

RURAL LIVELIHOODS, FOREST PRODUCTS AND POVERTY ALLEVIATION:  
THE ROLE OF MARKETS

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## Abstract

There is growing acknowledgement that forests and forest products are central to rural livelihoods, but their role in lifting households out of poverty remains contentious. This study tested the assertion by proponents of forest based poverty alleviation that changing conditions in the use and management of forests and forest products has created opportunities for poor rural households to lift themselves out of poverty. The study used detailed annual income data from various household sectors in two contrasting sites in Zambia, namely Mufulira and Kabompo districts, analyzing the relative contribution of forest income to household livelihood, the effect of household wealth status on forest use, factors driving household participation in forest product trade, and the influence of distance to urban markets on trends in the use of forest products. The study found that forest based activities play a central role in the livelihoods of households in the two study sites, contributing close to half of total household income, and dwarfing the contribution of agricultural sectors such as cropping and livestock rearing which are generally regarded as the main income sources for rural households. Forest based sectors were also found to be particularly valuable sources of household cash, often coming at critical times to meet basic needs. The findings also revealed that without the contribution of forest income, the proportion of households that would fall below the poverty line would increase sharply in both study sites. Wealthier households earned higher magnitudes of both subsistence and cash income from forest based activities than their poorer counterparts. Even the share of total household income coming from forest based activities was also higher among these better-off households, confirming that these activities are lucrative and they are improving the wealth status of households. Household participation in forest product trade was found to be influenced by demographic factors such as number of productive household members, age and the education level of the household head. Economic factors such as the level of income from wage labour, household poverty level, and ownership of key assets such as a bicycle were found to be important. Distance of homestead from the forest was also found to be an important contextual variable. The influence of urban demand on the use of forest products by rural households was significant in the study area. Although local sales played an important part as a source of cash for households, the most preferred channels for trade were linked to urban markets, either through roadside markets, middlemen or direct sales to urban buyers. The study concluded that with improved local organization and support for product development and marketing, some forest based activities provide a viable poverty alleviation option for poor rural households who otherwise have limited economic opportunities to escape poverty.

## DECLARATION

I declare that this thesis is my own work, and that all other sources used or quoted have been fully acknowledged and referenced. It is being submitted for the Degree of Doctor of Philosophy at Rhodes University, and has not been submitted for a degree or examination at any other university.

Manyewu Mutamba

Signature.....  
January 2013

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# CHAPTER 1

## INTRODUCTION: FORESTS, POVERTY, AND RURAL LIVELIHOODS

### **1.1 Introduction**

Tackling poverty is perhaps the most daunting challenge of our time. A large proportion of the population across the developing world lives in chronic poverty (Ruoff 2011). Although there is much debate about who should be counted as poor, there is general consensus that poverty is widespread, and that rural populations are consistently poorer than their urban counterparts (Aliber 2003; May 1998; Shackleton *et al.* 2007). Achieving ambitious poverty reduction targets such as those envisaged in the Millennium Development Goals, remains a colossal undertaking for both state and non-state actors in developing regions. Efforts to understand the complex rural livelihood systems have preoccupied development scholars for more than two decades but effective strategies to overcome rural poverty remain elusive (Campbell *et al.* 2002; Shanley *et al.* 2012).

In sub-Saharan Africa, the major constraints faced by rural households include the often marginal agro-ecological conditions for most forms of agriculture, low levels of asset endowment, and a generally unfavorable external environment (Frost *et al.* 2007; Frost and Mandondo 1999; Mortimore 1998). Frequent droughts, infertile soils, a declining forest resource base, lack of access to credit, difficulties in accessing vibrant markets for most products, weak or limited extension support systems, and the poor state of infrastructure and services are typical challenges (Campbell *et al.* 2002; Frost *et al.* 2007; Tesfaye *et al.* 2011). The interaction of all these factors over time has resulted in some of the highest incidences of poverty among rural populations. A number of studies have concluded that as much as 80 % of rural households in sub-Saharan Africa are poor, while up to 70 % of these are living in extreme poverty (Campbell *et al.* 2002; Nair 2004; Republic of Zambia 1998). Not only are these populations deprived materially, they are also severely disempowered by low levels of education, poor health, and a lack of

adequate information and space to participate in making policy decisions that affect their lives.

Rural households typically pursue diverse livelihood strategies, not because they have plenty of economic opportunities, but as a response to the constraints and risks they face (Campbell *et al.* 2002; Frost *et al.* 2007; Shackleton *et al.* 2001; Vedeld *et al.* 2007). To varying levels households are involved in livestock rearing, growing a range of crops, collecting forest products for both subsistence use and sale, small non-farm businesses (e.g., brick-burning, carpentry, craft production, beer brewing, trading) and off-farm wage employment. Remittances from family members working away from home also support various household activities and investments (Campbell *et al.* 2002; Cavendish 2002; Mortimore 1998; Scoones *et al.* 1996).

If understanding how rural households manage to cope with this multitude of constraints poses a daunting challenge, then crafting viable intervention strategies to transform rural livelihoods within this context becomes even more elusive. For a start there is a general lack of good empirical studies demonstrating the linkages between key facets of rural livelihood systems and poverty alleviation (Shackleton *et al.* 2007). A typical example is the case of forests and forest products. Despite high dependency on these resources by rural households, the significance of this livelihood sector in terms of poverty alleviation generally tends to be underestimated or completely ignored in local and national development strategies such as Poverty Reduction Strategy Papers (PRSPs) (Frost *et al.* 2007; Oksanen *et al.* 2003). Oksanen *et al.* (2003) noted that this is due to three main reasons: (i) a lack of basic data on forest-poverty linkages, (ii) weak understanding among decision makers of the links between forestry and poverty alleviation, and (iii) lack of concrete proposals for policy reforms and investment.

Although it is now increasingly acknowledged that forests and other natural resources play important roles in household, local and national economies (Fisher 2004; Scherr *et al.* 2004; Tesfaye *et al.* 2011; Vedeld *et al.* 2004,2007; World Bank 2001), their role in efforts to alleviate rural poverty remain a subject of much contestation. Timber and non-

timber forest products (NTFPs) provide rural households with energy, food, structural materials and medicines, both for subsistence and cash income generation. Most of these products are available to households as ‘free goods’ because other than labour, little or no capital outlay is required to access them (Belcher *et al.* 2005; Angelsen and Wunder 2003). But to what extent and in what ways do these products play a part in lifting rural households out of poverty? Are incomes from forest products merely supplementary to other more commonly acknowledged sources such as crop production and livestock rearing? Are poorer households more dependent on forest products for their livelihood than their richer counterparts? What factors influence household participation in forest product trade? How is the contribution of forest income to household livelihood influenced by factors such as distance to urban markets?

Debate around these questions has preoccupied development scholars and practitioners for more than two decades and yet there is little convergence (Sills *et al.* 2011). Two schools of thought seem to have emerged, which are described below, one insisting on the limited role of forests and forest products beyond subsistence and ‘safety net’ functions, and the other highlighting new opportunities associated with the changing landscape in the use, trade and management of forests and forest products. Although they are not entirely contradictory these two arguments arrive at very different conclusions on the prospects for forest-based poverty alleviation (FBPA). More recently, a third school of thought is emerging, noting that over the past quarter century the dominant narrative about forest products has swung from optimism to pessimism about their potential to alleviate poverty and encourage conservation (Sills *et al.* 2011). This school of thought takes a more balanced, middle-ground perspective on research and policy, focusing on non-timber forest products (NTFPs) that are grounded in cultural traditions, that are traded in local and regional markets, and that are managed in subtle ways across a spectrum of forest types (Sills *et al.* 2011). Additionally, the role of the agro-ecological context in shaping the relative prospects for FBPA is also being recognized (Shackleton *et al.* 2007).

### **1.1.1 Forests for subsistence and safety net functions**

Critics of FBPA argue that despite the wide range of goods and services from forested landscapes, the role of forests and forest products in rural livelihoods is limited to subsistence and safety net functions, offering few or no opportunities for local people to lift themselves out of poverty (Angelsen and Wunder 2003; Arnold and Townson 1998; Campbell *et al.* 2002; Frost *et al.* 2007; Shackleton *et al.* 2008). Kaimowitz (2003) and Shackleton (2005) emphasized the way income from forests complements other income sources, helping fill gaps in annual income flows. Many of these scholars recognize the poverty avoidance or safety net function of forest-based activities, protecting households from slipping deeper into poverty in times of distress. This role has earned some of these forest products the name ‘famine foods’ (Sills *et al.* 2011).

More skeptical commentaries however suggest that these activities may constitute a ‘poverty trap’ in the sense that dependence on them undermines possibilities for accumulation and diversification in the household into more viable activities (Collier 2007; Neumann and Hirsch 2000; Wunder 2001). Belcher and Schreckenberg (2007) defined NTFP activities as poverty traps in cases where households increased quantities harvested to maintain incomes in the face of declining prices. Similarly, Delacote (2009) argued that “a poverty trap situation occurs when returns to labour allocated to the extraction of a common property resource (CPR) resource declines due to a simple tragedy of the commons effect”.

In trying to explain the poor poverty alleviation potential of forest products, Angelsen and Wunder (2003) argued that the very same characteristics of most of these products that make them important and widely accessible to the poor also often limit their potential to lift people out of poverty. Key among the weaknesses of forest product based development is the lack of well-developed markets on which these products can be traded, resulting in these products often fetching low values (Angelsen and Wunder 2003; Campbell *et al.* 2002; Kaimowitz 2003; Tesfaye *et al.* 2011). The seasonal nature of many forest products makes market development more difficult and income flows

inconsistent due to supply fluctuations (Frost and Mandondo 1999). Belcher *et al.* (2005) noted that intensified management of valuable forest products can create opportunities to increase earnings but taking advantage of such opportunities requires market access, secure tenure over the resource base, sufficient labour and capital to invest, the wherewithal to wait for that investment to mature, and entrepreneurial skills. In situations where NTFPs have high value, and market forces lead to intensified and specialized production, Dove (1993) noted that they tend to be appropriated by people with more power, more assets, and better connections, i.e. the non-poor. Highlighting the boom-bust phenomenon, Homma (1992) demonstrated how high demand for NTFPs can over time lead to collapse of the naturally regenerating resource base, production on plantations outside of forests, and increased competition from synthetic substitutes.

The nature of rural markets also presents problems for trade in forest products. Dispersed population patterns and low buying power of rural households often limit the size of markets (Frost and Mandondo 1999; Wunder 2001), although benefits to some local traders can be significant (Shackleton *et al.* 2008). Besides, it is often cheaper for rural households to collect their own forest products, only buying those they cannot access due to scarcity or labour constraints. Whilst urban centers have the potential to generate significant demand for forest products due to the dense populations and relatively higher buying power of households, improved access to modern substitutes may limit the demand for forest products (Sunderlin *et al.* 2005), other than for those with cultural significance (Cocks and Dold 2004, 2006; Sills *et al.* 2011). Many of the forest products are often ‘inferior’ goods which are replaced in the household consumption basket by more preferred substitutes as incomes increase (Cocks and Dold 2006). The remoteness of most locations where forest products are found also makes access to urban markets more complicated and costly, especially for individual households operating with small volumes (Collier 2007; Nkem *et al.* 2010; Sunderlin *et al.* 2005).

All these factors limit the potential of forest based enterprises to grow into sustained sources of savings, investment, asset accumulation, and lasting increases in income that are necessary for households to escape poverty. Critics of FBPA conclude that the role of

forest products can only go as far as poverty mitigation, with little or no prospects for lifting significant numbers of local people out of poverty.

### **1.1.2 The changing landscape: new opportunities for forest based poverty alleviation**

Proponents of FBPA offer a more optimistic prognosis on the role of forests in poverty alleviation (Arnold *et al.* 2006; Dewees *et al.* 2010; Lowore 2006; Pouliot and Treue 2012; Shackleton *et al.* 2007; Shanley *et al.* 2012). They argue that a number of recent developments in the use, trade and management of forests and forest products have created new opportunities for local people to lift themselves out of poverty through forest based activities. Central to this argument is the influence of a number of emerging opportunities that are driving new trends. Dewees *et al.* (2010) identifies five key drivers of this changing context: (i) rapidly growing domestic markets for forest products due to urbanization; (ii) new niche markets for natural products; (iii) shifting resource rights to local people; (iv) new integrated resources management approaches; and, (v) new technologies and institutions opening up new market possibilities. The influence of the processes on utilization of forest products and their impact on forest based poverty alleviation is explored in detail below. Proponents of FBPA however caution that like most, if not all local development interventions, forest based activities are not necessarily a silver bullet to rural development. Poverty alleviation will ultimately require multifaceted actions, addressing constraints at various scales in the full range of sectors that make up rural economies (Sayer and Campbell 2002; 2004).

#### **1.1.2.1 Urbanization and the rapid growth of domestic markets**

A number of studies have demonstrated that rapidly growing urban markets for forest products in developing countries are providing new opportunities for resource users (Arnold *et al.* 2006; Lowore 2006; Scherr *et al.* 2004; Shackleton *et al.* 2008; Sunderlin *et al.* 2005; Vedeld *et al.* 2007). The African continent has the world's highest urbanization rates with an estimated 4 % growth per year (Chidumayo 2005; Dewees *et al.* 2010). Not only are cities growing in population, the number of urban centers is also increasing. There are now 43 cities in Africa with populations of over one million. These are projected to increase to 70 by 2015. In most cases the proportion of urban dwellers

vis-à-vis the total population is also increasing (Deweese *et al.* 2010). The proportion of Africans living in cities is projected to rise from about 20-25 % in 1970, 35-40 % in 2000 to about 50-55 % in 2025 (Chidumayo 2005). Most countries in southern Africa recorded high urbanization rates between 2000 and 2005 (Deweese *et al.* 2010).

Typically, the high rates of urbanization in much of sub-Saharan Africa do not match associated rates of industrialization and economic growth. The region's economies are growing slowly with per capita income growth rates of as low as 0.1 % between 1990 and 1999 (Kaimowitz 2003), although higher in the last decade. The result is high levels of unemployment and continued dependence on relatively cheaper traditional sources of energy, food, medicines and other products (Arnold *et al.* 2006; Lowore 2006). Arnold *et al.* (2006) concluded that persistently low incomes in Africa are reflected in continued strong growth in urban consumption of woodfuels and positive income elasticity for woodfuel at low income levels.

The rapid growth in Africa's urban population has thus led to rapid expansion in domestic demand for forest products. These include charcoal, construction timber and poles, fruits, palm wine, some medicinal plants, wildfoods, and furniture, among others (Arnold *et al.* 2001, 2006; FAO 2001; Ndoye *et al.* 1998; 1999; Scherr *et al.* 2004). In Tanzania for example, Chidumayo (2005) estimated increases of 14 % in charcoal demand due to a 1 % increase in the urban population. The Stockholm Environment Institute (SEI) (2002) also estimated that the consumption of charcoal increased by around 80 % between 1990–2000 in both Lusaka and Dar es Salaam and the proportion of households in Dar es Salaam which reported that charcoal was their principal fuel increased from about 50 to 70 % over the same period. Around 76 % of households in the towns of Maputo and Matola in Mozambique were reported to rely partially or exclusively on woodfuels for cooking (Pereira 2001). Bennett (2002) and Ndoye *et al.* (1998) also reported large increases in demand for wild meat generally by people of all income levels, largely driven by the rapid growth of Central African cities. Urban expansion has also driven growth in the production of furniture and housing materials from forest products (Kaimowitz 2003).

### **1.1.2.2 New niche markets for natural products**

Recent studies have shown that globalization is creating niche markets for ‘green’ and ‘fair trade’ forest products, improving the competitiveness of small-scale producers (Deweese *et al.* 2010; Mander and Le Breton 2006; Shackleton 2005; Shackleton *et al.* 2007). Export markets for wild natural product ‘derivatives’ such as fruit oils (e.g. marula oil and melon seed oil), which are also often tied to fair trade initiatives, are increasingly being demonstrated as having high potential (Cunningham 2011; Dewees *et al.* 2010; Shackleton *et al.* 2007). An increasingly aware market for ‘green clean’ products is emerging for art products (such as carvings from hardwoods), honey and edible mushrooms. In Zambia, organic certification for products from forests such as wild mushrooms, honey, and beeswax enable harvesting and export to international markets by small-scale producer cooperatives (de Boer 2003). Studies by Krog *et al.* (2005), Shanley *et al.* (2010; 2011) and Williams *et al.* (2000) revealed massive expansion of medicinal plant trade over the last decade. For instance, Krog *et al.* (2005) found 198 medicinal plant traders in three markets in Maputo, up from 10 in 1980.

### **1.1.2.3 New technologies and institutions, new market possibilities**

Considerable advances in communication technology, in particular mobile phones and internet are creating new opportunities for rural households by improving the flow of information and strengthening linkages with markets (Deweese *et al.* 2010; Muto and Yamano 2009; Overa 2006). According to a UNCTAD report (2009) Africans are buying cellular phones at world record rates, with increases of 550 % between 2003 and 2009. The report estimated that penetration rates for cellular communication in Africa have reached about a third of the population, with some countries (Gabon, the Seychelles and South Africa) coming close to 100 %. Cellular operators have also made huge investments in infrastructure, particularly in rural areas. In sub-Saharan Africa, close to half the population is covered, including 42 % in rural areas (UNCTAD 2009). Uganda, the first African country to have more cellular phones than fixed telephones saw sharp increases in penetration rates from 0.2 % in 1995 to about 23 % in 2008 despite low income levels in the country (Muto and Yamano 2009; UNCTAD 2009).

Rapid growth rates in mobile telecommunications in Africa have been shown to bring positive benefits to poor marginalized populations (Deweese *et al.* 2010). Key among these is a decrease in transaction and transport costs for informal traders, enabling increased profits, efficiency and reliability (Muto and Yamano 2009; Overa 2006; Deweese *et al.* 2010). Work by IFAD (2006) in Tanzania revealed the positive effect of mobile telecommunications on the bargaining power of smallholder farmers in price negotiations with middlemen, and also enabled direct links with buyers in urban areas.

#### **1.1.2.4 Shifting resource rights to local people**

Devolution of responsibility for natural resource management to local stakeholders is a growing trend across sub-Saharan Africa. Recent studies have revealed that devolution processes have had a profound effect on the use and management of resources by local communities (Shackleton *et al.* 2002; Kayambazinthu *et al.* 2003; Nemarundwe 2004; Mutimukuru *et al.* 2006). Shackleton *et al.* (2002) concluded that devolution has enabled recognition of local people as legitimate resource users rather than as poachers, criminals, and squatters. This has opened new channels for rural dwellers to communicate their priorities to government decision-makers, demand greater autonomy and, in some places, enhance villagers' organizational capacity and political capital. Importantly, this has facilitated greater access to forest products and involvement in local and more distant markets (e.g. Mahapatra and Shackleton 2011) as well a greater say regarding who may harvest and under what conditions (e.g. Saito-Jensen and Nathan 2011).

#### **1.1.2.5 New integrated resources management approaches**

Efforts to achieve win-win outcomes in both conservation and development have led to the emergence of new integrated natural resources management (INRM) approaches. Typical examples include Payments for Environmental Services (PES) schemes through which individuals and communities receive payments to manage local forests for services such as carbon sequestration, watershed protection, biodiversity maintenance, and aesthetic qualities of the landscape related to tourism (Pagiola *et al.* 2005; Wunder 2007), which also allows sustainable harvesting of NTFPs. In this way local resource users are compensated by off-site beneficiaries for choosing resource management options that protect valuable positive externalities. Although most PES schemes are still in their

formative stages, their potential to provide vital additional income to poor resource dependent communities is not in doubt.

Other approaches include community-based natural resource management and social or community forestry (Ribot *et al.* 2011). These approaches are centred on achieving sustainable livelihoods for local people based on local control and sustainable use of land and natural resources, including NTFPs. As with PES, there are many examples of success, but in some settings implementation challenges remain (Dressler *et al.* 2011). Nonetheless, the emphasis on environmental resources and their integration with socio-economic and livelihood outcomes, means that they have a meaningful role to play in advancing FBPA.

Within more modified systems, agroforestry has been advocated as a key approach in integrating environmental sustainability, supply of forest products, farming livelihoods and development (Garrity 2004). The integration and maintenance of trees around homesteads, in fields and forest plots, provides multiple, tangible NTFPs such as fuelwood, timber, fruits, medicines and craft materials, along with environmental (such biodiversity, increased soil fertility and soil moisture, carbon sequestration) and aesthetic or cultural benefits (Miller & Nair 2006). Thus, it is common to find key tree species retained when new fields or homesteads are created (Hansen *et al.* 2005; Paumgarten *et al.* 2005; Schreckenber 1999). Integration or maintenance of wild products in human landscapes and sites is not restricted to trees. Many communities in sub-Saharan Africa and elsewhere make extensive use of wild edible and medicinal plants found within fields and fallows (Delang 2007; Lykke *et al.* 2002; Shackleton *et al.* 2010). Some may have considerable value and thus contribute to the cash saving, safety-net and even poverty alleviation roles of forest products (Delang 2006a, b; High and Shackleton 2000).

The threat from a changing climate and the potential of forests to play a significant role in both adaptation and mitigation has brought a new dimension to prospects for forest based poverty alleviation. A growing number of Reduced Emissions from Deforestation and Degradation (REDD) initiatives have now taken off in a number of countries, providing incentives for communities to protect forests. Recent studies by Fisher *et al.* (2010); Nkem *et al.* (2010) and Robledo *et al.* (2012) all highlight the potential role of forests in helping households respond to the challenges associated with climate change.

### **1.1.3 The middle ground**

At the center of arguments put forward by proponents of a more balanced approach is the realization that between the two extremes of high value internationally traded forest products (which are considered at risk of boom–bust), and ‘famine foods’ (which households consume only under duress), there is vast middle ground of products with demand grounded in local preferences and cultural traditions, traded in local and regional markets. These products make up a diverse basket of products that insure and enhance quality of life for rural people, and are often managed in subtle ways across a spectrum of forest types (Sills *et al.* 2011).

They note that as with most generalizations, the concepts of boom–bust cycles, famine foods, and poverty traps accurately characterize some but certainly not all forest products (Shackleton *et al.* 2007). For example, a review by Sills *et al.* (2011) noted that of the 61 cases in CIFOR’s comparative study of commercialization (Belcher *et al.* 2005), only 12 % followed a boom–bust pattern (with contracted or unstable market). They also cite the 2006 study of 10 products from 18 marginalized communities in Bolivia and Mexico where none of the NTFP activities were characterized as poverty traps (Schreckenberg *et al.* 2006).

Proponents of this balanced approach point to the fact that pessimistic models served as an effective antidote to earlier unrealistic expectations that commercialization of forest products would automatically reconcile development and conservation objectives. Researchers were encouraged to broaden their sights beyond the highly visible and appealing NTFPs with potential international markets, to a new research agenda that

aimed to uncover the actual (as opposed to potential) role of forest products in local livelihoods and local trade (Shackleton *et al.* 2008; Sills *et al.* 2011).

## **1.2 Testing the optimism: Study objective, hypotheses and research questions**

Assertions by proponents of FBPA make a case for interesting and yet challenging enquiry into the role of forests in rural poverty alleviation. Although they argue that the changing context creates conditions for poor people to lift themselves out of poverty through forest based activities, little empirical work has been conducted to verify these claims. A few recent studies in sub-Saharan Africa (e.g. Babulo *et al.* 2009; Kamanga *et al.* 2009; Mamo *et al.* 2007) show that contribution of forest products is high (typically > 25 % of total income) but variable between sites. Equally, the contributions of trade to household income and poverty alleviation are variable, and have largely been examined through market chain analyses (e.g. Cunningham 2011; Ingram *et al.* 2008; Shackleton *et al.* 2011) rather than household level studies. Such assertions can only be verified through approaches that not only seek to broadly understand but more concretely measure credible poverty proxies at the forest-livelihood nexus. The complexity of markets, the unpredictability of stakeholders, the natural limitations of forest products, and the multi-faceted nature of rural livelihoods make it all too difficult to conclusively predict likely impacts of all these changes on people's livelihoods.

The objective of this study was to find empirical evidence that the changing context in the use and management of forest products has indeed created real opportunities for local people to lift themselves out of poverty through forest based activities. Using detailed annual income data (both subsistence and cash) from various household sectors from two contrasting sites in Zambia, namely Mufulira and Kabompo districts, the study analyzed the contribution of forest income to household livelihoods. With some of Africa's highest rates of urbanization, Zambia is an ideal case to investigate the effects of growing urban markets on trade in forest products. Significant progress in the development of niche markets and certification for forest products such as honey and beeswax also present an

opportunity to evaluate the impact of these changes on the contribution of forests. The boom in cellular communication across the country is redefining the way communities, even those in the most remote locations, are connected with the rest of the world.

### **1.2.1 Hypotheses**

Based on the literature reviewed above, the overall hypothesis of this study is that changing conditions in the use and management of forests and forest products has created significant opportunities for poor rural households to lift themselves out of poverty. The specific hypotheses that are tested in this study include the following:

- (a) Income from forest based activities is central rather than just supplementary to household livelihood and plays an important role in lifting households out of poverty.
- (b) Poorer households are more dependent on forest income and therefore rely more on this resource to lift themselves out of poverty.
- (c) Participation in forest product trade is determined by household characteristics such as education levels, age, wealth, and size.
- (d) Access to urban markets increases household participation in forest based activities and household income from such activities.

### **1.2.2 Research questions**

The following research questions guided the study:

- (a) What is the relative contribution of forest income to household livelihoods and to what extent can forest based activities support poverty alleviation?
- (b) How does household wealth status influence use of forest products?
- (c) What factors influence household involvement in the trade of forest products?
- (d) How does distance to urban markets influence forest product trade and household livelihoods?

## **1.3 Concepts and definitions**

### **1.3.1 Poverty and well-being**

Poverty is one of the most complex and poorly understood phenomenon in recent literature. Debates around its definition, measurement, causes and solutions have dominated modern development discourse. Without a good understanding of poverty to drive policy choices, crafting focused programmes for delivering poverty alleviation is a daunting undertaking. Given the sustained attention on the subject, the definition and understandings of poverty continue to evolve, each time incorporating various dimensions.

During the late 19th century, poverty was mostly associated with the notion of ‘subsistence’, which was seen as a matter of having enough food or income to survive and was subsequently associated with the idea of a poverty datum line. In the 1960s, poverty was defined largely by income; in the 1970s by relative deprivation and the basic needs approach, and in the 1980s non-monetary concepts were added, including powerlessness, vulnerability, livelihoods, capabilities and gender (Chambers 1988). The 1990s saw the use of well-being and ‘voice’ in defining poverty, and currently a rights-based approach seems to dominate (May 1998). Each has its own differing indicators and each have different contexts and implications, but it would appear that broadening the definition of poverty has not significantly altered who is counted as poor (Shackleton *et al.* 2007).

In its broadest sense, poverty is seen as the pronounced deprivation of well-being related to a lack of material income or consumption (the conventional measures of poverty), low levels of education and health, poor nutrition and low food security, high levels of vulnerability and exposure to risk, and a profound lack of opportunity to be heard (Chambers 1988; Shackleton 2005; Sunderlin *et al.* 2005). A conservative definition by the World Bank described poverty as the inability to attain a minimum standard of living, which is measured in terms of basic consumption needs or income required to satisfy those needs (World Bank 2000). Similarly May (1998) argued that poverty in its narrow sense is understood as a reflection of the “inability of individuals, households or entire

communities to command sufficient resources to satisfy a socially acceptable minimum standard of living”. Kehler (2001) concurs that this approach reflects one way of conceptualizing and measuring poverty where “objective social indicators such as income levels, consumption, expenditures, and housing standards, together with subjective indicators, such as attitudes, needs and perception of social conditions can be used to determine levels of poverty”.

Kehler (2001) also points out that, on another level, poverty can be conceptualized and measured by determinants of well-being, or alternatively by the access people have to those determinants of well-being. According to this perspective, poverty is the denial of various choices and opportunities to access and benefit from basic elements of human well-being such as food, housing, education, health, work and social security. In other words, as Kehler (2001: 15) notes, “... factors such as health, welfare and human rights are determinants of well-being, whereas the availability of shelter, health care, education facilities and income are factors that define access to those determinants of well-being.”

Other approaches to poverty have suggested that poverty can be defined “as a consequence of a range of inequalities – of resources, power and opportunity” and addressing poverty is about addressing these underlying issues (May 1998). It is essentially about the inability of individuals, households or communities to command or mobilize sufficient resources to satisfy their basic needs and thus that unmet ‘rights’ define this approach to poverty.

Following this rights-based approach, Du Toit (2005) concluded that “any attempt to understand poverty should begin and end with this issue: the intimate and mutually reinforcing links between poverty (in the narrow sense) and the lack of power of poor households..... It reduces them to a dependent status in complex and unequal relationships of patronage, clientilism and exploitation, and robs them of many of the resources and capabilities that they need in order to be able to claim rights and entitlements that are theoretically afforded them in a democratic society” (Du Toit 2005, p39).

A 'Poverty and Inequality' report in South Africa by May (1998) summarized the definition of poverty as "the inability to attain a minimal standard of living, measured in terms of basic consumption needs or the income required to satisfy these". May (1998) also included elements such as "alienation from the community, food insecurity, crowded homes, usage of unsafe and inefficient forms of energy, lack of adequately paid and secure jobs and fragmentation of the family". The report goes further to point out that poverty is not a static condition; individuals, households or communities may be vulnerable to falling into poverty as a result of shocks and crises and long-term trends, such as racial and gender discrimination, environmental degradation and macroeconomic fluctuations.

Although rural poverty has been demonstrated to be a multi-faceted concept, quantitative aspects of this study concentrated on its income dimension as it is perhaps the most significant and also relatively easy to measure accurately. Interpretation of results and subsequent discussions are however grounded in the broad conceptions of poverty incorporating the broad indicators of socio-economic deprivation.

### **1.3.2 Poverty reduction, mitigation and alleviation**

This study adopted widely used terminologies related to poverty and forest dependent populations such as poverty reduction, poverty mitigation, and poverty alleviation. Following Angelsen and Wunder (2003) the term poverty reduction or elimination is used to describe a situation where people are "lifted out of poverty", climbing above a predefined poverty line and thereby becoming measurably better off over time, in absolute or relative terms. In this case, forest resources help lift the household out of poverty by functioning as a source of savings, accumulation and asset building, resulting in a lasting improvement in income and welfare. The term poverty mitigation or prevention is used in relation to the role of forests in helping people to maintain a minimum standard of living (even when this is below a given poverty line) and helping them to avoid slipping deeper into poverty. Poverty prevention in this respect thus refers to the "insurance" or "safety net" functions of forests in mitigating against extreme

poverty. Achieving both poverty mitigation and lifting people out of poverty constitutes what has been referred to as poverty alleviation (Angelsen and Wunder 2003; Sunderlin *et al.* 2005).

### **1.3.3 Forest products and non-timber forest products**

The terms “forest product” and “non-timber forest product” have been used interchangeably with one another, and other similar terms (e.g. minor forest product, secondary product) for some period, and I do so throughout this thesis. With expansion of research and policy interest in NTFPs, especially through links with FBPA, an array of subtly different definitions have evolved. Shackleton *et al.* (2011) recently reviewed the definitions in frequent use and identified the main elements of what differentiates NTFPs, or forest products, from other natural resources. Key components are that they are biological resources (fauna and flora) found in wild and semi-wild environments used by local households and communities for direct consumption, income generation and cultural or spiritual fulfillment, the benefits of which can, under the right circumstances, prompt local populations and institutions to conserve the NTFPs and landscapes in which they occur.

## **1.4 Layout of Thesis**

Following this introduction *Chapter 2* gives a description of the study area and methods, outlining the bio-physical and socio-economic context. *Chapter 3* gives an overview of the results, tackling the first question on the relative contribution of forest income and prospects for forest based poverty alleviation. The chapter also reviews recent literature on issues around the contribution of income from forest products. Detailed trends in the use of forest products and how dependence on these products are influenced by household wealth status are explored in *Chapter 4*. An analysis of the influence of household characteristics and contextual factors on trade in forest products is presented in *Chapter 5*. The influence of urban markets on the utilization of forest products is explored in *Chapter 6*. Distance to urban markets and how it influences household participation in forest products trade is a central part of this analysis. *Chapter 7* concludes the thesis, synthesizing the main results and the conclusions of the study.

## **CHAPTER 2**

### **THE STUDY AREA AND METHODS**

#### ***2.1 Geographic location***

The study was conducted in four villages, with two drawn from each of the districts of Mufulira and Kabompo in Zambia's Copperbelt and Northwestern provinces, respectively (Figure 2.1). Key characteristics of each study site are summarized in Table 2.1. The selected villages in Mufulira district (Sosala and 14Miles) are situated within easy access (10-70 km) of a network of mining towns including Kitwe, Mufulira and Chingola, and Zambia's second largest city, Ndola. Both villages are located not more than 5 km from a tarred road connecting them with urban centers. The border post into the Democratic Republic of Congo (DRC) is less than 5 km from Sosala village, allowing vibrant cross-border trading in various commodities. In contrast to Mufulira, Kabompo district is located towards the Angolan border and remains largely remote from urban centres, only connected by a gravel road to the provincial centre Solwezi, some 365 km away. The selected villages in Kabompo, Nkhulwashi and Maveve, are located 23 km and 69 km, respectively, from the district centre.

It is important to highlight that the study sites that were selected are not meant to be representative of Zambia's rural population. The research design adopted was intensive and sought depth of understanding rather than breadth. Study sites were purposively selected based on some of the underlying assumptions of this study. For instance, the selected villages in Mufulira district are highly integrated with some of Zambia's most dynamic urban centres. This enabled an analysis of the impact of high levels of integration with urban markets on the utilization of forest products by rural households. On the other hand, the study villages in Kabompo district have little interaction with urban markets, and thus provide a basis for comparison. In addition, Kabompo district has seen significant progress in certification and niche market development for forest

products such as honey and beeswax. This enabled testing of the impacts of these initiatives on the contribution of forest products to household livelihoods.

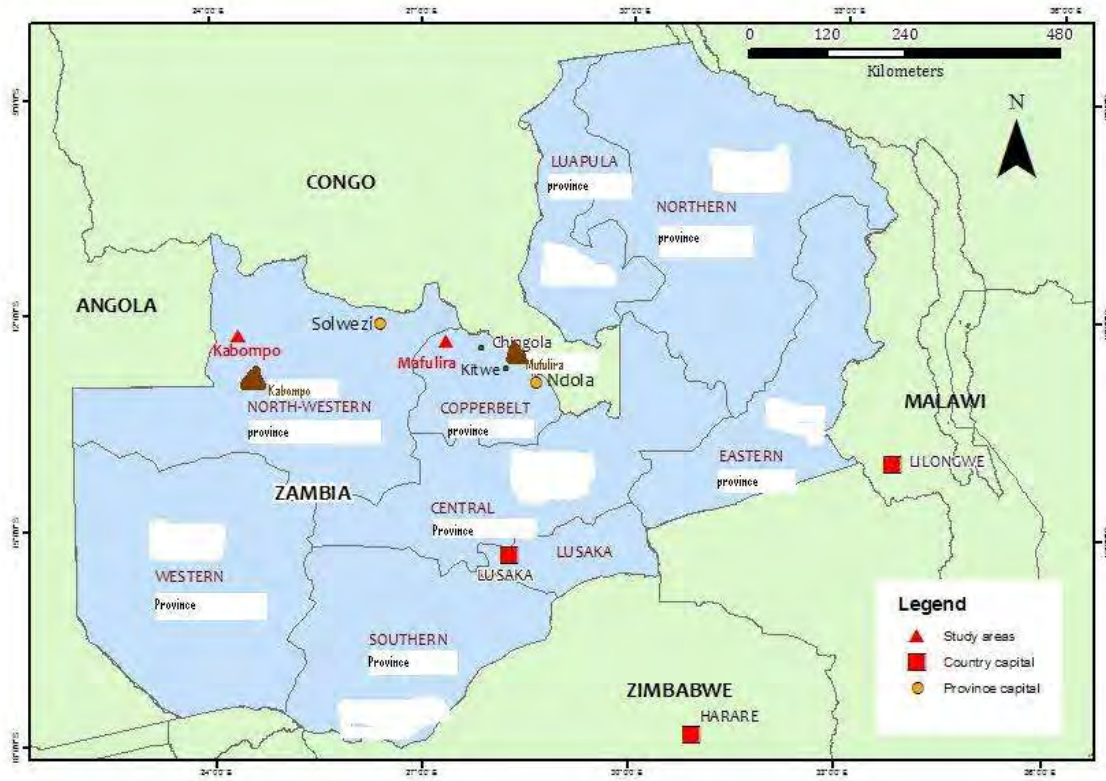


Figure 2.1: Location of Mufulira and Kabompo

Table 2.1: Summary characteristics of the two study districts

<b>Characteristic</b>	<b>Mufulira –Copperbelt Province</b>	<b>Kabompo – Northwestern Province</b>
Ethnic composition	Predominantly Bemba speaking but with significant numbers of Luvale	A mix of up to 15 ethnic groups, dominated by Luvale, Chokwe, Nkoya, Mbunda
Income sources	Crop production (maize, cassava, groundnuts, sweet potato, vegetables) Livestock (cattle, goats, pigs, poultry) Collection and processing of forest products Off-farm wages/casual jobs Small businesses (trading, beer brewing) Fishing Remittances	Crop production (maize, cassava, groundnuts, sweet potato, vegetables) Livestock (cattle, goats, pigs, poultry) Collection and processing of forest products Small businesses (trading, beer brewing) Fishing Hunting
Type of forest	Wet Miombo, mostly degraded, except on some state forests	Intact wet Miombo, little signs of deforestation
Important forest products	Firewood, charcoal, mushrooms, fruits, caterpillars	Firewood, timber, honey, fruits, mushrooms, caterpillars, bushmeat, thatch grass
Traded forest products	Charcoal, mushrooms, fruits, caterpillars	Honey, timber, thatch grass
Distance to nearest urban market	21 km	365 km
Access road	Villages less than 5 km from tarred road	Gravel road, in poor state during rains
Pressure on resources	High population density, 50 p.p. km <sup>2</sup> high incidence of encroachment on forest reserves	Low population density, 5 p.p. km <sup>2</sup> , little apparent competition for resources
Agro-ecological conditions	High rainfall, (>1,200 mm), acidic sandy soils	High rainfall, (>1,500 mm), Kalahari sands
Institutional setup	State structures allocate resources, externally-driven development related formations, no traditional structures	Traditional structures dominate, chief makes key decisions in resource allocation, externally driven development related formations, parallel state structures but hardly influence resource allocation.

## **2.2 Agro-ecological conditions**

Both study sites are located on Zambia's Northern Zone III high rainfall ecological belt covering Northern Luapula, Copperbelt and Northwestern provinces. This region is part of the Central African plateau which is characterized by high average annual precipitation of 1,200 mm and above and has a growing season of up to 190 days (Kajoba 1993). The climate of the area, like most parts of Zambia, has three distinct seasons: a rainy season from November to April; a cold season from May to August; and, a hot season from September to November. The high rainfall in this ecological zone has resulted in considerable leaching, leaving behind acidic sandy soils which limit crops that can be grown. Soils tend to be nutrient poor (Campbell *et al.* 1996; Frost 1996) often requiring chemical fertilizers to sustain crop production.

## **2.3 Vegetation and other natural resources**

As is the case across much of Zambia, the dominant vegetation type in the study areas is Miombo woodland. It is dominated by a few species, mostly from the genera *Brachystegia*, *Julbernardia* and *Isoberlinia* (Campbell *et al.* 1996; Chidumayo 2005; Chidumayo and Gumbo 2010). The term 'Miombo' is the Swahili name for a *Brachystegia* species. Miombo woodlands stretch across southern Africa in a belt from Angola and the Democratic Republic of Congo in the west, to Mozambique in the east (Chidumayo and Gumbo 2010). Miombo woodlands are the most extensive tropical seasonal woodland and dry forest formation in Africa, covering an area of around 2.4 million km<sup>2</sup> (Campbell *et al.* 1996; Dewees *et al.* 2010; Chidumayo and Gumbo 2010).

Miombo woodland is arbitrarily divided into dry and wet types given its large extent and little variation (Chidumayo and Gumbo 2010). Dry Miombo generally has a canopy less than 15 m in height and is found where rainfall is less than 1 000 mm per year. The dominant tree species are *Brachystegia spiciformis*, *B. boehmii* and *Julbernardia globiflora*. Wet Miombo is found in areas receiving more than 1 000 mm of rainfall per year and the canopy often exceed 15 m in height. The dominant tree species are *Brachystegia floribunda*, *B. longiflora*, *Julbernardia paniculata* and *Isoberlinia* (Chidumayo and Gumbo 2010). Wet Miombo covers about 1.36 million km<sup>2</sup>, extending

from near the coast in central and northern Angola, through northern Zambia and southern DRC, to central and northern Malawi and western Tanzania, with small extents in northern Mozambique and Burundi. Dry Miombo also covers a similar extent (1.2 million km<sup>2</sup> ) across southeastern Angola, southern Zambia and Zimbabwe to south, central and northern Mozambique, southern Malawi and much of southern Tanzania (Chidumayo and Gumbo 2010).

The unique characteristics of Miombo woodlands set the context for the use of these resources by local people (Chidumayo and Gumbo 2010). Typical features of this vegetation type are often linked to the availability of a wide range of timber and non-timber products that provide households with energy for heating and cooking, food, medicines and materials for construction. Unlike canopy tree species, the herbaceous layer of Miombo woodlands is typically dominated by a high diversity of vines and perennial herbs in the legume subfamily Papilionaceae (Dewees *et al.* 2010). Many of these plants are used as vegetables, dyes, medicines and even poisons that are important for hunting and fishing. Grass genera which produce useful thatch are also abundant. Patches of fertile deep soils, alluvial plains along river systems and wetlands support edible orchids that are highly valuable both for local consumption and sale (e.g. Challe and Price 2009). Although the timber values are much less than those of tropical forests, wood for fuel, charcoal and construction poles is abundant and plays a central role in local livelihoods. The fibrous bark particularly from *Brachystegia boehmii* is used in construction while *Brachystegia spiciformis* and other species are preferred for making beehives.

Particularly important to local livelihoods is the contribution of Miombo woodlands to local food supply. Edible fruits from Miombo are mostly from species growing on clay-rich soils (termitaria and riverine areas) where there is a high diversity of fleshy-fruited species. Two major fruit producing species occurring in large stands are in the Euphorbiaceae, namely from *Uapaca kirkiana* and *Schinziophyton rautanenii* (Dewees *et al.* 2010). Dominant woody species of the Miombo also have fungal associations with their roots, resulting in a remarkable diversity of Ectomycorrhizae, many of which produce

edible mushrooms, making Miombo woodlands one of the prime mushroom zones (Cunningham 2011; Frost 1996; Lowore and Boa 2001). A wide range of insects, especially the caterpillars of Saturniidae, a family of giant silk moths, supported by this vegetation type are an important source of protein and cash to local people (Deweese *et al.* 2010). The dominance of *Brachystegia*, *Julbernardia* and *Isoberlinia* also provides the basis for beekeeping as a highly significant form of land use in Miombo woodland. Other edible products include leafy vegetables growing on land cleared for farming (particularly Amaranthaceae, Capparaceae, Tiliaceae), which are more abundant on densely settled sites with eutrophic soils (Chidumayo 2005).

Rates of deforestation in Zambia's Miombo are disconcerting. FAO (2007) estimates suggest that as much as 445,000 ha of woodland (1 % of total forest cover) were lost annually between 2000 and 2005. As is the case across much of the Miombo region, the primary drivers of woodland loss are land clearing for agriculture and wood extraction for fuelwood. In many cases these factors work in tandem, wood extraction is often followed by use of land for agriculture (Deweese *et al.* 2010). The location of these woodlands on poor sandy soils results in low growth rates (Chidumayo 2005). While growth rates are low, strong coppicing usually results in good recovery rates (Deweese *et al.* 2010). Frost (1996) recorded coppice rates of about 2 m<sup>3</sup> per ha per year on plots in Zambia. Similar studies by Misana *et al.* (2005) in Tanzania recorded regrowth of 2.3 m<sup>3</sup> per ha per year. These recovery rates suggest that it takes 8 to 15 years for the degraded Miombo woodlands to recover from activities such as charcoal production which usually require tree sizes of greater than 10 cm diameter at breast height (Deweese *et al.* 2010).

## **2.4 Historical background and livelihood strategies**

The people of Mufulira and Kabompo share their origins in the Congo from where they are said to have migrated during the early part of the 19<sup>th</sup> century (Masumba *et al.* 2006; Sakahalu *et al.* 2006). While other groups came directly and settled in the northern part of the country, some groups settled briefly in Angola before civil strife forced them to proceed further south to settle in northwestern Zambia (Masumba *et al.* 2006). Despite their common history these communities now exhibit significant differences in their

livelihood systems, largely shaped by broader development trends in the country. The lure of copper mining in the Copperbelt province led to rapid economic growth, improved infrastructure, higher population pressure, higher rates of urbanization and generally more diverse livelihood opportunities (Chileshe 2005). In contrast, much of Northwestern province remains geographically remote from urban centers, with poor access roads and other infrastructure, resulting in limited livelihood opportunities.

According to discussions held at village meetings and key informant interviews held in the two study sites from the 10<sup>th</sup> to the 21<sup>st</sup> of November 2006, households in Kabompo and Mufulira are simultaneously engaged in multiple livelihood activities to meet subsistence needs as well as generate cash. The extent of involvement differs from area to area and from household to household. Deliberations of the meetings revealed that collection of forest products is a major part of people's livelihoods. Wood fuel provides energy to all most all households in these areas while a wide range of non-timber products that include honey, mushrooms, fruits, medicinal plants, thatch grass and game meat are extracted for subsistence use and sale. In Mufulira, charcoal sold is in nearby towns and on the roadside and was perceived by villagers as one of the highest cash income sources for households. In Kabompo, high quality organic honey, which fetches good prices on the export market, was noted by villagers as one of the most important forest products. Hardwood timber from the district was also described as highly valuable, mostly exported to South Africa and the DRC.

Many of the participants at village meetings concurred that livestock in both sites is limited to goats, chickens and pigs. Small livestock are important sources of meat and cash, especially for such expenses as school fees, healthcare, funerals and agricultural inputs. Small livestock are also slaughtered as part of traditional ceremonies or social functions such as weddings. Sometimes local butter trade also involves payment in the form of small livestock. Participants identified the low cost of purchasing such livestock as the main reason why they are easily accessible to most households. These animals were described as very hardy, requiring little managerial inputs and rarely succumb to diseases, making them cheap to maintain.

Very few households were said to own cattle even though they were perceived as being among the most valuable assets for rural households in Zambia. Among the reasons mentioned by villagers for the limited ownership of cattle are the severe outbreaks of diseases that have wiped out large herds of cattle in the past decade. The high cost of acquiring cattle was noted as the main constraint faced by most families in restocking their herds after such devastating shocks. Most of the households that currently own cattle were believed to be those with members in formal employment. Participants described how ownership of cattle significantly shapes household livelihood portfolios as cattle play an important role in many local activities, mirroring situations in Zimbabwe (Campbell *et al.* 2002) and South Africa (Shackleton *et al.* 2005). For instance, households with cattle were reported to be doing very well in crop production as they have access to draught power and manure. Even in forest based activities cattle drawn scotch carts were identified as the main form of transport for products from the forest to homesteads or markets. This enables cattle owners to extract more products and also to gain income by leasing out their animals to other households for the same purpose.

Across all sites participants at village meetings indicated that cropping is an important part of the local livelihoods system. However, the lack of draught cattle was noted as a major factor limiting its potential despite good rainfall in both sites. The main crops identified as important in the study sites include maize, cassava, sweet potato, groundnuts and various vegetables. The production cycle for most crops follows the rain season that starts around October/November to about March. Staple crops (maize and cassava) were identified as the dominant crops in both study sites and are grown by almost all households. In Kabompo discussions revealed that cassava remains more popular than maize, mainly because of cultural preferences but also because of the higher input requirements associated with maize production on the Kalahari sands that dominate the croplands. Most villagers in the district indicated that each year more and more fertilizer is needed to sustain yields due to declining soil fertility levels as increasing population pressures have limited the traditional practices based on shifting cultivation.

Besides own consumption, crops were identified by villagers as an important source of cash for households. Although most crops are sold locally, participants at meetings indicated that they also sell their surplus through more formal structures such as the government run Food Reserve Agency (FRA). Given its extensive network of collection centers across the country, farmers perceived the FRA as the major player in the maize market, determining the price of the crop each year. Although the farmers mentioned that they were sometimes disgruntled with the prices offered by the FRA, the agency remains the main buyer of maize especially in remote locations where private buyers are unwilling to go due to higher transport costs involved. Those who have been involved in local crop transactions indicated that these are sometimes in exchange for livestock, draught power, labour, clothes or even other crops.

In both sites participants at meetings revealed that although opportunities for formal employment are few, household members engage in a wide range of non-farm informal income generating activities that include small trading businesses, local artisanship, beer brewing, brick making and sale of casual labour. Levels of dependency on these income sources were said to vary widely from household to household, depending on asset endowments and the range of available opportunities. Some limited specialization in these activities was reported, particularly in the case of high value artisanal jobs and others that need specialized skills as is the case with charcoal making. Participants indicated that household members often take on several of these informal jobs concurrently, sometimes working with members of other households, through kinship or friendship associations that bring together groups of men, women or even both genders. Although returns from these informal jobs were said to be low, most participants at meetings felt that the cumulative income from undertaking several of these, especially during the off peak season, contribute significant cash inflows during what is otherwise a lean period.

Besides their own efforts to generate income, villagers in both sites acknowledged that they also receive remittances in the form of cash, food, clothes, utensils or even inputs, from relatives working away from home. More established households were said to have

better access to remittances as they often have older children working in urban areas. For the majority of households, the flow of remittances was described as unpredictable and largely concentrated around festive periods such as Christmas when relatives living away often visit their kin in the rural areas. Most of the villagers however concurred that this is an important source of regular income, driving a number of production and investment activities such as purchase of livestock, inputs and implements.

## ***2.5 Land Tenure and other institutional structures***

The land law of Zambia recognizes only two tenure regimes: state and communal, and all land is officially categorized as either State Land or Customary Land, respectively (Republic of Zambia 1995). Thus, land in Zambia may be held in two ways: through time bound leasehold granted by the President on State Land; and, through occupation under customary tenure rules on Customary Land, which is administered by traditional authorities (Bruce and Dörner 1982; Chileshe 2005). There are 73 tribes living in the Customary Lands under 240 chiefs, and above them are some eight senior chiefs and four paramount chiefs (Moll 1996). Customary Land forms approximately 87 % of the country's area. State Land is about 5.4 % and 7.6 % is covered by National Parks (Chileshe 2005).

Traditional governance arrangements still form the core of the institutional system in Kabompo district, with all land held by the chiefs in trust for their people. Land allocation decisions are the jurisdiction of the chief in consultation with local village headmen. These traditional structures are largely regarded by locals as legitimate and highly effective in enforcing a range of local rules that govern resource use and resolving conflicts, although pressure from outsiders over access to key resources constantly compromises the system. Suspicions of corruption are also not uncommon. Although parallel state governance structures exist in the district, they work closely with the traditional system as they often lack the resources and capacity to independently enforce rules especially at the local level.

A markedly different institutional landscape exists in Mufulira district where the traditional system is almost non-existent and state structures control all facets of local governance. Although the study sites are regarded as rural, much of the land is either State land or held by local councils. Villages have mostly been established through contestation with the State especially over land designated as State forests. Cases of illegal settlements and encroachment onto State or council land are rampant and often political pressure results in State forests being degazetted to legalize such occupation. High population pressure and economic expansion in the district means that pressure on resources, especially land, will continue into the foreseeable future.

More recently, development oriented institutional systems have also appeared in both districts as is the case elsewhere across the country, often driven by NGOs and other development agencies. These are largely aimed at improving local organization for resource management and empowering resource users to deal with various challenges such as productivity enhancement and marketing of products. Discussions with locals revealed that effectiveness of these institutions often depends on the level of outside facilitation and cases of collapse are common once outside help is withdrawn.

## ***2.6 Population and Poverty Status***

During the last census in 2000, Zambia was estimated to have a population of about 10.5 million people with about 65 % of the population living in the rural areas (Republic of Zambia 2000). Due to high economic activity associated with the mining industry, the Copperbelt province had the highest population (1.6 million) and the highest proportion (75 %) of urban population, while Northwestern province had the lowest population (580, 000) and also the lowest urban proportion (12 %). The Copperbelt province also exhibited some of the highest population densities in the country, estimated at about 50 persons per square kilometer. The Northwestern province had the lowest densities with just 5 persons per square kilometer although this is increasing, almost doubling between 1980 and 2000 (Republic of Zambia 2000).

According to the 2000 census, the population of females (50.8 %) was slightly larger than men (49.2 %), with the pattern being similar in rural and urban areas. Female-headed households were however more prevalent in rural areas (19.5 %) compared to urban areas (17.6 %), suggesting higher rates of migration among men who move to urban areas to look for work. Population growth rates however revealed that rates of migration maybe slowing. Between 1969 and 1980, annual population growth rates in urban areas were 6 % but this figure declined to 2.6 % between 1980 and 1990, and 1.5 % between 1990 and 2000. On the other hand annual population growth rates are rising in rural areas, from 1.6 %, 2.8 % and 3 % for the same periods, respectively.

Chronic poverty is widespread in Zambia. According to a 1998 Central Statistical Office (CSO) survey report (Republic of Zambia 1998), 73 % of the population is classified as poor, and of this 50 % is extremely poor. The acute levels of poverty are more concentrated in rural areas where up to 83 % of the population is classified as poor (compared with 56 % in urban), while 71 % of these are extremely poor. Provincial patterns are more or less the same, with the less developed provinces exhibiting higher incidences of poverty. As is the case in other countries in sub-Saharan Africa, female-headed households are highly vulnerable due to low asset endowment and the generally disempowering socio-economic circumstances (Campbell *et al.* 2002; Frost *et al.* 2007; Kaimowitz 2003; Vedeld *et al.* 2007). About 19.5 % of households in Zambia's rural areas are female-headed (17.6 % in urban) and of these 93 % are poor and 85 % are extremely poor (Republic of Zambia 1998).

Table 2.2 below summarizes some social indicators of well-being for Zambia. Many of the indicators suggest that in addition to income poverty, the socio-economic circumstances of most households in Zambia remain characterized by deprivation.

Table 2.2: Measures of well-being in Zambia

	<b>Total Population</b>	<b>Male</b>	<b>Female</b>
<b>Education</b>			
Adult literacy rate (%), ages 15 and above	67	77	58
Mean years of schooling, ages 15 and above	5.6	6.4	4.9
School attendance rate (%), ages 7-13	75	75	76
School attendance rate (%), ages 14-18	64	71	56
<b>HIV/AIDS</b>			
Prevalence rate (%), Urban & Rural, ages 15-49	16	13	18
Prevalence rate (%), Urban, ages 30-34	38	34	43
<b>Life Expectance and Child Mortality</b>			
Life expectancy at birth (yrs)	37.4	37.9	36.9
Infant mortality (deaths per 1000 births before age 1)	95	95	93
Under-5 mortality (deaths per 1000 births before age 5)	168	176	160
<b>Child Malnourishment</b>			
Stunted (%), ages 5 and under	47	48	46
Wasted (%), ages 5 and under	5	6	4

**Sources:** 2000 Census (literacy and schooling), 2002/03 LCMS (attendance), 2001/02 Demographic and Health Survey (HIV/AIDS, childhood mortality, child malnourishment), UN World Population Prospects: 2004 Revision (life expectancy)

Indicators such as education levels, adult literacy, HIV/AIDS prevalence rates, and child malnutrition, are worse for women compared to men, confirming the vulnerability of female-headed households. These trends have motivated a growing focus on female-headed households as a distinct social group requiring tailored poverty alleviation strategies. Although available data are not sufficiently disaggregated, most commentaries suggest that many of the socio-economic indicators are even worse for households living in rural areas and particularly for remote communities that remain disconnected to the mainstream society due to distance, poor infrastructure and limited flow of information. A sense of disempowerment, alienation and a lack of voice in key decision processes that

shape their lives is perhaps one of the most chronic forms of deprivation for these rural communities. This maze of all mutually reinforcing factors characterize the challenge of overcoming rural poverty in Zambia and many other developing countries across the world.

## **2.7 Study Design and Methods**

The empirical foundation of this study is based on a detailed quarterly *household questionnaire* survey that was conducted over a 12 months period. The survey was complemented with a once-off village level *forest products market* survey to discern trends in the trade in forest products as distance from urban markets increases. Extensive community consultations through a variety of *Participatory Rural Appraisal* (PRA) approaches were also conducted to gather in-depth information on the way of life of people in the study areas as well as follow up on key issues that could not be captured through a survey questionnaire.

With the growth in studies on use and valuation of forest products there has been increasing commentary on the methodological approaches and pitfalls to best capture the pertinent details. Early commentary by Ballance *et al.* (2001) and Gram (2001) stressed the need for multiple and nuanced approaches, especially when multiple forest resources were to be considered simultaneously, as is required in livelihood based studies. They also stressed the importance of matching respondent recall periods to the frequency of use and the necessity to provide sufficient attention to local units of harvest and sale. Much of the experience gained over the years was used to inform the large multi-country comparative studies led by the Centre for International Forestry Research (CIFOR), most recently the suite of Poverty and Environment (PEN) studies ([www.cifor.cgiar.org/pen\\_ref/home/index.htm](http://www.cifor.cgiar.org/pen_ref/home/index.htm)). Given the large number of researchers in these multi-country comparative studies a common set of methods were defined, which formed the basis of the approaches used in my thesis work reported here. The learning associated with these comparative studies was recently summarised in a book by Angelsen *et al.* (2011). However, some concerns have recently been expressed with the rigidity of approaches imposed by large comparative studies, which then fail to take

cognizance of local contexts and differences, which at times necessitate alternative approaches (Fisher *et al.* 2010; Menton *et al.* 2010; Shackleton *et al.* 2011).

### 2.7.1 Selection of study sites, sampling and data collection

One of the key objectives of the study was to understand how differences in access to urban markets due to remoteness and infrastructural differences influences the contribution of forest products to livelihoods of rural households. The study sites for the study were purposively selected to enable comparison on the basis of market access. Four villages were selected, with two drawn from each of the districts of Mufulira and Kabompo in Zambia’s Copperbelt and Northwestern provinces, respectively. The four selected villages in the two study sites have a combined population of 522 households. In each of the four villages, a complete household list was compiled and a random sample was taken to select the 50 households, giving a total sample of 200 households (Table 2.3).

**Table 2.3: Sampling of households**

	Kabompo			Mufulira			All households
	Maveve	Nkhulwashi	Total	Sosala	14Miles	Total	
Total number of households	104	148	252	97	173	270	522
Number of selected households	50	50	100	50	50	100	200

### 2.7.2 Defining the household

For purposes of this study a household was defined as a group of people who share the same dwellings, eat from the same kitchen, and depend on the same pool of assets for livelihood activities over an extended period of time. Family members working away from home were not considered as part of the household as they were not available for work and often had an independent source of livelihood. Any contributions from family members living away (food, inputs, money) towards the household were treated as remittances.

### **2.7.3 The household survey questionnaire**

The main instrument for data collection in this study was a household questionnaire administered to 200 households. The questionnaire survey captured quarterly household income and expenditure over a 12 month period starting late November 2005 to October 2006. The design of the survey questionnaire borrowed heavily from the methods of Cavendish (1999; 2002), Campbell *et al* (2002) and the Poverty and Environment Network (PEN 2007) ([www.cifor.cgiar.org/pen/\\_ref/home/index.htm](http://www.cifor.cgiar.org/pen/_ref/home/index.htm)) facilitated by The Center for International Forestry Research (CIFOR) (Angelsen *et al.* 2011). The common factor among these methods is the deviation from the conventional rural household income and expenditure survey designs that often miss or underestimate the contribution of forests and other non-farm income sources. These approaches also come with ingenious methods of valuing products that are not commonly traded as is the case with some forest products. Some modifications and improvements were applied to tailor the survey questionnaire to the local context.

The household questionnaire was structured with the intention to balance responsibly the increased accuracy that comes with shorter recall periods, and the overload on the respondents that is associated with more frequent rounds of interviews. As a compromise, households were mostly asked to report on activities during the previous month which were then extrapolated for each quarter. This approach was ideal in sectors that have high variability throughout the year involving frequent small transactions, as is the case with forest products, wage income, and small family businesses. In sectors such as crop production and livestock where transactions were less frequent and often involved large volumes that are easily remembered accurately, three monthly recall periods were used. The quarterly income data was then aggregated at the data analysis stage to compute annual household income.

The questionnaire was broken down into a set of five different surveys as follows:

- (a) The village survey that collected village level aspects, like average rainfall, infrastructure and institutional structures. This was conducted in each of the villages included in the survey at the start of the data collection period.

- (b) The village survey administered at the end of the data collection year to capture changes to village level variables during the survey period.
- (c) The annual household survey was conducted at the beginning of the survey year to capture household attributes that are unlikely to vary significantly within a year, such as household characteristics, asset ownership, participation in local institutions. The main respondent was the head of household although their spouse was also involved in the survey whenever they were available or in a few cases, where the head was not available over an extended period of time.
- (d) Household surveys were administered during *each* quarter of the data collection year. The quarterly surveys captured aspects of household activities that are better remembered within short recall periods e.g. quantity of different forest products collected, income from different household activities, expenditure on different household needs.
- (e) The household survey captured key changes in the household attributes over the survey year.

To improve accuracy and consistency, the survey adopted the use of measurement units that are commonly used locally. A *units* survey was then conducted at the end of the main household survey to establish conversion factors for changing the local units to metric units. An average of five samples of each measurement unit was taken to determine the conversion factors.

#### **2.7.4 Forest Product Market survey**

While the main household surveys captured detailed income and expenditure data for households in two contrasting sites (one near urban markets and the other one remote), the objective of the *forest product market* survey was to understand the level of trade in forest products for villages located in between these extremes. This once-off survey covered a total of 20 villages located along the continuum from the study site closest to urban markets to the one far away. One village was randomly selected within the vicinity of every 20 km point along the 400 km stretch of road between the main study sites. The data gathered included the types of forest products that were harvested for sale in each village and their main market.

### **2.7.5 Participatory Rural Appraisal (PRA)**

Community consultations through a variety of PRA approaches were conducted throughout the survey year, initially to mobilize community members to participate in the survey, and subsequently to gain an understanding about more subtle aspects of life in the study sites. A total of 10 focus group meetings and two large meetings were held in each village during the survey year. Usually focus group meetings comprised about 10 to 15 participants although five-to-seven participants were preferred for specific issues requiring expert opinion. Large meetings usually involved most people in the village, sometime numbering more than 50 participants.

Meetings were characteristically dominated by older men (about 60 %) while women and youths often constituted about 30 % and 10 % respectively. Various in-depth key informant interviews were held as follow-up to group discussions and also to investigate unique individual or household activities. Respondents were mostly people in leadership positions in the village, older members on historical issues, and other well informed villagers who were identified on a case by case basis. Participation by the research team in various village and household activities such as school meetings, funerals, weddings, traditional ceremonies, fishing and honey hunting revealed numerous aspects of peoples' lives that could not be captured through formal data collection.

### **2.7.6 Survey Implementation**

Secondary school graduates from each of the study villages were recruited and trained as enumerators. This was based on the understanding that locals would be highly knowledgeable about the area and would have no language problems. Given the long term nature of the study it also made sense to recruit people staying in the study villages, eliminating the logistical difficulties of constantly bringing enumerators from outside. The use of locally recruited enumerators was also central in making local people own the project rather than it being perceived as an exercise by outside people coming to just collect data (Angelsen *et al.* 2011).

Announcements for applications to work as enumerators were made during village meetings and these were followed by interviews. The headmaster from the local school and one of the village leaders were part of the interview panel. Interviews mainly tested numeracy and language proficiency, ability to learn quickly and elements of commitment and dedication to hard work. Two candidates were selected from each village, giving a total of eight enumerators, five males and three females.

The eight selected candidates were taken for a one week intensive training workshop during which they were prepared to work as enumerators. The training was facilitated by the lead researcher with help from forestry officers working in the study areas. Training started with giving the candidates a broad understanding of the project background and objectives. These were followed by detailed explanations and translations of all questions in the survey questionnaire. The enumerators then spend a lot of time practicing among themselves on how best to translate, phrase questions, and record responses. After additional training on research ethics and best practice in dealing with respondents, the enumerators were given an opportunity to conduct test interviews with households in a village outside the study areas. After these test interviews enumerators had additional practice sessions to improve their abilities.

After the training each of the enumerators was given their full kit of stationary and other accessories to use for the survey and deployed to their villages. The first round of surveys was launched two villages at a time to allow close supervision of the enumerators during the early stages of data collection. Each enumerator was assessed after conducting the first five interviews to determine their preparedness for the survey. At this stage two enumerators were relieved of their duties as being unsuitable for the job. This left only one enumerator per village in two of the four villages. Although this would mean more work for these enumerators, it was felt that this was the only way to ensure good quality data.

The first round of surveys (the first household survey, the first village survey and the first quarter household survey) started in November 2005 and was completed in December

2005. The subsequent quarterly surveys were then conducted after every three months. The final round of surveys (the second household survey, second village survey and the fourth quarter household survey) were concluded in October 2006. The *forest product market* survey was conducted between November and December 2006. The local units survey was conducted between November and December 2006.

### **2.7.7 Data analysis**

All quantitative data from the surveys were captured in a Microsoft Access database. These were then imported into a statistical package called STATA for all the necessary transformations, aggregation and analysis. All data relating to the quantities of products harvested and sold, and incomes earned were transformed into annual figures for each household. The gross income from products were obtained by multiplying the quantity of the product by the village-gate price reported in transactions, and adjusted for marketing costs in cases where products are marketed outside the village. All costs excluding own labour were then subtracted to obtain net income, i.e. the cash returns to the household. The household was used as the basic unit of analysis. Non-parametric tests and their post hoc equivalents were used for all statistical analysis to eliminate the need to prove the assumption of normality for the data. For ease of reporting, percentages and larger numbers were rounded to the nearest whole number, sometimes resulting in total percentages adding up to just over 100 %.

### **2.7.8 Income calculations**

Total annual household income was calculated as the sum of net earnings from all sectors of activities undertaken by households from October 2005 to September 2006. Although all cash expenses incurred by the households in the various sectors were deducted, family labour was not deducted, so the quoted net income is actually a return on family labour. All products produced or collected by households were valued at village-gate prices as reported in transactions. In cases where products were traded outside the village, the reported prices were adjusted by the cost of transport and other related marketing costs. The village average price was used to value products where households did not report any price either because they did not trade or they could not remember. Non-traded

commodities were valued using the willingness to pay approach where respondents were asked the maximum price they would be willing to pay for the commodity.

A distinction is made between cash and subsistence income. Cash income refers to the net value of products that are traded by the household while subsistence income is the value of products that are utilized by the household. All incomes and prices are reported in local currency, the Zambian Kwacha. At the time of the survey the exchange rate of the Kwacha to the US dollar was about K4, 000 to US\$1.

### **2.7.9 Categories of income generating activities**

In the two study districts the key income generating activities were grouped into eight sectors for purposes of analysis. Two agriculture based sectors (crop production and livestock rearing) were identified. Activities based on collection and processing of forest products were also identified and were characterized as two sectors, i.e. processed and unprocessed. A distinction was made between unprocessed forest products that are collected and utilized or sold without requiring significant transformation (e.g. firewood, fruits), and processed forest products that require processing from the original form (e.g. charcoal, furniture). In all illustrations the sectors forest (processed) and forest (unprocessed) are abbreviated as forest (pro) and forest (unpro) respectively.

Some households were involved in small family businesses for income generation. This set of activities was treated as a separate sector which is referred to as business. Casual jobs that were undertaken by household members bring in vital wage income or in-kind proceeds that form an important livelihood base for many households. These activities were classified in a sector referred to as wage. Fishing was also an important activity for some households during particular times of the year and this activity is considered here as the fish sector. The last sector described as 'other', includes all other income sources that did not fall into any of the above categories and were too small to be treated as individual sectors. The main income sources grouped into this category include remittances, gifts and government/NGO support.

## CHAPTER 3

# THE RELATIVE CONTRIBUTION OF FOREST INCOME TO HOUSEHOLD LIVELIHOODS

### 3.1 Introduction

Two or three decades ago it was widely believed that poor rural families largely earned their living from farming. A number of recent studies have now shown that rural livelihood portfolios are diverse (Cavendish 1997, Campbell *et al.* 2002; Lowore 2006; Sunderlin *et al.* 2005; Tesfaye *et al.* 2011; Vedeld *et al.* 2007), often including a number of non-farm income sources such as wage labour, craft work, small-scale trading, and remittances sent by relatives living away (Babulo *et al.* 2009; Frost *et al.* 2007; Jumbe and Angelsen 2007; Kamanga *et al.* 2009). Another major source of income is the collection of forest and other environmental products, which has gained recognition over the past two decades or so (Godoy *et al.* 2009; McSweeney 2005; Shackleton *et al.* 2007: 2008; Shanley *et al.* 2012; Vedeld *et al.* 2007). The significance of forest based income sources is a subject of much debate, especially with respect to its potential role in poverty alleviation. This chapter quantifies the contribution of these forest based income sources to the livelihoods of households in Mufulira with easy access to urban markets and those in remote Kabompo who have limited links to urban markets. The relative contribution to household income from forest-based activities is compared between these two sites to determine the influence of market access on the role of forest products in household livelihoods. Results are also used to infer the potential for FBPA strategies and conditions under which this may be feasible.

The optimism around FBPA is not misplaced. A growing number of studies now suggest that in sub-Saharan Africa alone, an estimated 15 million people earn a major portion of

their cash incomes from forest-related activities (Arnold and Townson 1998; Kaimowitz 2003, Ndoye *et al.* 1997). The work of Cavendish (1997), Campbell *et al.* (2002), and Lowore (2006) in southern Africa, Babulo *et al.* (2009), Tesfaye *et al.* (2011) in east Africa, and Vedeld *et al.* (2004; 2007) in west Africa, also revealed that rural populations depend on forest activities for up to a third of their income, with the poorer households having the highest share of their income from this source. Similarly, the work of Munishi *et al.* (1997) revealed that two-thirds of all Tanzanian households in seven administrative regions obtained at least 15 % of their incomes from forest products. In the same country, Monela *et al.* (1999) recorded contributions from wild honey, charcoal, fuelwood, and wild fruits of up to 58 % of households' total cash income in six rural villages. In South Africa, Shackleton and Shackleton (2000) and Shackleton *et al.* (2007) also recorded significant contributions from woodland resources to the incomes of small farmers in rural settlements which were often better than local unskilled wage rates and comparable to arable agriculture and livestock combined. Cavendish (2000), Narendran *et al.* (2001), Heubach *et al.* (2011), Ambrose-Oji (2003) and Fisher (2004) all reported contributions to total household incomes ranging from 20 % to more than 50 %. Significantly, studies by Dovie (2003), De Merode *et al.* (2004) and Shackleton (2005) found cases where forest product income shares were greater than those from cash crops.

Giving a more global perspective, The World Bank report entitled "Counting on the Environment, Forest Incomes, and the Rural Poor" (Vedeld *et al.* 2004) synthesized data from 54 household income studies from 17 countries, mostly from East and Southern Africa, South Asia and Latin America. The study found that, on average, forest based activities provided roughly one-fifth of poor rural families' income. About two-fifths of the income from forests came from harvesting wild foods (bushmeat, insects, and wild fruits and vegetables), while another third came from fuelwood. Fodder, medicinal plants, and timber provided much of the rest. The income was about evenly split between cash and products consumed directly. Wealthier families harvested more forest products.

However, these activities generated a much higher proportion of poorer families' total income. Villages farther away from markets and with lower educational levels got more of their income from forests. Local contextual factors to explain the differences across studies were not reported. However with low agricultural potential in sub-Saharan Africa, forest incomes are likely to be towards the upper end of the range.

Despite evidence of significant contributions to household livelihoods by forest based activities, other scholars insist their role is largely a subsistence and safety net function (McSweeney 2005), offering no means for rural communities to lift themselves out of poverty (Angelsen and Wunder 2003). Others have gone further to suggest that dependence on forests could actually be a poverty trap (Neumann and Hirsch 2000; Wunder 2001), undermining prospects of asset accumulation by households and rendering them more vulnerable (Collier 2007). Belcher *et al.* (2005) was also skeptical given the evidence of elite capture in circumstances where forest resources are highly valuable and markets are well developed.

Given these contrasting views, this chapter sought to quantify the contribution of forest based activities to households in remote and peri-urban communities. The analysis also compared forest based income with that from other household activities such as cropping and livestock, wage labour, small businesses, and fishing. To gain an insight into the potential contribution of forest based income to household poverty alleviation, the study also compared household income to a nationally defined poverty line under two scenarios; with and without income from forest based activities.

### **3.2 Methods**

A detailed outline of methods for data collection and analysis is given in *Section 2.7*. To set the context for this *Chapter*, key household characteristics that are likely to influence livelihood portfolios and the use of forest products such as demographic patterns,

education levels, gender and age were summarized across all the four villages. The mean values and frequencies were compared to determine whether they are statistically different across study sites. Comparison of means was conducted using the Kruskal-Wallis test. Where the Kruskal-Wallis test was significant at 95 % level, pair-wise comparisons were performed using the Mann-Whitney U test with a Bonferroni adjusted p-value. Similarly, patterns of ownership of key assets such as arable fields, livestock, family dwellings, implements and other possessions were also summarized. This analysis was followed by detailed income accounting for all household sectors to calculate total annual household income and annual income from each sector. Comparative analyses were undertaken to determine the relative contribution of forest based activities across sites. Using a nationally defined poverty line for rural areas (K350,000 per family per month), household poverty status was determined. A sensitivity analysis was also conducted to compare the household poverty status in scenarios with or without income from forest based activities. Observations from this analysis were used to make inferences into the potential for forest based activities to lift rural households out of poverty.

### **3.3 Results**

#### **3.3.1 Key household characteristics**

Mean household size was significantly higher in both villages of Kabompo than in Mufulira ( $H = 16.1$ ;  $p < 0.008$ ) (Table 3.1). Similarly the mean number of household members in the productive age group was significantly higher in Kabompo villages than those in Mufulira ( $H = 8.6$ ;  $p < 0.034$ ). There was however no significant difference between villages in the same district. Household members who were defined as 'productive' were those between 15 and 65 years of age. There was no significant difference in the mean age of household heads ( $H = 1.1$ ;  $p < 0.675$ ) across all villages. The mean number of years in school for household heads was also not significantly

different across all villages ( $H = 1.6$ ;  $p < 0.658$ ). Female-headed households made a small proportion of the sample in Maveve village (8 %) but within the same district, Nkhulwashi village had a significantly higher proportion (24 %) ( $\chi^2 = 8.3$ ;  $p < 0.040$ ).

Patterns in ownership of key productive assets across the four villages varied depending on the type of asset (Fig 3.1). Arable land ownership was widespread across all villages, ranging from 92 % in 14Miles to 100% in Maveve. Mean plot sizes were however significantly different across villages ( $H = 8.3$ ;  $p < 0.0358$ ). Cattle ownership across districts was highly skewed. There were no cattle owners among households in Mufulira district while 18 to 20 % of those in Kabompo villages owned cattle.

**Table 3.1: Key household characteristics by location**

Household Characteristic		Kabompo District		Mufulira District		Total	Significance level for $\chi^2$ or Kruskal-Wallis test
		Maveve	Nkhulwashi	14Miles	Sosala		
Household size	Mean	6.6 <sup>a</sup>	6.0 <sup>a</sup>	4.5 <sup>b</sup>	5.3 <sup>b</sup>	5.6	H = 16.1; df = 3
	SE	0.4	0.4	0.3	0.4	0.2	P < 0.008
Age of household Head (Yrs)	Mean	45.1	47.9	45.7	48.8	46.8	H = 1.1; df = 3
	SE	2.0	2.5	2.0	2.2	1.1	P < 0.675
Number of Years in School – Household Head	Mean	5.2	5.2	5.8	5.9	5.5	H = 1.6; df = 3
	SE	0.4	0.5	0.5	0.5	0.2	P < 0.658
Number of productive household members	Mean	3.2 <sup>a</sup>	3.0 <sup>a</sup>	2.4 <sup>b</sup>	2.6 <sup>b</sup>	2.8	H = 8.6; df = 3
	SE	0.2	0.2	0.2	0.2	0.1	P < 0.034
Gender of household head	% Male-headed	92 <sup>a</sup>	76 <sup>b</sup>	72 <sup>b</sup>	86 <sup>a</sup>	81.5	$\chi^2 = 8.3$ ; df = 3
	% Female-headed	8 <sup>a</sup>	24 <sup>b</sup>	28 <sup>b</sup>	14 <sup>c</sup>	18.5	P < 0.040
Size of arable fields (ha)	Mean	1.5 <sup>a</sup>	2.8 <sup>b</sup>	2.1 <sup>c</sup>	2.1 <sup>c</sup>	2.1	H = 8.3; df = 3
	SE	0.2	0.5	0.4	0.2	0.2	P < 0.0358
% of households with fields		100	96	92	96	96	$\chi^2 = 5.2$ ; df = 3 P < 0.159
% of households owning cattle		18 <sup>a</sup>	20 <sup>a</sup>	0 <sup>b</sup>	0 <sup>b</sup>	9.5	$\chi^2 = 21$ ; df = 3 P < 0.001

Unlike superscripts indicate significant differences between groups at  $p < 0.05$

### 3.3.2 Asset ownership

Figure 3.2a summarizes patterns of ownership for various household items including farming implements while Figure 3.1b shows ownership patterns for the eight most common items across villages. The most commonly owned item is a radio which was reported by 55 % of the households. A bicycle was the second most common asset (43 %) but with significant differences across districts. Rates of ownership were significantly higher in Mufulira compared to Kabompo (Kabompo: Maveve = 30 %; Nkhulwashi = 26 %; Mufulira: 14Miles = 52 %; Sosala = 58 %;  $\chi^2 = 17.3$ ;  $p < 0.0122$ ). A very small proportion of households reported ownership of agricultural implements such as ploughs (3.5 %), wheelbarrows, (2.5 %) and scotch carts (2 %). Analysis by district revealed that only households in Kabompo district own ploughs and scotch carts (*Plough*: Maveve = 2 %; Nkhulwashi = 12 %; *Scotch cart*: Maveve = 2 %; Nkhulwashi = 6 %). Wheelbarrows were only reported in Maveve by 10 % of the households (see Figure 3.1b).

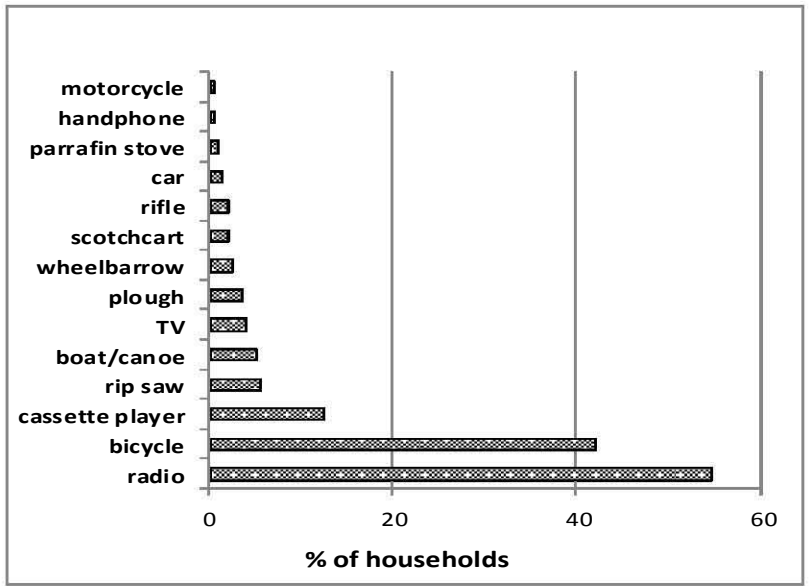


Figure 3.1a: Ownership of assets across all households

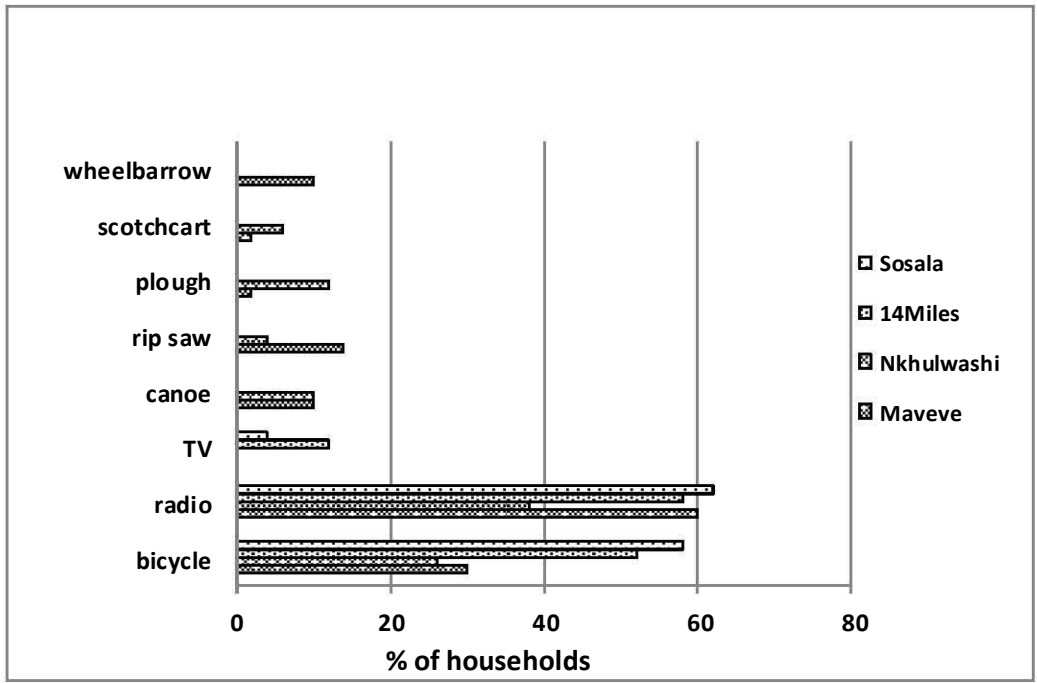


Figure 3.1b: Ownership of assets across villages

### 3.3.3 Type of housing

Grass-thatched, mud-walled houses were the most common type, especially in Kabompo where they were reported in more than half of the households (Maveve = 62 %, Nkhulwashi = 52 %) (Figure 3.2). The same type of housing was also dominant in Sosala (82 %). Grass-walled, grass-thatched houses were described as the poorest structures which are only used under the most desperate of circumstances. This type was only recorded in Nkhulwashi village (2 %).

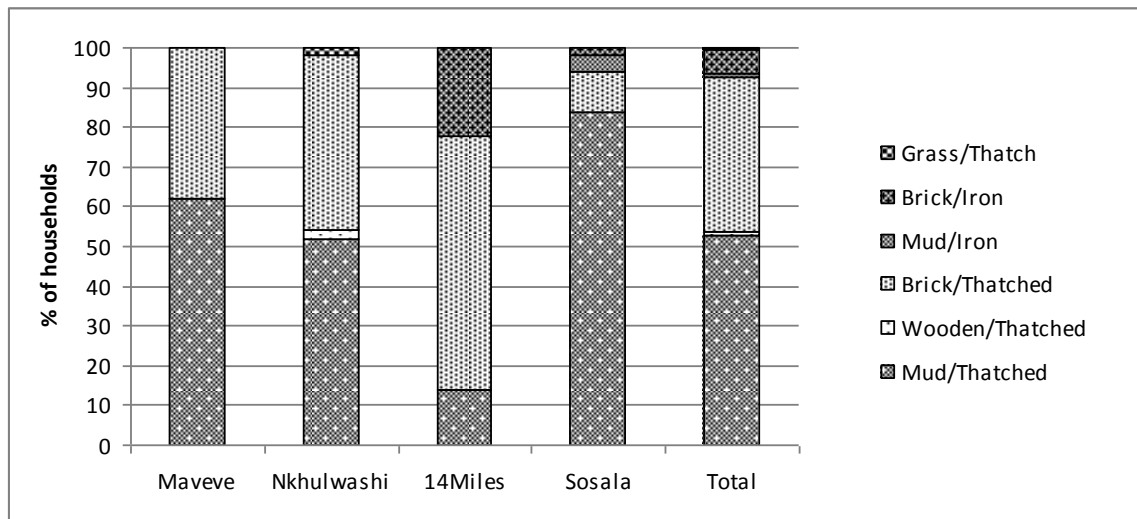
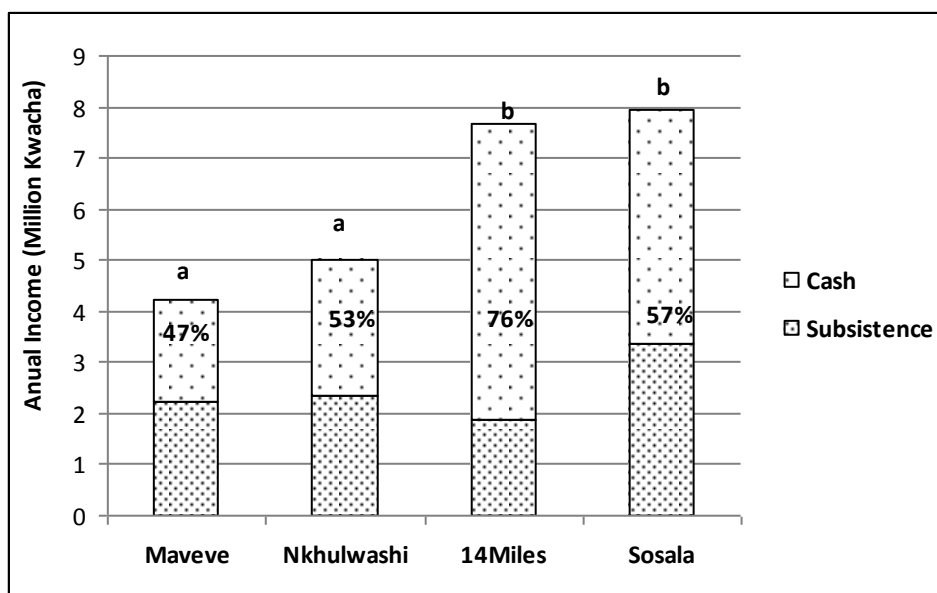


Figure 3.2: Type of main family house by village

### 3.3.4 Annual household income

#### 3.3.4.1 Income comparison by location

Households in both villages in the accessible district (Mufulira) earned significantly more income ( $\chi^2 = 5.1$ ;  $p < 0.02$ ) during the survey year compared to those in the remote location (Kabompo) (Figure 3.3). There were no significant differences between mean annual incomes for villages in the same district.



**Figure 3.3: Average annual household income by village, showing proportion of cash and subsistence income**

Unlike superscripts indicate significant differences between groups at  $p < 0.05$

Across all villages, the proportion of annual income that was earned as cash ranged from 47 % (Maveve) to 76 % (14Miles) of total income (Figure 3.3). In absolute terms however, the remote villages earned significantly less cash income compared with those in the accessible district of Mufulira ( $\chi^2 = 7.5$ ;  $p < 0.013$ ).

### 3.3.4.2 Income comparison by gender

Female-headed households reflected higher levels of poverty compared to male-headed households in all study sites. The mean annual income for female headed households was significantly lower compared to that for male-headed households ( $Z = 2.3$ ,  $p < 0.017$ ) (Table 3.2). This pattern is repeated across all villages although differences in the villages of Maveve and 14Miles were not significant (Table 3.2).

**Table 3.2: Mean annual household income (Kwacha) by gender of household head and village**

<i>District</i>	<i>Village</i>	<i>Male</i>	<i>Female</i>	<i>Statistics</i>
Kabompo	Maveve	4 346 898	2 637 588	Z= 0.822
	<i>SE</i>	834 016	665 652	p<0.4108
	<i>n</i>	46	4	
	Nkhulwashi	6 044 272	1 750 733	Z = 2.294
	<i>SE</i>	1 738 604	407 551	P<0.0218
	<i>n</i>	38	12	
Mufulira	14Miles	8 281 676	6 089 252	Z = 1.275
	<i>SE</i>	925 130	988 437	P<0.2024
	<i>n</i>	36	14	
	Sosala	8 370 571	5 351 550	Z = 2.027
	<i>SE</i>	569 985	622 703	P<0.0427
	<i>n</i>	43	7	
All households	<i>Total</i>	6 673 095	4 169 447	Z= 2.386
	<i>SE</i>	544 747	521 168	P<0.017
	<i>n</i>	163	37	

### 3.3.4.3 Household income and the poverty line

Comparison of mean annual household income with the nationally defined poverty line (based on a typical consumption basket for poor Zambians valued at K350 000 per month) revealed that at least 70 % of households in Kabompo fell below the poverty line (Figure 3.4). Households in Mufulira were better-off, as the percentage below the poverty line was only 9 % (Sosala) and 29 % (14Miles). Results suggest that although rural households are broadly regarded as poor, there are differences in the extent of poverty depending on location and level of integration with the rest of the economy. Even by this conservative poverty measure it is clear that many households in remote communities live in extreme poverty.

The situation worsened significantly when annual household income was calculated without the contribution of forest income (Figure 3.4). Under this scenario, the proportion of households below the poverty line increased dramatically, from 79 to 90 % in Maveve, 70 to 82 % in Nkhulwashi, 29 to 69 % in 14Miles, and 9 to 69% in Sosala. The highest increases were observed in the villages of Mufulira, suggesting a much bigger role of forest income in lifting households above the poverty line in this location.

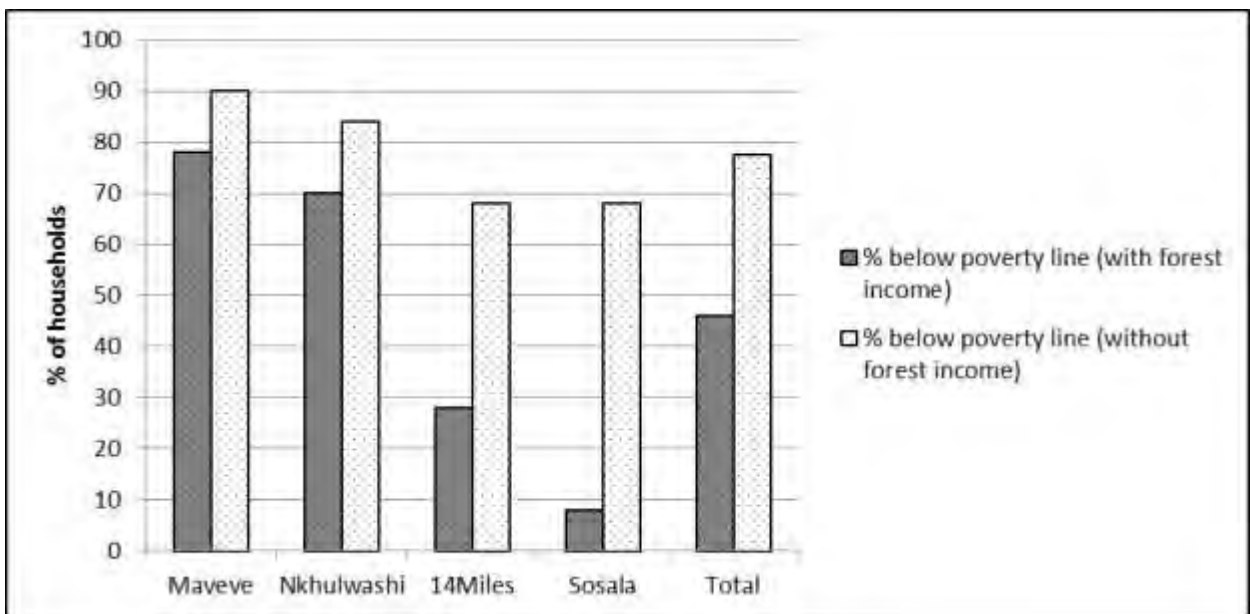


Figure 3.4: Percentage of households below the nationally defined poverty line with and without forest income

### 3.3.5 Income analysis within villages

There are wide disparities in annual income between households in Kabompo villages (Figure 3.5). Although the majority of the households (50%) were within a small range of the median of around K2 million, a few households earned as much as K30 to K60 million, as they had access to income generating activities which were not accessible to

others. The pattern is however different in Mufulira where there are no significant numbers of households doing exceptionally better than others.

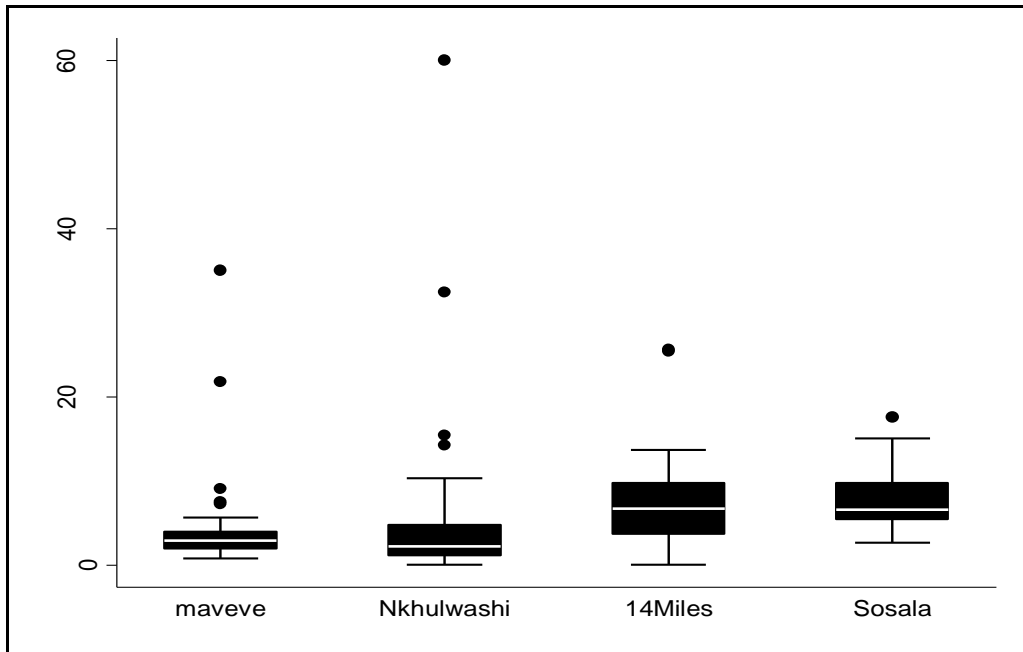


Figure 3.5: Box plot of mean annual income by village

### 3.3.6 Sectoral contributions to total household income

Across all villages, the two forest sectors (forest processed and forest unprocessed) were the highest contributors to household income, from 43 % in Maveve, 49 % in Nkhulwashi, 44 % in 14Miles, and 49 % in Sosala (Table 3.3). The contribution from the two agricultural sectors (cropping and livestock) was consistently overshadowed by that from forest sectors, only contributing 23 % in 14Miles and Sosala, and 38 % to 43 % in Maveve and Nkhulwashi respectively (Table 3.3). Overall, agricultural income contributed 29 % of total income while forest income contributed 46 %.

**Table 3.3: Mean Total annual household income (Kwacha) by sector and village**

Income sector	Kabompo									Mufulira			All villages		
	Maveve			Nkhulwashi			14Miles			Sosala			Mean	SE	%
	Mean	SE	%	Mean	SE	%	Mean	SE	%	Mean	SE	%			
Crops	751,178	68,511	18	664,315	59,611	13	532,970	69,314	7	1,124,520	130,067	14	768,245	45,692	12
Livestock	831,510	158,505	20	1,513,550	497,126	30	1,240,320	464,434	16	750,840	200,700	9	1,084,055	181,656	17
Forest (unpro)	1,736,782	671,660	41	2,426,214	1,009,023	49	1,127,226	180,842	15	2,619,691	194,964	33	1,977,478	310,723	32
Forest (pro)	78,798	23,771	2	9,330	4,677	0.1	2,164,812	343,367	29	1,306,170	235,370	16	889,777	121,508	14
Business	284,913	127,648	5	61,890	47,096	0.9	264,175	60,236	3	283,090	96,426	4	223,517	44,490	4
Wage	223,150	35,824	5	123,294	25,623	2	2,082,780	505,559	27	694,114	77,545	9	780,834	138,910	13
Fishing	221,610	47,056	5	189,060	53,272	4	0	0	0	731,310	216,906	9	285,495	59,800	5
Other	82,212	29,927	2	26,170	7,790	1	255,514	43,544	3	438,172	170,151	6	200,517	45,697	3
<b>Total</b>	<b>4,210,153</b>	<b>770,880</b>	<b>100</b>	<b>5,013,823</b>	<b>1,346,200</b>	<b>100</b>	<b>7,667,797</b>	<b>729,735</b>	<b>100</b>	<b>7,947,908</b>	<b>517,993</b>	<b>100</b>	<b>6,209,920</b>	<b>459,045</b>	<b>100</b>

Income from processed forest products was largely restricted to Mufulira villages which have better access to urban markets (Table 3.3). In this location processed forest products contributed between 16 % (Sosala) and 28 % (14Miles) compared to 0.1 % (Nkhulwashi) to 2 % (Maveve) in Kabompo. In contrast, unprocessed forest products contributed more in Kabompo (41 % in Maveve and 49 % in Nkhulwashi) compared to Mufulira (15 % in 14Miles and 33 % in Sosala ( $\chi^2 = 21.1$ ;  $p < 0.006$ )).

Opportunities to supplement household income through off-farm wage labour were more prevalent in Mufulira where 9 % and 27 % of total income in Sosala and 14Miles respectively, was from such activities. The proximity of these communities to commercial farming, mining and forestry plantation establishments enabled local households to seek wage employment. In the case of 14Miles, wages contributed a greater proportion of income (27 %) than agriculture (23 %), suggesting that whenever opportunities are available, rural household livelihoods can indeed be centered on non-agricultural activities. In Kabompo only 2 % (Nkhulwashi) to 5 % (Maveve) of household income was from wage employment.

About 80 % to 90 % of household income in Kabompo came from the agricultural and forestry sectors. The remaining four sectors contributed between 10 and 20 %. Although the agricultural and forestry sectors were also dominant in Mufulira, the other four sectors contributed substantially, accounting for 28 % in Sosala and 34 % in 14Miles. Higher levels of integration with the rest of the economy seem to create more income generating opportunities for households in Mufulira. Although running small family businesses provides a way of diversifying income sources for some households, the difficulty of running such enterprises viably in a rural location is apparent across all villages. The contribution of this sector was between 1 % and 7 %, with no discernible pattern between the two districts.

### **3.3.7 Contribution of sectors to cash income**

Table 3.4 summarizes the contribution of different sectors to cash income in the four villages. Trade in forest products in both districts provided the single most important source of cash for households (Maveve = 59 %; Nkhulwashi = 87 %; 14Miles = 49 % and Sosala = 48 %). In Mufulira where households have easy access to urban markets, both processed and unprocessed products were sold while unprocessed products dominated sales in Kabompo. Marketed surplus from crops and livestock was limited in all villages (Maveve = 20 %; Nkhulwashi = 22 %; 14Miles = 13 % and Sosala = 19 %). Most income from these sectors went into household subsistence, suggesting that without other substantial sources of cash like sale of forest products, households would be short of cash.

In both Mufulira and Kabompo casual wages were an important source of cash for households (Maveve = 14 %; Nkhulwashi = 6 %; 14Miles = 41 % and Sosala = 18 %), earning more cash than crop sales. The particularly high wage income contribution in 14Miles is related to the proximity of this community to various sources of casual employment, including commercial farms, mining operations and forestry plantations. Some households reported as many as five members simultaneously earning a wage for up to six months in a year.

**Table 3.4: Mean Annual cash income (Kwacha) for various sectors by village.**

Income sector	Kabompo									Mufulira			All villages		
	Maveve			Nkhulwashi			14Miles			Sosala			Mean	SE	%
	Mean	SE	%	Mean	SE	%	Mean	SE	%	Mean	SE	%			
Crops	216,006	32,013	11	23,040	7,815	1	151,230	37,380	3	587,470	90,336	13	244,436	29,606	9
Livestock	118,350	25,042	6	457,670	218,533	17	526,360	344,666	9	158,820	65,726	3	315,300	103,527	11
Forest (unpro)	938,630	354,780	48	1,909,590	1,011,851	71	618,750	133,558	11	804,405	128,696	18	1,067,844	272,292	38
Forest (pro)	32,198	15,479	2	5,250	4,472	0	1,907,718	306,621	33	1,043,207	192,173	23	747,093	105,889	27
Business	284,913	127,648	14	61,890	47,096	2	264,175	60,232	5	283,090	96,426	6	44,490	44,490	2
Wage	223,150	35,824	11	123,294	25,623	5	2,082,780	505,559	36	694,114	77,545	15	138,910	138,910	5
Fishing	74,010	14,512	4	67,770	25,203	3	0	0	0	559,740	182,932	12	175,380	48,618	6
Other	82,212	29,927	4	26,170	7,790	1	255,514	43,544	4	438,172	170,151	10	45,697	45,697	2
<b>Total</b>	1,969,469	-	100	2,674,674	-	100	5,806,527	-	100	4,569,018	-	100	2,779,150	-	100

### **3.4 Discussion and conclusions**

Results reported in this analysis are largely consistent with what have been recorded elsewhere in the region and internationally. But the findings reveal much higher levels of dependence on forest based activities than what has previously been recorded in works of Cavendish (1997; 2000), Campbell *et al.* (2002), Dovie *et al.* (2003), Godoy (2009), Heubach *et al.* (2011), Lowore (2006), and Shackleton *et al.* (2007; 2008). This evidence supports assertions that the role of forest based activities is more central to rural livelihoods than widely acknowledged. Further analysis revealed the central role of forest income in lifting large numbers of households above the poverty line suggesting reasonable prospects for forest based poverty alleviation strategies. The findings also show that the potential for FBPA is dependent on contextual realities such remoteness and access to vibrant urban markets.

#### **3.4.1 Asset ownership**

Households in both locations are severely constrained by lack of productive assets. Foremost among these are those assets required for productive activities. Cattle ownership was restricted to a small proportion of the population due to the high cost of acquisition and recent deaths following disease outbreaks. The most widely held household assets (radios and bicycles) have a limited role in productive activities. But as the only regular means of keeping in touch with the rest of the country, especially for remote villages in Kabompo, a radio is a highly prized possession. Purchases were sometimes made through barter exchanges with external traders who accept crops and livestock as payment. Bicycles are also particularly key as a mode of transport. They offer the cheapest means of getting goods to the market. Charcoal producers in Mufulira mainly rely on bicycles to ferry as much as 150 kg of charcoal to the market per trip, traveling distances of up to 30 km. In Kabompo bicycles are a vital mode of transport to reach important centers that are often up to 70 km away. Few alternatives are available and it's not uncommon for sick family members to be transported by bicycle to the nearest clinic, sometimes traveling for up to eight hours

Villages in Mufulira district consistently reported higher rates of ownership of the top three assets. They also reported assets such as TVs which were not reported by any household in Kabompo villages. Assets such as a canoe and a rip saw were restricted to Kabompo villages where they are more relevant. Canoes are used by locals as transport across the Kabompo River and also during fishing. Rip saws are an important tool in timber logging which is an important activity for some households in this area.

Conspicuous by their absence from the top of the ranking of household possessions are agricultural implements. Ploughs, scotch carts, and wheelbarrows were rarely reported by households. Only 2 % and 12 % in Maveve and Nkhulwashi, respectively, reported ownership of ploughs. The prices of these implements were said to be beyond the reach of most households who would rather concentrate on livelihood activities that are less dependent on such assets. The lack of cattle in Mufulira and the declining numbers in Kabompo after the disease outbreak was mentioned as another reason why households were not investing in agricultural implements which require draught power. In Maveve a recent externally funded project was cited as the source of most wheelbarrows that were reported by households. Generally, it seemed that household asset ownership patterns were both a cause and consequence of a limited dependency on agriculture as a means of making a living.

### **3.4.2 Trends in household income**

Analysis of total annual income revealed that households in remote villages of Kabompo earned less income compared to those in Mufulira who are more integrated with urban markets. At least half of annual income reported by households was in cash, with Mufulira residents earning more than those in Kabompo. Remote villages also had higher income disparities supporting assertions that for communities with easy access to markets, the limited barriers to entry associated with forest based activities can have income equalizing effects (Belcher *et al.* 2005). Although rural households are broadly regarded as poor, there seems to be differences in the extent of poverty depending on location and level of integration with the rest of the economy.

Female-headed households earned less income in all villages, suggesting higher levels of vulnerability compared to those headed by males. This finding is in common with much previous studies (e.g. Campbell *et al.* 2002; Lowore 2006; Monela *et al.* 1999; Shackleton *et al.* 2008). Even other socio-economic indicators such as levels of education were highly skewed against female household members. This trend has been reported widely and justifies on-going efforts to develop targeted interventions that address gender based vulnerabilities and integrate these with other aspects of rural development strategies.

Households across all four villages had highly diverse livelihood portfolios, earning varying amounts of income from agriculture, collection and processing of forest products, fishing, wage employment, small family businesses, and external inflows such as remittances. The biggest share of household income in all villages came from the forest sectors, contributing close to 50 % of total annual income. These figures are much higher than those reported by Cavendish (1997; 2000), Campbell *et al.* (2002), Heubach *et al.* (2011), Lowore (2006) and Vedeld *et al.* (2004; 2007) which were around 30 %. Much of the trends in forest income can be attributed to particular circumstances such as proximity to urban markets (as in the case of charcoal in Mufulira) or access to lucrative niche markets (as in the case of honey in Kabompo) supporting the arguments that these trends are elevating the prospects of forest based poverty alleviation.

Although rural households are often regarded as farmers, this result supports growing arguments that agricultural sectors (cropping and livestock rearing) are not always the most important income sources for rural households in sub-Saharan Africa. Rather, activities such as foraging for forest products may be more important and perhaps offer better opportunities for households to lift themselves out of poverty. Elsewhere studies have also reported increasing numbers of households depending on natural products due to declining opportunities in other sectors, although these have remained supplementary to other income sources (Campbell *et al.* 2002; Lowore 2006; Monela *et al.* 1999; Shackleton *et al.* 2008). Scherr *et al.* (2004) observed that in circumstances where the population is growing faster than per capita income, natural products trade provide

income generating opportunities for increasing numbers of people as capital costs are minimal.

This study found that crop and livestock sectors were more important in the remote site (Kabompo) where they contribute between 38 % and 43 % compared with 23 % in the more integrated site (Mufulira). This is also coincides with a higher ownership of agricultural assets in the remote site. Key staple crops (maize and cassava) dominated the crop sector across all villages, contributing the most income. These crops were also associated with the highest rates of participation, suggesting high dependency on these crops and relatively limited barriers to entry into the sector. In sharp contrast, livestock sectors earning the highest income were associated with the lowest participation rates, highlighting the difficulty of acquiring livestock for most households. Enquiries revealed that communities in Mufulira and the Copperbelt province in general have no history of cattle rearing while those in Kabompo have always depended on trading in livestock. These were sold as far as the Copperbelt province for lucrative profits which were vital in supporting crop input procurement. The livestock sector was however said to have suffered severely in the late 1990s after a disease outbreak that wiped out entire herds for most households. Campbell *et al.* (2002) noted similar crashes in livestock numbers as a major risk facing rural households who rely on them as a form of savings and for supporting other livelihood activities. Shackleton *et al.* (2005) also noted declining support for cattle in their study in South Africa, due to the combined effects of theft and drought or disease.

A number of livelihood studies have noted that for most rural households, access to cash is severely limited (Cavendish 1997; Frost *et al.* 2007). Opportunities for marketed surplus from household activities are few and irregular during the year. Meeting household cash needs for expenses such as school fees, buying inputs and other family requirements is a constant challenge for most households. Much of the findings in this study also largely reflect that position. Notably, the forestry sectors contributed the highest share of cash income across all villages, accounting for up to 50 % of all the income earned as cash. The proportion of processed products earning cash was typically

high, supporting arguments that these products are almost exclusively marketed. Charcoal was the dominant product among the processed forest products and was restricted to Mufulira because of proximity to the urban markets. In Kabompo honey was the most valuable product, supported by sustained efforts that have gone into training of beekeepers and the development of export markets for organic honey.

The agricultural sectors (crop and livestock) were particularly poor sources of cash, contributing just 5 % of household annual cash earnings. The challenge of producing crops under poor agro-ecological conditions that are typical of these communities, and difficulties associated with marketing may be the cause of limited marketed surplus. The highly seasonal pattern of crop enterprises also means all households produce at the same time, depressing local prices and intra-household trade following harvests.

Off-farm wages were also an important source of cash especially for households in Mufulira where there are more opportunities for lucrative short term jobs in the more formal economic sectors that pay higher wages. Again Kabompo's remote location with respect to the rest of the economy makes it almost impossible for households to find off-farm opportunities except for the limited intra-household transactions. Even income flows from external sources (e.g. remittances) were more limited in Kabompo where families hardly have any links beyond their own village.

### **3.4.3 Forest income and poverty**

Up to 75 % of households in the sample had incomes below the nationally defined poverty line for poor Zambians of K350, 000 per month. Even by this conservative poverty measure it is clear that many households in rural communities live in extreme poverty. Other studies in the southern African region by Frost *et al.* (2007) and Shackleton *et al.* (2008) also highlighted the depressed economic activity in rural communities. This situation worsened significantly when annual household income was calculated without the contribution of forest income. Under this scenario, the proportion of households below the poverty line increased dramatically, from 79 to 90 % in Maveve, 70 to 82 % in Nkhulwashi, 29 to 69 % in 14Miles, and 9 to 69 % in Sosala. The highest increases were observed in the villages of Mufulira, suggesting a much bigger role of

forest income in lifting households out of poverty in this location, suggesting the significance of opportunities associated with higher levels of integration with vibrant markets in urban centers around the study site.

A similar comparison by Heubach *et al.* (2011) and Shackleton *et al.* (2008) revealed the same dire consequences for household poverty status associated with loss of forest income. Although others have insisted that this poverty avoidance role of forests points to its safety net functions (Angelsen and Wunder 2003; McSweeney 2005; Shackleton *et al.* 2011; Shackleton and Shackleton 2010), more optimistic reviews suggest that these observations make a strong case of forest based activities as a pathway out of poverty (Deweese *et al.* 2010; Kaimowitz 2003; Ruiz Perez *et al.* 2004; Scherr *et al.* 2004). Although availability of some forest products in the Miombo region can be erratic, the wide diversity of food and non-food products collected suggest a reasonable chance that households can rely on these products from year to year with limited income volatility. As is the case with most studies on forests and poverty, the cross sectional nature of this study limits conclusive inferences on whether the high contribution of forests can be sustained resulting in savings and asset accumulation that drives permanent poverty alleviation.

Fisher (2004), Fisher and Shively (2005) and Belcher *et al.* (2005) noted the unique contribution of forest based activities towards reducing inter-household inequality, unlike other income sources such as wage labour, self-employment and cash transfers. Heubach *et al.* (2011) also recorded considerable reduction in inequality between households with inclusion of NTFP income in total household income. Low levels of intra-village income inequality observed in Mufulira where forest incomes are higher point to this income equalizing role of forest based activities. These results support assertions that forest based activities offer a more socially equitable path to poverty alleviation, justifying external interventions for supporting critical aspects such as market development.

#### **3.4.4 Conclusions**

The results revealed a high dependency on forest based activities beyond the widely acknowledged supplementary functions. A common perception of rural households as

farmers often suggests that agricultural sectors are the main sources of household income. Other non-farm sectors such as forest based and other non-farm activities are often overlooked, especially in planning strategies for tackling rural poverty. Based on the analysis of income composition, this study showed that income from forest based activities goes beyond merely ‘supplementing’ other sources. Rather these sectors should be recognized as a central part of local economies, not just helping households sustain themselves but also offering a means for them to escape poverty. Without access to forest income a large number of households would slip deeper into poverty.

Access to vibrant markets is key to successful exploitation of forest based activities and households that are well integrated with urban markets are better able to take advantage of forest resources to improve their livelihoods. Households in remote communities need targeted support, especially to develop markets for high value forest products. Without such support, exploitation of high value forest products will remain an insignificant source of income for remote households despite the potential. The resulting lack of broad-based local participation will open doors for elite capture and even exploitation by outsiders who have the resources and connections required for such complex enterprises.

The overall, the results of this study show that forest products are central to livelihoods, rather than just being supplementary to other sources of livelihood. With improved local organization and support for product development and marketing, some forest based activities provide a viable option for changing the lives of large numbers of poor households in rural communities who otherwise have limited economic opportunities to sustain themselves, let alone escape poverty.

## CHAPTER 4

# HOUSEHOLD WEALTH STATUS AND DEPENDENCE ON FOREST PRODUCTS

### **4.1 Introduction**

The influence of household wealth status on levels of dependence on forest products is as contentious as the concept of wealth itself. Understanding whether poorer households are more dependent on forest products than their richer counterparts is central to the broader debate on the role of forests in poverty alleviation (Fisher 2004; Paumgarten and Shackleton 2009; 2011). Mixed views are emerging from this debate, further clouding judgment on the prospects for forest-based poverty alleviation. This chapter explored this subject, comparing level of dependence on forest based income sources by different wealth groups in both the remote communities of Kabompo and peri-urban Mufulira.

The works of Ambrose-Oji (2003), Campbell *et al.* (2002), Cavendish (2000), Fisher (2004), Narendran *et al.* (2001) and others have inspired strong arguments around forests as a resource for the poor, offering employment of last resort for those who would otherwise have few economic alternatives due to limited endowments and opportunities. Barriers to entry into this sector were seen as being few because little or no skill or capital is required for poor households to access forest products. This enables a greater proportion of poor households to utilize forest products more frequently and in greater quantities (Shackleton and Shackleton 2006; Sunderlin *et al.* 2005). Ndoye *et al.* (1998), Reddy & Chakravarty (1999) and Shanley *et al.* (2012) showed that NTFPs are particularly crucial for the most marginalized and vulnerable segments of society who otherwise have limited alternatives. Similarly, Shackleton and Shackleton (2004) also argued that although resource commercialization offers both opportunities and constraints to poor households, the lack of alternative income sources suggests poor households benefit more than their wealthier counterparts.

Other studies dwell on the higher proportions of total household income coming from forests for poorer households. They accept that in quantity terms, wealthier households utilize more forest

products due to their superior access to key assets such as implements, cattle, and cash to hire labour (Cavendish 2000; Chopra 1997; De Merode *et al.* 2004; Wunder 2001). However, these authors insist that poorer households are still more dependent on forest products as their proportion of total household income coming from forests is greater than that for wealthier households (Campbell *et al.* 2002; Cavendish 2000; Fisher 2004). Chopra (1997) also showed that as household wealth increased and allowed for the purchase of alternatives, quantities of NTFPs used by households started to decline.

A far-reaching pro-poor forestry agenda has since emerged following these optimistic impressions on the role of forests in the livelihoods of poor households. Many governments and non-state development practitioners have widely embraced forest-based projects as a central component in their poverty alleviation strategies and broader rural development programs. Even international development agencies such as the World Bank have also endorsed the potential role of forests and forest products in helping poor households lift themselves out of poverty. This has seen renewed interest and investment in various promising models of forest management such as Joint Forest Management (JFM), co-management and other closely related variations of community forestry.

Dampening the euphoria of the pro-poor forestry is a more cautious body of evidence that suggest that investments in forestry are unlikely to help significant numbers of poor households lift themselves out of poverty. Contrary to the widely held perception that the poor are more dependent on forests, the work of Cavendish (1997; 2000); Campbell *et al.* (2002), Tesfaye *et al.* (2010; 2011), Vedeld *et al.* (2004; 2007) and other has shown that it is actually the wealthier households who have the capacity to exploit larger volumes of forest products due to their ability to better mobilize key assets such as capital, implements, and labour. Although the proportion of income from forest products remains higher for poorer households, these studies have demonstrated that richer households earn a higher magnitude, in absolute terms, of income from forest-based activities.

In Cameroon, NTFPs were found to make a greater contribution to middle-income groups (predominantly through trade), with wealthy and poor households benefiting to a lesser degree (Ambrose-Oji 2003). Findings from South Africa show wealth to have less of an impact on

proportion of households consuming NTFPs but to influence the procurement and sale, with a greater proportion of poorer households procuring NTFPs through self-collection and selling products on either a full-time or ad hoc basis (Cocks *et al.* 2008; Shackleton and Shackleton 2006). The work of Fisher (2004), and Paumgarten and Shackleton (2009; 2011), also suggest that poor households trade opportunistically in low-return products with low-skill requirements as a livelihood stabilizer and a means to cope while wealthy households are involved in the more lucrative trade of high-return products. Analyses by Chopra and Dasgupta (2008) in India from a large census of over 75,000 households also suggest that those households specializing in the sale of NTFPs are not necessarily poor, but happened to exploit opportunities of secure access to NTFPs.

Besides having access to superior financial and physical assets, richer households have also been shown to have better access to socio-political networks that connect them with sources of information and goodwill not normally available to poorer households (Belcher *et al.* 2005). Evidence of widespread incidences of ‘elite capture’ once forest product harvesting and marketing is sufficiently developed into lucrative enterprises has also undermined prospects for pro-poor forestry (Belcher *et al.* 2005; Frost *et al.* 2007; Ndoye *et al.* 1999).

But to what extent and in what ways are these commonly reported patterns of dependence influenced by key contextual realities such as remoteness or proximity to urban markets? Do poor households living in remote locations and those closer to markets face the same odds in trying to exploit forest resources as an avenue out of poverty? Could the typically complex market chains for forest products in remote locations be the defining factor in whether poor and wealthy households have significantly different patterns of dependence on forest based activities? This chapter tackles these questions, comparing incomes derived from forest based activities by poor and wealthy households in both Kabompo and Mufulira.

## **4.2 Methods**

The point of departure for this analysis was identifying a systematic approach to classification of households into wealth categories. Interactions with locals at village meetings (Chapter 2) suggest that conceptions of wealth are highly divergent within each site and even more so across districts. Particularly problematic was the widely used asset based wealth classification because

the type of household possessions were more related to site and tribal preferences than to household wealth status. Given these varying perspectives on wealth, an income based wealth classification was preferred as the most consistent approach to categorizing the sample. All sampled households were classified into quartiles of wealth on the basis of total annual household income, representing the poorest, the poor, the rich and the richest, respectively.

Following the categorization of households into wealth quartiles, an analysis of the distribution of households across the wealth quartiles in each village was conducted to establish how location influenced wealth status of households. A comparison of mean annual forest income was conducted across wealth classes using the Kruskal-Wallis test to determine whether there is any evidence of association between wealth status and dependence on forest based activities. Where the Kruskal-Wallis test was significant and 95 % level, pair-wise comparisons were performed using the Mann-Whitney U test with a Bonferroni adjusted p-value. Similarly, mean annual cash income from forest based activities was also compared across wealth classes to interrogate the links between trade in of forest products and household wealth status. The analysis also compared the proportion of total household income that comes for forest based activities across the wealth classes with a view to testing a commonly held view that poorer households have a larger proportion of their income coming from forests.

### **4.3 Results**

#### **4.3.1 Proportion of households in each income quartile**

In Kabompo, 30 % (Maveve) and 50 % (Nkhulwashi) of households fell into the lowest (poorest) income quartile (Figure 4.1). In fact, 70 % (Nkhulwashi) to 80 % (Maveve) of households were in the poorest to poor income category. In contrast, just over 10 % of the households in 14Miles fell into the poorest category while Sosala did not have households in this segment ( $\chi^2 = 65.6$ ;  $p < 0.034$ ). Only 8 to 10 % of households from each of Kabompo villages were in the richest income quartile while at least 40 % from the Mufulira villages are in this category. These results show that the remote district (Kabompo) had a significantly higher proportion of poorer households than in Mufulira district. There were however no significant differences between proportions of households in each wealth quartile for villages in the same site suggesting that the distribution of wealth status was closely associated with location.

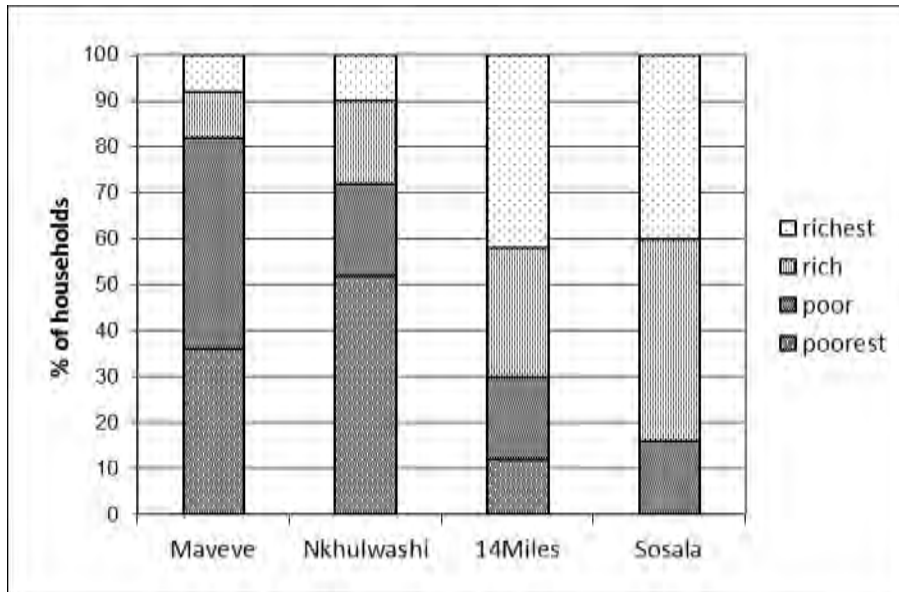


Figure 4.1: Proportion of households in each income quartile by village

#### 4.3.2 Household wealth status and gender, other household characteristics

The proportion of male headed households consistently increased from 74 % in the poorest income quartile to 90 % in the richest income quartile. In contrast, the proportion of female headed households decreased from 26 % in the poorest quartile to just 10 % in the highest income quartile (Table 4.1). Although male headed households were the majority in all income quartiles, the relatively higher proportion ( $\chi^2 = 5.93$ ;  $p < 0.05$ ) of male headed households in the wealthier income quartiles show that male headed households dominated higher income quartiles.

The analysis of household wealth status and mean years of schooling revealed that the number of years spent in school by households heads increased from an average of 4.8 in the poorest income quartile to an average of 6.4 in the richest income quartile (Table 4.1). These results show that wealthier households had generally higher levels of education compared to their poorer counterparts. There were no significant differences between the average ages of household head across the income quartiles suggesting that the level of education, rather than age of households head, has an influence on household wealth status.

**Table 4.1: Percentage of households in each wealth class by gender of household head**

	<i>Quartiles of Total Income</i>					<i>All households</i>
	<i>Poorest</i>	<i>Poor</i>	<i>Rich</i>	<i>Richest</i>		
Male	74	76	86	90	$\chi^2 = 5.9; P = 0.01$	81.5
Female	26	24	14	10		18.5
Mean years of education (Yrs)	4.8 <sup>a</sup>	5.4 <sup>b</sup>	5.4 <sup>b</sup>	6.4 <sup>c</sup>	H= 13; p= 0.02	5.5
SE	0.5	0.5	0.4	0.5		0.2
Mean age of H/head (Yrs)	48 <sup>a</sup>	44 <sup>a</sup>	48 <sup>a</sup>	47 <sup>a</sup>	H= 5; p= 0.19	46.8
SE	2.5	1.9	1.9	2.2		1.1

### 4.3.3 Household wealth and ownership of key assets

The mean number of cattle owned by households consistently increased from the poorest to the richest income quartile (Table 4.2). The same trend was repeated in the case of all other types of livestock, showing that households in the wealthier income quartiles generally own higher numbers of livestock than those in the lower wealth categories. Similarly the mean area of cropland was significantly higher in wealthier households.

**Table 4.2: Mean number of households assets by wealth quartile**

	<i>Quartiles of Total Income</i>					<i>All households</i>
	<i>Poorest</i>	<i>Poor</i>	<i>Rich</i>	<i>Richest</i>		
No. of Cattle	0.04 <sup>a</sup>	1.0 <sup>b</sup>	0.5 <sup>b</sup>	2.4 <sup>c</sup>	H= 19; p= 0.04	1.0
SE	0.04	0.3	0.2	1.3		0.3
No. of Goats	1.8 <sup>a</sup>	4.8 <sup>b</sup>	4.8 <sup>b</sup>	6.2 <sup>c</sup>	H= 17; p= 0.03	4.4
SE	0.6	1.3	1.5	2.2		0.7
No. of Pigs	0.3 <sup>a</sup>	0.6 <sup>a</sup>	1.1 <sup>a</sup>	4.6 <sup>b</sup>	H= 13; p= 0.04	1.6
SE	0.6	1.3	1.5	2.2		0.7
No. of Chickens	14.8 <sup>a</sup>	34.7 <sup>b</sup>	29.0 <sup>b</sup>	31.9 <sup>b</sup>	H= 25; p= 0.01	27.6
SE	2.3	4.8	3.1	4.5		1.9
Area of house (m <sup>2</sup> )	15.7 <sup>a</sup>	25.5 <sup>b</sup>	26.9 <sup>b</sup>	27.9 <sup>b</sup>	H= 21; p= 0.01	24.0
SE	1.4	2.6	1.8	1.9		1.1
Area of cropland (Ha)	1.3 <sup>a</sup>	1.3 <sup>a</sup>	2.5 <sup>b</sup>	2.7 <sup>b</sup>	H= 16; p= 0.03	2.0
SE	0.1	0.2	0.4	0.4		0.1

The mean area of the family house increased steadily from the poorest to the richest income quartile (Table 4.2). Even the quality of the family home was higher in the wealthier income categories (Table 4.3). The poorest structures with grass or wooden walls and thatch were only found in the poorest income quartile. The best quality of houses built from brick walls and corrugated iron roofs were only found in the rich and richest income quartiles. These results show that poorer households had smaller and lower quality family dwellings compared to their counterparts in the richer income categories.

**Table 4.3: Percentage of households in each income quartile and the type of house owned**

<i>Type of house</i>	<i>Quartiles of Total Income</i>				<i>All households</i>
	<i>Poorest</i>	<i>Poor</i>	<i>Rich</i>	<i>Richest</i>	
Grass/thatch	6	0	0	0	0.5
Wooden/thatch	2	0	0	0	0.5
Mud/thatch	60	56	58	40	53
Brick/thatch	28	44	32	48	39
Mud/iron	0	0	2	2	1
Brick/iron	4	0	8	10	6

$$\chi^2 = 18.3019 \quad P = 0.247$$

Overall, the status of household asset ownership was generally consistent with the categorization of households according to income. These results indicate that total household income is a good measure of household wealth status in the study sites.

#### **4.3.4 Household wealth status and forest income**

The analysis of mean annual household forest income across the wealth quartiles revealed significant differences (Figure 4.2). Mean annual forest income increased consistently from the poorest to the richest wealth category ( $H = 123.0$ ;  $p < 0.0001$ ). In fact, mean forest income almost doubled between successive wealth quartiles along the continuum from the poorest to the richest households. With a more than ten-fold difference between the poorest and the richest households, the results show that forest income increased with the wealth status of households in the sample. The results however do not solve the causality conundrum of whether households were getting richer because they collected more forest products or they were managing to exploit more forest products because they were already rich. Cash income increased at a rate higher than subsistence income, indicating that the richest were taking advantage of forest based opportunities to generate cash.

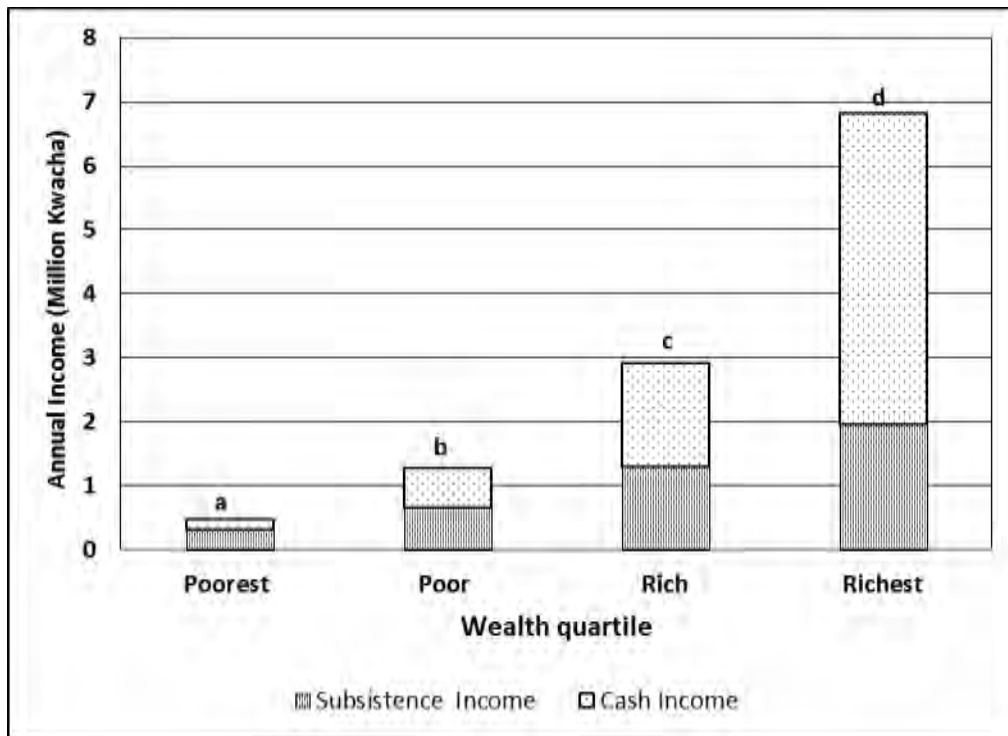


Figure 4.2: Mean annual cash and subsistence forest income by wealth quartile

#### 4.3.5 Household wealth status and type of forest product

Almost all households (99 %) across all income quartiles collected firewood as it is the main source of energy for cooking and heating in the study sites (Table 4.4). The second most commonly collected forest product is thatch grass which was collected by 75 % of all households. Thatch grass is an important material which is used for the roofs of houses by more than 90 % of households. Because of this important function, thatch grass is also commonly sold locally and in markets outside the villages. The proportion of households who collected thatch grass increased sharply from 56 % in the poorest income quartile to 90 % in the rich income quartile, before declining to 82 % in the richest income quartile. A similar trend was observed for the fourth and fifth ranked products mushroom and medicinal plants which were collected by 67 % and 56 % of all households. The proportion of households collecting these two products rose sharply from the poorest income quartile to the rich quartile before declining marginally in the richest quartile.

Although the increasing trend across the poorest and rich income quartiles was also maintained in the case of poles, bamboo, fruits, caterpillars, game, honey, charcoal and timber, no decline

was observed in the richest quartile, meaning that the proportion of households collecting these products continued to increase across income quartiles. The common thread across all these products is that they are among the most commonly traded forest products and are important cash income sources for households. Patterns in the collection of reeds suggested that poorer households were more involved than their richer counterparts. In the case of birds, no discernible pattern was observed.

**Table 4.4: Percentage of households in each income quartile collecting forest products**

	<i>Quartiles of Total Income</i>				<i>All households</i>
	<i>Poorest</i>	<i>Poor</i>	<i>Rich</i>	<i>Richest</i>	
Timber	4	5	6	8	6
Poles	44	52	72	74	61
Firewood	96	100	100	100	99
Bamboo	4	10	18	34	17
Fruits	10	34	72	70	47
Mushrooms	38	72	80	76	67
Medicinal Plants	20	54	76	74	56
Thatch grass	56	72	90	82	75
Reeds	30	22	20	8	20
Game	4	10	16	16	12
Birds	6	14	12	20	13
Caterpillars	10	36	56	58	40
Honey	12	34	30	36	28
Charcoal	4	22	64	68	35

$$\chi^2 = 90.0619 \quad P = 0.003$$

Overall, the results generally showed that richer households are more involved in the collection of most forest products relative to their poorer counterparts. The results also suggest that for subsistence use related products, participation tended to decline in the richest wealth class. Levels of participation however continued to increase into the richest wealth class in the case of commonly traded products.

#### **4.3.6 Household wealth status and trade in forest products**

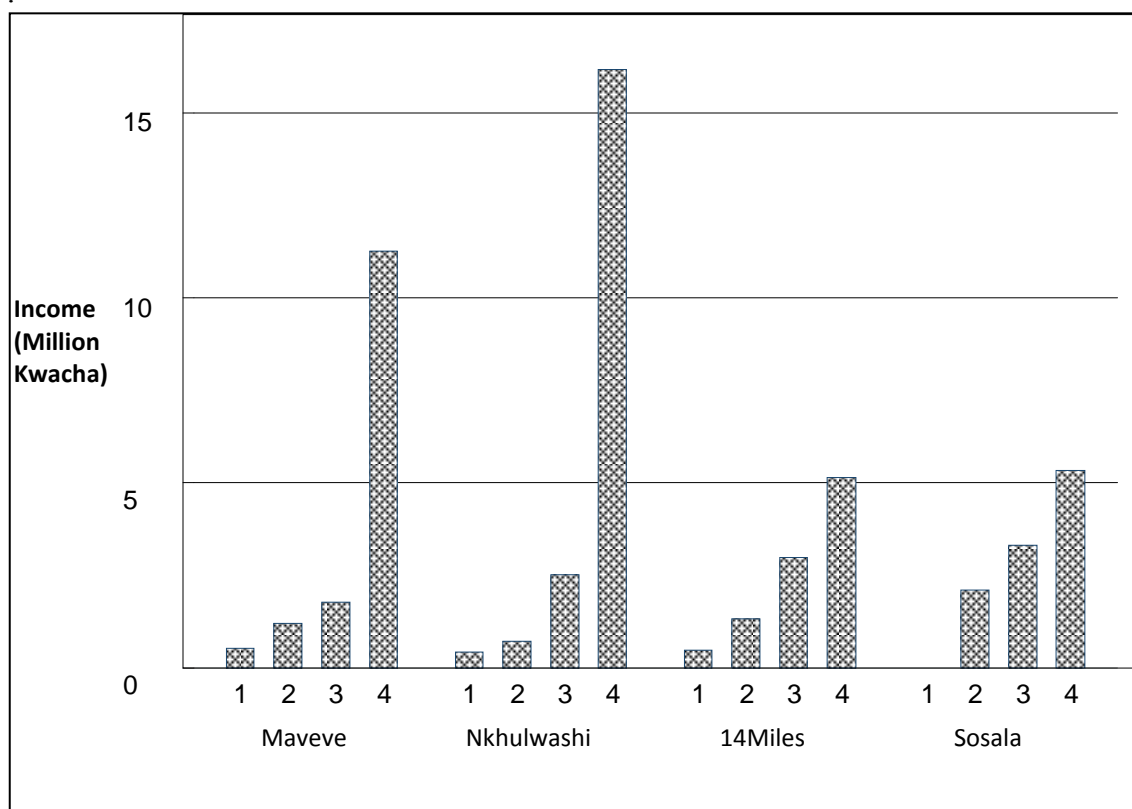
Trends in mean annual household cash income from the sale of forest products closely follow those for total forest income reported in earlier. Analysis of annual household cash income from forests (Figure 4.2) revealed significant difference across the wealth quartiles ( $H = 123.0$ ;  $p <$

0.0001). These results confirm that richer households did not just collect more forest products for their own use but also for sale.

Differences in mean forest cash income between successive wealth quartiles were more pronounced than those for mean total forest income, with a more than thirty-fold difference between the poorest and the richest households. Again this suggests that differences in quantities of forest products utilized are more pronounced for traded goods than for own consumption. Figure 4.2 shows that although differences in subsistence income from forests is significant across income quartiles ( $H = 91.7$ ;  $p < 0.0001$ ), the magnitudes are not as high as in the case of cash income. For instance, there is only a six-fold difference between the poorest and the richest households compared to a thirty-fold difference in cash forest income between these groups. Difference between successive wealth categories are just about two-fold for subsistence use while these are close to more than three-fold in the case of income from traded forest products. The results show that richer households collected more forest products for own use but they collect even more traded forest products than the poorer counterparts.

#### **4.3.7 Household forest income by wealth and site**

Trends of mean forest income for different wealth categories when analyzed by site revealed interesting patterns. The results confirmed the sample wide trend of poorer households earning less forest income than their richer counterparts (Figure 4.3). The analysis, however, revealed that the richest households in both remote villages earned exceptionally high incomes from forest based activities, suggesting that they engaged in highly lucrative forest based enterprises which were not available to the poor in the same location. Earlier analysis revealed that only about 10 % of households were in the richest wealth category in each of the two remote villages. These results suggest that the links between household wealth and its level of exploitation of forest products are stronger in the remote location compared to those in communities close to urban markets.



**Figure 4.3: Mean annual forest income by wealth quartile and village**

The results for mean forest income closely mirror those for mean cash income from forest based activities (Figure 4.4). Richer households earned higher cash income from forest products than their poorer counterparts, and again the richest households in the remote site earned significantly more than all other groups. This confirms that the richest households in both remote villages were engaged in lucrative trade in forest products. These disparities between the richest and the rest of the households in the remote sites (Kabompo) suggest that either the richest households had access to high value traded forest products that other households did not have, or they had better capacity to exploit forest products in ways other poorer households could not. Analysis in subsequent sections further interrogates the nature of forest based activities pursued by households in different wealth classes.

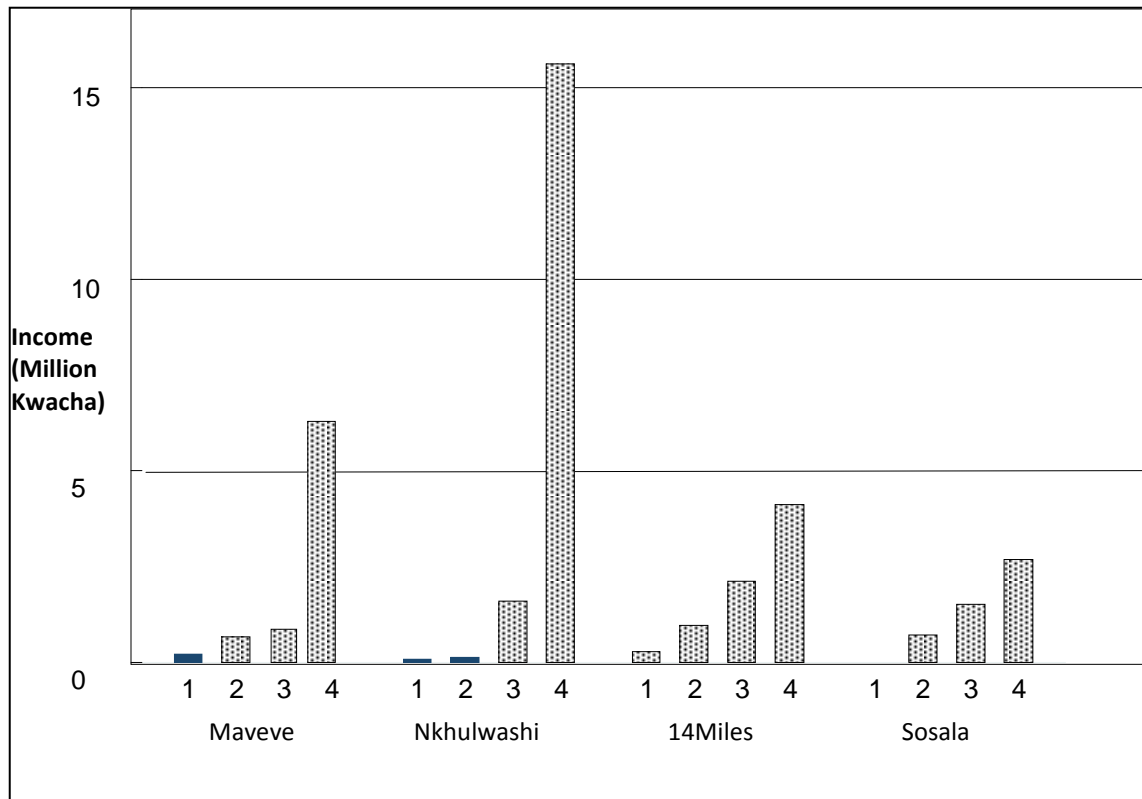
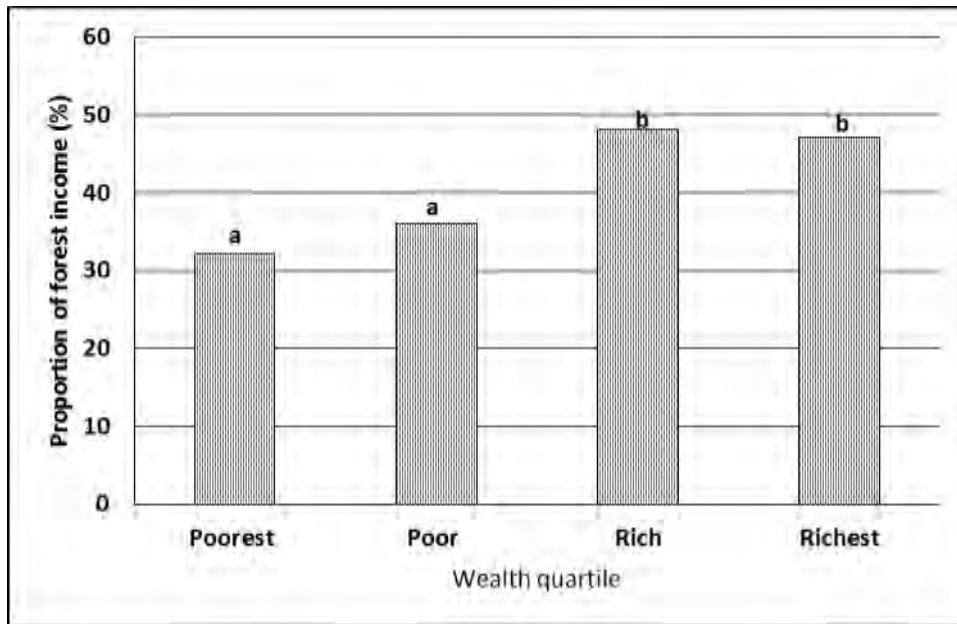


Figure 4.4: Mean annual cash income from forests by wealth quartile and village

#### 4.3.8 Proportion of total household income from forests

To further interrogate the links between household wealth and dependence on forests, the study adopted a widely used approach based on the analysis of the proportion of household income that comes from forests. This variable was compared across the four wealth categories of households (Figure 4.5). The analysis revealed that forests contributed less to the incomes of poorer households (32 - 36 %) than to those of richer households (47- 48 %) ( $\chi^2 = 16.1$ ;  $p < 0.001$ ). The contribution of forests increased steadily from the poorest to the rich wealth quartile and then leveled off in the richest wealth quartile, suggesting that beyond a certain income threshold, households started to substitute forest based activities with other more lucrative livelihood activities (Figure 4.5).



**Figure 4.5: Proportion of total household income coming from forest products**

The general trend of richer households having more income from forests was still evident even when households were grouped by location although less distinctly so (Figure 4.6). This supports earlier assertions that dependency on forest income is generally higher among richer households across all the study sites. The decline in forest dependency for the richest wealth category is only witnessed in Sosala villages, which also happened to have no households in the poorest category.

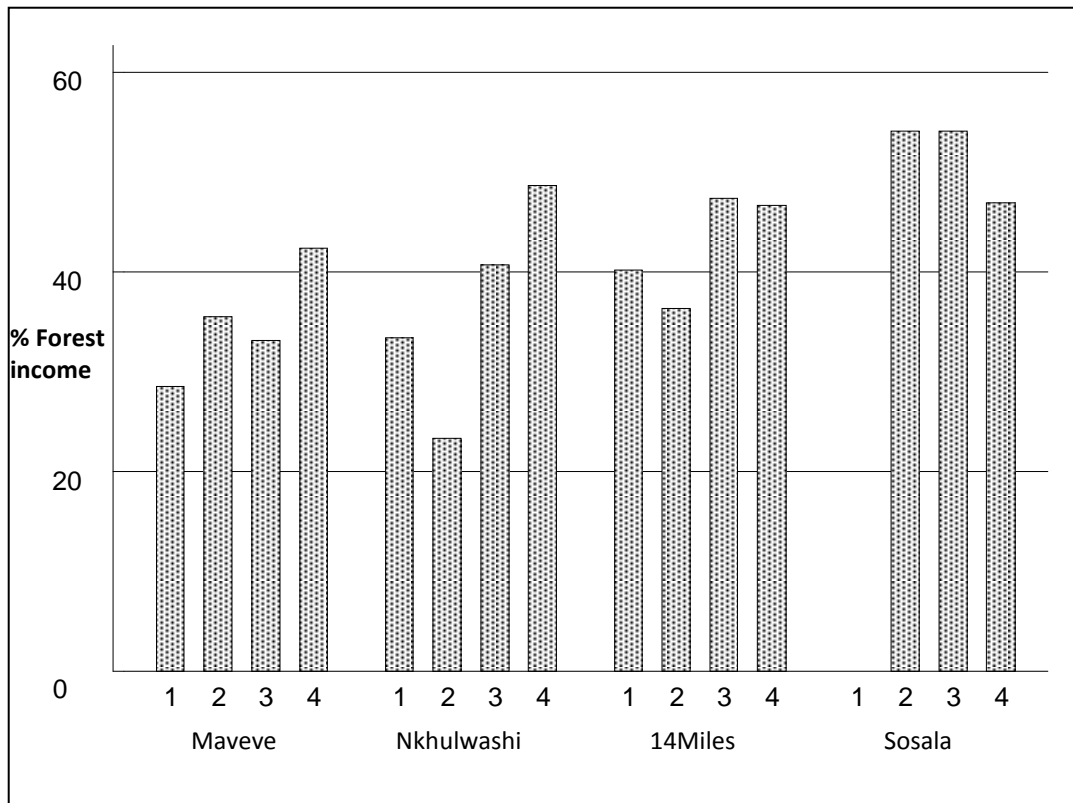


Figure 4.6: Proportion of total household income from forests by wealth quartile and village

#### 4.4 Discussion and Conclusion

The results challenge some of the assertions by different studies on the relationship between household wealth and dependency on forest based activities. The observed increase in forest income from the poorest to the richest wealth quartile supports the findings of pioneering studies by Cavendish (1997; 2000), Campbell *et al.* (2002), Fisher (2004), Lowore (2006), Shackleton *et al.* (2007; 2008) and Paumgarten and Shackleton (2009; 2011). Although it is a common economic concept, decline in the participation of the richest households in the collection of subsistence oriented products observed in this study has not been widely reported in similar studies.

When disaggregated by location, the differences between rich and poor households become even more glaring. Although the trends confirm that richer households earned more income from forests than their poorer neighbors, these disparities are more severe in the remote villages where the richest households earn substantially higher incomes than the rest of the households. These

local 'elites' have capacity to exploit high value products such as timber and honey (as in the case of Kabompo) at much higher levels than poorer households, and have the resources and education levels that help them undertake costly marketing transactions that are made even more complicated by remoteness. Although richer households in villages closer to markets still manage to earn more from forests, differences with their poorer counterparts are small compared to the case of remote villages. Fears of elite capture have been expressed widely in other studies (Collier 2007; Mander and le Breton 2006; Lowore 2006; Neumann and Hirsch 2000; Sunderlin *et al.* 2005; Wunder 2001) and are noted as a stumbling block to forest based poverty alleviation (Angelsen and Wunder 2003; Dove 1993; Ndoye *et al.* 1997; 1999). Others have however suggested that higher levels of forest product commercialization simply require levels of resourcefulness and wherewithal commonly found among richer households (Belcher *et al.* 2005). Both these points of view cast some doubt about the potential of forest based activities as a viable poverty alleviation pathway for the poorest households.

The situation looks even more pessimistic for poor households in remote locations. The findings suggest that the ability of poor households in remote locations to exploit forest resources are limited, especially with respect to exploitation of high value forest products, compared to poor households located closer to markets. Access to vibrant urban markets seems to be the difference. Whereas it would take considerable resources and wherewithal for households in remote villages to access urban markets for forest products, villagers located close to urban center just need the most basic assets like bicycles to take their products to urban markets. As such earnings from forest based activities for villages closer to markets are not as widely different across wealth classes as those in remote locations. It has been noted elsewhere that forest income has an income equalizing effect (Ambrose-Oji 2003; Fisher 2004) but these results suggest that this is true where communities are more integrated with markets.

Supporting findings from similar work in the region by Cavendish (1997; 2000), Campbell *et al.* (2002) and Lowore (2006), the results confirm that richer households earn significantly higher magnitudes of incomes from forest products than their poorer counterparts. Although other studies (Campbell *et al.* 2002) find that this mostly relates to products for subsistence use, this study confirms that even when it comes to trade in forest products, richer households earn significantly more income from this livelihood activity than poorer households. These results are

hardly surprising as they are consistent with earlier findings that forest sectors are the most lucrative income earners for households in both districts, even performing better than farming sectors. Under these circumstances it follows that all households would rather prioritize investment into forest based enterprises, and the richer households would naturally do better as they have better capacity for most forms of economic activity.

Although richer households have been shown to earn more from forests, the proportion of their income from forests has been found to be lower than that for poorer households (Campbell *et al.* 2002; Cavendish 1997, 2000; Fisher 2004). This has led to conclusions that poorer households are more dependent on forests for their livelihoods compared to the richer counterparts who have access to other more rewarding income sources. This study contradicts this. The proportion of household income from forest based activities is still higher for richer households, though the differences are marginal. Even when the analysis is disaggregated by location the same pattern persists. Although there is evidence to suggest that beyond a certain income threshold, household dependency on forest based activities begins to decline, most of the households in the sample do not seem to have reached that threshold except in the case of the richest households in one of the peri-urban villages, Sosala. These results suggest that patterns of household dependency on particular income sectors maybe influenced more by the relative value of earnings from each sector compared to available alternatives rather than the type of sector itself. In circumstances where forest based activities provide the most lucrative income earning opportunities as in this particular case, all households regardless of wealth status will equally prioritize investing their resources to exploit forest products.

Results emerging from this analysis are consistent with arguments for forests as a resource which has potential to go beyond just safety net functions and provide a pathway out of poverty for rural households. Pessimistic impressions of forests as a low value sector, employer of last resort, mostly exploited opportunistically by poor households to make ends meet (Angelsen and Wunder 2003; Campbell *et al.* 2002; Fisher 2004; Paumgarten and Shackleton 2009; 2011), are strongly refuted by findings from this study. Not only do the results show that under certain circumstances forest can be the major source of income for both rich and poor rural households, they also imply that with adequate support for more organized exploitation and marketing of high value forest products, forests can play a major role in poverty alleviation. In remote

locations external interventions can increase the number of local households that are able to benefit from high value forest resources and eliminate tendencies of elite capture, reducing income disparities among local households.

Many aspects of the results justify a more optimistic perspective on the role of forests in poverty alleviation efforts. The findings support a growing consensus around emerging opportunities for more profitable exploitation of forest products as a way out of poverty such as growing urban demand and niche markets for forest products such as charcoal and organic honey respectively. In both locations forest based income sources were shown to be the most rewarding enterprises for households regardless of wealth status. It is logical to speculate that the most promising poverty alleviation efforts in these communities would have to be those rooted in overcoming the constraints that households face in sustainable use of forest products.

#### **4.4.1 Conclusions**

Comparison of forest income for households in different wealth quartiles revealed that richer households earned higher magnitudes of income from forest based activities. This trend was repeated across all sites, with more pronounced differences in the remote site. The resource intensive extraction and complex marketing chains for high value forest products in remote locations results in a few local elites benefiting from forest products that the rest of the households have no capacity to exploit as in the case of timber. In the case of honey, external support in the development of lucrative market chains has led to wider participation and equalized earnings from this enterprise across all wealth categories. In Mufulira, easy access to vibrant and expanding urban markets for forest products such as charcoal enabled households from all wealth classes to benefit from forest based activities. Differences in earnings between the rich and the poor can only be attributed to the scale of resources employed in the enterprises.

Both rich and poor households were equally dependent on forests for their livelihoods as the proportion of their income coming from forest based activities was only marginally different. Results suggest that forest based activities are priority livelihood sectors for both rich and poor households in both sites and can potentially play a significant role as a pathway out of poverty with the appropriate support.

# CHAPTER 5

## FACTORS INFLUENCING HOUSEHOLD TRADE IN FOREST PRODUCTS

### 5.1 Introduction

The use of forest products for cash income generation is now recognized as an important part of rural livelihoods in southern Africa and internationally (Belcher *et al.* 2005; Kaimowitz 2003; Ndoye *et al.* 1999; Ruiz Perez 2004; Shackleton *et al.* 2007; 2008). Interest in the trade of forest products by rural households was largely motivated by a growing body of evidence showing that areas of high forest cover often coincided with high levels of poverty among the local communities (Sayer and Campbell 2002; 2004; Scherr *et al.* 2004; Shackleton 2005; Sunderlin 2005;). The question of how the twin objectives of forest conservation and poverty alleviation could be achieved became a subject of intense interest. Although some scholars were skeptical and feared that trade in forest products could fuel rapid clearing of forests (Collier 2007), many felt that trade in forest products, especially NTFPs, offered local households both a way out of poverty and an incentive to manage forests sustainably (Arnold 2001, 2002; Kaimowitz 2003; Sayer and Campbell 2002; 2004). Even international development agencies now recognize the potential role of forests in achieving the Millennium Development Goals (MDGs) related to poverty alleviation and have incorporated them as development priority areas (FAO 2003; World Bank 2002).

Despite this realization it soon became apparent that there was a limited understanding of the role of forests in local livelihoods, including strategies that could be employed to influence household dependency on forest products (Frost *et al.* 2007). Many country Poverty Alleviation Strategy Papers (PRSPs) continued to ignore the role of forests in poverty alleviation efforts (Kaimowitz 2003; Scherr *et al.* 2004). Oksanen *et al.* (2003) concluded that this was mainly because of a lack of basic data on forest-poverty linkages and a weak understanding among decision makers of the links between forestry and poverty alleviation.

Understanding factors that influence household dependency on forest resources, especially the use of forest products to generate cash, is central to understanding the role of forests in local livelihoods and in the broader goal of poverty alleviation. A number of studies have revealed that rural households are severely constrained by lack of cash, both to meet their daily needs and also to drive investment in productive assets (Babulo *et al.*; 2009; Kamanga *et al.* 2009; Ndoye *et al.* 1999; Ruiz Perez *et al.* 2010). Efforts to tackle rural poverty will need to find answers to this cash crunch and proponents of forest based poverty alleviation have focused on how trade in forest products could be part of the solution.

This chapter interrogated the factors that influence household dependence on forest trade as a source of cash. The objective was to identify those factors that could be targeted in efforts to elevate the role of forest based poverty alleviation. The study focused on a set of household characteristics which have already been shown to be linked to household use of forest resources as well as a number of key livelihood assets that are central to household productive activities. Poverty and income variables were also included to take into account the trade-offs between the various household livelihood sectors. In addition to these, a set of contextual and institutional variables such as distance from forest and membership in a local forest user group (FUG) were included in the analysis.

A similar study by Jumbe and Angelsen (2010) determined factors that influence household choice in the source of firewood. Results of their multinomial Probit model showed strong correlations between household choice of firewood source and both household level factors such as family size, and contextual factors including distance to forest and attributes of the product sources. They however did not find any strong correlations with institutional factors such as regulations and restrictions in the use of certain firewood sources, suggesting weaknesses in the enforcement of such measures. This led them to recommend the strengthening of institutional arrangements for governing forest use to encourage sustainable use of resources.

Heubach *et al.* (2011) also estimated a regression model to determine factors that influence household dependency on NTFPs. The authors used a set of household level and asset linked variables to model this relationship. In addition they also considered the influence of ethnicity to

household dependency on NTFPs. Their findings suggest that household dependency on NTFPs is strongly correlated with the size of crop land, crop income, number of women members of the household and the amount of income from other off-farm activities.

## **5.2 Methods**

This study used a Probit regression to explore the relationship between key household level and contextual factors and household dependency on forest product trade. Probit regression is specifically tailored for handling dichotomous variables. The first step was to create a dichotomous response (dependent) variable by classifying households into two categories, those who depended on trade in forest products as a source of cash income (Traders) and those who did not (Non-traders). Traders were defined as those households who earned at least 5 % of their total annual cash income from the sale of forest products. Households who earned less than 5 % of their total cash income from forests were defined as Non-traders.

The explanatory (independent) variables that were included in the Probit regression include the following:

- (a) household characteristics such as gender, age and education level of household head, household size and number of productive household members;
- (b) ownership and number of key assets such as cattle, goats, chickens, bicycle, radio, cropland, family house;
- (c) income related variables including total household income, total crop income, wage income;
- (d) household poverty status (i.e. below or above poverty line), and quartiles of total income;
- (e) contextual variables including distance of homestead from the main forest used for most products and location (village); and,
- (f) an institutional variable indicating whether anyone in the household was a member of a forest user group.

The first stage of the analysis summarized the independent (explanatory) variables across the two categories of households (Traders and Non-traders) and where possible means were compared using the nonparametric Mann-Whitney U test. A Probit regression was then computed on the independent variables to estimate the coefficients that reflect the relationship with the response

variable. The strength of the correlation (significance) was determined by comparing the computed p values with a 95 % level of confidence.

## 5.3 Results

### 5.3.1 Distribution of Traders and Non-traders

The categorization of households into Traders and Non-traders on the basis of whether they obtained at least 5 % of their cash income from the sale of forest products resulted in 78 % of the households in the sample being classified as traders and 22 % as non-traders (Table 5.1). The results demonstrate the central role of forest based activities as sources of cash for a large number of households in the study sites.

**Table 5.1: Proportion of Trader and Non-trader households**

	<i>Number of households</i>	<i>% of households</i>
Traders	156	78
Non-Traders	44	22
All households	200	100

A breakdown of households by district and village revealed that the large majority of households classified as Traders (60 %) were located in Mufulira district compared to Kabompo (40 %). This result reflects better opportunities to trade in forest products in Mufulira district due to its proximity to urban markets, leading to a higher level of dependence on forests for cash income generation by households (Table 5.2). Non-traders were dominated by households from Kabompo district who made up 86 % of this category. The results reiterate the limitations faced by households in remote locations in their utilization of forest products mainly due to difficulties in accessing vibrant urban markets despite having access to abundant natural resources.

**Table 5.2: Percentage of households involved in forest product trade by village**

		<i>Traders</i>	<i>Non-traders</i>
Kabompo	Maveve	26	23
	Nkhulwashi	14	63
Mufulira	14Miles	30	7
	Sosala	30	7
All households		100	100

$\chi^2 = 48.7$ ;  $P < 0.013$

### 5.3.2 Key household characteristics of traders and non-traders

Male headed households accounted for 83 % and 75 % of Traders and Non-traders, respectively (Table 5.3). In contrast there were more female headed households among non-traders (25%) compared to traders (17 %). This result suggests that the gender of the household head is an important influence on whether a household relies on trade in forest products. The higher levels of physical effort involved in both the collection and transporting of most products and the complexity of getting products to markets, especially in the case of urban markets, coupled with competing daily household maintenance responsibilities seem to disadvantage female headed households.

**Table 5.3: Percentage of households involved in forest product trade by gender, poverty status, and ownership of assets**

		<i>Traders</i>	<i>Non-Traders</i>	<i>All households</i>	<i>Statistic</i>	
					$\chi^2$	P values
Gender	Male	83	75	81	1.58	0.20
	Female	17	25	19		
Poverty line	Above	62	25	54	19.10	0.0001
Quartiles of income	Poorest	16	57	25	31.90	0.0001
	Poor	26	20	25		
	Rich	28	14	25		
	Richest	30	9	25		
Own bicycle		49	16	42	15.23	0.001
Own cattle		8	13	10	1.12	0.289
Own goats		29	20	27	1.23	0.270
Own radio		56	45	54	1.66	0.198
Member of forest user group		32	45	35	2.71	0.10

### 5.3.3 Poverty status of Traders and Non-traders

The proportion of households above the poverty line (see Chapter 3) was higher among the Traders (62 %) compared to Non-traders (25 %) suggesting that trade in forest products was helping households escape poverty (Table 5.3). A breakdown by income quartiles confirms that

very few Traders (16 %) were in the poorest income quartile compared to Non-traders (57 %). While the distribution of Traders is lowest in the poorest income quartile (16 %) and highest in the richest income quartile (30 %), the opposite is true for Non-traders who tended to dominate the poorer income categories.

#### **5.3.4 Asset ownership among Traders and Non-traders**

A significantly higher proportion of Traders owned bicycles (49 %) compared to non-traders (16 %) (Table 5.3). Bicycles are a vital asset in the trade of forest products as they are a cost effective means of transporting products to markets for most households in both districts. Similarly, ownership of a radio was higher (56 %) among Traders, compared to Non-traders (45 %).

Ownership of livestock however showed a somewhat mixed trend. As in the case of bicycles and radios, ownership of goats was higher among Traders (29 %) compared to that of Non-Traders (20 %). The mean number of goats owned was also higher among Traders (4.6) compared with Non-Traders (3.5) although this difference was not statistically significant (Table 5.4). The mean numbers of chicken was also marginally higher among Traders (28.3) compared to that for Non-traders (23.1). In contrast, ownership of cattle was lower among the Traders (8 %) compared to Non-traders (13 %). The mean number of cattle among Traders was only 0.8 compared to 1.3 for non-Traders (Table 5.4).

The differences between cattle ownership and that of other livestock could be linked to the difference in the cost of acquiring such assets. While small household income injections such as those associated with sale of forest products could be enough to finance savings in the form of chickens or goats, more substantial and sustained income flows would be required for a household to purchase cattle or other high value assets. Ownership of such high value assets is perhaps more a reflection of longer term economic fortunes of households as transactions involving these are rare, reflecting more a household's historical rather than the current economic prospects. The wide-spread cattle deaths in the study areas due to diseases in recent years could have also distorted the observed trends.

There were marginal differences in the size of cropland between the two categories of households, suggesting that decisions to engage in forest product trade was not directly linked to opportunities for crop based livelihood activities. The mean size of the family house was significantly larger among Traders (25.5m<sup>2</sup>) than that for Non-traders (18.6 m<sup>2</sup>), reinforcing the assertion that Traders were generally better off.

**Table 5.4: Means of household characteristics by Trader/Non-trader**

	<i>Traders</i>	<i>SE</i>	<i>Non-Traders</i>	<i>SE</i>	<i>Z Statistic</i>	<i>P value</i>
Household size (persons)	5.5	0.2	5.8	0.4	0.49	0.62
No. of productive members	2.8	0.1	2.7	0.2	0.27	0.78
Age of household head (yrs)	45.6	1.1	50.8	2.9	1.30	0.19
Years of education HH	5.6	0.2	5.2	0.5	0.45	0.65
Distance from forest (km)	0.5	0.03	0.9	0.04	0.10	0.92
Annual crop income (kwacha)	805,198	54,880	637,233	78,882	1.12	0.26
Annual wage income (kwacha)	803,170	93,321	701,645	57,811	4.95	0.001
Total household income(kwacha)	6,953,867	554,424	3,572,292	718,060	5.26	0.001
Size of cropland (ha)	2.01	0.1	2.2	0.5	0.13	0.89
Area of house (m <sup>2</sup> )	25.5	1.2	18.6	1.4	3.58	0.003
No. of cattle	0.9	0.4	1.3	0.7	1.05	0.29
No. of goats	4.6	0.9	3.5	1.4	0.93	0.34
No. of chickens	28.3	2.1	25.1	5.4	1.53	0.12

### 5.3.5 Household characteristics of Traders and Non-traders

There were no significant differences between the mean household size of Traders (5.5) and that of Non-traders (5.8) (Table 5.4). Similarly there were no significant differences in the mean number of productive family members between the two groups, suggesting that labour endowments did not seem to have a strong influence on household dependence on forest based activities for cash. Head of households among Traders were slight younger (45.6 years) compared to those among Non-trader households (50.8 years). There was little difference in the mean number of years of education for household heads of the two categories. Overall, there was little difference in human capital endowments among the two groups, suggesting that this factor is not be a key determinant of whether households chose to rely on forest products for their cash income.

### **5.3.6 Income levels for Traders and Non-traders**

Traders had significantly higher total household incomes compared to their non-trading counterparts, suggesting that the sale of forest products made a considerable difference to household income profiles (Table 5.4). This trend was also repeated in the case of crop and wage income, suggesting there was limited tradeoffs between these two sectors and forest based activities. Rather, dependency on forest products seems to have been driven more by availability of opportunities rather than deliberate household choices.

### **5.3.7 Distance to forests**

The average distance to the nearest source for most forest products was slightly higher (0.9 km) for non-traders compared to traders (0.5 km). This relationship was however not statistically significant, suggesting that households located closer to sources of forest products were equally inclined to depending on forest based activities for cash income generation as those located further away. The key role played by this resource and communal ownership of forests in the study areas ensures that all households have equal access to these resources regardless of their location in the village.

### **5.3.8 Membership to a Forest User Group (FUG)**

Contrary to expectation, membership to a Forest User Group (FUG) was lower (35 %) among Traders compared to that among Non-traders (45 %). This distribution was however not significant statistically, suggesting that participation in FUG is not related to whether one is a Trader or not.

### **5.3.9 Probit regression**

The results (Table 5.5) show that the model as a whole is statistically significant ( $\chi^2 = 87$ ; P value = 0.0001; Pseudo  $R^2 = 0.44$ ). This means that the explanatory variables included in the model account for a significant part of the likelihood of households being either Traders or Non-traders.

#### **5.3.9.1 Household characteristics and trade in forest products**

Of all household attributes, only the number of productive members has a positive correlation with household dependency on trade in forest products (Table 5.5). This means households with

more members in the productive age group are more likely to engage in the collection and selling of forest products. A one unit increase in the number of productive household members for example will increase the likelihood of trading in forest products by 18 percent. The high demand for labour in the collection and selling of forest products could explain why households with more productive members have better chances of participating in trade.

The size of the household in itself however, was found to be not statistically significant, implying that household size does not necessarily have a bearing on the exploitation of forest products for cash income generation. The results suggest that the composition of the household is more important than the size. A large number of minors and elderly family members for example, could undermine the household's capacity to participate in economic activities due to the additional social care burden.

Both the age and education level of the head of the household was found to be negatively correlated to participation in trade of forest products. Households headed by older members and those with higher levels of education were found to be less likely to participate in the sale of forest products. Each additional year on the age of the household head reduced the likelihood of participating in the sale of forest products by 3 %. Similarly, an additional year of schooling reduced the household's probability of participating in forest product trade by 13 %. The physical demands of forest product collection and trading could explain why households headed by more elderly members were less likely to be involved in forest product trade. A better education on the other hand, would open up more opportunities for the household head in other more attractive economic endeavors, reducing the need to depend on forest based activities as a source of cash income. With regard to gender, the analysis did not find any statistically significant correlation (Table 5.5). This suggests that there is no compelling evidence that gender of household head influences participation in the trading of forest products.

### **5.3.9.2 Asset ownership and household trade in forest products**

Ownership of all assets except a bicycle was negatively correlated with household participation in forest product trade (Table 5.5). Although this relationship was not very strong, the results show that households who were better off in terms of assets were less likely to be involved in

forest product trade. Ownership of a bicycle however, was positively correlated to household participation in forest product trade. Owning a bicycle increased the likelihood of household involvement in forest product trade by 62 %. Given their role as a cost effective means of transport, bicycles play a major role in the ferrying forest products to markets for households in all the four study villages.

### **5.3.9.3 Household income and trade in forest products**

The amount of income from wages had a significant negative correlation with the probability of household trading in forest products, refuting earlier indications of limited trade-offs between these sectors. Households who spend more time offering their labour for a wage are less likely to find time for collection and sale of forest products. Total household income and crop income was however positively correlated with household participation in forest trade. The positive correlation with total household income could be linked to the fact that the forest cash income variable used to categorize household is in fact a part of the total household income. The central role of crop production in meeting household food requirements could explain the limited trade-offs between this sector and cash income sources such as trade in forest products.

**Table 5.5: Coefficients of the Probit model of dependency on trade in forest products**

	<i>Coefficient</i>	<i>SE</i>	<i>Z</i>	<i>P value</i>
Household size	-0.07	0.09	0.97	0.45
No. of productive members	0.18*	0.15	1.63	0.02
Gender of Hhld head (male = 1)	-0.48	0.43	-1.66	0.27
Age of Hhld head	-0.03*	0.01	-1.63	0.004
Education of Hhld head	-0.13*	0.05	-2.12	0.01
Annual crop income	0.00008	0.00003	-1.04	0.79
Annual wage income	-0.00002*	0.00001	-2.73	0.01
Annual household income	0.00003	0.00002	1.1	0.52
Poverty status (above poverty line = 1)	1.43*	0.69	2.21	0.04
Income quartile (poorest =1)				
2	0.43	0.39	3.28	0.32
3	-0.83	0.74	0.39	0.74
4	-0.73	0.8	0.19	0.78
Area of cropland	-0.02	0.48	-1.06	0.29
No. of cattle	-0.22	0.46	-3.25	0.001
Area of house	-0.02	0.01	-0.26	0.79
No. of goats	-0.01	0.01	-2.66	0.52
No. of chickens	-0.001	0.01	-0.76	0.44
Ownership of bicycle (Own = 1)	0.62*	0.26	0.28	0.01
Ownership of radio (Own = 1)	-0.58	0.25	-0.35	0.72
Membership of FUG (member = 1)	-0.05	0.29	-2.95	0.87
Distance to forest	-0.20*	0.24	-0.66	0.02
Constant	2.68*	0.71	1.08	0.002

$\chi^2 = 87$ ; P value = 0.0001; Pseudo R<sup>2</sup> = 0.44: \*show significance at 5 % level

Notes: Hhld – household; FUG – forest user group

#### 5.3.9.4 Household poverty status and trade in forest products

Household poverty status was strongly correlated with participation in forest product trade. Households above the poverty line were up to 1.4 times more likely to be Traders. Although the differences between income quartiles were not statistically significant, households in the richest income quartiles had two-fold chance of being a trader compared to a household in the poorest income quartile. In other words, chances of a household being a trader increase from the poorest to the richest income quartile.

### **5.3.9.5 Contextual and institutional influences**

The distance from the homestead to the nearest source of forest products had a negative correlation with the likelihood of household participation in forest trade. Every additional kilometer reduced the probability of a household being a trader by about 20 %. This finding confirms the influence of distances although earlier results suggest that this factor is not significant. Membership to a Forest User Group (FUG) was again found to have an insignificant influence on participation in trade. One would expect that Traders would more likely be members of FUGs as this affects their livelihood more directly. This relationship may be confounded in situations where some Traders find FUGs to be ineffective or even a hindrance in their use of forest products, due to governance or other social weakness.

## **5.4 Discussion and Conclusion**

The results of this study revealed that household participation in forest product trade is influenced by a mix of household level and contextual variables. Variables that were found to be significant include:

- (a) number of productive household members;
- (b) age of the household head;
- (c) level of education of the household head;
- (d) income from wage labour;
- (e) household poverty status;
- (f) ownership of a bicycle; and,
- (g) distance from homestead to forest

The influence of education of the household head on household dependency on forest products is a widely reported phenomenon. Similar studies by Jumbe and Angelsen (2010) and Heubach *et al.* (2011) also included the education variable in their models. Although the education factor was not significant in both studies, it exhibited the same negative correlation with dependency on forest products as is the case in this study. This evidence supports the rationale of other studies (Babulo *et al.* 2009; Cavendish 2000; Fisher 2004) on forest dependency that have consistently included this variable in their analysis. The declining dependency on forests by more educated households is hardly surprising. The range of opportunities available to them is much wider than

for their less educated counterparts. Frost *et al.* (2007) also reported higher earnings for more educated households from such sources as formal employment, remittances and other off-farm sources.

Jumbe and Angelsen (2010) found a significant correlation between use of a firewood source and household size. This study also found the same positive influence of the number of productive household members which is a more accurate reflection of household's labour endowment than the household size. The study also found a strong negative correlation between household's participation in forest trade and the distance of homestead from forest. Although distance was described as a contextual variable, it is a good proxy variable for the labour requirement in the collection of forest products. These results suggest that households who needed more labour input to collect forest products due to longer distances from forest products sources were less likely to participate in forest product trade.

The labour intensive nature of forest product collection, processing and the often time consuming marketing of products imply that households without enough labour or who cannot afford to hire labour will be severely limited in their participation in forest product trade. Labour constraints present a major bottleneck to most rural households across southern Africa. The high rates of rural-to-urban migration (Deweese 2010; Scherr *et al.* 2004) in recent years have worsened this situation. Even the most promising rural development initiatives have collapsed due to labour constraints.

This study also revealed the negative influence of a closely related variable, the age of the household head. Elderly household heads are generally less energetic and the rigors of harvesting forest products and taking them to markets usually prove too challenging them. Besides being more energetic, younger household heads are likely to cope better with the complexity of urban trade in forest products which in some cases borders on illegality and depends on an intimate understanding of the urban terrain.

Tradeoffs observed in this study between forest products and other income sources such as wage labour were also reported by Heubach *et al.* (2011) as a significant determinant of household

dependency on NTFPs. A limited labour pool means that households are forced to choose between collecting forest products and other income earning opportunities. Although the resulting choices are often a mix of various livelihood strategies, more labour intensive activities such as collection, processing and sale of forest products usually come off second best. Poorly developed markets for such products and the associated risk also diminish their attractiveness for households.

With respect to poverty, the results again support a growing body of evidence that point to the positive correlation between household dependency on forests and improving poverty status (Babulo *et al.* 2009; Jumbe and Angelsen 2010; Kamanga *et al.* 2009; Vedeld *et al.* 2007). There is growing consensus that in some situations forest resources can lead to sustained livelihood improvements for large numbers of poor households. The notion of forest based activities as employer of last resort, only helping households to cope during lean periods (Angelsen and Wunder 2003) is increasingly being challenged by emerging evidence.

Ownership of most types of assets, including livestock, family dwellings and electronic gadgets, was shown to be poorly correlated to household participation in forest product trade. The analysis was complicated by the fact that levels of these assets are low among the sampled households. Only assets that were directly linked to forest product trade such as a bicycle had strong positive correlation with household participation as they are a cost effective means of transport to the market.

#### **5.4.1 Conclusion**

Household participation in the harvesting and sale of forest products was influenced by a mix of household level and contextual factors. Key among these factors was a set of labour related variables such as the number of productive household members and the age and education level of the household head. These variables highlighted that while the quantum of labour was an important determinant in household participation in forest based activities, the quality of the labour was equally important. Both age and level of education were negatively correlated with household participation in forest based trade. This implies that households headed by elderly members or those with higher levels of education were less likely to be involved in the sale of forest products. While age possibly discouraged participation due to the physical demands of

forest based activities, higher education opened opportunities for alternative economic activities for raising cash.

The significant trade-offs between involvement of households in short-term wage earning jobs and participation in forest based trade also reiterated the negative influence of education. More educated household members often have access to a wider range of economic activities including wage paying jobs. The study found that higher incomes from wage labour reduced the likelihood of household participation in forest based activities. Households who spend more time on wage paying jobs would be less likely to have time for the harvesting and sale of forest products. A significant wage income may have also lessened the need for households to sell forest products to raise cash.

The significant influence of distance from the homestead to the forest, which is gives an indication of the required labour input in the collection of forest products, also suggest that labour is a key constraint. Households that were located further from the forest were associated with a lower likelihood of participating in forest trade. The results suggest that as the distance between the homestead and sources of forest products increases, households find it less and less attractive to participate in forest based activities.

The results confirm that participation in forest based trade is central to household poverty alleviation. Participation in the sale of forest products significantly increased the likelihood of households being above the nationally defined poverty line. This finding demonstrates the role that forest based activities play in keeping rural households out of poverty. The weak correlation between participation in forest trade and high value assets such as livestock, dwellings and household gadgets, which often reflect household investment and consumption potential, however point to the limited role of forest trade in driving asset accumulation. Significant correlations are only limited to assets such as bicycles which provide a direct service to forest based activities in the form of transport. These findings suggest that most households have not yet reached levels were they can save or accumulate assets from their participation in forest trade.

# CHAPTER 6

## ACCESSING URBAN MARKETS FOR FOREST PRODUCTS

### 6.1 Introduction

Proponents of forest based poverty alleviation have strongly argued that growing access to vibrant markets for forest products has created new opportunities for poor resource users in rural communities to lift themselves out of poverty (e.g. Tieguhong *et al.* 2012). Foremost amongst the factors driving the growth of markets for forest products in Africa is the increase in demand that accompanies growing urban populations (Arnold *et al.* 2006; Dewees *et al.* 2010; Lowore 2006; Shackleton *et al.* 2008). Although African rural and urban markets are not as lucrative as international trade, Sills *et al.* (2011) argued that they offer more sustainable demand as they are less susceptible to boom-bust cycles similar to those posited by Homma (1992), partly due to the cultural significance and familiarity of these products (Cocks *et al.* 2011; Van Vliet *et al.* 2011). Following his work on forest products in the Amazonia, Homma (1992) cautioned early proponents of international trade in NTFPs, arguing that commercial extraction of the most valuable NTFPs follows a cyclical pattern, which is characterized by an initial stage of expansion, followed by a stabilization phase, and ultimately a bust when the forest product is replaced by either synthetic substitutes or cultivation of the same or similar species although there are numerous exceptions to this Cunningham (2011).

Fears around the boom-bust phenomenon have prompted many authors to suggest the focus should be firmly on local and regional markets for forest products (Shackleton *et al.* 2008) rather than international markets as was the case two decades ago. A review by Sills *et al.* (2011) suggests that the fundamental difference between these two markets emanates from the nature of cultural connections with forest products. Markets for forest products with cultural significance often places a premium on “wild harvested” products, meaning that they cannot be easily substituted by cultivated or synthetic products. Similarly, ‘green’ markets operating globally put a premium on “ethical consumption”, fair trade, and ecological certification, which also reflects concern with the production process and not just the final

product (Mander and le Breton 2006; Shackleton 2005; Shackleton *et al.* 2007). However, without a strong cultural connection, the international market for certified “green” or “fair trade” food and health care products derived from NTFPs can be “extremely fickle and trend-driven” (Laird and Guillen 2002).

A characteristic feature of urbanization patterns across Africa is the limited corresponding growth in economic activity (Deweese *et al.* 2010). The region’s economies are growing slowly with per capita income growth rates of as low as 0.1 % between 1990 and 1999 (Kaimowitz 2003). The result is high levels of urban unemployment and growing levels of urban poverty (Deweese *et al.* 2010). A growing population of the urban poor has been linked with continued dependence on natural products mostly for food, medicines and energy (Arnold *et al.* 2006; Kaimowitz 2003; Lowore 2006). Although many poor urban consumers of forest products are equally keen to maintain their connection with natural products, their demand for most products is probably motivated by cost considerations as forest products remain a cheap alternative to modern substitutes.

While increasing demand for forest products is mainly being driven by a growing population of the urban poor across Africa, a shift towards natural products among the more affluent urban consumers is also reinforcing this trend. This unexpected trend is driven by increasing awareness of potential public health benefits of wild-harvested and traditional products (Johns and Maundu 2006; Mander and le Breton 2006). Growing evidence of this nutritional transition explains the increase in demand for certain natural products as incomes grow that is reported in a number of studies (Bennett 2002; Ndoye *et al.* 1997). Evans (1996) identified two categories of such products - wild staples that are ingredients of everyday “cultural foodways or food patterns”, and wild luxuries, which “are rare, valuable or otherwise prestigious items of food from the wild”.

Although much of the urban trade in forest products remains largely unquantified, it has been shown to be substantial throughout the world (Belcher *et al.* 2005; Ndoye *et al.* 1999; Shackleton *et al.* 2007, 2008; Shanley *et al.* 2012; Sills *et al.* 2011). This is particularly true in the case of products such as charcoal, construction timber and poles, fruits, palm wine, some medicinal plants, wild meat, and furniture, among others (Arnold *et al.* 2006; FAO 2001; Scherr *et al.* 2004).

Despite the opportunities they present and their relative simplicity compared to international markets, local and regional urban markets for forest products can still be very difficult for some rural producers to access due to poor infrastructure, lack of information, and high transaction costs (Nkem, *et al.* 2010; Shanley *et al.* 2002). To what extent are rural households able to benefit from opportunities presented by urban markets for forest products? In what way do household socio-economic characteristics and other contextual factors affect household access to urban markets? How does distance from urban markets influence the marketing channels used by households and the types of forest products traded? This chapter analyzed patterns in the marketing of forest products to answer these questions. Specifically, the study analyzed trends in access to urban markets by households in the study sites for each of the traded forest products and how this is influenced by factors such as age, gender and education of household head. The choice of marketing channel was also compared for households in different wealth quartiles to determine whether access to different marketing channels is related to household wealth status.

## **6.2 Methods**

### **6.2.1 Data collection**

This chapter is based on data collected through two complementary approaches. First, as described in Chapter 2, detailed household level data for 200 households in four villages was collected through a quarterly household questionnaire in over a 12 month period. Two of the villages were located in a remote district while the other two were situated close to urban centers. The household questionnaire captured all details of household activities and transactions involving forest products and also other forms of income generation. Second, to get an understanding of the influence of distance from urban centers on the use of forest products, a once off supplementary survey was conducted, interviewing 200 households, 10 from each of the 20 selected villages along a distance gradient between the remote study site and the site located close to urban centers. The selected villages were approximately 20 kilometers apart on a 400 kilometer stretch of road. In each village, households were randomly selected for interviews. The main respondents were the household heads but in cases where they were not at home, their spouse was the main respondent.

The focus of the supplementary survey was to establish the extent of household participation in the trade of forest products. Data were also collected on the type of forest products that

households were trading and the marketing channels they were using. For those households that were not selling forest products, they were asked for reasons why they were not participating. Households were also asked to rank their income generating activities in order of their contribution.

## **6.2.2 Data Analysis**

The focus of the analysis was on understanding the influence of two sets of variables on the nature of household trade in forest products. These included household socio-economic characteristics (age, education level and gender of household head, household wealth status), and contextual variables such as location of village and distance from urban centers. To understand trends in marketing of forest products, the volume of transactions for each product and the marketing channel used were calculated. A Principal Components Analysis (PCA) was run to establish whether there were any correlations between forest products, the marketing channels and location. Trends in the marketing channels used by households in different socio-economic categories were identified to establish the influence of these factors on choice of market for forest products. The influence of distance on the nature of forest product trade was mainly determined by analyzing two variables; the number of households trading in forest products, and the preferred marketing channel as distance from urban markets increase.

## **6.3 Results**

### **6.3.1 Types of marketing channels for forest products**

Trends in the choice of marketing channel for forest products by households differed from village to village (Table 6.1). To a large extent the remote villages of Maveve and Nkhulwashi relied on inter-household trade and road-side markets for selling forest products. The main products from these communities that reached urban markets are the high value timber and honey which were either sold directly to urban consumers or to urban wholesalers. In Maveve, 86 % of all timber sales were directly to urban consumers or wholesalers while similar channels also accounted for 90 % of all sales in Nkhulwashi. These transactions involved direct transactions with urban buyers who either traveled to collect the timber or requested the seller to deliver. In addition to direct sales, these products also reached urban markets through local wholesale buyers who acted as ‘middlemen’, aggregating small

quantities from households into larger quantities that are economically viable to transport and sale in distant urban markets. As much as 50 % of all honey sales reported by households in Nkhulwashi were through middlemen who went on to sell to either urban consumers or exporting companies. Other products like game, caterpillars and mushrooms (dried) which are easy to preserve locally also found their way from the remote villages to urban consumers through middlemen.

The most prominent marketing channel in the villages located close to urban populations where the roadside markets that are usually dotted along roads leading to urban centers. In Sosala for instance, the proportion of roadside sales for different forest products ranged between 40 % (mushrooms) and 91 % (caterpillars). Similarly in 14Miles, roadside markets were the single biggest outlet for products such as fruits (60 %), mushrooms (90 %) and caterpillars (65 %). Although much of the charcoal was also sold at roadside markets, a significant proportion of the sales (34 % in Sosala and 38 % in 14Miles) were directly to urban consumers. Despite hunting being illegal in Zambia, households still reported significant volumes of trade in game meat, with as much as 50 % of all transactions in 14Miles conducted directly with urban consumers who in most cases place their orders well in advance. Households in Sosala also targeted urban buyers for game meat sales but preferred to do so through roadside markets which handled 92 % of the transactions. These are usually opportunistic sales which target travellers along major roads to urban centers and do not need any prior arrangements or connections.

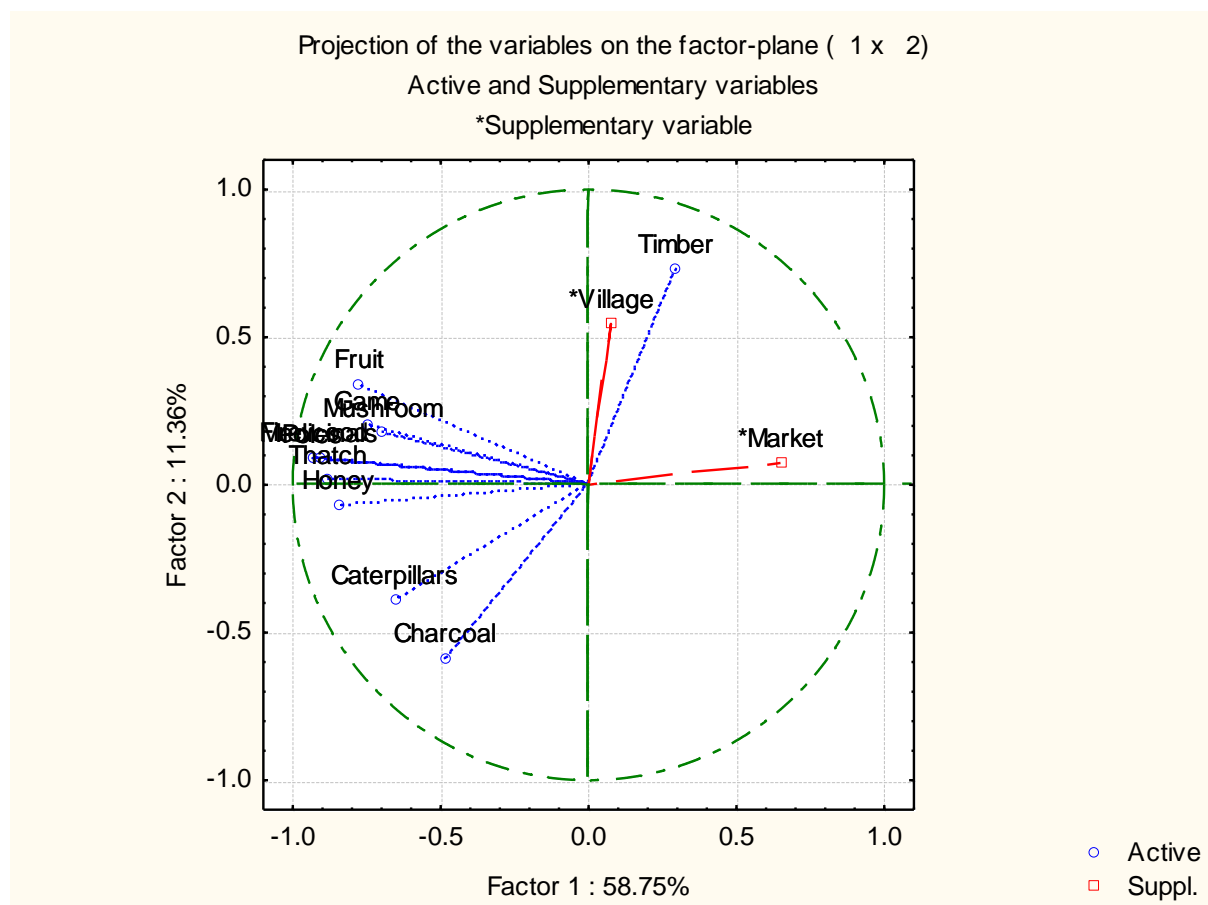
Unlike in the case of remote villages, very few sales in villages closer to urban centers occurred through middlemen. With villages such as Maveve and Nkhulwashi located more than 15 km from the main road, there are limited opportunities for roadside sales. The option of middlemen is therefore attractive to most households who would otherwise find it costly and complicated to get their products to the market. This result suggests that where urban markets are more accessible and risks are low, it is worthwhile economically and logistically for individual traders to pursue direct transactions with urban consumers.

**Table 6.1: Percentage of transactions conducted through each type of market channel by village**

	<i>Timber</i>	<i>Poles</i>	<i>Firewood</i>	<i>Fruit</i>	<i>Mushrooms</i>	<i>Medicinal plants</i>	<i>Thatch grass</i>	<i>Game</i>	<i>Caterpillars</i>	<i>Honey</i>	<i>Charcoal</i>	<i>Total</i>	$\chi^2$	<i>p-Value</i>
<b>Sosala</b>														
Inter-household	-	10	7	11	9	13	10	8	7	10	20	11	35.3	0.04
Road-side	-	78	62	43	40	65	86	92	91	57	46	65		
Local wholesalers	-	0	0	0	0	0	0	0	0	0	0	0		
Outside consumers	-	12	31	46	51	22	4	0	2	33	34	24		
Outside wholesalers	-	0	0	0	0	0	0	0	0	0	0	0		
Total	-	100	100	100	100	100	100	100	100	100	100	100		
<b>14Miles</b>														
Inter-household	-	83	61	27	10	89	96	37	35	67	31	66	17.7	0.15
Road-side	-	15	11	60	90	2	3	13	65	33	31	21		
Local wholesalers	-	2	24	7	0	2	1	0	0	0	0	10		
Outside consumers	-	0	4	3	0	7	0	50	0	0	38	2		
Outside wholesalers	-	0	0	3	0	0	0	0	0	0	0	1		
Total	-	100	100	100	100	100	100	100	100	100	100	100		
<b>Nkhulwashi</b>														
Inter-household	0	23	41	40	76	67	14	0	0	25	-	39	25.1	0.04
Road-side	0	65	47	0	0	33	75	33	0	0	-	45		
Local wholesalers	0	0	12	0	0	0	3	0	0	50	-	1		
Outside consumers	67	12	0	60	24	0	0	67	0	12	-	14		
Outside wholesalers	33	0	0	0	0	0	0	0	0	13	-	1		
Total	100	100	100	100	100	100	100	100	100	100	-	100		
<b>Maveve</b>														
Inter-household	0	100	100	100	100	100	96	83	31	66	-	71	12.1	0.11
Road-side	14	0	0	0	0	0	0	17	0	4	-	3		
Local wholesalers	0	0	0	0	0	0	0	0	46	17	-	8		
Outside consumers	72	0	0	0	0	0	0	0	0	4	-	15		
Outside wholesalers	14	0	0	0	0	0	4	0	13	4	-	3		
Total	100	100	100	100	100	100	100	100	100	100	-	100		

Results of a Principal Components Analysis (PCA) of forest product trade by market and village (Figure 6.1) are consistent with those reported above. They confirm that timber trade was associated with the remote villages of Nkhulwashi and Maveve and negatively associated with the villages closer to urban areas (Sosala and 14Miles) where most valuable species have been depleted. In contrast, charcoal trade was associated with the two villages closer to urban areas (Sosala and 14Miles) due to the high demand. As such the results showed the negative relationship between the extent of trade in timber and charcoal.

Trade in all products was highly correlated with each another, except in the case of timber, caterpillars and charcoal. Market type was negatively associated with levels of trade in all resources other than timber, caterpillars and charcoal. This means that most of the trade was conducted through local market channels (inter-household and roadside). There was no relationship (positive or negative) between village and type of market favoured. This is consistent to earlier findings of the dominance of inter-household and roadside markets in both study sites.



**Figure 6.1: Projection of forest products on a factor plane of PCA**

*Notes*

1. The four villages were coded 1 (Sosala), 2 (14 Miles), 3 (Nkhulwashi) and 4 (Maveve)
2. The markets were coded 1 (inter-household), 2 (roadside), 3 (local wholesalers), 4 (external consumers) and 5 (external wholesalers)

## **6.3.2 The influence of household characteristics on choice of marketing channel**

### **6.3.2.1 Gender of household head**

Female headed households depended more on local inter household trade (41 %) than male headed households which only conducted 32 % of their transactions through this channel (Table 6.2). Male headed households however preferred roadside sales which handled 50 % of their sales compared to 42 % for female headed households. Dependence on middlemen was slightly higher for female headed households (5 %) compared to male headed households. Male headed households also conducted more direct sale transactions with urban buyers (15 %) than female headed households who only conducted 12 % of their transactions with urban consumers.

### **6.3.2.2 Education level of household head**

There was no distinct pattern in the choices of marketing channels used by households in different education categories (Table 6.2). For instance households headed by members with no schooling and those with tertiary education had the highest proportion of inter-household sales (61 % and 42 % respectively). There was little difference between households headed by members with primary and secondary education who also conducted 33 % and 28 % of their sales through the same marketing channel. Households headed by members with tertiary education showed less preference for roadside sales, only conducting 28 % of their transactions through this channel compared to proportions ranging between 44 % and 52 % for the rest of the households. Tertiary level households also relied more on middlemen who handled 11 % of their transactions compared to between 2 and 4 % for the rest of the households. Volume of direct sales to urban consumers was highest for secondary level households (18 %), compared to 11 % and 14 % for no school and primary school households. Tertiary level households did not report any direct transactions with urban consumers.

### **6.3.2.3 Age of household head**

Households headed by members under the age of 25 reported the highest dependence on inter-household sales (62 %) compared to the rest of the households who only depended on

this channel for between 30 and 34 % of their transactions (Table 6.2). The under 25 households also reported the least dependence on roadside sales (27 %) compared to other households who conducted 48 to 51 % of their transactions through this channel. Similarly, under 25 household reported the lowest volume of transactions with urban consumers (3 %) compared to the other age categories who conducted 14 to 15 % of their transactions with urban consumers. There were marginal differences on the level of dependence on middlemen, with transactions by households in all categories ranging between 3 and 5 %.

#### **6.3.2.4 Wealth status**

Households in the poorer wealth categories reported the highest reliance on inter household trade (55 % and 44 % respectively), compared to the richer categories who only contacted 24 and 34 % of their transactions through the same channel. The wealthier households conducted more of their transactions through roadside sales (56 and 51 %) compared to households in the poorest and poor wealth quartiles (33 % and 40 % respectively). Households in the two wealthier categories also reported higher proportions of direct transactions with urban consumers (18 and 16 %) compared to the two poorer household categories (6 and 9 %).

**Table 6.2: Percentage of transactions conducted through each type of market channel by household characteristic**

	<i>Inter-household</i>	<i>N</i>	<i>Roadside</i>	<i>N</i>	<i>Local wholesalers</i>	<i>N</i>	<i>Outside consumers</i>	<i>N</i>	<i>Outside wholesalers</i>	<i>N</i>	<i>Total</i>	<i>N</i>	$\chi^2$	<i>p-Value</i>
<b>Gender of household head</b>														
Male	32	433	50	681	3	46	15	202	1	7	100	1,369	13.6	0.03
Female	41	115	42	116	5	13	12	33	0	1	100	278		
All households	33	548	48	797	4	59	14	235	0	8	100	1,647		
<b>Level of Education</b>														
No School	42	84	44	87	3.5	7	11	22	0	0	100	200	15.7	0.01
Primary	33	327	48	474	4	41	14	135	1	7	100	984		
Secondary	28	126	52	231	2	9	18	78	0	1	100	445		
Tertiary	61	11	28	5	11	2	0	0	0	0	100	18		
All households	33	548	48	797	4	59	14	235	0	8	100	1,647		
<b>Age of household head (Yrs)</b>														
Under25	62	37	27	16	5	3	3	2	3	2	100	60	13.5	0.04
Middle-age	34	334	48	478	3	30	14	142	1	5	100	989		
Older	30	177	51	303	4	26	15	91	0	1	100	598		
All households	33	548	48	797	4	59	14	235	0	8	100	1,647		
<b>Wealth quartile</b>														
Poorest	55	103	33	62	4	8	6	12	2	3	100	188	14.3	0.01
Poor	44	133	40	121	6	17	9	28	1	2	100	301		
Rich	24	132	56	312	3	15	18	101	1	1	100	561		
Richest	30	180	51	302	3	19	16	94	1	2	100	597		
All households	33	548	48	797	4	59	14	235	1	8	100	1,647		

### 6.3.3 The influence of distance on household participation in trade of forest products

The proportion of households that sold forest products in each village at various distances from the urban center generally increased with distance from the urban center up to about 180 km, before declining (Figure 6.2). Participation rates in the sale of forest products in villages within the first 100 km from the urban markets (20-60 %) were surprisingly lower than for villages in the 100 to 200 km range who reported rates of up to 90 %. Most households (20 – 50 %) within the 100 km range cited scarcity of forest products as the main reason why they did not sell forest products (Table 6.3). Many more households (43 – 75 %) in this range mentioned that they had other sources of income which could well mean that forest products are not an attractive option. Only 10 % of households in this distance range ranked forest products as their most important income sources.

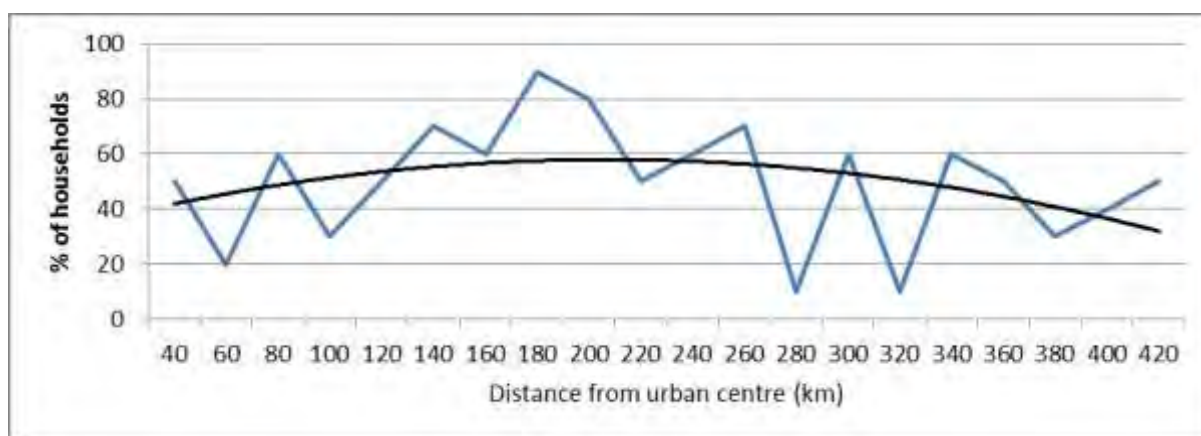


Figure 6.2: Percentage of households selling forest products by distance of village from urban centre

The highest participation rates in the sale of forest products (80 - 90 %) were reported in two villages (180 – 200 km) located within the vicinity of a small but rapidly growing mining town of Solwezi. The households who did not take part in trade indicated that this was mainly because they had other income generating opportunities (Table 6.3). There were, however, sentiments that scarcity was becoming an issue as a few households indicated that they don't sell forest products because they have become increasingly difficult to find. For villages beyond 200 km, the proportion of households selling forest products fell sharply reaching about 10 % in villages at 280 km (Figure 6.1). Small fluctuations from village to village suggest the influence of small local business centers which could be responsible for pushing up localized trade.

**Table 6.3: Distribution of reasons (%) for not selling forest products in each village**

	<i>Difficult to reach market</i>	<i>N</i>	<i>Scarcity of products</i>	<i>N</i>	<i>Other Income sources</i>	<i>N</i>	<i>Prohibitive rules</i>	<i>N</i>	<i>Lack of labour</i>	<i>N</i>	<i>Total</i>	<i>N</i>
<b>Village (distance from city, Km)</b>												
40	0	0	40	2	0	0	40	2	20	1	100	5
60	13	1	25	2	50	4	0	0	13	1	100	8
80	25	1	0	0	75	3	0	0	0	0	100	4
100	14	1	14	1	43	3	0	0	29	2	100	7
120	20	1	0	0	40	2	20	1	20	1	100	5
140	0	0	0	0	100	3	0	0	0	0	100	3
160	0	0	0	0	25	1	25	1	50	2	100	4
180	0	0	100	1	0	0	0	0	0	0	100	1
200	50	1	50	1	0	0	0	0	0	0	100	2
220	60	3	0	0	40	2	0	0	0	0	100	5
240	0	0	0	0	75	3	0	0	25	1	100	4
260	67	2	0	0	33	1	0	0	0	0	100	3
280	0	0	0	0	0	0	0	0	0	0	0	0
300	0	0	50	2	50	2	0	0	0	0	100	4
320	22	2	22	2	33	3	0	0	22	2	100	9
340	0	0	25	1	50	2	0	0	25	1	100	4
360	20	1	0	0	60	3	0	0	20	1	100	5
380	17	1	17	1	67	4	0	0	0	0	100	6
400	17	1	50	3	17	1	0	0	17	1	100	6
420	20	1	20	1	20	1	0	0	40	2	100	5
All households	18	16	19	17	42	38	4	4	17	15	100	90

$\chi^2 = 31.45; P = 0.035$

Most reported transactions (60 - 90 %) were through roadside markets which targeted travelers to urban centers (Table 6.4). Even in villages within the 100 km distance from the urban centers, the proportion of direct sales to urban dwellers was very low (11-18 %). Beyond 200 km, the sharp decline in households involved in trade could be linked to the decline in the quality of the road, and the associated decline in traffic volumes and general economic activity. Even with the poor quality of road and less traffic, roadside markets remain the dominant outlet for forest products.

**Table 6.4: Percentage of transactions conducted through each type of market by village**

	<i>Inter-household</i>	<i>N</i>	<i>Roadside</i>	<i>N</i>	<i>Outside consumers</i>	<i>N</i>	<i>Total</i>	<i>N</i>
<b>Village (distance from city, Km)</b>								
40	9	1	73	8	18	2	100	11
60	0	0	100	2	0	0	100	2
80	6	1	83	15	11	2	100	18
100	13	1	88	7	0	0	100	8
120	13	1	75	6	13	1	100	8
140	18	3	82	14	0	0	100	17
160	33	5	67	10	0	0	100	15
180	4	1	63	17	33	9	100	27
200	18	3	65	11	18	3	100	17
220	27	3	73	8	0	0	100	11
240	7	1	93	14	0	0	100	15
260	13	2	80	12	7	1	100	15
280	20	6	63	19	17	5	100	30
300	28	5	33	6	39	7	100	18
320	0	0	0	0	100	1	100	1
340	40	4	60	6	0	0	100	10
360	10	1	90	9	0	0	100	10
380	38	3	63	5	0	0	100	8
400	0	0	100	8	0	0	100	8
420	10	1	50	5	40	4	100	10
All households	16	42	70	182	14	35	100	259

$$\chi^2 = 37.13; P = 0.013$$

## **6.4 Discussion**

### **6.4.1 Household dependence on urban markets**

The influence of urban demand on the use of forest products by rural households was significant in the study area. Although local sales played an important part as a source of cash for households, the most preferred channels for trade were linked to urban markets, either through roadside markets, middle-men or direct sales to urban buyers. High value products were mostly targeted for the more lucrative urban markets. Cocks *et al.* (2011), Tieguhong *et al.* (2012) and Van Vliet *et al.* (2011) also reported similar trends.

The role of middlemen in facilitating transactions on behalf of rural households was again evident, especially in the case of remote villages. Although middlemen have been associated with dishonesty, profiteering and exploitation of rural households, many studies now suggest that they play an important role in the marketing of products whose value would otherwise be too low to justify the effort of individual producers operating with small volumes (Belcher *et al.* 2005; Sills *et al.* 2011; Tieguhong *et al.* 2012). Besides carrying the risks that come with trading, the levels of sophistication and connections that the middlemen brings to bear, especially when dealing with urban consumers are attributes that most rural households do not possess (Shanley *et al.* 2012; Tieguhong *et al.* 2012).

The role of roadside markets was significant in shaping trading in forest products in both remote villages and those close to urban centers. The opportunistic nature of this form of trade reduces the transaction costs for both the seller and the buyer (Belcher *et al.* 2005; Ndoye *et al.* 1997; 1998; 1999). Most of these markets are located within the village or within walking distance from most households. Some are even positioned in such a way that sellers can simultaneously work on other activities (e.g. working in the fields, performing household chores or herding livestock). Roadside markets in villages can also be important centers for social gatherings and exchanges which most local people recognize (Cocks *et al.* 2011; Shanley *et al.* 2012; Shackleton *et al.* 2008). On the other hand, most buyers usually have other reasons for travelling such that they do not consider the cost of getting to these markets as directly related to the cost of

products. The lowering of transaction costs associated with roadside markets ensures that even low value forest products are able to reach distant consumers in urban centers (Ndoye *et al.* 1998; 1999).

Perishability of most forest products such as fruits, mushrooms, game meat and caterpillars played a big part in determining options for their marketing (Belcher *et al.* 2005; Tieguhong *et al.* 2012). Despite the growing premium status and potential high value of these traditional foods among urban consumers (Sills *et al.* 2011), their sale was limited to local inter household transactions. Although local households preserve some of these products using traditional methods, allowing transportation to urban areas, the volume and quality concerns remain a hindrance to viable trade.

#### **6.4.2 Household socio-economic characteristics**

The findings showed that female headed households mostly relied on local sales for their forest products and had lower levels of participation in markets linked to urban consumers. They depended more on middlemen, suggesting that the constraints of reaching lucrative markets were more severe for this category of households. As also noted by Ruiz Perez *et al.* (2004), Shanley (2006) and Shanley *et al.* (2010; 2012), these results support widely held views that female headed households are in a position of disadvantage and have limited assets, capabilities, information and time to exploit opportunities. Although the exact reasons for this trend are a subject of contentious debate, there is general consensus that female headed households are prone to more severe levels of deprivation (Frost *et al.* 2007; Shackleton *et al.* 2007; 2008).

An equally vulnerable group is those households headed by youths (Campbell *et al.* 2002; Frost *et al.* 2007). Households headed by members under 25 years had limited opportunities to reach lucrative urban markets and relied mostly on local inter-household trade. They also relied heavily on middlemen to get their products to markets. In most cases such households are constrained by lack of most forms of assets, including labour due to the small size of families (Campbell *et al.* 2002). The key role of middlemen in bridging the gap between such vulnerable households and lucrative market support the assertions that transparent and dependable associations with middlemen can play an important role in improving rural household linkages with the mainstream economy (Belcher *et al.* 2005; Tieguhong *et al.* 2012).

The poorest households were shown to have very limited access to urban markets, while the richest enjoyed better linkages through roadside sales, middlemen and even direct sales. Although forest products have been labeled resources for the poor, with limited barriers to utilization (Anglesen and Wunder 2003), exploiting these resources in a way that helps poor households escape poverty remains a daunting challenge. Without targeted interventions to counter this self-reinforcing conundrum, the status quo will perpetuate poverty and worsen inequality among households locally, nationally and globally (Belcher 2005; Ruiz Perez *et al.* 2004; Shackleton *et al.* 2008).

### **6.4.3 Distance to urban markets**

The results on the influence of distance once again revealed the access-scarcity conundrum that is typical for most rural settings (Arnold 2001; Arnold *et al.* 2006; Ndoye *et al.* 1998; 1999). While it is relatively easy for households located close to urban areas to sell forest products to urban consumers, such opportunities usually mean scarcity of products quickly becomes the binding constraint (Belcher 2005; Shanley *et al.* 2010; 2012; Sills *et al.* 2011). The opposite is true for those households located far from urban centers. The results show that as long as villages are located close to a main road, distance from an urban center does not make much difference as roadside markets become the main channel of trade in forest products. In fact the further away the market is from the urban center the more attractive it is to the buyer as prices are lower and quality is usually higher because products are generally more readily available (Babulo *et al.* 2009; Chidumayo 2005; Ndoye *et al.* 1999).

For villages such as Maveve and Nkhulwashi, located far from main roads linking major towns, the importance of roadside markets diminish. The volume and value of forest products that can be sold at markets become a major consideration. High value, low volume products such as honey which can justify the cost of reaching consumers dominate external trade. The high value of hardwood timber also makes it a lucrative product, encouraging even direct sales with urban buyers.

#### **6.4.4 Conclusion**

Households in disadvantaged socio-economic circumstances struggle to access urban markets for forest products. For this category of households, the services of middlemen are critical and they enable disadvantaged households to reach lucrative markets. Roadside markets go a long way in connecting households, even those located in remote areas, with urban markets. The central role of roadside markets also means that distance from an urban centre does not have a major influence on trade in most forest products as long as households are located close to a major road linking urban centers. While households located close to urban markets have easier access to these centres of demand, availability of forest products is a major constraint. The opposite is true for households located far from urban centres. Marketing interventions that focus on improving infrastructure such as roads and bulking of products either through middlemen or other forms of aggregation could significantly benefit households in remote communities, especially those in disadvantaged socio-economic circumstances.

# CHAPTER 7

## INTEGRATION: WHAT PROSPECTS FOR FOREST BASED POVERTY ALLEVIATION?

### 7.1 Introduction

Despite growing acknowledgement that forests and forest products are central to rural livelihoods, their role in lifting households out of poverty remains a subject of much debate. Following a review of the dominant schools of thought on this subject (Chapter 1), the study collected and analyzed empirical data to verify some of the key assertions from these divergent paradigms. The study particularly focused on finding empirical evidence that the changing context in the use and management of forest products does create real opportunities for local people to lift themselves out of poverty through forest based activities. This assertion is a key argument posited by some of the proponents of forest based poverty alleviation such as Arnold *et al.* (2006), Lowore (2006), Shackleton *et al.* (2007, 2008), Dewees *et al.* (2010), and Heubach *et al.* (2011).

In trying to further the debate this study was guided by the following specific research questions: (i) is income from forest products central to household livelihoods or rather supplementary to other acknowledged sources such as crop production and livestock rearing; (ii) are poorer households more dependent on forest products for their livelihood than their richer counterparts; (iii) what factors influence household participation in forest product trade; and, (iv) how is the contribution of forest income to household livelihood influenced by factors such as distance to urban markets?

The study used detailed annual income data from various household sectors in two contrasting sites in Zambia, namely Mufulira and Kabompo districts, analyzing the relative contribution of forest income to household livelihood, the effect of household wealth status on forest use, factors driving household participation in forest product trade, and the influence of distance to urban markets on trends in the use of forest products. This section presents key messages and

conclusions from the study and their implications for forest based activities and rural poverty alleviation.

## **7.2 Forest based activities and household income**

A comparison of the relative contribution of different household economic activities to total household income illustrate the central role that forest based activities play in the livelihoods of rural households. These activities contributed close to half of total household income in both sites, dwarfing the contribution of agricultural sectors such as cropping and livestock rearing (29 %) which are generally regarded by external commentators and researchers as the backbone of rural economies. These results revealed some of the highest rates of dependence on forests for income compared to previous work. Similar studies by Cavendish (1997; 2000), Campbell *et al.* (2002), Dovie *et al.* (2003), Godoy (2009), Heubach *et al.* (2011), Lowore (2006), Pouliot and Treue (2012), Shackleton *et al.* (2007; 2008), had estimated contributions from forest based activities of about 30 %. In Northern and Central Ethiopia, Babulo *et al.* (2008), Mamo *et al.* (2007) and Tesfaye *et al.* (2011) also estimated contributions from forests between 27 % and 39 % for rural households living close to natural forests. Saha *et al.* (2012) reported relative contributions from NTFPs ranging between 19 % and 32 % for different tribal groups harvesting a wide variety of NTFPs in the humid tropics of Northeast India.

These findings indicate that forest based activities are a key facet of rural economies in the region and therefore need to be part of national and local poverty alleviation strategies. Although there seems to be growing convergence of opinions on the significant contribution of forest based activities to household income, much contention remains on whether this points to the potential of the sector in lifting rural households out of poverty (Kamanga *et al.* 2009; Kar and Jacobson 2012; Saha *et al.* 2012; Shanley *et al.* 2012). Despite limited empirical evidence so far to ascertain whether forest based activities can lift households out of poverty, the high contribution from forest based activities to daily livelihoods and trading income has certainly fueled the optimism among proponents of forest based poverty alleviation (Sills *et al.* 2011). In trying to understand this link between the high dependence on the forest sector and its potential role in poverty alleviation, this study presented compelling evidence suggesting that in some

contexts the contribution from forest activities are significant enough to lift rural households above the poverty line.

Without the contribution of forest income, the proportion of households that would fall below the poverty line was shown to increase from about 70 % to 90 % in the remote villages and from about 10 % to 70 % in villages located close to urban centres. The assumption was that if these households lost forest income it was highly unlikely they would find alternative economic activities to fill that gap due to low formal skills, low assets and scarcity of such opportunities. Income generating opportunities associated with trade in forest products with the urban markets clearly lifted a significant proportion of households in Mufulira above the poverty line. This suggests that where households have easy access to markets for forest products, forest based strategies can play a big role in lifting households out of poverty, justifying the caution by Heubach *et al.* (2011), Saha *et al.* (2012), Sills *et al.* (2011), and Shackleton *et al.* (2008) among others not to overlook this sector in rural development interventions.

It's difficult to say whether this poverty alleviation role of forests points merely to the safety net functions of forest products as described by Angelsen and Wunder (2003) and McSweeney (2005) or a more sustained improvement in household wellbeing. A positive correlation between forest income and household assets observed in the study however suggests that forest based activities are contributing to more sustained poverty alleviation beyond the safety nets. At the very least these findings strengthen optimistic views that under certain contexts forest based activities could provide the best options in poverty alleviation strategies. Interventions to ensure sustainable utilization of forest resources, improved marketing arrangements and value addition, could increase benefits from forests and long term support to investments and asset accumulation that would more permanently lift households out of poverty.

Fears of overexploitation are not unfounded where high value products are being harvested for trade. Saha *et al.* (2012) noted that for species collected commercially, overexploitation was inevitable in the absence of strict law enforcement. The authors showed declining revenue accruing to the Forest Department from licenses for collection of selected NTFPs from forest areas in the past 14 years. The decline was attributed to high market demand of some species that fuelled disregard for traditional harvesting guidelines leading to unsustainable exploitation. The

authors suggested strengthening village level institutions for governing use of forest products as a way of ensuring sustainable use of forest products. Tesfaye *et al.* (2011) and Tumusiime *et al.* (2011) also concurred on the risk of overexploitation and recommended that promotion of forest based activities should go hand-in-hand with an enhanced ability to govern forest use. Tumusiime *et al.* (2011) argued that increased law enforcement alone is unlikely to protect natural resources. The authors recommended interventions that allow managed access to these resources in the short term, whilst creating operational opportunities outside the areas to cater for local peoples' rights and needs in the longer term. Saha *et al.* (2011) suggested domestication of certain species and basic value addition as viable options that would increase the benefits from high value products without over-exploiting the forest resource.

The prospects for forest based poverty alleviation in the study sites were also dampened by contextual factors such as remoteness and limited access to vibrant urban markets. For communities in remote locations, realizing this potential may need deliberate external development efforts, especially around reducing the transaction costs in the marketing of products. Improving infrastructure for transport and communication through the introduction of cellular networks in some parts of the remote study site is already making a major difference in the way rural households interact with outside markets. Development efforts could also seek to encourage the emergence of middlemen who facilitate market access for household in remote locations who would otherwise find it uneconomic or logistically challenging to reach markets. Some local forest users could be supported to take on this function and act as service providers for their neighbours as suggested by Nkem *et al.* (2010) and Tieguhong *et al.* (2012).

A study by Muto and Yamano (2009) conducted with Ugandan households in 94 communities revealed a reduction of marketing costs of agricultural commodities as a result of an increased information flow due to mobile phone network expansions between 2003 and 2005. The authors reported increased sales of banana in remote communities after the expansion of coverage. The mobile phone coverage expansion seemed to induce the market participation of farmers in remote areas who produce perishable crops. Similarly, Overa (2006) showed reduced transaction costs due to use of cell phones by small-scale traders in Ghana. It is expected that similar effects could apply to utilization forest products in remote communities where linkages with outside markets are poor and transaction costs are high Without these interventions forest based

opportunities often remain available to local elites, and outsiders with the means to overcome the marketing bottlenecks (Chukwuone and Okeke 2012; Nkem *et al.* 2010; Shackleton *et al.* 2007; 2008).

Although households in both sites were constrained in terms of ownership of productive assets, this situation was more severe for remote households. Levels of asset ownership were positively correlated to household income generation in forest based activities. Further interrogation suggested that high forest incomes were enabling some households to acquire more assets. Although the relationship between asset ownership and ability to utilize forest resources is mutually reinforcing (Chen *et al.* 2013; Nkem *et al.* 2010), the observed trends suggested that for most households the types of assets they owned do not directly enable higher levels of forest utilization. This implies the purchases were being driven by forest income but not the other way round.

These findings support the widely held views that forest based activities are vital in poverty alleviation strategies as they do not require high levels of assets for households to participate (Arnold *et al.* 2006; Dewees *et al.* 2010; Kaimowitz 2003; Lowore 2006). Although this study found this to be the case where households were located close to urban markets or along major highways linking urban centres, exploitation of high value products (e.g. timber) in remote locations was usually correlated higher levels of household wealth. It could be argued that the households that make a breakthrough into this lucrative trade had a better chance of accumulating higher incomes, assets and savings. In this case the exception was trade in honey which benefited a large number of households as a direct result of external market development interventions.

Low levels of intra-village income inequality observed in Mufulira where forest incomes were higher also point to the income equalizing role of forest based activities, supporting assertions that forest based activities offer a more socially equitable path to poverty alleviation (Dewees *et al.* 2010; Lowore 2006; Sills *et al.* 2011). The opposite is however true in remote locations where access to lucrative urban markets is limited by high transaction costs. Market development interventions in such circumstances could play a significant role as was demonstrated in the case of honey in the remote Kabompo district (Dewees *et al.* 2010).

Income deprivation was highest among female-headed households as found in previous studies (Campbell *et al.* 2002; Shackleton *et al.* 2007; 2008). This trend was more severe among remote households, suggesting the difficulties in reaching markets prevent female-headed households from benefiting as much from forest based trade. Female-headed households were also found to be conducting only 12 % of the marketing of forest products beyond their own villages. The more lucrative urban markets were largely beyond the reach of these households given the complexities of participating in such markets and competing social demands on female household members that keep them around the home. This trend has been reported elsewhere (Belcher *et al.* 2005; Shanley *et al.* 2012) justifying on-going efforts to develop targeted interventions that address gender based vulnerabilities and integrate these with other aspects of rural poverty alleviation strategies.

### **7.2.1 Forests and cash income**

This study corroborated the importance of forest based activities as cash income sources. Across all villages, forest based activities contributed the highest share of cash income, accounting for up to 50 % of all earnings. Similar studies have found forests to be particularly valuable sources of household cash, often coming at critical times when all other economic opportunities are limited (Arnold *et al.* 2006; Frost *et al.* 2007; Schure *et al.* 2012; Shackleton *et al.* 2007; 2008). Processed products and other high value products such as charcoal, honey and timber were highly lucrative sources of cash income as they were almost exclusively marketed. Although central to household food needs, agricultural sectors were found to be very poor cash income sources, contributing just 20 % of all cash earnings. The highly seasonal pattern of crop enterprises also resulted in all households producing crops around the same time, depressing local prices during post harvesting periods. Off-farm wages were also found to be important sources of cash, especially for households who are better integrated with the national economy, generating between 15 % and 36 % of household cash. Wage contributions are however limited in remote communities where they accounted for between 5 % and 11 % of household cash.

Given the cash constraints facing most rural households (Campbell *et al.* 2002; Frost *et al.* 2007; Schure *et al.* 2012), the better prospects of cash income generation in forest based sectors is valuable to rural households. A number of livelihood studies have also noted that for most

households in rural communities, access to cash is severely limited and limiting (Cavendish, 1997; Frost *et al.* 2007). Meeting household cash needs for expenses such as school fees, buying inputs and other family requirements is a constant challenge for most households (Campbell *et al.* 2002), and NTFPs can play a significant role in this regard (Shackleton *et al.* 2008). These cash injections can tip the balance in favour of increased livelihood security through asset purchases or strategic investments or simply development of some reserves.

### **7.3 Household wealth and dependency on forest products**

Understanding whether poorer households are more dependent on forest products than their richer counterparts is central to the broader debate on the role of forests in poverty alleviation. The results of this study challenge some of the assertions by earlier authors on the relationship between household wealth and dependency on forest based activities. The observed increase in forest income from the lowest to the highest wealth quartile supports the findings of pioneering studies by Campbell *et al.* (2002), Cavendish (1997; 2000), Fisher (2004), Lowore (2006), Shackleton *et al.* (2007;2008) and Paumgarten and Shackleton (2009).

When disaggregated by location, the differences between rich and poor households become even more glaring. Although the trends confirm that richer households earned more income from forests than their poorer neighbors, these disparities were more pronounced in the remote villages where the richest households who make up just about 10 % of the population earn up to ten times higher incomes than the rest of the households. These local ‘elites’ have capacity to exploit high value products such as timber and honey (as in the case of Kabompo) at much higher levels than poorer households, and have the resources and education levels that help them negotiate costly marketing transactions that are exacerbated by remoteness. Although richer households in villages closer to markets still manage to earn more from forests, differences to their poorer counterparts are marginal compared to the case of remote villages. Fears of elite capture have been expressed widely in other studies (Collier 2007; Mander and Le Breton 2006; Lowore 2006; Neumann and Hirsch 2000; Sunderlin *et al.* 2005; Wunder 2001) and are noted as a stumbling block to forest based poverty alleviation (Angelsen and Wunder 2003; Belcher *et al.* 2005; Dove 1993; Ndoye *et al.* 1999). Others have, however, suggested that higher levels of forest product commercialization simply require levels of resourcefulness and wherewithal

commonly found among richer households (Belcher *et al.* 2005). Both these points of view dampen the optimism about the potential of forest based activities as a viable poverty alleviation pathway for the poorest households.

The situation looks even more pessimistic for poor households in remote locations. Findings suggest that the ability of these households to exploit forest resources for trade is limited, especially with respect to exploitation of high value products, compared to poor households located closer to markets. Access to vibrant urban markets seems to be the difference. Whereas it would take considerable resources and wherewithal for households in remote villages to access urban markets for forest products, villagers located close to urban centers need basic assets like bicycles to take their products to urban markets. As such, earnings from forest based activities for villages close to markets do not differ widely across wealth classes. It has been noted elsewhere that forest income has an income equalizing effect (Fisher 2004; Ambrose-Oji 2003; Mahaptra and Shackleton 2012) but these results suggest that this is true where communities are more integrated with markets.

Supporting findings from similar work in the region by Cavendish (1997; 2000), Campbell *et al.* (2002), and Lowore (2006), the results confirm that richer households earn significantly higher incomes from forest products than their poorer counterparts. Although other studies (Campbell *et al.* 2002; Tesfaye *et al.* 2011; Vedeld *et al.* 2004; 2007) find that this mostly relates to products for subsistence use, this study confirms that even when it comes to trade in forest products, richer households earn significantly more income from this livelihood activity than poorer households. These results are hardly surprising as they are consistent with earlier findings that forest sectors are the most lucrative income earners for households in both districts, even performing better than farming sectors unlike most studies. Other ascertaining causality remains a challenge, the analysis of assets suggests that households are getting richer by exploiting more forest resources and not the other way.

Although richer households have been shown to earn more from forests, the proportion of their income from forests has been found to be lower than that for poorer households (Campbell *et al.* 2002; Cavendish 1997; 2000; Fisher 2004; Kamanga *et al.* 2009; Tesfaye *et al.* 2011; Vedeld *et al.* 2004; 2007). This has led to conclusions that poorer households are more dependent on

forests for their livelihoods compared to the richer counterparts who have access to other more rewarding income sources. This study contradicts this assertion. The proportion of household income from forest based activities is still higher for richer households, though the differences are marginal. Even when the analysis is disaggregated by location the same pattern persists. Although there is evidence to suggest that beyond a certain income threshold (see Chapter 4, Section 4.3.8), household dependency on forest based activities begins to decline, most of the households in the sample do not seem to have reached that threshold except in the case of the richest households in one of the peri-urban villages, Sosala. These results further reinforce the earlier conclusion that those households that are involved in forest based activities are getting richer as a direct result of earnings from this sector.

Results emerging from this analysis are consistent with arguments for forests as a resource which has potential to go beyond just safety net functions and provide a pathway out of poverty for rural households. Pessimistic impressions of forests as a low value sector, employer of last resort, mostly exploited opportunistically by poor households to make ends meet (Angelsen and Wunder 2003; Campbell *et al.* 2002; Fisher 2004), are strongly refuted by findings from this study. Not only do the results show that under certain circumstances forest can be the major source of income for both rich and poor rural households, they also imply that with adequate support for more organized exploitation and marketing of high value products, forests can play a major role in poverty alleviation. In remote locations external interventions can increase the number of local households that are able to benefit from high value forest resources and eliminate tendencies of elite capture, reducing income disparities among local households as illustrated by the case of market development for honey in Kabompo.

Many aspects of the results justify a more optimistic perspective on the role of forests in poverty alleviation efforts. The findings support a growing consensus around emerging opportunities for more profitable exploitation of forest products as a way out of poverty that comes with growing urban demand and niche markets for forest products (Lowore 2006; Sills *et al.* 2011), such as charcoal and organic honey respectively. In both locations forest based income sources were shown to be the most rewarding enterprises for households regardless of wealth status. It is logical to argue that the most promising poverty alleviation efforts in these communities would

have to be those rooted in overcoming the constraints that households face in exploiting forest products in a viable and sustainable way.

#### **7.4 Factors influencing household participation in forest based trade**

Understanding factors that influence household dependency on forest resources, especially the use of forest products to generate cash, is central to understanding the role of forests in local livelihoods and in the broader goal of poverty alleviation (Jumbe and Angelsen 2010). The results of this study revealed that household participation in forest product trade is influenced by a mix of household level and contextual variables, significantly:

- (i) number of productive household members;
- (ii) age of the household head;
- (iii) level of education of the household head;
- (iv) income from wage labour;
- (v) household poverty status;
- (vi) ownership of a bicycle; and,
- (vii) distance from homestead to forest

The influence of education of the household head on household dependency on forest products is a widely reported phenomenon. Similar studies by Jumbe and Angelsen (2010) and Heubach *et al.* (2011) also included the education variable in their models. Although the education factor was not significant in their studies, it exhibited a significant negative correlation with dependency on forest products in this study. This evidence supports the rationale of other studies (Babulo *et al.* 2009; Cavendish 2000; Fisher 2004) on forest dependency that have consistently included this variable in their analysis. The declining dependency on forests by more educated households is hardly surprising. The range of opportunities available to them is much wider than for their less educated counterparts. Frost *et al.* (2007) also reported higher earnings for more educated households from such sources as formal employment, remittances and other off-farm sources.

Jumbe and Angelsen (2010) found a significant correlation between use of a firewood source and household size. Similarly, this study also found the same positive influence of the number of productive household members which is a more accurate reflection of a household's labour endowment than the household size. The study also found a strong negative correlation between household's participation in forest trade and the distance of homestead from forest. Although distance was described as a contextual variable, it is a good proxy variable for the labour requirement in the collection of forest products. These results suggest that households who needed more labour input to collect forest products due to longer distances from forest products sources were less likely to participate in forest product trade.

The sometimes labour intensive nature of forest product collection, processing and the often time consuming marketing of products imply that households without enough labour or who cannot afford to hire labour will be severely limited in their participation in forest product trade. Labour constraints present a major bottleneck to most rural households across southern Africa (Frost *et al.* 2007). The high rates of rural-to-urban migration (Deweese *et al.* 2010; Scherr *et al.* 2004) in recent years have worsened this situation. Even the most promising rural development initiatives have collapsed due to labour constraints (Frost and Mandondo 1999).

This study also revealed the negative influence of a closely related variable, the age of the household head. Elderly household heads are generally less educated and less energetic and the rigors of harvesting forest products and taking them to markets may prove too challenging for them. Besides being more energetic, younger household heads are likely to cope better with the complexity of urban trade in forest products which in some cases borders on illegality and depends on an intimate understanding of the urban terrain.

Tradeoffs observed in this study between forest products and other income sources such as wage labour were also reported by Heubach *et al.* (2011) as a significant determinant of household dependency on NFTP. A limited labour pool means that households are forced to choose between collecting forest products and other income earning opportunities. Although the resulting choices are often a mix of various livelihood strategies, more labour intensive activities such as collection, processing and sale of forest products may reduce the participation of

households with alternative income sources. Poorly developed markets for such products and the associated risk also diminish their attractiveness for households.

With respect to poverty, the results again support a growing body of evidence that point to the positive correlation between household dependency on forests and improving poverty status (Babulo *et al.* 2009; Jumbe and Angelsen 2010; Kamanga *et al.* 2009; Vedeld *et al.* 2007). There is growing consensus that in some situations forest resources can lead to sustained livelihood improvements for large numbers of poor households. The notion of forest based activities as an employer of last resort, only helping households to cope during lean periods (Angelsen and Wunder 2003) is increasingly being challenged by emerging evidence.

Ownership of most types of assets, including livestock, family dwellings and electronic gadgets, was shown to be poorly correlated to household participation in forest product trade. The analysis was complicated by the fact that levels of these assets are low among the sampled households. Only assets that were directly linked to forest product trade such as a bicycle showed a strong positive correlation with household participation as they are a cost effective means of transport to the market.

## **7.5 Access to urban markets**

The role of urban markets in influencing the use of forest products is a growing area of focus in the forest based poverty alleviation debate. To many proponents of forest based poverty alleviation, access to growing urban markets for forest products across Africa has given rural households new opportunities to lift themselves out of poverty (Arnold *et al.* 2006; Dewees *et al.* 2010; Sills *et al.* 2011). Poor road and communication infrastructure and huge distances to these urban markets remain major constraints to tapping this potential. This study analyzed trends in access to urban markets by households in the study sites for each of the traded forest products and how this is influenced by factors such as age, gender and education of household head. The choice of marketing channel was also compared for households in different wealth quartiles to determine whether access to different marketing channels is related to household wealth status.

The influence of urban demand on the use of forest products by rural households was significant in the study area. Although local sales played an important part as a source of cash for

households, the most preferred channels for trade were linked to urban markets, either through roadside markets, middlemen or direct sales to urban buyers. High value products were mostly targeted for the more lucrative urban markets.

The role of middlemen in facilitating transactions on behalf of rural households was again evident, especially in the case of remote villages. Although middlemen have been associated with dishonesty, profiteering and exploitation of rural households, many studies now suggest that they play an important role in the marketing of products whose value would otherwise be too low to justify the effort of individual producers operating with small volumes (Belcher *et al.* 2005; Shanley *et al.* 2012; Sills *et al.* 2011). Besides carrying the risks that come with trading, the levels of sophistication and connections that the middlemen bring to bear, especially when dealing with urban consumers, are attributes that most rural households do not possess.

The role of roadside markets was significant in shaping trading in forest products in both remote villages and those close to urban centers. The opportunistic nature of this form of trade reduces the transaction costs for both the seller and the buyer. Most of these markets are located within the village or within walking distance from most households. Some are even positioned in such a way that sellers can simultaneously work on other activities (e.g. working in the fields, performing household chores or herding livestock). Roadside markets in villages can also be important centers for social gatherings and exchanges which most local people recognize. On the other hand, most buyers usually have other reasons for travelling such that they do not consider the cost of getting to these markets as directly related to the cost of products. The lowering of transaction costs associated with roadside markets ensures that even low value forest products are able to reach distant consumers in urban centers.

In the remote location, perishability of most forest products such as fruits, mushrooms, game meat and caterpillars played a big part in determining options for their marketing. Despite the growing premium status and potential high value of these traditional foods among urban consumers (Sills *et al.* 2011), their sale in the remote site was limited to local inter-household transactions. Although local households preserve some of these products using traditional methods, allowing transportation to urban areas, the volume and quality concerns remain a hindrance to viable trade.

The findings showed that female headed households mostly relied on local sales for their forest products and had lower levels of participation in markets linked to urban consumers. They depended more on middlemen, suggesting that the constraints of reaching lucrative markets were more severe for this category of households. These results support widely held views as highlighted by Shanley (2006), Shanley *et al.* (2010) and Sunderlin *et al.* (2005) that female headed households are in a position of disadvantage and have limited assets, capabilities, information and time to exploit opportunities. Although the exact reasons for this trend are a subject of contentious debate, there is general consensus that female headed households are prone to more severe levels of deprivation.

An equally vulnerable group is those households headed by youths. Households headed by members under 25 years had limited opportunities to reach lucrative urban markets and relied mostly on local inter-household trade. They also relied heavily on middlemen to get their products to markets. In most cases such households are constrained by lack of most forms of assets, including labour due to the small size of families. The key role of middlemen in bridging the gap between such vulnerable households and lucrative market support the assertions that transparent and dependable associations with middlemen can play an important role in improving rural household linkages with the mainstream economy (Belcher *et al.* 2005; Shanley *et al.* 2010).

The poorest households were also shown to have very less access to urban markets, while the richest enjoyed better linkages through roadside sales, middlemen and even direct sales. Although forest products have been labeled resources for the poor (Angelsen and Wunder 2003), with limited barriers to utilization, getting poor households to escape poverty will depend on them getting support to access lucrative market. Without such targeted interventions to overcome these constraints, the status quo will perpetuate poverty and worsen inequality among households locally, nationally and globally.

The results on the influence of distance once again revealed the access-scarcity conundrum that is typical for most rural settings. While it is relatively easy for households located close to urban areas to sell forest products to urban consumers, such opportunities usually mean scarcity of products quickly becomes the binding constraint. The opposite is true for those households

located far from urban centers. The results show that as long as villages are located close to a main road, distance from an urban center does not make much difference as roadside markets become the main channel of trade in forest products. In fact, the further away the market is from the urban center the more attractive it is to the buyer as prices are usually lower and quality is often higher as the condition of the forest generally improves as distance from urban centers increases.

For villages such as Maveve and Nkhulwashi, located far from main roads linking major towns, the importance of roadside markets diminish. The volume and value of forest products that can be sold at markets become a major consideration. High value, low volume products such as honey which can justify the cost of reaching consumers dominate external trade. The high value of hardwood timber also makes it a lucrative product, encouraging even direct sales with urban buyers.

## **7.6 Conclusion**

The results of this study show that forest products are central to livelihoods, rather than just being supplementary to other sources of livelihood. With improved local organization and support for product development and marketing, some forest based activities provide a viable option for changing the lives of large numbers of poor households in rural communities who otherwise have limited economic opportunities to sustain themselves, let alone escape poverty.

Access to vibrant markets is key to successful exploitation of forest based activities and households that are well integrated with urban markets are better able to take advantage of forest resources to improve their livelihoods. Households in remote communities need targeted support, especially to develop markets for high value forest products. Without such support, exploitation of high value forest products will remain an insignificant source of income for remote households, especially the poor, despite the potential. The resulting lack of broad-based local participation will open doors for elite capture and even exploitation by outsiders who have the resources and connections required for such complex transactions.

Comparison of forest income for households in different wealth quartiles revealed that richer households earned higher magnitudes of income from forest based activities contrary to

commonly held view that forests are a resource for the poor and forest based activities are an employer of last resort. This trend was repeated across all sites, with more pronounced differences in the remote site. The resource intensive extraction and complex marketing chains for high value forest products in remote locations results in a few local elites benefiting from forest products that the rest of the households have no capacity to exploit, as in the case of timber. In the case of honey, external support in the development of lucrative market chains in Kabompo has led to wider participation and equalized earnings from this enterprise across all wealth categories. This demonstrates the potential to support broad based sustainable exploitation of forest products that could transform the lives of many rural households. In Mufulira, easy access to vibrant and expanding urban markets for trade in forest products, such as charcoal, enabled households from all wealth classes to benefit from forest based activities. Differences in earnings between the rich and the poor can only be attributed to the scale of resources employed in the enterprises.

Both rich and poor households were equally dependent on forests for their livelihoods as the proportion of their income coming from forest based activities was only marginally different. Results show that forest based activities are priority livelihood sectors for both rich and poor households in both sites and can potentially play a significant role as a pathway out of poverty with the appropriate support.

Household participation in the harvesting and sale of forest products was influenced by a mix of household level and contextual factors. Key among these factors was a set of labour related variables such as the number of productive household members and the age and education level of the household head. These variables highlighted that while the quantum of labour was an important determinant in household participation in forest based activities, the quality of the labour was equally important. Both age and level of education were negatively correlated with household participation in forest based trade. This implies that households headed by elderly members or those with higher levels of education were less likely to be involved in the sale of forest products. While age possibly discouraged participation due to the physical demands of forest based activities, higher education opened opportunities for alternative economic activities for raising cash.

The significant trade-offs between involvement of households in short-term wage earning jobs and participation in forest based trade also reiterated the negative influence of education. More educated household members often have access to a wider range of economic activities including wage paying jobs. The study found that higher incomes from wage labour reduced the likelihood of household participation in forest based activities. Households who spend more time on wage paying jobs were less likely to have time for the harvesting and sale of forest products. A significant wage income may have also lessened the need for households to sell forest products to raise cash.

The significant influence of distance from the homestead to the forest, which is gives an indication of the required labour input in the collection of forest products, also suggest that labour is a key constraint. Households that were located further from the forest were associated with a lower likelihood of participating in forest trade. The results suggest that as the distance between the homestead and sources of forest products increases, households find it less and less attractive to participate in forest based activities especially as a source of cash income.

The results confirm that participation in forest based trade is central to household poverty alleviation. Participation in the sale of forest products significantly increased the likelihood of households being above the nationally defined poverty line. This finding demonstrates the role that forest based activities play in keeping rural households out of poverty. The weak correlation between participation in forest trade and high value assets such as livestock, dwellings and household gadgets, which often reflect household investment and consumption potential, however suggest that most rural households are still too poor (compared to national income status) to afford many of the assets that rich households are normally invest in. A lot more investment would be needed to support forest based activities they rely on, before many of these households can start to save and accumulate assets. Current levels of income remain insufficient to go beyond consumption and support savings and investment.

Households in disadvantaged socio-economic circumstances struggle to access urban markets for forest products. For this category of households, the services of middlemen are critical and they enable disadvantaged households to reach lucrative markets. With better access to information household are better empowered to demand a better deal from middlemen who have been

associated with lack of transparency and exploitation. The role of middlemen should also be supported and encouraged they bring with them market linkages and take on risks which poor remote households would otherwise be unable to cope with.

Roadside markets go a long way in connecting households, even those located in remote areas, with urban markets. The central role of roadside markets also means that distance from urban centres does not have a major influence on trade in most forest products as long as households are located close to a major road linking urban centers. While households located close to urban markets have easier access to these centres of demand, availability of forest products is a major constraint. The opposite is true for households located far from urban centres. Marketing interventions that focus on improving infrastructure such as roads and bulking of products either through middlemen or other forms of aggregation could significantly benefit households in remote communities.

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