previous study by Lowore (2006) who noted that NTFP traders lack capital to invest in processing or buy from others to bulk up the quantity and do not know how to access better markets. te Velde et al. (2006) offers a different perspective in their studies conducted in Bolivia and Mexico also developing countries, that value addition was determined by the type of markets available to the traders. For example, mushrooms were sold fresh for local consumption and fresh for export which was not the case in this study, all mushrooms were sold locally. NTFP income potential is determined by where and what value is added. Value addition at source depends on access to resources and markets as reviewed by Wiersum et al. (2014).

4.4.3 NTFP value chain analysis

A value chain approach helps to analyse the distribution of benefits to different actors along the chain, their positions and behaviour (te Velde et al., 2006). It can also help in identifying opportunities and possible points of upgrading (Shackleton et al., 2011). In any chain there are governance types which are influenced by the physical distance of the consumer from NTFP collector and the required skills in processing, marketing and product presentation (te Velde et al., 2006).

4.4.3.1 Actors in the value chain and their roles

The study found that the NTFP value chains in the study villages were short with most of the products being sold within the village, local and town markets. These were sold directly to consumers and some to intermediaries. Belcher & Schreckenberg (2007) and Shackleton et al. (2007) in their studies noted that the types of markets available are important in the trade on NTFPs. In most cases the activities were done by men or women and at times, children who collected, transported, stored, cleaned, graded, processed, packaged and sold the products to final consumers and intermediaries. The key actors involved were traders, transporters and intermediaries. The study's findings are similar to that of Shackleton et al. (2008) from South Africa, southern Africa, where in some cases the same individuals performed all the functions in the chain. This is influenced by the length of the chain (Belcher & Schreckenberg, 2007). It was found that there was lack of national and international value chains in this region with most of the products sold in local markets. The prospects of any of the NTFPs in finding international markets is still far because the quantities harvested are few. The traders are working in isolation, not organised in groups as associations for specific products. This could result in problems when it comes to meeting the quantities required and adhering to the international standards.

Gendered participation in product harvesting, transporting, processing and selling was observed as different products had different gender groups involved at different stages. However, the level of women participation may be context specific as noted by Nkem (2010) in the Democratic Republic of Congo, (Congo Basin Forests) where women (63%) dominated the trade in NTFPs. This study found that most NTFP collection could

be carried out by men, women, boys and girls depending on the type of the product, distance to the source and labour requirements. In certain cases men and boys supported the harvesting and transportation due to long distances to get the resource, e.g. mushrooms and wild fruits. This could be attributed to different cultures and location of the study sites as such certain trends are location and product specific. Women and girls were the primary collectors and traders of edible orchids. The women and girls carried out all the activities along the chain supporting the findings by Kasulo et al. (2009) in Mzimba and Kasungu districts. This also supports the findings by Challe & Struik (2008) who noted that the majority of collectors of edible orchids in Tanzania were females.

This study revealed that most products were sold directly to consumers by traders while some were sold to intermediaries. The price offered to traders depends on the length of the chain also noted by Bista & Webb (2006) in Nepal almost a decade ago. An exploitative role of intermediaries cannot be generalised since they help to develop NTFP value chains based on an understanding of context and product specific information (te Velde et al., 2006). This study found that, despite the cash income of NTFP traders being reduced once the products were sold to intermediaries, the latter played a critical role in saving perishable products from getting spoiled. Wild fruits and mushrooms were known for their storage challenges since they are perishable products if they were not sold in a single market day. This agrees with the findings by Nkem et al. (2010) that a short shelf life is one of the main constraints of marketing NTFPs and can result in losses to participating households.

The intermediaries in this study took on the risk of moving a perishable product beyond the local markets, a process which sometimes become complex due to the issues of storage, transportation as well as source of the product, as shown by Belcher & Schreckenberg (2007). Although intermediaries may influence prices they could play a critical role of stabilising prices if fair trading practices are applied (Bista & Webb, 2006). No evidence of this was found in the present study. The study also found that the products in the case study villages did not reach national and international markets although some of them, e.g. edible orchids have that potential where traders could receive better prices than the local markets, as noted by Adam et al. (2013) in Sudan, also a poor

developing country. However, this study did not collect the details on why there is lack of national and international markets for the products. However this could be attributed to the low quantities, accessibility, demand for the products, prevailing market prices, information sharing, lack of value addition, marketability, availability of sustainable sources to meet the demand on the national and international level. Several studies carried out previously and last decade or so, show that information dissemination empowers collectors and traders to establish selling outlets and get connected to traders, especially when the products are to be traded internationally as they are expected to fulfill import and export requirements (Banana, 2005; Bista & Webb, 2006; Belcher & Schreckenberg, 2007). What is important in a value chain is to promote a system where two or more actors at different nodes will obtain a better deal rather than only focusing on the extent of exploitation by intermediaries (Marshall et al., 2006a; te Velde et al., 2006).

4.4.3.2 Traders motivation to participate in NTFP trade

The respondents' responses showed that households who participated in the trade derived socio-economic benefits at different stages of the value chain. In this study the proceeds from the trade were used for food purchases during food deficit months, especially in recent years when the agricultural sector in Malawi faced challenges due to erratic rainfall and prolonged dry spells, also mentioned in other studies in developing countries in Africa and around the world by Belcher et al. (2003), Nkem et al. (2010), Adam et al. (2013) and Wunder et al. (2014b). The socio-economic benefits from NTFPs are derived from the consumption of goods and services and income generated (FAO, 2014; Mujawamariya & Karimov, 2014). NTFPs are considered as households' primary supplementary and emergency sources of income (Mukul et al., 2015). Furthermore, the study revealed that proceeds from the trade were used by the households to pay school fees or assisted in meeting educational needs of their children at primary and secondary level. This in return will help to shape a future for the children with a possibility of changing the household's socio-economic status in future. The trade also provided an opportunity of capital to be invested in other income generating activities for the households. Some of the proceeds were used for purchasing farm inputs such as fertiliser and seed for crop production.

The trade allowed households to purchase livestock, especially poultry. Some previous and recent studies by; (Arnold & Ruiz Peréz, 2001; Ahanken & Boon, 2011; Adam et al., 2013), have also shown that NTFP trade can be an important source of savings to build a coping strategy during times of need. Dewees et al. (2010), concluded that the miombo woodlands (also dominant in Malawi) are regarded as a natural insurance, pharmacy, and supermarket, providing consumptive goods not easily available mainly in subsistence economies.

NTFP trade was regarded as an alternative source of income in instances when other sources were not feasible or available, and one that required few skills and little capital investment, similar to the findings in previous studies in other developing countries in Africa (Heubach et al., 2011; Kar & Jacobson 2012b; Malleson et al., 2014). Households were motivated to undertake the trade because they kept traditional products and knowledge, experienced multiple benefits, reduced vulnerabilities and it was compatibility with other activities. This supports the findings by Malleson et al. (2014) that NTFP activities are compatible with smallholder farming and traditional domestic roles. In Malawi, NTFP trade is an activity which most households join because of poverty rather than to make a profit (Lowore, 2006). In the study village respondents revealed that they participated in NTFP trade as a means of generating cash income when other options were not feasible, supporting the findings by Lowore (2006) that this situation makes it difficult to promote the trade from income generation into real business. Two of the products traded in this study, mushrooms and wild fruit, were typical of many NTFPs in that they were collected to supplement household cash income during critical months of the year when most of the households do not have food from their own gardens but rely on accessing it from markets as reviewed by Arnold & Ruiz Peréz (2001). However, edible orchids and thatch grass differed in this respect because they were collected when most of the households had harvested their rain fed crops. In the case of orchids, the uniqueness of the product (only found in one of the four study villages) and its apparent rising popularity among customers may explain the interest of traders. In the case of thatch grass, the fact that it could be stored meant that selling was done at any time when the trader needed income.

In the study villages some households started NTFP collection and selling because there was no need for capital investment (a free resource), similar to the findings by Malleson et al. (2014) in Cameroon, Ghana and Nigeria. Also, food insecurity and proximity to the NTFP sources created room for interested households to participate. Malleson et al. (2014), reported that this decision in turn assists participating households to reduce their risks, increase resilience to shocks and stresses through a diversified livelihood strategy.

Despite the motivational factors, traders also faced some challenges at different stages. During harvesting, they had to walk long distances to collect the NTFPs, transportation challenges, working in hostile environments, losses or wastage experienced during harvesting, transportation and processing. Furthermore, wildfires destroyed some of the products before harvesting. Additionally, marketing the products had its own challenges related to storage for some of the products if not sold on a single market day. Similar to the work of Belcher & Schreckenberg (2007) and Nkem et al. (2010) who found that NTFP trade was constrained by long distances, limited market outlets, access and low shelf life of many products. In the case of mushrooms and edible orchids the key requirement for participation was the skill to identify the edible species. In this study women dominated in transferring the knowledge on gathering edible orchids to young girls and mushrooms to children who had to accompany them during collection, also found by Challe & Price (2009), Kasulo et al. (2009) and Challe & Struik (2008) in their studies in Tanzania and Malawi.

4.4.3.3 Factors influencing household involvement in NTFP trade

The study revealed that households had a range of reasons for participating in NTFP trade. NTFPs contributed to both the subsistence needs of the participating households and cash income, supporting the findings by Nahayo et al. (2013) who found that the products contributed to the livelihoods of local people in Rwanda also a resource-poor, land locked and developing country. Availability and accessibility of the products also influenced a household decision to participate in the trade. Opportunistic traders were less able to cope with the challenges experienced by more specialist traders of the same products and tended to visit the distant NTFP sources less frequently. Therefore,

collection of NTFPs requires adequate time and labour depending on the distances also noted by Saha & Sundriyal (2012).

In this study, mushrooms, wild fruits, thatch grass and edible orchids were all collected from open access regimes, removing a barrier of joining the trade. In only a few cases was permission required if the product was to be collected from other people's fields. Traders from Mpheta village had to pay a fee to enter Chikala forest reserve for wild fruit collection. Similarly, permission for entry was required from the village head if the products were to be collected from graveyards. The study's result is similar to that of Wiersum et al. (2014) in his review study on the recent trends in NTFP governace. He noted that NTFP access depends on legal and customary rules and norms that control access to communally owned, public and private land. Saha & Sundriyal (2012) also noted that traditionally, communities in north east India also enforce selected customary rules to collect NTFPs from clan or community forests. There was no evidence in this study of traditional leaders not allowing NTFP traders to sell fruits in order to protect seed sources, as has been found to be the case in south eastern Zimbabwe (Mutenje et al., 2011).

The responses revealed that some traders disengaged themselves from NTFP trade to participate in other more profitable businesses, supporting the findings by Malleson et al. (2014) and Steele et al. (2015) who noted that NTFPs are characterised by low returns. Some NTFP traders were discouraged after failing to gain a positive return on their effort. The findings in the study villages showed that despite NTFP trade being regarded as less rewarding by some traders these products provided the best, short-term, cash income opportunities, contributed to poverty alleviation and flow of income to the households when other options are not available supporting some past and recent arguments of Arnold & Ruiz Peréz (2001) and Malleson et al. (2014).

4.4.3.4 Marketing of NTFPs and returns

In the study villages different actors were involved in NTFP trade from harvesting to selling of the products. Different quantities were harvested with opportunists harvesting less than specialists. The study found that low prices contributed to opportunists not devoting more time to the trade, limiting the option of NTFPs as income contributors to

the participating households. The findings support the results of Guadiose & Aziz (2014) who noted that when NTFP prices were low and small quantities harvested some collectors decided not to participate in certain seasons in Kenya. This decision restricts the prospects of collection as a contributor to household income (Gaudiose & Aziz, 2014). Furthermore, in the study villages NTFP trade was perceived as unattractive to some households due to the limited cash income the trade contributed. Similar to findings of Gaudiose & Aziz (2014), who found that the collection of NTFPs could be more attractive when harvesters expect to get a positive return on their efforts.

Despite the profits from NTFPs being regarded as marginal some households had been involved in the trade for more than three decades. Additionally, responses revealed that households were involved in trading multiple products and other agricultural produce. Similar to a study conducted in Democratic Republic of Congo (Jensen, 2009), where households were selling six NTFPs and earned an average monthly revenue comparable to two elementary school teacher salaries. The study found that trading multiple products in some cases enabled households to earn more than the lowest-earning worker in Malawi. The choice of a household to be involved in trading multiple NTFPs was influenced by the seasonality of the products, ease of entry and marketability of the products. A comparative study by Wunder et al. (2014a), have also shown that open access and low barriers to entry into natural resource based trade was an economic opportunity for people with limited options.

The success of NTFP traders depends on the number of suppliers and consumers, and the existence of a fair and accessible market (te Velde et al., 2006). In this study the returns to labour were dependent on the prices offered, quantities harvested, demand and supply at the markets, time of selling the products during the year (in season or out of season) and the types of markets. These factors affected the returns to NTFP traders because when demand was low and supply of the products high, price and bargaining powers were reduced. As a result intermediaries and final consumers dominated the process, as highlighted by Sunderland et al. (2004) in a review study of NTFP commercialisation in Africa. Thus, market saturation with the products due to limited number of markets affects the amount of cash income generated. As noted in this study, most of the products

had short value chains and were sold largely in local markets. Demand and supply had an impact on the revenue which they expected to receive from the products. Jensen (2009) had similar observations where traders meet and oversupply the market exposing themselves to exploitative prices offered by consumers and vendors.

The study also found that the types of markets where the products were sold had an influence on the final price offered since most of the products were sold in local markets and within the village. Saha & Sundriyal (2012), for example, also reported that a large number of NTFPs were sold in local markets in North East India with few traded at commercial level outside the state. Furthermore, Banana (2005), prevously concluded that the absence of organised information systems, production and distribution, influenced by supply and demand contributed to low returns to NTFP traders. However, in this study all the NTFPs were traded within the country and locally, none had reached the export commercialisation stage. Low value addition activities, lack of low cost processing technologies and the few quantities harvested to some extent contributed to this status. Conversely, the time of selling the NTFP product in a year had a positive impact on price only for thatch grass, a product usually sold within the village. When sold out of season the prices doubled or tripled because of scarcity of the product and high demand during the rainy season. Similarly, Shackleton et al. (1998), in the past showed substantially higher prices for dried leafy vegetables sold out of season than fresh ones in season.

There were no major differences in prices in various local markets where NTFPs were traded. While in town markets the differences were noted or similar prices offered with reduced quantities so that the intermediaries realised some profit. In general, the responses of the participating households showed that the returns were not matching with labour to harvest, transport and finally sell the NTFPs with only few involved in thatch grass appreciating the benefits. This was worsened by the scarcity of the resource resulting in reduced amounts harvested. The results support the findings by Adam et al. (2013) who noted that labour, product price, access to the resource and market had an influence on the contribution of NTFPs to livelihoods strategies. Adam et al. (2013) also

mentioned that knowing the buyers and sellers in the chain is important because it helps collectors to have stronger bargaining power when selling their products.

4.5 Conclusion

NTFP trade plays an important role in the livelihoods of participating households. The trade helped households to meet both subsistence and cash income needs. Availability and accessibility of the products determined household participation in NTFP trade. Although NTFP trade was characterised as a low return business, the proceeds were important during critical months of the year. The products were collected through open access regimes with few places requiring permission from the village heads or the field owners.

NTFP traders were motivated to participate in the trade due to monetary and non-monetary benefits. Most of the traders were driven into trade due to poverty as the key challenge which reduces the capacity of a household to meet its basic needs and chose NTFP trade because of the low barriers to entry. The majority of traders were opportunists earning small incomes from the trade. Specialist were frequent traders and used to doing the trade despite the challenges while the opportunists were not able to stay long in the trade and were involved occasionally, sometime regularly.

The value chains studied were short, dominated by traders and some intermediaries as key actors, while most of the products were sold within villages and local markets. Returns to labour were dependent on the quantities sold, available markets, and prices which were influenced by demand and supply. A number of socio-economic benefits were appreciated by the traders such as meeting school needs, buying food and other daily necessities, but also the possibility of using NTFP cash income to invest in other income-generating activities like poultry. However, despite the benefits associated with the trade, the availability and abundance of NTFPs had been declining over a decade due to land use/cover changes. Rural communities will continue harvesting these products; therefore a sound management arrangement is critical to establish sustainable sources and maintain the benefits associated with the trade. Value addition on most NTFPs was not done as most of the products were sold raw and largely in local markets.

CHAPTER FIVE: SYNTHESIS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

NTFPs play multiple roles in the livelihoods of most people who collect and trade them. NTFPs are important to households as primary, supplementary and emergency sources of income and are used as cultural and decorative items (Paumgarten & Shackleton, 2009; Mukul et al., 2015). They provide energy, food, medicine, fibre and shelter to rural households (Shackleton & Shackleton, 2004). For example, mushrooms and edible caterpillars are dietary sources of protein; firewood provides energy; and NTFPs are also sources of house construction materials (Nkem et al., 2010; Saha & Sundriyal, 2012). Giliba et al. (2010) in their study in Mbulu and Babati Districts in Tanzania found that 90% of the sampled households used firewood, 60% fodder, 40% honey and construction materials, respectively. NTFP products which are used as medicine help communities to sustain their physical, mental health and wellbeing demands. In Ghana, Congo Basin communities relied on medicinal plants to treat various ailments due to poverty and lack of income to purchase pharmaceutical products (Nkem, 2010; Ahanken & Boon, 2011). In Malawi, edible orchids were also used for medicinal purposes (Kasulo et al., 2009) and 25% of households in Bangladesh around a protected area used at least some medicinal plants for treating common ailments (Mukul et al., 2015). NTFP benefits are two fold, namely households get monetary and non-monetary benefits (Giliba et al., 2010), with the latter including spiritual, cultural and recreational purposes (Youn, 2009).

Household dependency on NTFPs varies with location and socio-economic condition of the household, while cash income generated from NTFPs varies according to the type of the product (Mukul et al., 2015). In Bangladesh, Mukul et al. (2015) found that firewood, medicinal bark, bamboo and tendu leaves accounted for more than 90% of NTFPs base income to households, while in Zambia NTFPs contributed 35% of household income (Mulenga et al., 2014). The source of the products determines the quantities available to households as noted by Giliba et al. (2010) in Tanzania that 65% of the respondents indicated collecting large quantities of NTFPs from national forest reserves. Additionally, the availability of the products in some cases is affected by fire and grazing which influence the presence or absence and growth form of particular tree species (Giliba et al.,

2010). Vegetation type is linked to the availability of different types of NTFPs and quantities to be collected by households (Cocks et al., 2008). Resource use patterns also differ between wealthy and poor households, e.g the wealthy purchased more NTFPs in South Africa than the poor (Shackleton & Shackleton, 2006). However, increase in financial status of households did not result in a decrease in the use of NTFPs, since few wealth related differences exist in respect to NTFP use (Shackleton & Shackleton, 2006; Cocks et al., 2008; Paumgarten & Shackleton, 2009).

NTFP trade involves traders at local level who later sell to intermediaries or directly to final consumers. Marketing of NTFPs differs between countries, with most products having no formalised marketing chains, and being sold within the village, nearby town and not sold by private traders and cooperatives (Steele et al., 2015). Chilongo (2014)'s study in Malawi, found that of the most collected forest products, almost all were sold in their raw form except for wooden utensils, supporting the argument in this study that little value addition is done to most NTFPs. Value addition depends on access to the resources and markets at the end of the value chain (Wiersum et al., 2014).

NTFPs are most important to the poorest households living in most remote areas who may be most vulnerable to changes in economic, political and environmental conditions (Howell et al., 2010). They may improve the livelihoods of rural communities because they provide alternative income sources to households (te Velde et al., 2006; Mujawamariya & Karimov, 2014). However, NTFP marketing is given limited attention in terms of pricing, unlike agricultural commodities which have a system of fixing minimum procurement prices (Mahapatra & Shackleton, 2011). Households involved in NTFP trade are usually characterised by low levels of socio-economic indicators, assets and are typically described as poor (Mulenga et al., 2014). Few studies have focused on recording and addressing forest and environmental income in Malawi, while at the same time calculation of the commercial value of NTFPs is difficult even though they play an important role in the livelihoods of rural communities (Thandani, 2001; Walker & Peters, 2001). Data on utilisation and marketing of NTFPs and rural livelihoods is important for informed decision making.

Therefore, this study assessed the contribution of NTFP trade to households in four villages in southern Malawi along a deforestation gradient. Specifically, it analysed household use and preference, the contribution of NTFP trade to household income, the types and quantities of NTFPs which were marketed. It also analysed the value chain of mushrooms, wild fruits, edible orchids and thatch grass. The four study villages were chosen based on their location in relation to forest reserves and their forest cover status.

5.2 Household use, buying and selling of NTFPs

Households use, buy and sell NTFPs for various reasons (Chapter 2 & 3). Households in the study sites used a variety of NTFPs to meet household basic needs with all using firewood (100%). Findings show a high proportion of households using NTFPs and all using at least one product. This supports other findings from Malawi, South Africa, Bangladesh and elsewhere of the important contribution of NTFPs to livelihoods (Shackleton & Shackleton, 2004; Kamanga et al., 2009; Kar & Jcobson, 2012b; Saha & Sundriyal, 2012; Wunder et al., 2014b). The wide use of NTFPs by households in the study sites suggests their importance as safety-nets, for coping and income generation. However, this depends on the availability and accessibility of the resource and the type of the product to fulfill the mentioned strategies. Some of the NTFPs were acquired through buying as well as from self-collection. However, overall purchase was much less common than collection. Only for construction wood did more than 50% of households resort to purchases. For all other products, less than half the households purchased the product.

The study found that one of the most important sources of cash income for most of the households was farming, ranked as number one. Like Mukul et al. (2015)'s study around Satchari in Bangladesh, another poor developing country, farming is the main occupation for respondents in the present study. However, the only difference between the two study results is the proportion of households involved. In this study it was 82% of the households while in Bangladesh it was only 37%. The study revealed that NTFP trade was third with 15% of the households relying on it, while in Bangladesh it came second with involvement of 18% and 32% of the households in the two study sites. This could be associated with the differences in location and the socio-economic context (Mukul et al.,

2015). Asfaw et al. (2013) found similar results in Ethiopia where the highest contributor of total annual household income was agricultural related, crop production (40.7%) while NTFP income was second contributor (32.6%).

The results showed that 39% of households were involved in NTFP trade. In contrast, Paumgarten & Shackleton (2009) found that only 22% of households were involved in NTFP sale in South Africa also a southern African country. Differences observed here are linked to a number of factors, (e.g. types of markets, pricing, demand and supply) which this study did not address in detail. Results within the villages indicate 77% of households in Mtogolo, 62% in Mtuluma 1, 25% in Kasonga and 2% in Mpheta participating in the trade. Villages which had low-medium and medium-high forest cover had the largest number of households involve in the trade. Results for product specific trade further revealed that Mtogolo households traded nine products, involving 8% - 39% of households, Kasonga 14 products with 2% - 64% involved, Mtuluma1, 11 products with 4% - 54% and Mpheta village 11 products with all involving less than 10% of the households. Thus the village with the lowest forest cover, Mpheta, had the lowest number of households involved in trading NTFPs.

However, there could be other factors which influence a household's decision to participate in NTFP trade. Like Shackleton & Shackleton (2006)'s study in South Africa, revealed that wealthy households bought more NTFPs while few of the poor bought NTFPs, mostly acquiring them through self-collection. The results showed that though Kasonga had medium-high forest cover associated with high forest deforestation, only a quarter of the households were involved in NTFP trade. This could be associated with the socio-economic status of the households and income generating opportunities available in the study sites. For instance, it was observed that Kasonga village is the source of timber and timber products such as doors, window and door frames, which are usually sold at Songani market. There was a reduction in the number of households involved in NTFP trade in Kasonga as men decided to participate in high value trade activities mentioned above. Some households traded multiple products and this resulted in more cash income generated compared with the lowest-earning workers' annual income for some cases,

although this may be dependent on the types of products combined, the prices they get at the market and the quantities which are sold.

There were variations on the level of use, buying and selling of NTFPs by households in the study villages. Mpheta village had the least forest cover, lowest mean use of NTFPs, lowest proportion of households selling, the highest proportion buying and the longest mean travel time to collect the products. It was the only village that showed increasing numbers of traders and customers across all three NTFPs for the value chain analysis. Mtogolo had the second lowest forest cover, lowest mean use of NTFPs, proportion of households selling, proportion using, proportion buying and second highest mean travel time to collect NTFPs. In contrast, Kasonga and Mtuluma 1 both had medium to high forest cover and they both had the highest mean selling, proportion buying. They also had the lowest travel time with the highest use in Kasonga whilst Mtuluma 1 was just a bit lower than Mtogolo (Table 31). Availability and accessibility of NTFPs influence how the products are acquired by households. This is similar to the previous findings of Shackleton & Shackleton (2006) that some NTFP products are purchased by the households if the raw materials are not readily available locally and households with greater access to disposable income often purchase NTFPs rather than collect their own.

Table 31: Comparison of mean use, buying and selling of NTFPs across the study villages in relation to forest cover and deforestation status

Village	Mean NTFP Use	Mean NTFP buying	Mean NTFP selling	Forest Cover	Deforestation rate
Mtogolo	83.1	26.3	12.7	Low-medium	High
Kasonga	88.1	12.0	13.5	Medium – high	High
Mtuluma 1	77.8	12.4	17.5	Medium-high	Medium
Mpheta	4.4	28.7	1.8	Low	Low

5.3 Value chains of mushrooms, wild fruits, edible orchids and thatch grass

The results from this study show that the value chains of the four products were short and simple. Despite the chains being short, they operated in the same way and included similar functions; collection, transport, processing, sale direct and through intermediaries as longer value chains described by Marshall et al. (2006a). The results highlight why

the chains were short and not reaching national markets. The main factors which contributed to such short value chains were; (i) all the products were largely sold in local markets, (ii) the marketing network for the products was not well developed compared to the marketing of agricultural produce where people know the expected minimum prices unlike NTFPs, (iii) low value addition with most of the products sold in raw form and unwillingness of the buyers to pay more for products, and (iv) perishability of two of the products studied. Location of the village and deforestation status appeared to have no influence of the length of the value chain.

The study found different types of actors as described by Bolwig et al. (2011); traders, processors, intermediaries and final consumers who were directly involved within-chain exchanges of products as chain actors. However, it was found that the external actor in the study villages was the Forestry Department which provided expertise and guidance in forest management. Expelled actors were also revealed as some traders moved out from the value chain due to challenges associated with NTFP trade. Also, non-participants or excluded actors were noted as more than half of the households indicated not engaged in NTFP trade supporting the descriptions by Bolwig et al. (2011). The study further revealed the absence of vertical and horizontal coordination within the value chain among different actors at different or same nodes. NTFP traders were usually engaged in one-off market transactions, as individuals. There was no bulking of the products for sale and no sale contracts with the buyers were available as a certainty about future revenue from NTFP trade as reported by Bolwig et al. (2011) and Mitchell & Coles (2011). Collective action is a requirement for increasing the vertical coordination as described by (Mitchell & Coles, 2011). However, the vertical coordination despite the benefits may be difficult and costly to achieve because it involves higher performance requirements, e.g. quality as mentioned by Mitchell & Coles (2011).

5.4 Challenges associated with NTFP trade

The returns associated with NTFP trade were affected by low market prices and the types of markets. For example Malleson et al. (2014), in their study in Ghana, Cameroon and Nigeria, found that prices are subject to external market forces. High prices would result in poor sales regardless of quality since not everyone will be willing to pay adequately

for quality NTFPs (Kilchling et al., 2009). Types of markets influence prices and this has been reported as a common challenge to NTFP traders in India, South Africa, Bolivia and Mexico (te Velde et al., 2006; Shackleton et al., 2011; Mahapatra & Shackleton, 2012; Saha & Sundriyal, 2012). Adam et al. (2013)'s study, found that cash income received from NTFPs was affected by market saturation due to limited number of markets. Additionally, the low shelf life of some products exposed the traders to exploitation when demand was low and supply high during the peak season, as reported by Belcher & Schreckenberg (2007) and Jensen (2009). The need for households to acquire knowledge for certain products (i.e. mushrooms, edible orchids) to be involved in the trade was a hindrance to some who lacked knowledge and means to acquire it. This support findings from Malawi, Tanzania and elsewhere that there was need for knowledge transfer from elderly people to the young ones regarding identifying and harvesting certain NTFPs (Challe & Struik, 2008; Challe & Price, 2009; Kasulo et al., 2009).

The respondents' perceived that there has been a decline in availability of most NTFPs over the last decade although there were some differences between villages. In all the study villages land cover/use change resulted in the reduction of the availability of the harvestable quantities, with deforestation as the driver due to clearing of new land for settlement and agricultural production. This comfirms the findings by Openshaw (2010) who found that forest and grasslands were converted into agricultural production and settlement in Malawi. Therefore, low amounts were harvested by traders for most of NTFPs due to scarcity of the resources, which in turn affected the returns to labour considering the labour input to collect, process, transport and sell the products. Adam et al. (2013) reported similar results in the drylands of Sudan. Small quantities harvested forced other traders to stop, especially the opportunistic traders as it restricts the NTFP contribution to household income. Furthermore, the trade does not attract households due to limited cash income, also concluded by Mujawamariya & Karimov (2014), that small quantities collected and the low price received from the market influenced households' decisions to participate in the trade. However, positive returns would attract more to participate in the trade. This argument is similar to that of Malleson et al. (2014) who noted that households will join other attractive and profitable businesses if NTFP trade is not rewarding.

5.5 The key questions

5.5.1 What types of NTFPs are used and preferred at household level in relation to deforestation status?

The study found that more than half of households used a variety of NTFPs as a source of energy for cooking, food, construction materials and medicine. These included firewood, bamboo, thatch grass, wood for building, wood for fencing, wild vegetables, wild fruits, medicinal plants, rope fibre, mushrooms, honey, bush meat, edible orchids, edible caterpillars and other NTFPs. All households used at least one NTFP. In the case of Mpheta village, which had low forest cover, less than half of the households used mushrooms, bush meat and honey. Household use of NTFPs highlights the significant role of the products in contributing to rural livelihoods to meet subsistence daily needs.

The study found that the most preferred products were medicinal plants, construction materials (bamboo and thatch grass), and firewood as the main source of energy for cooking. Differences were noted on the number of preferred products between villages. Mtogolo and Kasonga each had five products preferred; Mtuluma 1 had eight and Mpheta had ten. The preferences were based on whether the product would provide cash income, could be used for subsistence, availability and accessibility of the resource, easy harvesting, easy processing, the quantities harvested and marketability.

Despite the low forest cover and low deforestation rates households from Mpheta preferred more products and had to source these products mostly through buying rather than less self-collection. On the other hand Mtuluma 1 came second with medium-high forest cover associated with medium deforestation. This signifies the availability and accessibility component of NTFPs determining how many products a household can use. Mtogolo and Kasonga had the lowest number of products preferred. However, for Kasonga it was largely the edible NTFPs providing both a subsistence and income contribution which were preferred, a preference that was also affected by the fact that orchids were only available at this site and the high deforestation rates may have reduced the availability of other products.

5.5.2 What types of NTFPs are marketed in relation to deforestation status?

All the NTFPs in the study sites were marketed but the major difference was the proportion of households involved. For all the marketed products, only five had more than 10% of the households involved and the rest below 10%. The findings suggest that NTFP marketing is a multifaceted endeavor. However, it is worth noting that NTFP selling demonstrated a safety net role, coping strategy and income generation for stepping up and stepping out through accumulation of household assets. The villages had different levels of deforestation potentially undermining the availability and accessibility of some NTFPs. Consequently, the products could be available but had to be collected from distant places, difficult to reach, described by NTFP traders as "risky environments", low quantities putting off some households interested in marketing NTFPs. The collection time was longest in Mpheta and Mtogolo, corresponding with their lower forest cover and distances to the sources.

In relation to deforestation status, there were variations in proportion of households involved in selling NTFPs within the village. Thus, Mtogolo and Kasonga had at least three products with participation of more than one quarter of the households respectively, while Mtuluma 1 had two products and Mpheta had none. Additionally, Kasonga and Mtuluma 1 had one product and two, respectively, with more than half of the households involved for each product. Another notable trend was the selling of bush meat which was done in Kasonga and Mtuluma 1 villages only, a clear indication of the low forest status in the other two villages. The absence of bush meat signifies how disturbed the habitats for the animals are since the places do not have adequate forest cover to support their presence, while for Mpheta the low forest cover is associated with the grassland area and the long distances to the major sources (forest reserves).

5.5.3 What quantities are marketed, where do they sell the NTFPs and why?

Different quantities were marketed for various products with different units of measurement. Substantial quantities marketed were associated with the amount of cash income generated by a trader. However, generalisations cannot be accepted for some products because apart from the quantities marketed, the market prices they receive also affect the revenue generated. The products were sold in a wide range of markets which

included; within the village, neighbouring village, local markets and town markets in Zomba. Therefore, the type of the market and where it is located influences the product prices. The results show that the products were locally sold as they were perceived as local, free, with no or little value added.

5.5.4 Who are the key actors in NTFP value chains and why?

Traders, transporters, intermediaries and consumers were the key actors in the chain. To have a complete chain of product movement from source to consumer the products needed to be collected and have specific actors to carry out different roles. The traders' roles in the chain were two fold. They both collected, sold the products direct to consumers and to intermediaries. Transporters were involved to take the products to the markets, especially where the traders could not manage to walk. Intermediaries bought all the quantities at once and took the risks of perishability and transportation losses away from the traders. Finally, the consumers were the final users; their absence will eliminate NTFP trade.

5.5.5 What type of value addition is done along the chain?

Little or no value addition was done for most of the products in the study sites. Most of the value addition activities were simple with little or no impact on the product price. They involved grading according to size, processing, and packaging, while in the case of bamboo, making furniture. Exceptionally, furniture from bamboo was perceived to be one of the best products after value addition than selling the bamboo in their ordinary form.

5.5.6 How much income is generated from NTFP trade?

The cash income generated from the traded NTFPs was in the range of Mk8,000-Mk180,000 (US$20-US$456) per year per household. However, some households traded multiple products which resulted in more income generated above the Mk180,000 which was the highest for a single product. This was specific to product combinations and the number sold. A total of Mk185,000 (US$469) and Mk196,300 (US$498) was realised after selling two and five products, respectively, translating into 8% and 14% more than the annual earnings of the lowest-earning worker in Malawi.

5.6 Future research

The findings of this study have showed some insight into the socio-economic contribution of NTFP trade to households while at the same time adding to recent data. However, the findings have also unveiled some areas for future studies.

1. The study showed that NTFP use and trade benefited households in various ways. However, the sources have been affected due to deforestation over the years resulting in lower quantities available for harvesting. Therefore, it would be important to generate inventories of commonly traded NTFPs in Malawi to appreciate their abundance and availability for use by the households.
2. Firewood and edible orchids showed that they have the potential of contributing substantial cash income to households. However, in the case of firewood it would be critical to assess the harvesting levels and establish whether they are sustainable or not in the event of higher cash income generation.
3. Though the study has revealed the wide use of NTFPs, marketing and value chains for specific products it does not indicate the proportion of NTFP income at household level compared to the other sources, e.g. farming, fishing and temporary employment among others. A study to focus on the proportion of cash income generated from NTFP trade compared to all other cash income generation activities at household level would be useful.
4. The study also revealed that the customer base for wild fruits i.e., *Uapaca kirkiana* has been increasing because they are indigenous and regarded as tasty. A study on demand for wild fruits by urban dwellers would be of interest and this may be a window for value addition.
5. The quantities reported in this study are estimates. Therefore, another study focusing on specific products in season will be ideal to do the actual measurements of the quantities harvested.

5.7 Policy implications and issues

With respect to the overall findings in this study, the following are the issues recommended for policy makers and other players in environment and natural resources management to enhance availability of NTFPs for the improvement of rural communities' livelihoods:

1. Focus by the forestry experts should be placed on management of NTFP sources and making the harvesting of such products sustainable. Establish mechanisms which will enhance data capturing and management specifically for NTFPs in Malawi. For instance, generation of inventories of NTFPs with potential for high income generation which will be context specific in Malawi can help to determine the true value of the standing forests leading to a more rational decision regarding alternative uses. Also, explore the possibility of extending the short value chains to district and national levels to enhance the benefits which traders could get from the trade.
2. Value addition is critical for NTFP traders to get better prices for their products. Enhancing value addition would help participating households earn more cash income due to higher prices. Therefore, considerations to promote value addition of wild fruits, e.g. *Uapaca kirkiana* should be encouraged. For instance simple packaging of the wild fruits and connecting the traders to supermarkets will increase the cash income benefits. These are indigenous fruits known by many people, hence with the potential of some customers not exposed to the products in large cities and districts. Furthermore, introduction of low cost technologies for mushroom drying and juice making from wild fruits would empower communities economically as these will receive better prices than the products which are sold raw when in abundance.
3. Open access regimes are complicated systems as they lead to competition for the available resources. Therefore, strengthening the capacity of local institutions involved in the management and protection of the sources is important for them to have the capacity of enforcing the existing by-laws or develop them if not in place.

4. To reduce buying of the NTFPs which could have been self-collected by the households' and promote NTFP trade, afforestation, natural regeneration and re-afforestation programmes coupled with incentives to manage the trees for the first four years should be supported. There is need for a paradigm shift in terms of management of forest reserves and species regeneration from the usual focus on timber products by including NTFPs. Households which are involved in NTFP trade should be encouraged to participate in the forest management systems to strike a balance between product harvesting and conservation. Considering the levels of education of most household heads in the study sites being primary level, their opportunities in securing well paying full time employment is limited. NTFP trade if well-developed will provide options for cash income generation at household level. Reliance on NTFP trade is noticed and will still be there but the economic returns are small.
5. The success of the co-management arrangements with communities around the forest reserves which were the major sources of NTFPs in the study villages needs to be thoroughly analysed to assess its performance as a management option. The reserves are still under government control, proper strategies should be put in place to check whether the system is working by analysing the extent to which communities around such reserves are benefiting and motivated to participate in the programme, so that they can take the risks associated with enforcement of the by-laws. If well implemented communities around and away from the reserves will all benefit in the long term.
6. Establishment of associations and collectives in NTFPs in Malawi could also promote sustainable use of the resources. This could increase the bargaining power of the traders so that they are able to get better prices than selling as individuals without any group.
7. Finally, the Forestry Department and other stakeholders in environment and natural resources management should consider cultivation of edible orchids and enhance the domestication of wild fruits through provision of indigenous tree seedlings, carrying out research and providing technical support.

5.8 Conclusion

This study has provided insights into the use, sale and buying of NTFPs by households. These were embraced as strategies for coping, cash income generation and safety-nets where proceeds from NTFP trade were used for food purchases during food deficit months of the year. Some of the products were used for home consumption as non-monetary benefits. The study has further highlighted the use and marketing of NTFPs between villages in relation to deforestation status. It has shown that different products were preferred and marketed based on availability and accessibility as evidenced by the different proportions of households involved across the villages. Households' returns from NTFP trade were largely determined by the quantities harvested and types of markets where the products are sold. This has an influence on the market prices and the level of value addition. The role of NTFPs for cash income generation to households has been highlighted within the broader picture of socio-economic benefits realised from trade and the ability of the households to generate some cash income from the products.

In conclusion, the study has outlined areas for future research and concisely discussed policy implications and issues as recommendations for the future. NTFPs are basically providing a short term safety net role in the study sites. Based on the results the potential of these products for long term poverty reduction is largely dependent on availability of the resources. Currently, the harvestable quantities available are few and this undermines the potential of NTFP trade for poverty reduction. The management systems in place should ensure that the resources are given a chance to regenerate to increase their contribution towards poverty reduction at household level.

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Appendices

Appendix 1: Chi –Square test of NTFP trade as one of the important sources of cash income versus gender of households head

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.053	1	.081
Continuity Correction	2.417	1	.120
Likelihood Ratio	2.856	1	.091
Linear-by-Linear Association	3.042	1	.081

Appendix 2: Chi – Square test of NTFP trade as one of the important sources of cash income versus livestock ownership

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.071	1	.024
Continuity Correction	4.358	1	.037
Likelihood Ratio	5.069	1	.024
Linear-by-Linear Association	5.054	1	.025

Appendix 3: Chi – Square test of NTFP trade as one of the important sources of cash income versus number of months the household had food from own garden/field

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.564	3	.000
Likelihood Ratio	19.518	3	.000
Linear-by-Linear Association	18.052	1	.000

Appendix 4: Chi – Square test of NTFP trade as one of the important sources of income versus farming as another most important source of income

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.360	1	.000
Continuity Correction	13.728	1	.000
Likelihood Ratio	13.034	1	.000
Linear-by-Linear Association	15.307	1	.000

Appendix 5: Cross tabulation name of village versus NTFP Trade

Name of village * NTFP trade as one of the important sources of cash income for the household cross tabulation

			NTFP trade as one of the important sources of cash income for the household		
			Yes	No	Total
Name of village	Mtogolo	% within Name of village	77%	23%	100%
	Mtuluma 1	% within Name of village	62%	38%	100%
	Kasonga	% within Name of village	25%	75%	100%
	Mpheta	% within Name of village	2%	98%	100%
Total		% within Name of village	15%	85%	100%

Appendix 6: Cross tabulation Name of village versus NTFP trade (those who relied on the trade as one of the most important source of cash income)

Name of village * NTFP trade as one of the important sources of cash income for the household cross tabulation

			NTFP trade as one of the important sources of cash income for the household		
			Yes	No	Total
Name of village	Mtogolo	% of Total	3%	1%	5%
	Mtuluma 1	% of Total	6%	3%	9%
	Kasonga	% of Total	5%	16%	21%
	Mpheta	% of Total	1%	64%	65%
Total		% of Total	15%	85%	100%

Appendix 7: Household survey questionnaire

Household survey on NTFP trade (buying and selling)

Questionnaire Number		
Household ID		
Name of Village		
Traditional Authority		
Enumerator's name		
Date of interview		
Starting time		
Finishing time		

Section A: Household attributes

1. How many people are in this household (sleeping in the house and eating from the same pot most of the time)?		
2. How many are older ≥18years?		
3. How many of these adults (≥18years) have a paid full time employment?		
4. How many of these adults (≥18years) have a paid part time employment?		
5. What is the main source of income (cash) for this household?		
Activity	**5a) Importance source of cash income for the household** *(please tick)*	**5b) Ranked in order of importance (1 as most important)**
Farming		
Fishing		
Businesses		
Formal employment		
NTFP trade		
Casual labour (Ganyu)		
Others specify		
6. Is the household head Male or Female?		
7. How old is the household head?		

8. How many years of schooling does the head of the household have? *(Please circle the response)*	1= Junior Primary 2= Senior Primary 3= Junior secondary 4= Senior secondary 5= Tertiary level 6= Never been to school
9. How many months do you have food in your household from your own garden/field in a year?	1= ≤ 3 months 2= 4 months – 6 months 3= 7 months – 9 months 4 = 10 months - 12 months (all year round)
10. Do you use hired labour for productive works? E.g. ploughing/cultivating the fields	1= Yes 2= No
11. What is the total land holding size for this household including the piece of land around your home?	
12. How long have you stayed in this village? *(i.e. Household head or spouse if married)*	
13. Do you own livestock?	1= Yes 2= No If yes How many? If no go to section B

Livestock type	**Owned by the household** *(please tick)*	**Quantity (numbers)**
1= Goats		
2= Chickens		
3= Cattle		
4= Sheep		
5= Rabbits		
6= Ducks		
7=Guinea fowl		
8= Others specify		

Section B: Household level use and buying of NTFPs

	Q14 Do you use?	**Q15** Do you ever buy?	**Q16** If buy, how often:					**Q17** Typically, how much do you buy each time?	**Q18** What does it cost per unit	**Q19** Where do you buy it:			
			Weekly	Fort-nightly	Monthly	Every 2 – 3 months	1 -2 times per year			In the village	Neighbouring village	Market give name	(In tow Zomba
Firewood													
Mushrooms													
Thatch grass													
Bush meat													
Honey													
Wild fruits													
Wild vegetables													
Medicinal plants													
Rope fibre													
Bamboo													
Wood for fencing													
Wood for building (Poles)													
Orchids													
Edible caterpillars													
Others (please specify)													

Section C: Household level selling of NTFPs

	Q20 Do you ever sell?	**Q21** If sell:			**Q22** For what price do you sell it for per unit?	**Q23** Do you do any value addition to the product? E.g. grading, packaging, processing etc.	**Q24** Where do you sell it:			
		Quantity (no. of units per day, week, month, season, year))	Unit	Per how long (E.g. per week; per month, per season, etc.)			In the village	Neighbouring village	Market give name	(In town) Zomba
Firewood										
Mushrooms										
Thatch grass										
Bush meat										
Honey										
Wild fruits										
Wild vegetables										
Medicinal plants										
Rope fibre										
Bamboo										
Wood for fencing										
Wood for building (poles)										
Orchids										
Edible caterpillars										
Others please specify										

Q25. (Only for those involved in selling NTFPs) Would you be willing to participate in a further exercise, i.e. a group discussion of about 2 hours on the trade in NTFPs? If yes, what is your name? Thank you for your time.

Appendix 8: Checklist for key informant interviews with NTFP traders

Name of Village :	**Date:**	**Product:**
Facilitator:	**Note Taker:**	**Participants: M: F:**

Motivation to participate in NTFP trade (individual interviews with NTFP collectors and traders as key informants on the subject matter under discussion). *[Zowalimbikitsa okafuna/kukolola ndi kugulitsa chikande, udzu, zipatso (monga masuku a mtchire) ndi bowa kutenga mbali kumalonda amenewa].*

a. How did you start NTFP trade and for how long have you been doing this? (*Munayamba bwanji malonda amenewa? Ndipo mwakhala mukuchita malonda amenewa kwanthawi yayitali bwanji?)*

b. How were you introduced into NTFP trade? Who introduced you? (*Anakuphunzitsa/kukudziwitsani za mtundu wa malonda amenewa ndi ndani/munayamba bwanji?)*

c. Discuss how long they have been trading the product and why? *(Mwakhala mukupanga malonda amenewa kwa nthawi yayitali bwanji ndipo chifukwa chiyani?)*

d. Explain any barriers to entry to NTFP trade. Does one need specific skills or knowledge to become a trader in specific NTFP? Discuss the skills needed if any and where they are learnt. *(Kambilanani zolepheretsa munthu kuyamba malonda a zinthu zimenezi chikande, udzu, zipatso zamtchire, bowa. Munthu amafunika luso lina lapadela, nzeru zapadela kuyamba malonda amtundu umenewu? Kambilanani zimene zimafunikazo kuti munthu aphunzire ndipo atha kukaphunzira kuti?)*

e. How is pricing done and what are the prevailing prices per unit (kg/bundle/basket/pole/plate/bucket in the village, Local market and town markets. *(Kambilanani m'mene amayikila mtengo pakatundu wawo, ndipo mitengo pa msika ndiyotani pa kg/mtolo/basiketi/mbale/ etc).*

f. Discuss the returns to labour for the activity? How much money can one earn, for how many hours of work? (*Kambilanani zimene amapeza poyelekeza ndi ntchito imene amagwira, amapeza ndalama zochuluka bwanji, atagwira ntchito ma ola angati?)*

g. Do you realise non-monetary benefits of NTFP trade (e.g. working from home, being able to multitask with other household chores, flexible hours, being self-employed, being able to work with other family members, keeping traditional products and knowledge alive, learning business skills, proud of being able to work for myself, using the products without buying etc.) *[Zilipo zina zimene mumapindula pamene mukupanga bizinezi/malonda a mtundu umenewu kupatula ndalama? Mwachitsanzo kugwilira ntchito kunyumba, kupanga zinthu zina pakhomo, kupanga malondawa nthawi imene ukufuna, kuzilemba ntchito wekha, kugwila ntchito ndi abale pakhomo ndi zina zotere (Check the list)].*

h. Are they products which could substitute NTFP products on the market? *(Zilipo zinthu zina zimene zingalowe m'malo mwa katundu ameneyu pamsika)*

i. How much effort different actors (people) devote to the trade? (Are they opportunistic and just do it once or twice in a season, do they do it frequently, or specialise in a particular product and invest a great deal of effort in trading the product?) *(Anthu amene amatenga mbali mumalonda amenewa amayikapo mphamvu/khama lotani? Alipo ena ongopeza mwayi ndikugulitsa kanthawi kochepa kamodzi kapena kawiri pa sizoni/chaka, amagulitsa kawirikawiri kapena anakhazikika pogulitsa katundu wa mtundu umodzi ndipo amayikapo mtima, mphamvu zawo ndi nzeru zawo pa malonda amenewa).*

j. Trading multiple products, Discuss how the participant is benefiting, and how many products is trading. *(Kugulitsa zinthu zingapo nthawi imodzi , kambilanani kuti akupindula bwanji, ndipo akugulitsa zinthu zingati, azitchule).*

k. Discuss the range of benefits people get in a single season? For example, how much does an opportunist earn from trade versus a person who has been in the trade for some time (specialist). *(Kambilanani phindu losiyanasiyana limene amapeza mu sizoni/chaka chimodzi, munthu ongopezapo mwayi ndikugulitsa nawo kwa kanthawi amapeza motani poyelekeza ndi munthu amene ali*

katakwe/ngwazi amene wakhala akuguklitsa katundu ameneyu kwa nthawi yayitali).

l. Discuss the challenges which are faced by different actors at different levels and how they can be addressed. Why people start/continue/stop getting in NTFP trade. (*Ndi mavuto anji amene anthu amene akutenga mbali mu malonda amenewa amakumana nawo pa masitegi osiyanasiyana. Kambilanani nchifukwa chiyani anthu amayamba/kusiya kapena kupitiliza malonda a mtundu umenewu?)*

m. How have you benefited as an individual or family from NTFP trade? Explain the benefits accrued since you started NTFP trade. *(Kodi mwapindula bwanji ngati munthu kapena banja pochita malonda a mtundu umenewu kuyambila pamene munayamba malonda amenewa).*

Appendix 9: Checklist for an in depth-survey

1. Value chain analysis, check list for a focus group discussion with 8-12 participants

A. The resource

I. Discuss the sources of the NTFP products
   i. Where they get them (location)
   ii. How far is the resource in terms of distance
   iii. Explore any issues to do with access rights (is there equitable access to the resource in the community?)
   iv. Seasonality of the product, how long is the product traded?
   v. Is the product's abundance stable, increasing or decreasing and why?

II. Discuss any challenges which are faced in accessing the resource and why?

III. Discuss any challenges/constraints to investing more in the trade e.g. climatic issues, poor rains leading to low mushroom harvest.

IV. Discuss any changes in the resource availability with participants and the reasons to the changes and how that has affected resource availability e.g. grasslands where they get thatch grass being converted into agriculture land.

V. Discuss if returns/benefits match with the labour, time invested, costs of permits, processing and value obtained at the market for the product.

VI. How does value addition brings impact on product price if done. Discuss what is done to add value and any other benefits.

B. The value chain for traded NTFPs

I. Discuss the key routes for the product, for both processed and unprocessed product. The routes will be discussed and presented in a diagrammatic form.

II. Identify the important actors in the value chain and discuss the activities they carry out e.g. collection/harvesting, processing, transportation and selling to the final consumer.

III. What losses/wastages are experienced during harvesting/collection, transportation and processing?

IV. Identify who the main consumers/buyers are and where they are located.

V. Are there changes in number of traders for the past 10 years to date? (More or less traders, why? Is there a problem or market demand issues).

VI. Explore whether the customer base is increasing, stable or reducing and why?

VII. How is the demand for the product or available markets and at what level?

VIII. Discuss how pricing is done i.e. who has the powers in price determining and who dominates in the value chain? How does this affect success for various people involved in NTFP trade?

IX. Discuss how many collectors/traders are involved in NTFP trade regularly, occasionally, and frequently (these will be estimates).

X. Discuss the challenges which are faced by different actors at different levels and how they can be addressed.

C. Motivation to participate in NTFP trade (individual interviews with NTFP collectors and/or traders as key informants on the subject matter under discussion)

I. How did you start NTFP trade and for how long have you been doing this?

II. How were you introduced into NTFP trade? Who introduced you?

III. Discuss how long they have been trading the product and why?

IV. Explain any barriers to entry to NTFP trade. Does one need specific skills or knowledge to become a trader in specific NTFP? Discuss the skills needed if any and where they are learnt.

V. How is pricing done and what are the prevailing prices per unit (kg/bundle/basket/pole/plate/bucket in the village, Local market and town markets.

VI. Discuss the returns to labour for the activity? How much money can one earn, for how many hours of work?

VII. Do you realise non-monetary benefits of NTFP trade (e.g. working from home, being able to multitask with other household chores, flexible hours, being self-employed, being able to work with other family members, keeping traditional products and knowledge alive, learning business skills, proud of being able to work for myself, using the products without buying etc.).

VIII. Are they products which could substitute NTFP products on the market?

IX. How much effort different actors (people) devote to the trade? (Are they opportunistic and just do it once or twice in a season, do they do it frequently, or specialise in a particular product and invest a great deal of effort in trading the product?)

X. Trading multiple products, Discuss how the participant is benefiting, and how many products is trading.

XI. Discuss the range of benefits people get in a single season? For example, how much does an opportunist earn from trade versus a person who has been in the trade for some time (specialist).

XII. Discuss the challenges which are faced by different actors at different levels and how they can be addressed. Why people start/continue/stop getting in NTFP trade.

XIII. How have you benefited as an individual or family from NTFP trade? Explain the benefits accrued since you started NTFP trade.

2. Community timeline on Non-Timber Forest Products availability

With reference to ASSETS PRA reports for the selected villages on community timeline on food security the following issues will be discussed with NTFP collectors or/and traders

i. Main events which affected forest cover or grasslands, other wooded lands and trees outside the forest and had an impact on the availability of NTFPs (indicate the year of the event in some cases estimations will be acceptable based on the memory of the participants).

ii. Could you describe how the events affected the livelihood status of those households involved in NTFP trade?

iii. May you explain how the events affected NTFP trader's capacity to access NTFPs and the quantities harvested or collected? How did this affect the livelihoods of households involved in NTFP trade?

iv. Which of the events is considered the most important to the current status of NTFP availability and accessibility?

v. Review the summary of events with participants and ask for any additions or modifications.

vi. Discuss the table below for each NTFP based on quantities collected and accessibility.

NTFP collection based on quantities

Type of NTFP	**More collection**	**No Change**	**Less collection**	**Explanation**
Firewood				
Mushroom				
Thatch grass				
Bush meat				
Honey				
Wild fruits				
Wild vegetables				
Medicinal plants				
Rope fibre				
Bamboo				
Wood for fencing				
Wood for building				
Orchids				
Edible caterpillars				
Others (e.g. Reeds, Typha grass)				

NTFP collection based on accessibility

Type of NTFP	Easily accessible/no need to get permit	Not easily accessible/ requires permit	Explanation
Firewood			
Mushroom			
Thatch grass			
Bush meat			
Honey			
Wild fruits			
Wild vegetables			
Medicinal plants			
Rope fibre			
Bamboo			
Wood for fencing			
Wood for building			
Orchids			
Edible caterpillars			
Others (e.g. Reeds, Typha grass)			

3. NTFP preference and ranking

The preference criteria to be used will focus on income contribution, subsistence use, availability of (and access) to the resource, easy harvesting, easy processing, quantities harvested and marketability of the NTFP.

Using scoring matrix to rank the NTFPs, discuss the reasons behind each product based on the criteria below focusing on (advantages and disadvantages)

Type of NTFP used	**Income contribution**	**Subsistence use**	**Availability (easy access to the resource)**	**Easy harvesting**	**Easy processing**	**More quantities harvested**	**Marketable**
Firewood							
Mushroom							
Thatch grass							
Bush meat							
Honey							
Wild fruits							
Wild vegetables							
Medicinal plants							
Rope fibre							
Bamboo							
Wood for fencing							
Wood for building							
Orchids							
Edible caterpillars							
Others (Reeds, Typha grass etc)							

Using preference ranking matrix identify the most important characteristics which influence households to choose the type of NTFP to be traded/sold

Criteria	**Income contribution**	**Subsistence use**	**Availability (easy access to the resource)**	**Easy harvesting**	**Easy processing**	**More quantities harvested**	**Marketable**
Income contribution							
Subsistence use							
Availability (easy access to the resource)							
Easy harvesting							
Easy processing							
More quantities harvested							
Marketable							

4. Key informants Interviews with Forestry Staff in the selected sites

I. How is NTFP trade helping households in the selected villages in your view?
   - Discuss on income, subsistence use etc.

II. Discuss any changes on forest/vegetation cover over the past 10 years? What are the key drivers and underlying causes to the changes? What has been the impact on NTFP availability and accessibility?
   - Discuss the reduction or increase in area under forest cover

III. Are there records on NTFP quantities harvested/collected for the past 10 years and number of households involved?
   - Discuss the monetary value of the products in total
   - Discuss any observed changes to the household status socially and economically due to involvement in NTFP trade.

IV. Are there any impacts on forests, grasslands, trees outside the forest and other wooded lands due to NTFP harvesting or collection? How?

V. Explain the type of arrangement with communities in managing the forests and other wooded lands and the results?

VI. How do you support communities to promote NTFP trade to another level?

VII. Which NTFP products do you think could be promoted and why?

VIII. How can commercialisation of some NTFPs be achieved?