

UNIVERSITY OF HELSINKI

Department of Forest Sciences

**LOCAL COMMUNITY PERCEPTIONS OF THE IMPORTANCE OF NON-
WOOD FOREST PRODUCTS IN TANZANIA: CASE STUDY IN
SHEBOMEZA AND MKWAKWANI VILLAGES**



A Thesis submitted for MSc Degree in Forest Science and Business

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Tiivistelmä — Referat — Abstract Non-wood forest products (NWFPs) are one of the major sources of food and income for rural populations in Tanzania. A survey was conducted to assess the economic importance of non-wood forest products in the study area. The study was carried out in two villages; Shebomeza and Mkwakwani in Muheza and Korogwe districts, from 12 th to 25 th July, 2013. A structured questionnaire was used to gather data from the respondents. A total of sixty-four respondents were chosen based on their involvement in NWFP practices. The most important NWFPs are fodder, honey, beeswax, cloves, cinnamon, nuts, fruits, medicinal plants and aromatic herbs. There was statistical significance in household income difference of respondents from the two villages and in respondents with different farm sizes. No statistically significant differences were found due to income differences of respondents with different age classes and respondents with respect to different number of livestock. This study also analyzed the most important NWFPs in the study area, the frequency of collection, purpose for collection and income generating potential. Factors affecting peoples' perception of the economic importance of NWFPs have been discussed as well as their impact on consumption and income generation. Opportunities and constraints within the supply chain have been identified and suggestions have been put forward on how local community can easily utilize the supply chain for their benefit.			
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DEDICATED TO MY FAMILY

For their love and support

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LIST OF ABBREVIATIONS

EAM	Eastern Arc Mountains
EAMCEF	Eastern Arc Mountains Conservation Endowment Fund
FAO	Food and Agricultural Organization
FBD	Forestry and Beekeeping Division
GDP	Gross Domestic Product
MNRT	Ministry of Natural Resources and Tourism
NBS	National Bureau of Statistics
NGO	Non-Governmental Organization
NTFPs	Non Timber Forest Products
NWFPs	Non Wood Forest Products
RALG	Regional Administration and Local Government
TFC	Tanzania Federation of Cooperatives
TZS	Tanzanian Shilling (1US\$= TZS 1550)
URT	United Republic of Tanzania

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1. INTRODUCTION

1.1. Background of the study

Throughout history, man's interaction and dependence on forest and woodlands has been centered on non-wood forest products. During that period, a group of related families united together to collect roots, nuts, seeds and fruits. They also hunted wild animals for meat and skin hides. All these products enabled them to meet their basic needs for food clothing and shelter. For some communities living in the rural areas, this has not changed. However, most of the forest management systems in many counties emphasize on the production of timber and considers NWFPs as minor products (FAO, 2005). Provided that man still depends on forest and trees, it is therefore important to understand a wide range of products from forests trees and woodlands. NWFPs are important in supporting livelihoods of many people in Tanzania and around the world. Rural communities in particular depend on these products for food and nutritional requirements, medicines, fodder for livestock, fiber, fertilizers, construction materials, cosmetics and cultural products. At local and global level NWFPs provides raw materials used in industrial processing such as food and beverages, confectionery, flavorings, perfumes, medicines, paints, and polishes (FAO, 1995a: FBD, 2000). As urbanization continues to raise, the demand for NWFPs especially those of food and medicine is increasing too. This is because people are now demanding natural products because of the health benefits and their importance in fighting diseases. Likewise, in developing countries for instance, the demand for NWFPs in the urban areas is influenced by people from rural areas who have migrated to urban centers and still embrace their rural culture and habits.

According to National Bureau of Statistics (2013), Tanzania has 44.9million people, and 75% of the total population lives in the rural areas. Along with small scale agriculture, these people depend on NWFPs for their health and nutritional needs and in meeting their consumption and income needs. Despite of great potential for improving household income and increasing national foreign exchange, NWFPs remain grouped as minor products. These products are overlooked in national statistics, and there are few studies done by national bodies to underpin the importance of NWFPs to both national and local community economies.

The development of NWFPs into a strong and successful industry in Tanzania faces many limitations. First, as in many developing countries, NWFPs are connected to traditional and cultural use in such a way that they are not widely known (FAO, 1995b). Rural communities employ this measure as a way to address their subsistence needs. Second, transactions involving NWFPs usually takes place in household and small scale units outside the marketing system, therefore forming part of an informal sector. Due to these reasons, NWFPs are often ignored by policy makers and planners. As FAO (2005) pointed out that, most forest management systems favor large scale timber production; this often leaves NWFPs at a disadvantage.

In the past few decades, we have seen an increasing number of research and studies on NWFPs. It has brought a better understanding of the role played by NWFPs both to environment and economy. The increased consumer knowledge and market preference for natural products and emphasis on efficient use and sustainability of natural resources have helped this development (FAO, 1995b).

1.2. Definition and scope of Non-Wood Forest Products

FAO (1995a) states that, “NWFPs consist of goods of biological origin other than wood, as well as services derived from forests and allied land use”. This definition asserts and encourages better accounting of NWFPs of both plant and animal origin as a group and their overall contribution to the national economy which policy-makers can use to set priorities and policy implementation (Table 1). Similarly according to FAO (1999), NWFPs comprise of goods of biological origin other than wood derived from forests and other wooded land outside the forest. Based on these two definitions, NWFPs excludes all woody materials such as timber, chips, charcoal, fuel wood, household equipment, and carvings. On the other hand, forest plantations are included in the definition of forest; therefore NWFPs are also obtained from plantations such as gum Arabic and rubber.

Table 1. List of NWTP according to two main categories

Plant products		Animal and Animal products	
Category	Description	Category	Description
Food	Vegetable foodstuffs and beverages provided by fruits, nuts ,seeds and roots	Living animals	Mainly vertebrates such as mammals, birds and reptiles
Fodder	Animal and bee fodder provided by leaves, fruits etc.	Honey and beeswax	Products provided by bees
Medicines	Medical plants(leaves, bark, roots) used in traditional medicine and or/pharmaceutical companies	Bush meat	Meat provided by vertebrates mainly mammals
Perfume and cosmetics	Aromatic plants providing essential(volatile) oils and other products used for cosmetics purposes	Other edible animal products	Mainly edible vertebrates such as insects, crabs and other secondary products of animals such eggs.
Dying and Tanning	Plant materials(mainly bark and leaves) providing tannins and other parts(especially leaves and fruits) used as colorants	Hides, skins	Hides and skins of animals used for various purposes
Utensils and handcrafts	Heterogeneous products includes thatch, bamboo, rattan, wrapping leaves, fibers (e.g. aroma, Bwo, Flo, Silk cotton Flos, Screw pine)	Medicine	Entire animal or parts of animals such as various organs used for medical purposes(caterpillars, snake oil and crab legs
Construction	Thatch, bamboo, fibers	Colorants	Entire animal or parts of the animal such as various organs used as colorants
Ornamental	Entire plants(orchid,ferns,philodendron) and parts of the plants(e.g. pots made from roots) used for ornamental purposes	Other non-edible animal products	e.g. bones used as tools
Exudates	Substances such as gums(water soluble) resins(water insoluble) and latex(milk or clear juice) released from plants by exudation		

Source (Ahenkan and Boon, 2011)

1.3. Importance of non-wood forest products

For the majority of Tanzanian rural households, NWFPs provide essential food and nutrition, as well as medicine, fodder, fuel, thatch and construction materials, gums, and non-farm income (FAO, 1995a). During the dry season and agricultural cycles these products play a great role in relieving the communities from hunger and helps in smoothing out other seasonal fluctuations.

Collection and trade of NWFPs provide employment and is a major source of income for people in rural areas. For pastoral communities and other communities involved in animal husbandry fodder is important for livestock.

For the majority of the rural populations, forest is the pharmacy. Both wild and domesticated plants are main medicinal resources for rural communities. According to FAO (1995a), about 25% of all medication prescribed worldwide contains ingredients extracted directly from medicinal plants. Poor households in particular depend on these products for their livelihood because they usually have more access to the forest than to other resources.

Through open-access to forests and lack of other options, women depends more on NWFPs for household use and income than men (FAO 1989). In many places particularly in the rural areas, women are responsible for the household activities that involve forest- based foods and medicine, as well as fuel wood. In this respect NWFPs are particularly important to women in addressing their needs for food security and nutrition.

Despite the fact that NWFPs are used by the majority of rural population, urban populations also use these products which they purchase from local traders. Therefore, markets can be created to supports both conservation and reduction of poverty through the purchasing of several NWFPs.

1.4. Problem statement

Non Wood Forest Products (NWFPs) in Tanzania faces many challenges such as deforestation, lack of inadequate information on the location and type of products and absence of local processing industries to produce value added products. Likewise the marketing side of these products is not in order. There is no organized marketing

channel and marketing information with regard to these products. The worst part is that, there is a lack of awareness both at local and national level on the economic importance of NWFPs and their role in supporting the lives of people through income generation and food security.

1.5. Purpose of the study.

The purpose of this study is to assess local community perceptions of the economic importance of NWFPs in Tanzania. To accomplish this purpose, the study will have four research questions. These are:

- i. What NWFPs resources are collected by people in the rural areas and who is involved in NWFPs collection?
- ii. What is the purpose of collecting NWFPs and what NWFPs resources generate the most income?
- iii. What kind of NWFPs supply chain currently exists?
- iv. What are the impacts of laws and regulation on NWFPs collection?

1.6. Organization of the study

This study is organized into five chapters which are further subdivided into sub chapters. In the first chapter, a general introduction of the topic of study is given which explains the definition and scope of NWFPs and their importance. It is followed by the problem statement of the study, research questions and organization of the study. The second chapter contains a review of literature, which reports the findings of previous studies conducted by various researchers in Tanzania and elsewhere in the world, and the other four subchapters namely NWFPs as a source of food, economic contribution of NWFPs, NWFPs and the role of gender, markets and trading of NWFPs and relationship between forest management and NWFPs. Chapter three describes the study site, sampling method, data collection methods, software used for analysis, and tools which was used to analyze the data. Chapter four is dedicated to the presentation of results of the study. Here the major findings of the research are given. Finally, chapter five and six is devoted to discussion, conclusion and limitation of the study.

2. LITERATURE REVIEW

2.1. Previous studies in NWFPs

There are a good number of studies on NWFPs done before on various topics both in Tanzania and the global. The importance of NWFPs in supporting rural livelihoods and economy has drawn attention from researchers, governments and NGOs. This section presents previous studies on NWFPs in Tanzania and elsewhere.

In a study undertaken by Adam et al. (2013) on the contribution of NWFPs to livelihood strategies for rural development in the dry lands of Sudan, they found that the contribution of selected NWFPs to the total household was higher for *A. digitata* (51%) followed by *Z. spina-christi* (42%) and *B. aegyptiaca* (26%). They also found, factors influencing the contribution of NWFPs livelihood strategies to household income include access to the market, central and local government taxes, and lack of training and capacity building. For example it was found that, market access for *A. digitata* collectors is significantly and positively associated with returns from the fruit trade. Similarly the study found that, the high taxes levied by central and local government reduced the amount of financial returns people get from NWFPs activities. Likewise, it was found out that lack of organization and cooperation in selling the fruits, small markets and a lack of market information are the other factors limiting financial returns. In addition, poor quality roads connecting the villages with local and regional markets was cited by villagers as having a significant impact on their financial returns.

Chukwuone and Okeke (2012) conducted a research to find out if NWFPs can be used to promote household food security in savannah and rain forest region of Southern Nigeria. The results indicate that, the proportion of household food that is plant species of NWFPs is less than 50%, while 54.3% of the respondents admitted that plant species of NWFPs account for over 50% of their household food. The results also indicate that the nature of household size, financial position of the family and occupation (civil servant and business), and education level dictate to the highest degree the amount of household food that is of NWFPs origin. It is expected that medium wealth families will consume less food of NWFPs origin, while large families will have the biggest share of household food from NWFPs because more

food is required to maintain the family. Moreover highly educated people are less likely to consume NWFPs as food; thus their household food is expected to have less food varieties from NWFPs

In 2012, Kar et.al conducted a study on NWFPs income contribution to household economy and related socio-economic factors in Bangladesh. In this study they found that one third of the surveyed households engaged themselves in selling NWFPs for their income. Bamboo, wild vegetables, and broom grass were ranked by villagers as the most important cash generating NWFPs. On analyzing yearly household income data, they found that bamboo produces the highest income followed, by wild vegetables, and broom grass. In general, bamboo produces double the income of wild vegetables and broom grass.

In another case study in northern Benin, Heubach et.al (2011) found out that the economic importance of NWFPs in rural household economy was significant. All households involved in the study reported to be engaged in collection of, and more than 80% in the sale of NWFPs. They also found that income from NWFPs account for 39% of total household income, second to income from crop production which sits at 44%. When they compared economic contribution of NWFPs between ethnic groups they found that, for pastoral society income from NWFPs accounted for 30%, and that of tiller societies stood at 42% of the total income. The difference in share of NWFPs to total income is caused by activities each ethnic group is inclined to. The pastoral societies have no time to cultivate NWFPs in their farms and hence depend on those NWFPs they found in the bush when herding the cattle. Conversely, the tiller societies stands at a good chance of cultivating different types of NWFPs alongside with their crops; thus giving them a better advantage ahead of the pastoral societies.

M. Schaafsma et.al (2011) focused on the importance of local forest benefits in valuing non-timber forest products using an extensive scale, spatially-explicit analysis of NWFP collection in the Eastern Arc Mountains in Tanzania. The results show that the total value flow of the actual annual extraction of NTFPs considered in their study collected from the EAM blocks is estimated at US\$ 42 million per year. Compared to the official statistics of mean rural expenditure per capita in rural areas of US\$142 per year (NBS, 2007), the results show that the total modeled NWFP collection contributes on average around 12% to rural incomes. Also the results show that

firewood, which is the main source of energy for many people in the rural areas, has an economic flow benefit of US\$25million.

Majule et al. (2010) undertook a research on the socio-economic importance of non – wood food forest products to the community in the southern cost areas in Tanzania. In the results, Majule et al. (2010) suggests that, in both villages, large proportions of communities depend on agriculture for their livelihoods. The major cash crops grown include cashew and cassava, while food crops include sorghum and cowpea. They also argue that the other source of livelihoods for people in those villages is the exploitation of NWFPs for both food and income. A number of NWFPs were identified and categorized into staple food, fruits and relishes. The most popular NWFP is *Dioscorea hirtiflora* (ming'oko) and is used in different forms and it contributes significantly in addressing food insecurity caused by drought. Gender division with regard to exploitation of NWFPs was evident in all the study sites with women engaged more than men.

In a survey to determine the demand for NWFPs by urban consumers and sellers in Switzerland, Klichling et al. (2009) found that edible products such as forest honey, berries, mushrooms, roots and chestnuts were the most attractive products to customers and have the most promising selling potential. Other highly demanded NWFPs comprised of pharmaceuticals and alternative medicines products such as teas, ointment and herbs, and body care products such as lotions and balms. However when they compared the demand potential and actual purchase, they found that forest honey is the most important followed by food products such as berries, mushrooms and chestnuts. They also found that higher sales in NWFPs were a result of new trend called “naturalness”. Customers now value more natural products. The huge demand for natural products resides in the perception for their health value which has been known for ages and therefore appreciated by many customers. They also found that NWFPs are niche products in the way that they attract a small portion of customers who are aware and have interest in the natural products.

In 2000, the Forest and Beekeeping Division of the Ministry of Natural Resources and Tourism carried out a research on the role of NWFPs in food security and income generation. According to the results, there are about 75,000 edible plant species in Tanzania, out of which 12,000 has been used as food, but only 2000 of which have

been domesticated. The most important NWFPs of plant origin include: shoot tubers, roots leaves, flowers, fruits, nuts, oil seeds, condiments, spices, and mushrooms, among others. Animal derived NWFPs include honey, bush meat, fish shells, edible bird eggs, and insects. Additionally, NWFPs are major sources of income for most people in the rural areas and contribute about 5% of GDP. However, the potential of these NWFPs are currently not known, and hence their contribution to the national economy is not appreciated.

Kajembe et al. (2000), carried out a study on the potential of NWFPs in household food security in Tanzania, and the role of gender based knowledge. The results indicate that there exists attributed local knowledge between men and women on selection, preparation, utilization, storage, and even consumption of wild foods. Results also point out that NWFPs are essential in coping with food shortages during dry seasons and absorbs shock as a result of fluctuating agricultural cycles. The nutritional value of these foods is good and in many instances better than the domesticated ones. Lastly the study revealed that, deforestation, lack of proper forest management regimes, and non-homogeneity of non-wood forest products users are the major threats to the availability and sustainable use of these resources.

2.2. Forest Policy and NWFPs in Tanzania

General Discussion

The United Republic of Tanzania is rich in valuable, unique natural ecosystems and genetic forest resources which generate nutrition and income to many people both in the rural and urban areas. These forests harbor various types of flora and fauna.

The majority of people in Tanzania depend on forests for timber, food, fuel, fiber and medicines. Particularly, for people living the rural areas NWFPs play a great role in household income generation. Forests also contribute significantly to the national economy. According to Salim and Monela (2000), forests contribute between 2 to 3 percent of the total GDP and 10 percent of the country's registered exports. However, evidence suggests that, the cash and noncash contributions made by NWFPs and other forest products to household income and livelihoods are not accurately captured by official statistics.

Tanzania has about 33.4 million ha of forests and woodlands that cover almost 48% of the total area of mainland (Ngaga, 2011). Large parts of the forest area consists of woodlots on public lands. About 6% of the area consists of permanent crops, 40% of permanent pastures and 7% is inland waters (Ngaga, 2011). The main forest types consists of: 1) the extensive miombo woodlands in lowland areas across the central and southern parts of the country; 2) the Acacia woodlands in the northern regions; 3) the coastal forest/woodland mosaic in the east; 4) mangrove forests along the Indian Ocean coastline, and 5) the closed canopy forests on the ancient mountains of the Eastern Arc in the east (Akida and Blomley, 2006). In addition to the above forest land distribution, 14.3 million ha are found within gazetted Forest Reserves, 2.5 million ha are proposed as Forest Reserves and about 2 million ha are in Game Reserves or National Parks (URT, 2001; Akida and Blomley, 2006).

The forest cover in Tanzania is disappearing at a rapid rate. Before independence, the forest cover was more than 50%, which has gradually decreased to 45 % in late 1970s, about 41% in late 1990s and is about 36% currently (Hamza, 2007). This reduction in forest cover is due to population growth and development pressure. The main factors accelerating deforestation are agriculture, illegal logging, charcoal production, and clearing of forest for human settlement.

The United Republic of Tanzania forest policy (1998) provides a framework on which the country's forest resources are managed. The policy aims to enhance the contribution of the forest sector for sustainable development, conservation, and management of country's natural resources for the benefit of present and future generation. To support the forest policy, the government also enacted other laws such the Forest Act No 14 of 2002, the Land and Village Act of 1999, and the Local Government Laws (Miscellaneous Amendment Act No 6 of 1999)

The government of the United Republic of Tanzania has been embarking on several major efforts to curb the decrease in forest cover. For example in 2001 the government established the Eastern Arc Mountain Forest Conservation Endowment Fund. The EAMCEF's main purpose is to provide financing to conservation activities aimed at improving the livelihoods of communities adjacent to the forest and conservation of biodiversity in these mountains. With the same purpose, in January 2001 the government declared January 1st to be tree planting day. During this day,

every region, municipalities, districts and villages should participate in planting trees in their respective areas. Another notable impact of the forest policy (1998) is the introduction of community based forest management and private forest plantations. As of 2010, Tanzania had about 40 000 ha. of private companies industrial plantations and 80 000 to 140 000 ha. of village and farm plantations (FBD, 2010).

NWFPs also managed to capture attention from law and policy makers. The Land and Village Act of 1999 clearly stipulate that villagers are allowed to access the forests to collect NWFPs. In case where the village is close to a forest reserve, the village natural resource committee responsible for forest conservation arranges the days on which people are allowed to go into the forest to collect the NWFPs. Due to the importance of NWFPs to rural communities; the sale of NWFPs is exempted from taxes and fees. However traders who go to villages to buy NWFPs for resale are subject to pay natural resources fees. The fee is usually levied for the purpose of supporting forest conservation activities that maintains the availability and supply of NWFPs and other natural resource products.

2. 3. Non wood forest products in Tanzania

Tanzania has a wide variety of NWFPs both of plants and animal origin. As stated by FAO (2000), NWFPs of plant origin include medicinal plants (*e.g. Acacia melifera*), fodder (*e.g. Acacia spp*), honey, and beeswax. Other NWFPs found in Tanzania are bamboo (*Arudinaria alpina*), fibers(*e.g. Adansonia digitata*),resins(*e.g. Acacia mearnsii*), essential oils(*e.g. Acaia fernesiana*), and food products such as fruits(*e.g. Andasonia digitata*,*Acacia nilotica*), spices (*e.g. Cinnamomum verum*), edible oils (*e.g. Andasonia digitata*), colorants, gums (*e.g. Acacia Senegal*), and mushrooms(*e.g. Brachystegia*).In contrast, NWFPs of animal origin include bush meat, live animals such as birds, insects and trophies (FBD, 2000;Kajembe et al.,2000).

For the purpose of this research and to simplify the discussion, NWFPs will be grouped into four groups (table 2). As shown below in table 2, the food category is the largest group consisting of a wide range of NWFPs. This is because NWFPs are essentially food materials for most rural communities. These NWFPs provide a cushion, and supplements the diet of many families in times of drought, crop failures, and fluctuating agricultural cycles. Medicinal products are important remedies in

treating diseases and many rural communities rely on them. This reliance is due to high cost of conventional medicines, and a lack of modern health care facilities in rural areas. Likewise, extractive products apart from providing employment to people engaged in it; generate foreign exchange as most of the extracted products are sold outside the country. For example in 1987 5000 tons of wattle extract from *Acacia mearnsii* valued at US\$ 4million were exported (MNRT, 1989). The other category consisting of fiber and thatch grass is important to many rural dwellers. For example, most houses in the rural areas are grass thatched instead of using corrugated iron sheets. Therefore the importance of dry grass cannot be overstated. Other fibres are used to make brooms, ropes, baskets, mats, fish traps, tables, and stools, which are then used at household level and for sale to earn extra income.

Table 2. Major categories of NWFPs in Tanzania

Food	Medicines
Fruits: <i>Andosonia digitata</i>	Bark: <i>Acacia melifera</i>
Vegetables: <i>Pupalia lupacea</i>	Roots: <i>Cassia abbreviata</i>
Roots and tubers: <i>Dioscorea</i>	Leaves: <i>Albizia anathelmintica</i>
Grains	Flowers: <i>Clerodendrum paniculatum</i>
Nectar and saps	
Seeds	
Nuts	
Mushrooms: <i>Brachystegia, Combretum</i>	
Fodder: <i>Acacia spp</i>	
Spices : <i>Cinnamomum verum</i>	
Edible oils	
Honey	
Birds, insects, rodents and other large animals	
Extractive products	Fibers and thatch grass
Tannins; from <i>Acacia mearnsii</i>	Leaf: <i>Pandanus spp</i>
Dyes; from <i>Bridellia micrantha</i> ,	Stems: <i>Oreobambos buchwaldii</i>
Gum Arabic; from <i>Acacia Senegal</i> tree	Bark: <i>Abutilon Spp</i>
Resins : <i>Acacia mearnsii</i>	Grass
Essential oils: <i>Acaia fernesiana</i>	Bamboo: <i>Arudinaria alpina</i>

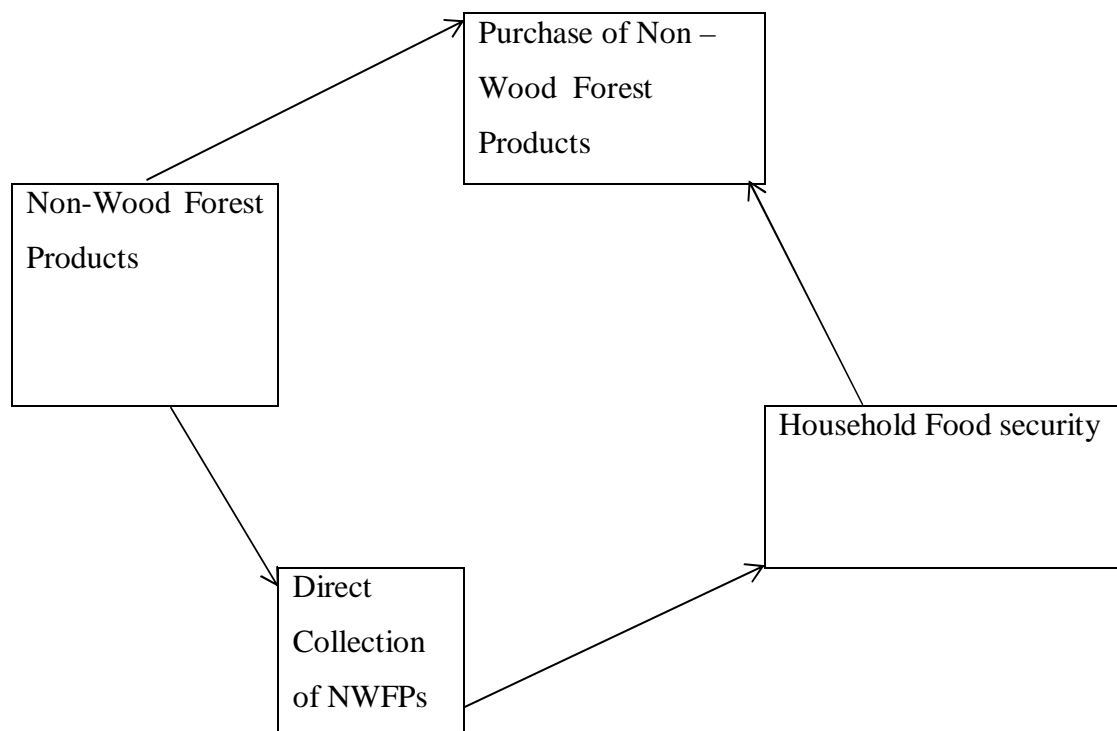
Source (FBD, 2000; Kajembe et al., 2000)

Non wood forest products in Tanzania are mainly used for subsistence and commercial purpose for trade in local and international markets. The economic importance of NWFPs in Tanzania is not measured by statistical figures in trade and transactions, but to what extent these products support peoples' daily livelihood and

subsistence economies of the masses. However, statistical figures hardly show how important these NWFPs are in supporting rural economies. Policy makers pay little attention to these products and there are no small scale forest based industries designed to utilize the NWFPs resources.

2.4. NWFPs contribution to food

Even though very little or no attention is being paid to NWFPs by policy makers in the pursuit for food security, NWFPs have been an important source of food in Tanzania. Generally the majority of rural populations still depend on the forest for both subsistence and income. Forest foods are consumed by both rural communities and many in the urban areas in the Tanzania.



Source FBD (2000)

Figure 1. Relationship between NWFPs and household food security

Kajembe et al. (2000) argues that in many rural areas, people will be in difficult conditions if agriculture was the only means to provide their food and nutritional needs. According to FAO (1989), NWFPs contributes to the local food system in two ways: NWFPs might be collected for direct consumption or they might be sold to gain income for food purchases or other expenditures (figure 1). Therefore NWFPs contribute both direct and indirect to the household food security system. Similarly

Hoskins (1990) and Ogden (1990) have emphasized the importance of forest for the security of food. They advocate that forest and trees contribute to food security in many parts of the world by providing a direct source of food, providing essential nutrients and medicines that increase nutritional impact of other foods and by filling the food gaps through the supply of food during seasonal shortages and acting as emergency foods.

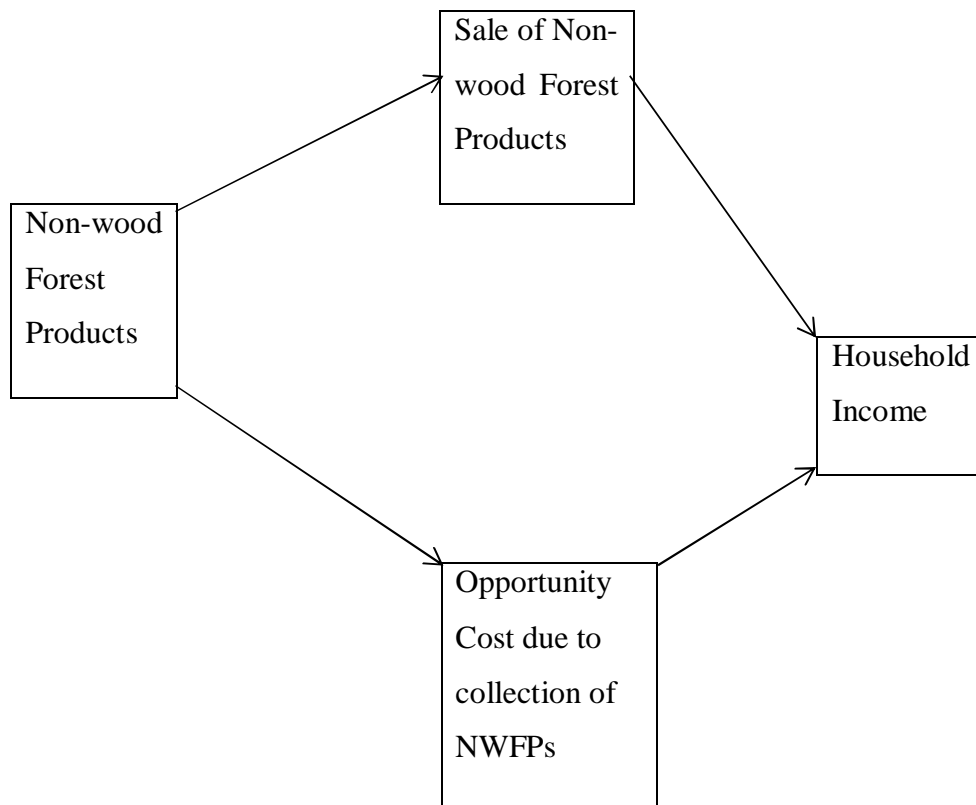
Table 3. Contribution of forest foods to human nutrition

Forest foods	Energy	Micro nutrients	
	carbohydrates, protein, fats	Vitamins	Minerals
Forest animals, Birds	High in fat, complete protein	offal/organs high in nutrients, vitamin B	Animal iron
Fish	Complete protein	Some vitamin B	Animal iron, calcium from small fish bones
Insect, larvae, insect eggs	High in fat, high in protein	Vitamin A, Vitamin B12	Animal iron
Mushrooms	High in carbohydrate, rich in protein	Small amount of vitamin A and C depending on the species	Most species are low in iron
Bamboo shoots	High in fibers and carbohydrates, rich in vegetable protein	Mineral amount lost in cooking	
Plants-leaves, stems, flowers	Low in energy, source of soluble fibre	Leaves are important for vitamin A, C and folic acid. The dark the leaves the more vitamin A and C	Vegetable iron from dark greens
Tubers	Rich in starch		
Honey	High in energy, rich source of simple sugars	Vitamin A	
Nuts	Carbohydrates, oils, protein		
Fruits, berries	Sugars and Soluble fibre	Important source of vitamin A and C	Calcium, magnesium, potassium

Source, (Clendon, 2001)

Foods from the forest include both plant and animal products. The plant foods incorporates stems, shoots, tubers, roots, and leaves, flowers, fruits, nuts, oil seeds, spices, and mushrooms. Animal foods products include honey, bush meat, fish shells, edible bird eggs and insects. All these foods are important in providing essential vitamins, minerals, carbohydrates and protein (Table 3).

2.5. Economic contribution of NWFPs



Source FBD (2000)

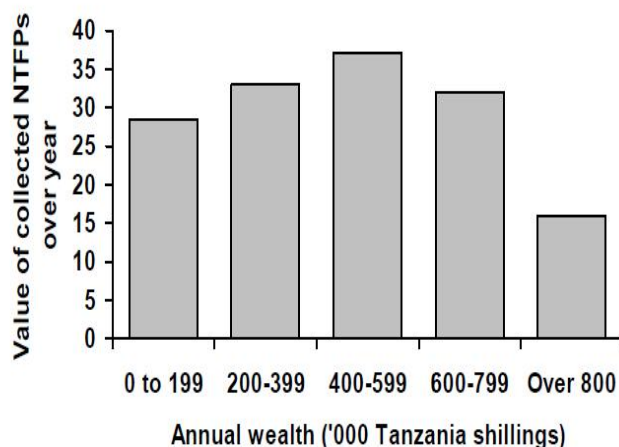
Figure 2. Relationship between NWFPs and household income generation in Tanzania

The economic contribution of NWFPs can generally be thought of the practice of selling NWFPs for the purpose of accruing income. According to figure 2, income may be generated either through direct sale of NWFPs to market, or through opportunity cost of using NWFPs as alternative goods and service (FBD, 2000). For the purpose of this study we will refer to the income generated through direct selling of NWFPs.

Income from non-farm activities is important in rural economy in Tanzania. Forest based activities such as collection of NWFPs constitute a large part of such income. NWFPs activities also account for the large part of the total harvest from the

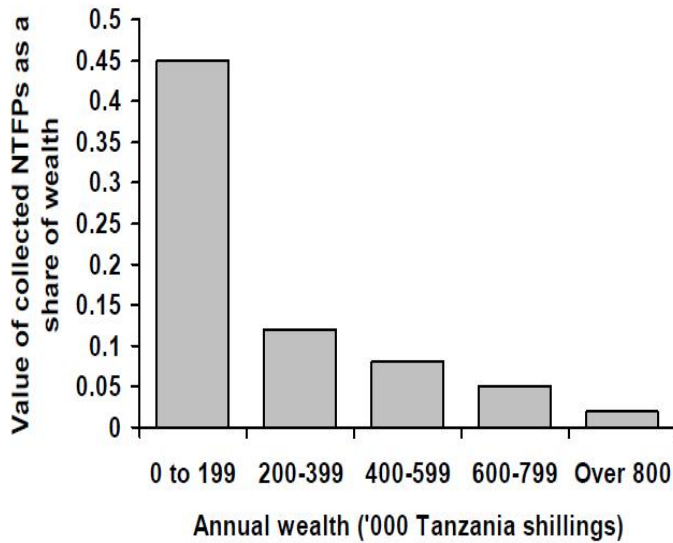
forest in many areas. Majority of people in the rural areas supplement their farm income by gathering and trading products such as forest foods and medicinal plants. Also small-scale manufacturing of items such as furniture, basket, mats, and craft goods constitute a substantial informal sector. Income from these activities supports many families during seasonal shortfall of food and cash crop income and in times of drought and other emergencies (FAO, 1996).

According to Robinson and Kajembe (2009), income from NWFPs activities accounts for 12 percent of wealth in forest dependent communities. When the income from NWFPs activities for each household is considered as a function of the total value of households' overall wealth, communities with intermediate level of wealth depends greatly on forest resources in absolute terms while the poorer have less dependence (figure 3a). But as a percentage of wealth, NWFPs are most important to the poorest households (figure 3b)



Source (Robinson and Kajembe, 2009)

Figure 3a. Income from NTFPs as a function of household annual wealth



Source(Robinson and Kajembe, 2009)

Figure 3b. Share of NTFPs to annual household wealth

2.6. Trading and Marketing of NWFPs

2.6.1. Marketing channels

According to Augustino et al. (2011), a NWFPs gatherer/producer can use three main channels to market the products. The gatherer/producer can market the products as an individual, through a middle man or through a cooperative.

Marketing individually

A producer/gatherer marketing as an individual represents a small player controlling insufficient resources. The lack of enough resources limits the producer/gatherer's bargaining power in the market place. The producer/gatherer cannot keep up with rapid changes in market conditions, and small volume of products cannot attract large companies interested in bulk purchases. Producers/gatherers do not know the markets for their products due to lack of information about markets and prices. Without proper market information, the producer/gatherer is prone to selling to any buyer at prices usually set by the buyer.

Marketing through a middle man

Middlemen play an essential role in marketing of products. According to Bingham et al. (2005), the functions of middle men include, providing information about the market, maintaining price stability, promoting the product in their territory, providing financing by extending credit to producers, absorbing risks in markets that require product volumes for individual producers to provide and providing essential services for commodities that require time, storage space and energy inputs. During this study it was established that many producers/gatherers are forced to sell their NWFPs through a middleman because they lack information about markets; the costs involved in the transport of products to the market is high and infrastructures such as roads leading to market place are in bad condition, which makes the products to take a considerable amount of time before reaching the market. Middlemen with sufficient resources use this opportunity to unfairly exploit the producer/gatherer by paying low prices for the products. However, Augustino et al. (2011) suggest that producers/gatherers can avoid this unfair exploitation exerted by middlemen by educating themselves about market condition, organizing themselves into groups for collective strength and high bargaining power, and demanding the establishment of a transparent market channel where transactions and margins can easily be traced.

Marketing through a cooperative

Marketing through a cooperative is one way to eliminate the middleman in NWFPs trade so that poor forest dependent communities can benefit. According to Nabaghan (2010), the functions of cooperatives include procurement, processing and storages of products, educating collectors and producers on good harvesting and conservation issues. Cooperatives are also responsible for working closely with its respective members for management and trade of NWFPs and conducting research about market and prices of NWFPs. Thus marketing through a cooperative will help collectors and producers to have higher bargaining power, access to market information and prices of products. However, cooperatives face many problems, and if not addressed early on can lead to their collapse. For example, cooperatives in Tanzania have been functioning since the 1970s; many of them stopped operating 15years ago. According to the Tanzanian Federation of Cooperatives (TFC,2006), the major problems that lead to the collapse of cooperative societies in Tanzania are corruption, lack of strong

leadership, politicians interfering into the affairs of the cooperative, lack of government support, and cooperatives operate against the interests of its members.

2.6.2. Markets for NWFPs in Tanzania

Since Non-wood forest products consists of a variety of products ranging from fruits and food to aroma chemicals and medicinal plants, the markets for them show corresponding variation; battering in subsistence economy, local village markets, large city markets and international markets (Lintu,1995;Agustino et al., 2011). Markets for NWFPs in Tanzania can be divided into: (i) simple village local market, (ii) Urban or national markets and, (iii) International markets.

Simple village local market

Although small in terms of quantities and values of products and producers, village local markets are important to local communities. This market allows resources to be utilized efficiently, opens up doors for producers and gatherers with excess production and hence enables producers/gathers and others involved in selling and distribution of the product to earn cash income. Village local markets also acts as a meeting point where middlemen and companies trading in urban and international markets meet local producers/gatherer and exchange information and contacts for further business relations. Unfortunately, statistical figures about local trade is difficult to find due to the infrequent nature of the market and because only part of the trade in the local market is monetized and recorded. Some local markets in Tanzania can be described as international markets. A good example is the demand for spices such as cinnamon and cloves which is often driven by middlemen and large companies buying for the purpose of exporting to region and world markets.

National Markets

When we talk of national markets for NWFPs in Tanzania, we are referring to the trading of NWFPs in urban markets. This market is of vital important for local producers/gatherers who would like to earn more income from NWFPs activities. The health of this market largely depends on urban dwellers that have moved from villages and still maintain their cultural habits. Nevertheless, to take advantage of this market, the producer/gatherer has to use appropriate market approaches to pinpoint the demand and market potential. Most of the products entering this market include

fruits, nuts, spices, raw materials for flavors and medicinal plants. Some of the products such as medicinal plants are tied to traditional habits.

International Markets.

International markets for NWFPs refer to the international trade of NWFPs, which is composed of import and export of many products at different processing stages. These products are either in raw form or processed to lesser or large degree. A large number of products are always sold in small quantities compared to others. For example the quantity of cinnamon bark oil amounts to 2.8 tons/year in world trade while Brazil nuts amounts to 14000tons/year in world trade (Lintu 1995).

Trading in international markets means knowing markets beyond the country of production. The trade is always controlled by foreign and local brokers, agents, traders and other middlemen. Depending completely on the information provided by these intermediaries does not guarantee that gatherers and producers get sufficient information that they need. Many products which enter international markets are raw materials, and few a value added NWFPs. The market size, growth and its specific requirements are determined by factors far away from supplying countries (Lintu 1995). Availability of reliable information is a key factor in succeeding in international markets. Honey and beeswax are the only NWFPs from Tanzania exported in large volumes to international market, and generate a significant amount of foreign exchange (Table 4). From table 4, it shows that beeswax generates more foreign exchange than honey despite the variations in the volumes of each of the product sold. In addition the value of beeswax sold has been increasing, while that of fluctuates year after year.

Table 4. Export of Tanzanian Honey and Beeswax, 2002-2011

Year	Honey		Beeswax	
	Metric ton	Value US\$	Metric ton	Value US\$
2002/2003	823	905,443	592	1,776,600
2003/2004	821	1,067,657	332	1,165,490
2004/2005	465	779,718	488	1,241,100
2005/2006	148	159,809	302	1,403,794
2006/2007	370	340,345	261	1,132,063
2007/2008	430	395,600	57	247,232
2008/2009	621	807,300	2606	11,302,222
2009/2010	456	684,000	607	2,632,559
2010/2011	205	328,000	1666	7,225,442

Source (RALG, 2013)

2.7. NWFPs and the Role of gender

Studies show that there are differences between men and women with respect to NWFPs collection and knowledge. In Tanzania the responsibilities women have in a family directly qualifies them to be real experts in NWFPs collection, processing, and preservation. Forest based activities such as collection and sale of NWFPs enables many women to generate a substantial income. The fact that, NWFPs resources can easily be accessed, and minimum capital is required to enter the industry allows women to participate in NWFPs activities more than men (FAO, 1995b). In addition, NWFPs activities may be performed at or near home, allowing women to combine NWFPs activities with household chores such as child care. Furthermore, since women use NWFPs for some household needs such as medicine and foods, collection of NWFPs for sale can be done together with other activities. Income from these activities is important to women for feeding and clothing the family and to meet their other needs for cash (FAO, 1995b). This means that there exist gender dimension in NWFPs activities. For example in Tanzania, beekeeping, hunting, and wood carving are done by men while women engage themselves in basket and mats weaving, medicinal plants, wild vegetables and mushrooms collection.

However, as pointed out by Kajembe et al. (2000) women have a wider knowledge about forest foods than men. This is due to the fact that, women are the ones

responsible for sustaining the livelihood of the family. Therefore their knowledge on the nutritive content of the different forest foods is essential for keeping the family healthier. While men's local knowledge on forest foods has declined as a result of formal education and emigration, women still retain a high and wider knowledge about forest foods crafts and medicine plants (Kajembe, 2000).

2.8. NWFPs and forest ownership regime

The great part of NWFPs collected and used by rural people comes from land they do not own. These products come from land that is owned by four property regimes, namely: 1) private, 2) state, 3) common, and 4) non common or open access (FAO, 1995a; FAO, 1995b). These regimes function differently with regard to access to NWFPs.

For private property regimes access to NWFPs is restricted to the owner of property unless there are other regulations or arrangements that allow other users to have access to NWFPs.

Other property regimes are defined by Schlanger and Ostrom (1992) as follows:

Common property refers to a private estate managed by a group of people such as a village or tribe, and the group as a whole decides how to use the resource. On the other hand, *open-access property* regime suggests that, individuals have privilege and no claim rights with respect to the use of resources. This type of property regime is common in those countries that embrace every man's right such as Finland.

In the *State property* regime individuals have a duty to observe rules concerning the use of resource. These rules are set by agencies. For example, in Tanzania the Forest and Beekeeping Division of the Ministry of Natural Resources and Tourism is responsible for setting rules regarding the use of forests in the country. Access to NWFPs and other forest resources is regulated by the Forest Act of 2002 and the Village act of 1999. Both laws clearly state the importance of recognizing local communities as appropriate structures to implement natural resources management. However, in practice these laws do not recognize customary land rights; all the land is owned by the state and anyone seeking access must have use rights (Coulibaly-Lingani et al., 2009).

This state controlled approach appears not to match with local communities' perception of access rights to forest resources. The approach also undermines the role of local communities, their traditional institutions and knowledge of forest management practices, and local communities are considered as destroyers of forests (Gobeze et al., 2009)

3. MATERIALS AND METHODS

3.1. Data collection

Primary data of the study was collected from 12th to 25th July 2013 in Tanzania. Two villages namely Shebomeza and Mkwakwani adjacent to Amani Nature Reserve in Muheza and Korogwe districts were selected for data collection. The time allocated for the entire process of data collection was equally divided between the two villages involved in the study. Data was collected by interviewing villagers who were involved in NWFPs collection and practice using the interview guide shown in appendix. The study concentrated on this group of producers/collectors because of their experience and their likelihood of providing correct information about NWFPs. Throughout the entire data collection process the researcher was assisted by a guide from EAMCEF, and village heads of the areas where data collection was conducted.

3.2. Study site description

Shebomeza and Mkwakwani villages lies adjacent to Amani Nature Reserve within the East Usambara mountain block which stretches from Muheza to Korogwe district in Tanga municipality. Muheza district is about 148km from Tanga municipality while Korogwe is about 57km drive from Tanga municipality. To the east the municipality is bordered by the Indian Ocean, and to the west by Morogoro region. To the south and north it is bounded by Coast and Moshi region respectively.

According to EAMCEF (2013), Korogwe district has 22 villages while Muheza has a total number of 17 villages. Out of a total number of 39 villages, only two villages, one from each district were selected for study. There is strong variation in terms of NWFPs availability in two villages. While Shebomeza has a wide variety of NWFPs, Mkwakwani village has few NWFPs with beekeeping activities leading the way.

Topographically both villages are on sloped hills and the vegetation structure is composed of dense natural forests with rainfall almost throughout the year. The two villages are rich in biodiversity. The tropical rain type of forest cover in the area houses many types of animals such birds, butterflies, lizards, chameleons, snakes and amphibians which are rare to find in other parts of the world.

The main economic activities in the two villages are small scale agriculture, animal husbandry, forestry, and related activities. The Shebomeza village is well known for growing tea, and there are big tea plantations owned by private companies. People in this village also grow black pepper, cardamom, maize, as well as other food and cash crops. The villagers also keep a significant number of cows and other livestock per household, which are source of income and household consumptions. Mkwakwani village, apart from growing food and cash crops and animal husbandry, is famous for beekeeping. Eco-tourism is also practiced in the two villages, with most of the nature trails in Shebomeza village.

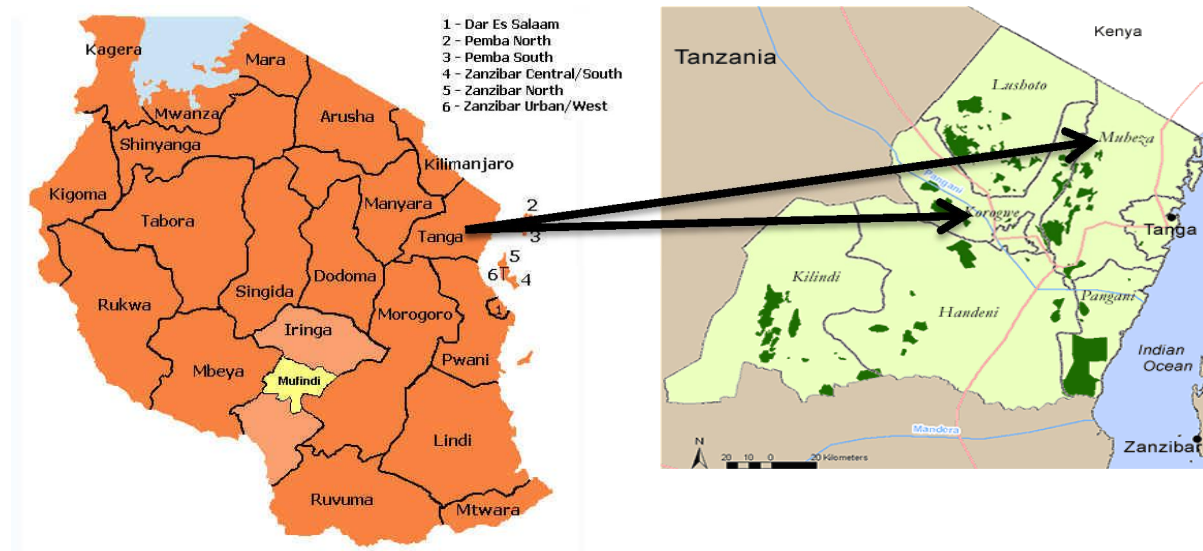


Figure 4. Maps of Tanzania and Tanga Municipality

3.3. Sampling method

In selecting the sample for the study this research employed judgmental or purposive sampling technique. According to Malhotra (2004), judgmental sampling is a form of convenient sampling in which the population elements are selected based on the judgment of the researcher. With this technique, the researcher chooses the elements

to be included in the sample because he or she believes that they are representative of the population of interest.

The main advantages of judgmental sampling are low costs, convenience and speed, and utility if broad population inferences are not required. Conversely, the values of judgmental sampling depend on the researcher's expertise and creativity.

In using judgmental sampling method this study selected the sample based on the availability of NWFPs and people involved in NWFPs practices. The study also made sure that there is a proportional representation of both men and women in the sample.

3.4. Data collection methods

This study was based on a quantitative survey. The method was used to gather opinions of different people involved in NWFPs activities. A series of interviews were conducted with different groups of gatherers/producers. Information collected included demographic information, knowledge on NWFPs, experience in NWFPs activities, opinions on the economic importance of different type of NWFPs, and their personal views with respect to markets, prices, and availability of NWFPs. A structured questionnaire was used to collect data from respondents. Key questions for gatherers/producers were structured based on previous literature review and questionnaire pre-testing survey conducted in the study area (see appendix).

A total of 64 interviews were conducted with villagers based on their time availability and involvement in NWFPs practices. The locations of respondents' residence were identified with the help of a guide from EAMCEF, and village chairmen. Between 8 to 10 interviews were conducted every day, with each interview taking between 15 to 20 minutes. Data collected included information on NWFPs dependence, type, frequency of collection, profitability, use, markets and restrictions to access NWFPs. Other data collected were information on respondents' demographics such as age, family size literacy, household income, employment, livestock and land ownership, mode of transport and distance from respondent's house to the forest.

As the majority of the respondents were illiterate, they could not give absolute figures for some factors such as distance, and total household income. The figures were estimated by giving the respondent a range of figures which a person thinks the distance and total income would be.

After completing the data collection in the field, the study visited three urban markets in Tanga, Dar es Salaam, Morogoro and Moshi. The purpose of the visit was to observe what actually happens in the market with regard to trading of NWFPs. At some point the study engaged into informal discussion with NWFPs vendors to collect their views on NWFPs prices and the general market conditions. Figure 4 shows the data collection process in the study area.

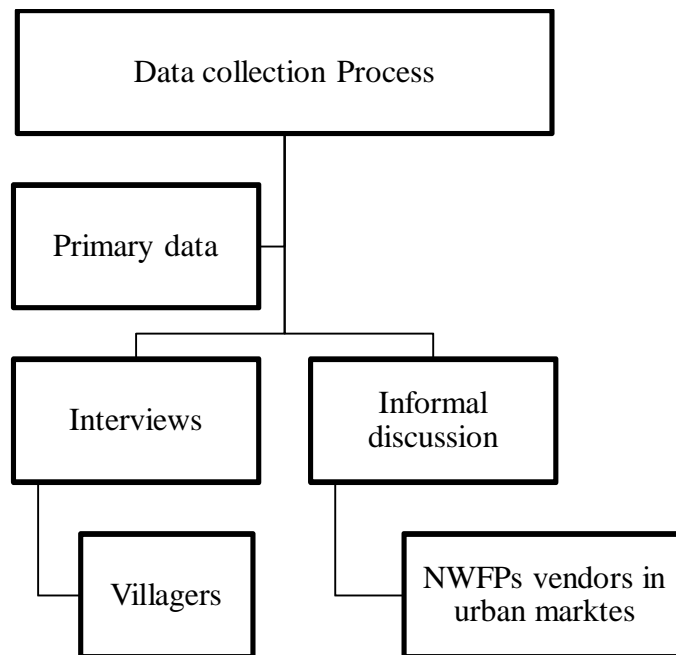


Figure 5. Flow chart for the whole data collection process

3.5. Methods of analysis

3.5.1. Descriptive statistics

IBM SPSS software was used for statistical analysis. Descriptive statistics (mean, standard deviation) were used to describe the demographic profiles of NWFPs producers/gatherers age, family size, education, employment, and household income. The scenario of NWFPs in the study area will be analyzed using frequency distribution tables. Other variables to be analyzed using frequency distribution tables include market place, and persons involved in collecting NWFPs. The purpose behind NWFP collection and respondents' knowledge of legal rules governing forest management and resource use will be analyzed using frequency distributions. Cross tabulation and Chi-square test will be used to test income differences of the respondents based on village. One way ANOVA will be used to test income

difference of respondents according to age group, farm size, and number of livestock. Table 5 shows the purpose of analysis and method of analysis used in this study.

Table 5. Purpose and method of analysis used in the study

Purpose of analysis	Method of analysis
Description of the demographic profiles of respondents	Distribution
Description of the scenario of NWFPs	Distribution
Description of respondents' knowledge of forest management and resource use	Distribution
Income differences of the respondents from the two villages	Cross tabulation
Income difference of respondents of respondents of different age groups	One way ANOVA
Income difference of respondents with different farm size	One way ANOVA
Income difference of the respondents with different number of livestock	One way ANOVA

4. RESULTS

This chapter presents the results of the empirical analysis.

4.1. Village communities in the study area

Muheza and Korogwe districts have many villages with high diversity in terms of tribal composition. The major village communities surveyed are Shebomeza (48.4%) and Mkwakwani village (51.6%) (Table 11). These two villages are located adjacent to Amani Nature reserve where they own small plots of land for cultivating crops. The major crops cultivated are maize (corn), beans, rice, black pepper, tea, etc. The communities also collect/produce a wide of NWFPs such honey, cinnamon, fruits, nuts, etc. When two villages are compared in terms of socio-economics there are no differences, although there is high variation in household income between the two villages. In this study the villages are not analyzed separately because there are no big differences in terms of livelihood opportunities between the two villages.

Table 6. Village communities surveyed in the study area

Village	Number of respondents (%)
Shebomeza	31 (48.4)
Mkwakwani	33 (51.6)
Total	64 (100)

4.2. Demographic characteristics of the respondents

The information about the demographic characteristics of the respondents is presented in subsections below

4.2.1. Age of respondents

Most respondents were in the age class 40 to 49 (29.7%) followed by 60 and above (25%), and 30 to 39 (23.4%). The age class 15 to 19 (0%) and 20 to 29% contained the least respondents. Therefore, the village work force constitutes respondents with ages between 20 and above 60 years employed themselves in NWFPs collection, agriculture, and other wage earning activities. On the other hand, respondents who are 60 years and above who might be expected to rarely involve themselves in NWFPs activities are more active than some other age groups, such as 20 to 29 years olds.

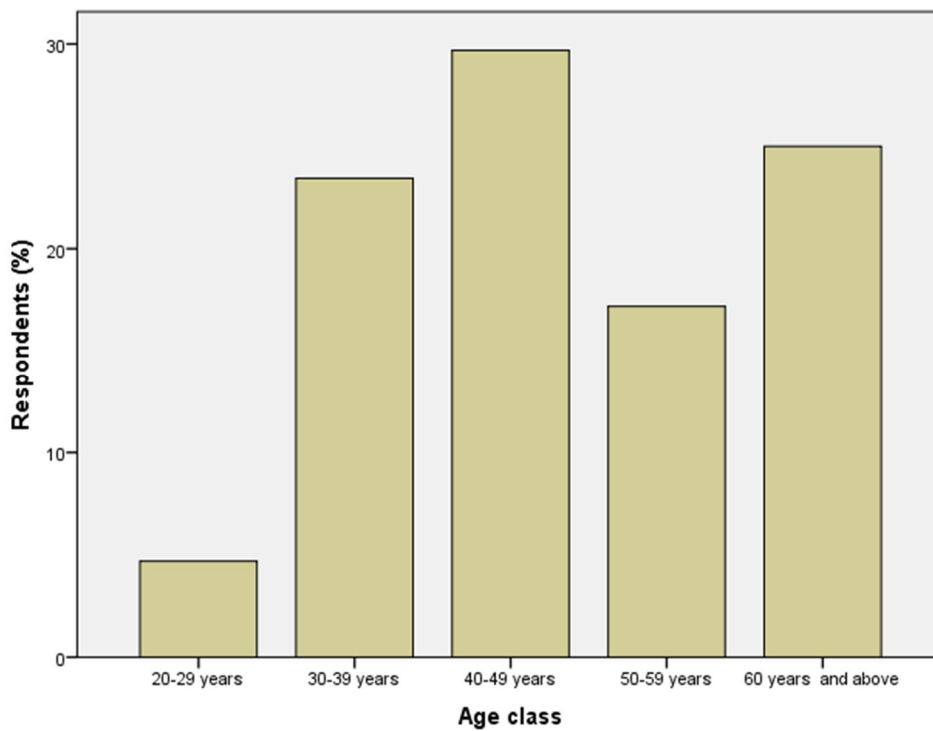


Figure 6. Age of respondents

4.2.2. Literacy level

The literacy level of respondents was high with 92.2% completed basic education or attended primary school. While only 3.1% of the respondents have attended lower secondary school, the percentage of respondents who had attained high education level qualification was: high school (1.6%), vocational education (1.6%) and university degree (1.6%).

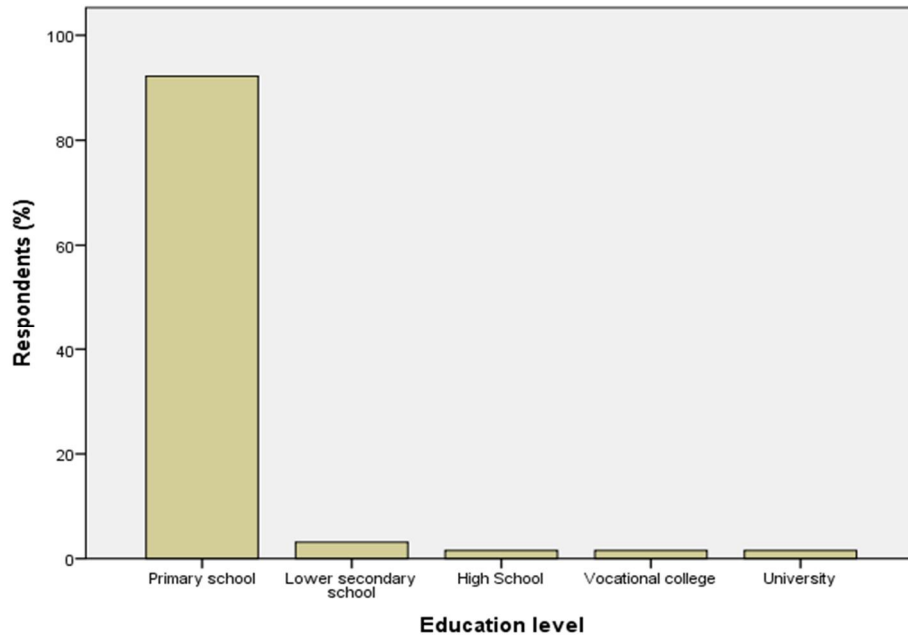


Figure 7. Literacy level of respondents

4.2.3. Family size

50 per cent of all respondents had families, with an average of 6.5 persons per household. Another 25 per cent of the respondents had an average of 9.5 persons in a family. While the smallest family had on average of 3.5 persons, the largest family had on average 12.5 persons. Having a large family like this in the rural area implies that, the family has enough resources to take of the family. Based on the information given by the respondents and observation made by this study these large families own large hectares of land, and keep a vast amount of livestock. In general, the respondents had large families characterized by early marriages.

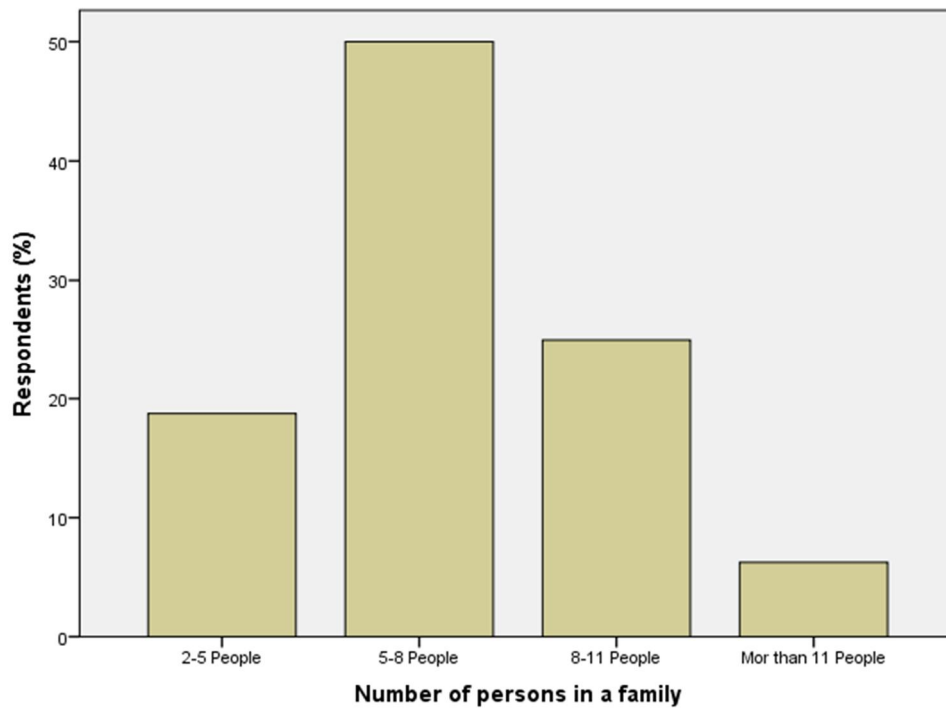


Figure 8. Family size of respondents

4.2.4. Land ownership

Out of 64 respondents, the landless is only 1.6% followed by 98.4% who owns between 1 and 5 plots of land, with average holdings of between 3 and 12.5 hectares of arable land. This indicates that rural communities highly depend on agriculture as their major means of generating income and producing food for household consumption.

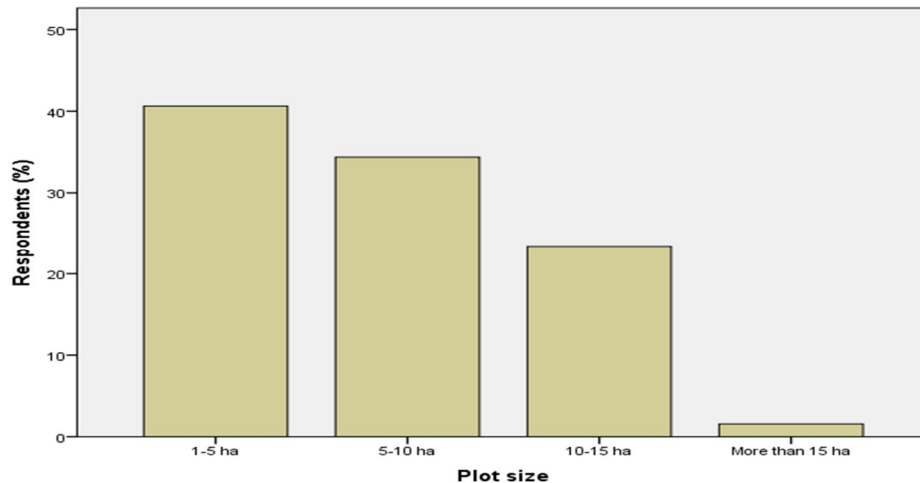


Figure 9. Farm size of respondents

4.2.5. Livestock ownership

89% of respondents own livestock between 2.5 and 12.5 animals per household. The reason for high number of animals is because of practice of agriculture and availability of free fodder in the forest lands. Observation made by this study and information given by respondents suggests that many respondents prefer keeping cows because there is a market (cooperative) where they can sell their milk. Other animals kept by respondents include poultry, goats and pigs. Keeping animals is a kind of economic security and prestige for rural communities

4.2.6. Household income

About 58% of all respondents had total annual income less than TZS 1 million (less than US\$ 615) which is equivalent to less than US\$ 2 a day. The other 29.7% of respondents had an average annual income of TZS 3 million and only 3.1% of respondents had more than TZS 10 million.

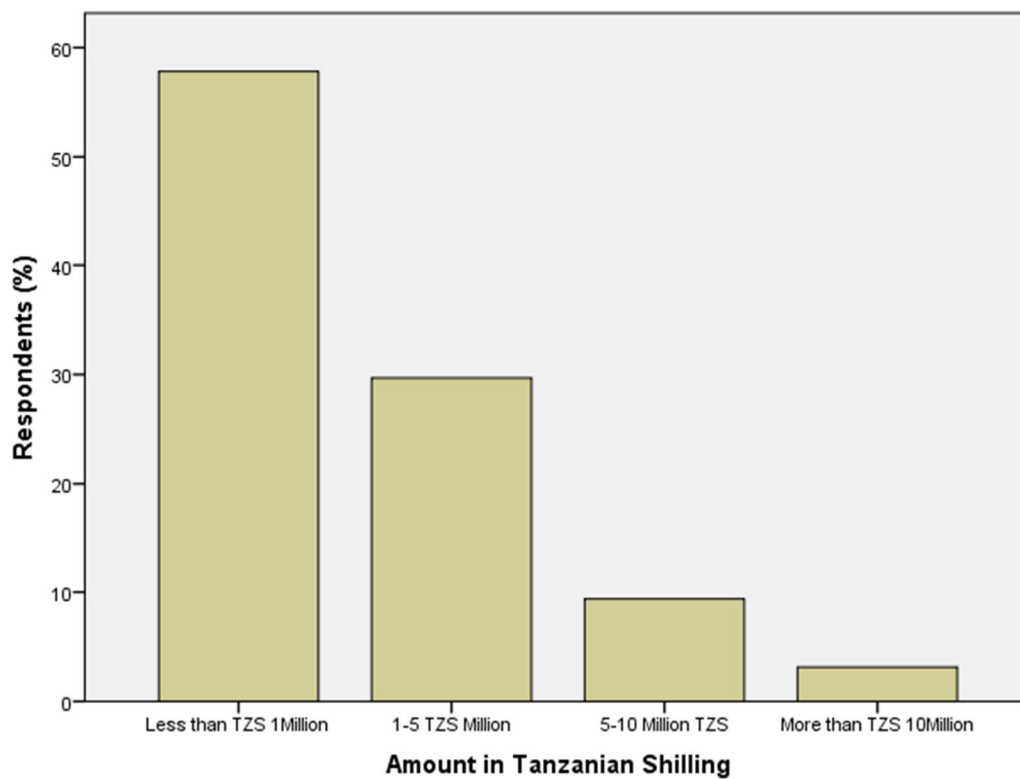


Figure 10. Total annual income of respondents

According to table 7, the p -value indicates that there is a significant difference in incomes of respondents from the two villages. Almost 68 per cent of respondents from Shebomeza village have income less than TZS 1million compared to 36 percent from Mkwakwani village. Similarly 84 per cent of respondents from Mkwakwani earned (TZS 1-5million) compared to about 16 per cent from Shebomeza village. Generally Mkwakwani village is richer than Shebomeza village.

Table 7. Income difference of respondents of two villages

Village name	Less than TZS 1 Million (%)	1-5 TZS Million (%)	Asymp. Sig. (2-sided)
Shebomeza	25(68)	3(10)	Pearson Chi-Square ,003**
Mkwakwani	12(32)	16(84)	Likelihood Ratio ,002
Total	37(100)	19(100)	Linear-by-Linear Association ,012

*P<0,1 **P<0,05

When analyzing the income differences among age groups, the respondents were divided into five groups as shown in table 8. The *P*-value in table 8 shows that there is no significance difference in income among respondents of different age class. However the results show that there is significant difference between respondents aged 40-49 years and 60 years and above. This is because of the fact that old people tends to own more resources they have accumulated over time than other groups. In the same way, if the number of respondents could be increased to more than 64, there would be a significance difference at ($P<0,1$) between respondents aged 40-49 years and 50-59 years.

Table 8. Income differences of respondents of different age groups

Age class(I)	Age class(J)	Mean difference(I-J)	Significance
40-49 years	20-29 years	-,07018	,885
	30-39 years	-,33684	,216
	50-59 years	-,46411	,122*
	60 years and above	-,61184	,024**
		,932	,205
Between groups			

*P<0,1 **P<0,005

While the results indicate that there is significance difference ($P=0,003$) in income of respondents with different farm size, there is no significant difference in income of respondents with different number of livestock (table 9). However when the respondents with different number of livestock are evaluated separately, the results

shows that there is a significance difference in income of respondents with number of livestock between 5-10 and those with more than 20 livestock (table 9)

Table 9. Income difference of respondents according to number of livestock

Number of livestock(I)	Number of livestock(J)	Mean difference(I-J)	Significance(P-value)
5-10	Less than 5	-,27778	,286
	10-15	-,52381	,140
	15-20	-,41667	,345
	More than 20	-,80952*	,025*
Between groups		1,025	,189

* $P < 0,05$

Major sources of income

Income of respondents in the study area is generated by five major activities: agriculture, NWFPs, livestock keeping, wage earning, services and allied activities. However, according to respondent's views, the most important sources of income are agriculture, NWFPs activities and livestock keeping.

Agriculture as a major source of income provides more income than other activities. The majority of respondents cultivate maize, beans, rice, sweet potatoes, bananas, tea, black pepper, cardamom, and vegetables on small plots of land. Maize and beans are both for household consumption and for sale in the village local market and small amounts are sold to urban markets. Rice and bananas are cultivated specifically for sale in urban markets, and they are the two most important cash crops for local communities in the study area.

NWFPs are another major source of income for the majority of the respondents in the study area. 53.1% of the respondents said that they depend on NWFPs and NWFPs contribute between 0-10 per cent of their livelihoods. Apart from generating income and employment, NWFPs support local communities during drought and cyclical agricultural fluctuations.

Animal husbandry also contributes greatly to total household income of respondents in the study area. The major livestock kept include cows, goats, sheep, pigs, and poultry. Milk production from cows is high due to the presence of free fodder from forests, and the climate in the study area also allows people to grow fodder for their cows. Small amounts of milk are used for household consumption and the rest is sold. Likewise, the sale of goats, sheep, pigs and poultry generates a significant income for the people.

4.3. The most important NWFPs in the study area.

Table 6 below shows the details of various NWFPs people collect, frequency of collection, and percentage of respondents involved. People in this study area involve themselves in various NWFPs activities, such as collection of fodder, tannins, latex and gum, medicinal and aromatic herbs, mushrooms, nuts, fruits, wild vegetables, roots and tubers, and wild grains. The respondents also engage themselves in butterfly farming, basket and mats weaving, beekeeping, and agroforestry (cloves and cinnamon). The most important NWFPs are fodder (76.5%), honey and beeswax (66.2%), cloves and cinnamon (30.9%), nuts (16.2%), fruits (14.7%), and medicinal and aromatic herbs (10.3%)

NWFPs are collected all year round. However most of them are seasonal in nature. According to information given by respondents, March to September is considered the good season for NWFPs collection. Out of the six most important NWFPs, only fodder is collected throughout the year, while honey and beeswax varies according to the season (February to May, and June to September). Other NWFPs have their peak season between May and June.

On average, each NWFP is collected between once and three times a year. However, this frequency may vary according to season and NWFP collected. For example, harvesting of honey and beeswax is done 2 to 3 times a year depending on the weather condition during that particular season. NWFPs activities and collection in the study area is done by both men and women, with men accounting for about 70% of the total work force in NWFPs activities. There is also a clear division of work in NWFPs activities; while men are more engaged in beekeeping, women find their interests in collection of spices, and basket and mat weaving.

Table 10. Details of NWFPs activities in the study area

NWFP activity	Number of times per year	Number of respondents (%)
Collect(graze) fodder/hay for livestock	Throughout the year	76.5
Collect honey and beeswax(beekeeping)	two to three times a year	66.2
Others(Cloves and Cinnamon)	once a year	30.9
Collect nuts(<i>Msambu</i>)	Once year	16.2
Collect fruits(wild mangoes, jackfruits)	Once a year	14.7
Collecting medicinal and aromatic herbs and plants	Unknown	10.3
Collect wild vegetables	Once year	7.4
Collect roots and tubers	Once a year	5.9
Collect thatch and fiber grass	Once a year	5.9
Collecting mushrooms	Unknown	2.9
Butterfly farming	Throughout the year	2.9
Basket and Mats Weaving	Unknown	2.9
Collect wild grains	unknown	1.5
Game hunting(meat)	once a year	1.5
Collect Tannins, dyes, latex, gums and resins	Unknown	1.5

Fodder

Collection of fodder is done throughout the year and forms an important food material for livestock. Fodder is available in the forests and woodlands and in some places fodder is grown in farms to make hay for feeding animals during the dry season. Green fodder from the forests is very important in giving livestock nutritional matter to produce large quantities of milk. Most of the respondents in the study keep more cows in relation to other animals. Therefore most of the fodder collected is used to feed cows in order to produce milk for sale. As the study noted, the milk is sold to a cooperative at an average price of TZS 1500(US\$ 0.90) per liter which in turn sale the milk to a diary company.

Honey

Natural honey is available in the study area and people collect it 2 to 3 times a year (March to September). Honey collection is done by men as it requires skills to handle the bees. However the introduction of protective clothes, gloves and boots has made the work easier and now more women are now participating in beekeeping and honey collection. Gathering or harvesting of honey is mainly done in the night, and is very laborious when someone does not have proper tools for honey collection. On average, people collect 60 liters or more per season depending on the nature and type of beehive used in the beekeeping process (Interview with respondents). While in the village local market 1 liter of honey fetches TZS 10,000, in the urban market the same volume fetches between TZS 25,000 and TZS 45,000 depending on whether the honey is from sting or stingless bees (Interview with respondents and personal observation).

Beeswax

Beeswax is produced from combs left after honey is pressed and those combs which the bees have forsaken. The combs are melted into boiling water and then strained through a sack cloth and left to cool. The solidified beeswax is ready to be marketed through various channels. A small amount of beeswax is consumed locally, and the rest is bought by companies for export. The average price for one kilogram of beeswax in the study area ranges between TZS 4000 and TZS 6000 (Interview with respondents)

Cloves and Cinnamon

Cloves and cinnamon are grown along with other crops and trees. In the study area, respondents have support from Eastern Arc Mountains Endowment Fund which supplies seedlings to groups of farmers. The main aim is to grow these NWFPs along with other crops to reduce pressure local communities exert on the forests in search of NWFPs. These spicy NWFPs are harvested between June and September. To produce cinnamon, little shoots of cinnamon tree are stripped of inner bark and then dried to form cinnamon rolls.



1. Cinnamon seedling nursery 2. Cinnamon barks being dried

Figure 11. Cinnamon activities in Shebomeza village

On the other side cloves are produced by picking pink buds from the clove tree are then sun dried and turns dark brown. According to interviews with respondents, the average price for one kilo of cloves ranges between TZS 16,000 and TZS 25,000 while the average price per kilo of cinnamon is TZS 2500.

Medicinal and aromatic herbs and plants

Forests are the biggest pharmacy for rural communities. Unreliable access to conventional medicine forces these communities to rely on medicinal plants available in the forests to cure diseases. Some of the diseases treated by medicinal herbs include malaria, colds, diarrhea, stomach ulcers, impotence, and snake bites. Most of the medicinal plants and herbs are used locally by people and traditional healers to cure diseases. A small amount of the collected herbs are sold at urban market to vendors and traditional healers in cities. Locally the study did not establish the actual price for medicinal plants because most of the collected herbs are tied to personal use and cultural practices other than business. However, observation made by this study in the urban centers shows that the prepared medicinal plants and herbs fetch between TZS 1600 and 7200 depending on the specie and type of disease to be treated.

Nuts

The commonly collected nuts in the study area is *Allanblackia stuhlmannii*

(Clusiaceae) locally known as *Msambu*. *Allanblackia stuhlmannii* bearing trees can be found in the forests, as well as in farms where they are grown alongside with other crops and trees. This oil-yielding nut is available seasonally for collection from February to May. The oil from this nut is used for cooking, and the solid fat component from this nut is used for making candles, margarines and similar products. The average price of one kilogram of *Allanblackia stuhlmannii* nuts is TZS 250.

Fruits

Fruits with commercial value that people in the study area collect include wild mangoes (*Irvingia gabonensis*), mamey (*Pouteria sapota*) also locally known as namea and jack fruits (*Artocarpus heterophyllus*). Wild mangoes are available for collection in September, while mamey and jack fruits are collected in March and June respectively. Jackfruits varies widely in size and have a round shape of average weight between 3 to 30 kg. The unripe fruit is green in color; when ripe it turns into light brown color and spreads a sweet, fruity smell. The price of jackfruit in the study area is between TZS 500 to TZS 1500 depending on the size and weight of the fruit.

4.4. Purpose for collecting NWFPs in the study area

NWFP are collected by household either for subsistence or commercial purposes. All households covered by this study depend on NWFPs for subsistence use such a food and medicine and commercial purposes in generating income.

4.4.1. Subsistence uses

Nearly 52 per cent of all respondents involved in this study collected NWFPs for subsistence purposes (Table 11). The subsistence purpose of NWFPs can be divided into two groups:

Food

This is the largest group consisting of various NWFPs which are directly consumed or used in food preparation. Included in this group are fruits (1.6%), mushrooms (1.5%), wild vegetables (1.5%), nuts (1.6), root tubers, wild grains, bush meat (1.5%), honey

(5.9%) cloves and cinnamon (1.5%). Many of these forests food are important sources of nutrients.

Table 11. Subsistence and Commercial purpose of NWFPs

NWFP activity	Purpose for collection (%)		Income generation (%)
	Subsistence	Commercial	
Collect honey and beeswax(beekeeping)	5.9	61.8	67.6
Others(Cloves and Cinnamon)	1.5	29.4	30.9
Collect(graze) fodder/hay for livestock	36.8	19.1	75
collect nuts(<i>msambu</i>)	1.5	5.9	7.4
Butterfly farming	-	2.9	2.9
Basket and Mats Weaving	-	1.6	2.9
Collect fruits(wild mangoes, jack fruits)	1.5	1.5	7.4
Collecting medicinal and aromatic herbs and plants	4.4	1.5	2.9
Collecting mushrooms	1.5	-	-
Collect roots and tubers	2.9	-	-
Collect thatch and fiber grass	1.5	-	-
Collect wild vegetables	1.5	-	-
Collect wild grains	-	-	-

These forest foods are true even where agricultural foods provide the bulk of the diet. For example in a study conducted by Harkonen et al. (1995), when people were asked to compare mushrooms and other foodstuffs such as meat, fish and some other vegetables, most people considered mushrooms to be similar to meat, especially chicken. *Mushrooms* are high in protein, containing typically between 20 and 30 per cent and a wide range of vitamins, minerals and amino acids (Dijk et al., 2003).

Similarly *fruits and nuts* are rich in nutrients. They are the largest category in this group containing about 40 edible species (FAO, 1983). They are good sources of protein, minerals, fibers and fatty acid. Fruits and nuts commonly used include wild mangoes, mamey, jackfruits, passion, berries, *Allanblackia stuhlmannii(msambu)* and a lot more other forest fruits and nut species which this study will not cover. Other

highly consumed fruits are those that are cultivated domestically such mangoes, papayas, bananas, and avocados.

In the same way, honey is very popular food, rich in calories and has a substantial amount of protein. Interviews with respondents show that many people in the village believe that consumption of honey increases blood. The respondents argue that increasing blood through honey consumption helps the body to fight diseases, such as malaria, which is often associated with reduction of blood in a sick person. In other places honey is used in making a refreshing local beer commonly known as *wanzuki*.

Wild vegetables are also consumed by people in the study area. They are important in supplementing poor staple food with vitamins and minerals. Interview and discussion with respondents indicated that the most preferred wild vegetables by communities in this study are *mshunga* or *mchungu* (*Pupalia Lappacea*).

Bush meat is perhaps the most important NWFP in terms of its contribution to people's diet. In some cases where domestic animals are not kept, bush meat is the only source of protein. In the study area people are banned completely from hunting wild animals and few people did it secretly without the knowledge of local authority.

Medicine and traditional health care

Another area in which NWFPs make a contribution to subsistence use is as source of medicine. Even though the majority of rural population still depends on herbal medicines and traditional healers for their health care, only 1.6 percent of respondents in the study area use herbal medicines to treat diseases. The main reason is the availability and easy access of conventional medicines from village health care. This study observed a major shift in the use of herb medicine. Herbal medicine was being used by traditional healers to heal diseases and other body ailments. Now herbal medicines are being used by professional doctors to treat diseases that the normal conventional medicines cannot treat. For example, in the study area, this research had the chance to visit one retired medical doctor who is using herbal medicines to treat diseases such as cancer (at initial stage), diabetes, impotence, and infertility for couples who are unable to conceive. The same situation is also seen in urban centers. For example in the city of Dar es Salaam, there are a number of health care centers

dedicated to treating diseases using herbal medicine. Among the most treated diseases are diabetes and uterus fibrosis in women.

4.4.2. Commercial uses

While in most cases NWFPs are collected for subsistence purposes, they are also important sources of income for forest dependent communities. In this study, the most commercially valued NWFPs are honey and beeswax, cloves and cinnamon, fruits, and nuts

Honey and beeswax is the most profitable and commercially valued NWFP in the study area. About 62% of all respondents collect honey for commercial purposes and almost 68 percent of all respondents rank honey and beeswax as the most profitable and income generating NWFP .The higher demand of honey and beeswax in local, urban and international market might be the reason why communities in the study area perceive it as most commercial valued NWFP.

The second most commercially important group of NWFPs are cloves and cinnamon. Approximately 29 per cent of all respondents collect cinnamon and cloves for commercial purpose, and 31 per cent rank them as the most profitable and income generating NWFPs after honey and beeswax. These NWFPs are mostly collected for export to international markets where they are in higher demand than in the local markets.

Other commercially valued NWFPs are fruits (1.5%), basket and mats weaving (1.6%), butterfly farming (2.9%), nuts (5.9%). However, in unexpected circumstance NWFPs activities such as collecting fodder (19.1%), and income potential (75%) was give high responses by respondents in terms of income generating potential. The main reason is that since fodder is fed to livestock such as cows which produce milk for sale; then fodder is regarded as being important in income generation by respondents in the study area.

4.4.3. Trading and marketing of NWFPs in the study area

More than 50 per cent of all NWFPs collected are sold to final consumer both in village local markets and urban markets (Figure 12). On the other hand, middle men and companies are important customers buying around 30 per cent of all NWFPs

products produced in the study area. At the moment, the local market (village and urban markets) is seemingly the most important market for NWFPs collected in this study area. When compared to international or export market, the local market has more than 75 per cent market share (figure 13). The main reason is that local markets are not regulated and there are no laws, guidelines or standards that NWFPs must meet before selling, and they are easily accessible by majority a of NWFPs producers or collectors.

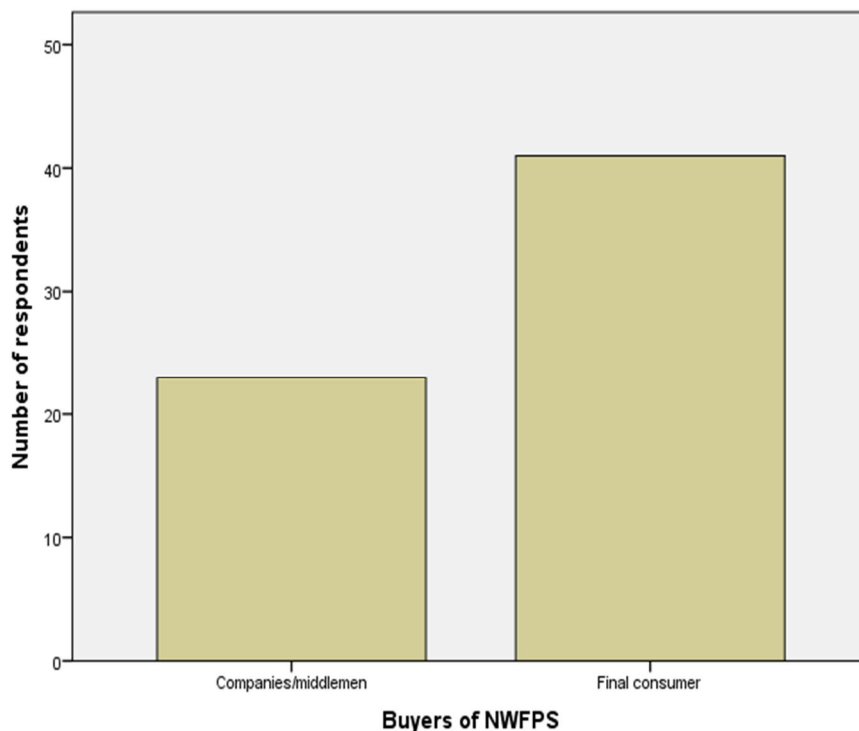


Figure 12. Buyers of Non- wood forest products

It is easy for NWFPs collectors operating individually to access these markets to sell their products without having to meet any market requirements. In contrast, international markets have strict regulations with respect to quality and source of the NWFPs. Any individual or company selling NWFPs in these markets must adhere to quality and certification standards imposed by importing country. The cost and time spent in getting quality assurance and certification standards are unbearable for most of rural dwellers operating individually. Hence international markets are left out to large companies and SMEs which have the capacity to meet international markets standards.

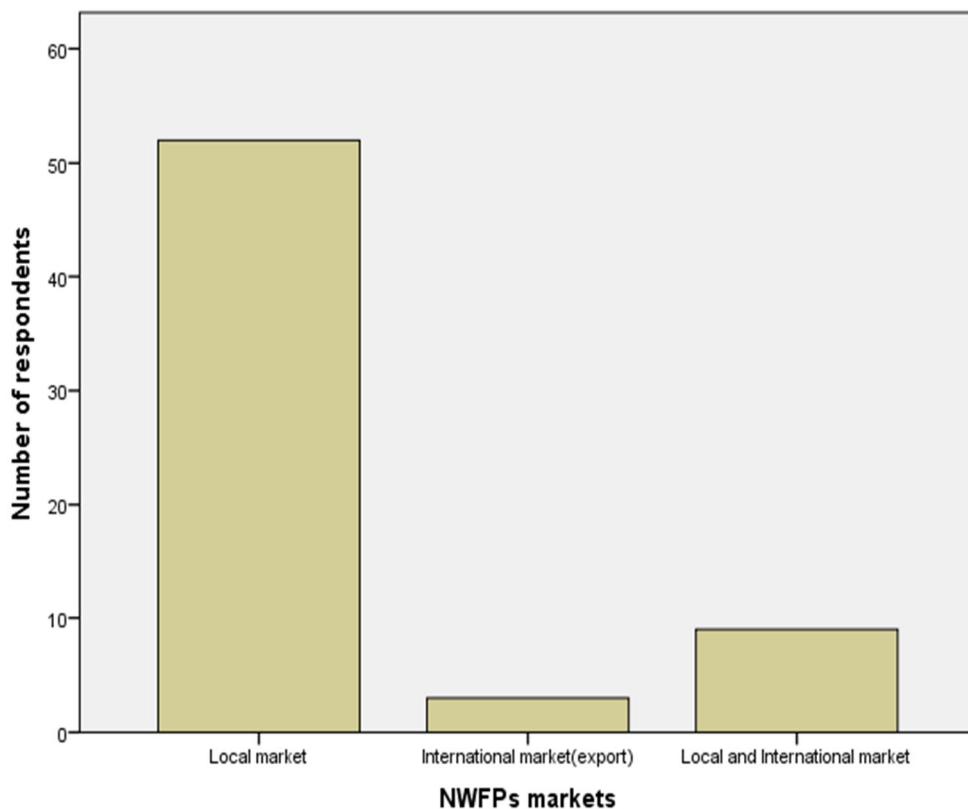


Figure 13. Markets for Non-wood forest products

On analyzing the marketing channels through which NWFPs pass before reaching final consumer, this study found that NWFPs sub-sector in Tanzania as a whole consists of fragmented actors loosely connected through short term or long term business transactions. These relationships are not based on institutional arrangements through contracts and they rapidly change over time. They are also characterized by lack of well-defined roles from consumption to production.

With the exception of *msambu* and butterfly farming which are sold to institutional buyers who have contractual arrangement with collectors/producers, other traded NWFPs in the study area pass through a marketing channel where actors exhibit a fragmented relationship as shown in figure 14. This kind of relationship is not beneficial to collector/producer because the collector/producer does not have access to market information, prices and many actors in the chain pursue multiple strategies to maximize their profits at the expense of the collector/producer. Good representatives of the relationship shown in figure 14 are honey, beeswax, cloves and cinnamon.

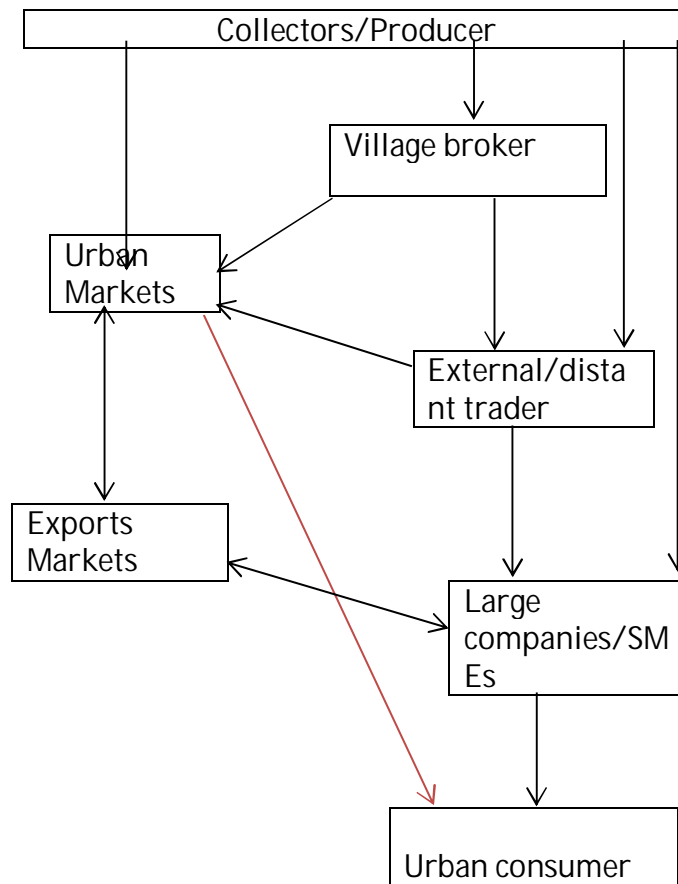


Figure 14. Supply chain of selected NWFPs in the study area (Researcher's design)

As shown in figure 14, the number of intermediary between production and consumption is likely to change depending on the prevailing circumstances. The larger the number of intermediaries, the lower the price received by the collector/producer. The model of operation of each actor in figure 14 is discussed below.

Collector/producer

Collectors/producers sell their NWFPs to either consumers in the local village market or to a village broker commonly known as *dalali*, or to an external trader. The NWFPs can either be obtained in the market or sourced at the collector/producers' house, or delivered to buyers business premises. Normally these are spot markets involving cash transaction only.

There are few instances of forward sales practiced in the study area whereby collectors/producers sell their NWFPs before harvesting. Honey is good example whereby a buyer particularly a village broker or external trader or a company promises to buy all the honey produced at an agreed price after harvest.

Village broker

This is a person contracted by external trader or companies to collect the NWFPs on their behalf. Normally the contract is entered into verbally and is based on trust. The contract takes on a forward sale arrangement whereby the broker and external trader or company agree on price. The payment can be made in advance to the village broker, or settled later depending on financial ability of the later. The village broker then starts buying the NWFPs from different producers at any price he or she can negotiate until the required volume is reached. The village broker commission is the difference between the actual prices paid to the collectors/producers and the sales price agreed on previously and an agency commission agreed on between the two parties. Cloves and cinnamon are good example of NWFPs that exhibit this type of transaction.

External or distant trader

There are individual traders from nearby regions that buy NWFPs from collectors/producers from villages in person or through village brokers. According to the information given by respondents most traders comes from Tanga, Morogoro, Dar es Salaam, Arusha and Kilimanjaro. The purchased NWFPs are transported to urban markets in question for sale to local consumer and export to nearby low value export markets such as Kenya and Uganda.

Large companies/SMEs

Large and small and medium enterprises like the distant trader buy NWFPs either directly from collectors/producers or through village brokers who acts as company agents. However, as this study learnt, it is only honey and beeswax that the large companies and SMEs would like to deal directly with the collectors/producers. Most of the honey and beeswax they buy are for export to international markets where there are strict requirements with regard to hygiene and quality of the products. Therefore, large companies and SMEs normally supply beekeepers with containers to store the

honey after harvest before they process it. In this case they are confident that, the honey is free from contamination of rust and other dirt than if collectors/producers were allowed to use their tools.

Most of the NWFPs bought by companies and SMEs are exported and a small amount is sold to final consumers in supermarkets and kiosks. The main exports are honey, beeswax, cloves and cinnamon which are sold to regional markets such Kenya, Uganda, South Africa, Zimbabwe, Botswana, Mauritius, and international markets such as EU, US, UAE and Japan.

4.5. Impact of laws and regulations on NWFPs collection

When analyzing the impact of laws and regulations imposed by forest management regime, this study found that 63percent of all respondents are aware of the existence of law and regulations with regard to forest use and management, and 65 percent of these respondents said that all the laws are clear. During the discussion, when the respondents were asked if their livelihood had been affected by these laws, most said they are better off. They argued that even though they don't have frequent visits to the forest, the laws and regulations helps to conserve the forest which in turn gives them rain and water to drink. The other minority group feels that, the laws and regulations helps to conserve the forest, rather than taking into account their needs. Statement such as "conserve the forest for future generations" indicates that, the current needs of the people are not priorities of the forest management regime. However, the majority of the respondents agreed that if people had free access to the forest, they would destroy it as it had happened in the past before the government intervened. They also argued that nowadays, women participate fully in meetings and they sit on village committee responsible forest management

Furthermore, 79 percent said they have arrangement with the forest services on how and when to go forest to collect NWFPs and other households needs. Similarly 75 percent of the respondents said that the forest service regime allocates equally the access rights to the forest, and 92 percent said that they do not pay anything when using the forest. In a similar situation, when respondents were asked if they are ready to participate in making decision about forest use and management, 68 percent said they are ready to participate in allocating forest use rights. Likewise, 53 percent said

that they would like to participate in activities related to forest maintenance while 69 percent said that they are interested in protecting the forest against fire.

5. DISCUSSION

a) Factors affecting perceptions of NWFPs

Non-wood forest products (NWFPs), contribute significantly to rural household's livelihoods. However, the perceptions of the importance of NWFPs are influenced by several factors as discussed below.

Household determines the amount of food needed to feed the family members. As the result shows, 50 per cent of the respondents had on average of 6.5 persons and the other 25 percent had 9.5 persons per household. Respondents in this study thus had on average large families, and it is expected that they will require more food to maintain the family: therefore increasing consumption of NWFPs (Chukuwone and Okeke, 2012). On the other hand household, with large families have more labour at their disposal and can collect and sell more NWFPs than families with few members (Kar and Jacobson, 2012).

The level of education a person has attained influences his or her consumption choices with respect to food. Most of the respondents in this study had only attained a basic education, which limits their chances to having more disposable incomes through jobs. Therefore, the food they consume will contain a large proportion of NWFPs. On the other hand, highly educated individuals are less likely to have a large proportion of food from NWFPs (Chukuwone and Okeke, 2012; Kajembe, 2000).

The distance of the respondents' houses to the forest has an effect on how people value the NWFPs. Based on discussion with respondents and observations made by this study indicate that, the average distance from the respondents' houses' to the forest is between 3 and 5 kilometers. This means that people can easily go to the forest by foot, or by bicycle. Therefore, in this study distance does not affect peoples' ability to collect the products because they can easily walk to the forest. In this study people also grow the NWFPs alongside other crops on their farms, which are less than 500 meters from their houses.

Access to financial capital is another factor that affects the way local communities perceive the importance of non-wood forest products. During the survey when people were asked if they had any ideas on how to improve their incomes from NWFPs, the most common answer was lack of capital. For example, beekeepers contended that if they were empowered through the provision of modern beehives and other beekeeping tools, they could harvest larger volumes of honey than they are collecting now, and that their total income from the sale of honey would increase. Similar results were reported by Mamo et al., 2007 and Adam et al., 2013. Access to capital allows households to overcome liquidity problems, invest more in NWFPs activities, and control high transportation costs to reach distant markets (Adam et al., 2013).

The price of NWFPs affects the income generated through the sale of non-wood forest products. When respondents were asked why they are not satisfied with their income from the sale of NWFPs, a commonly cited reason is that the prices they get from buyers is very low, and hence the buyers benefits more than they do. On the other hand, the price of NWFPs is affected by demand and access to markets which consequently affects the total income generated from the sale of NWFPs (Adam et al., 2013). For example in village local markets where the demand is low, it is expected that the price will be low. However, in other markets such as national and international markets where the demand of some products is high, the price is also high. A good example in this study is honey. In the village market, the price of 1 liter of honey is sold at TZS 10,000 while in the urban market the same volume can be sold up to TZS 45,000.

Seasonal markets and the inability to keep up with demand is another factor that determines the amount of income generated through the sale of NWFPs. As shown in the results section, most of the NWFPs are collected once or twice a year which means that the market for these products is also limited to the seasons when the products are available. In such a situation the overall financial returns from the sale of NWFPs are affected than if the NWFPs were available for collection the whole year.

Poor infrastructures, especially roads linking villages with local and urban markets, have a significant impact on the movement of goods from production centers to the markets. Direct observations made by this study revealed that villagers in the study area are cut-off from the rest of the country during the rainy season due to bad roads

that are impassable. Thus, transaction costs increase, which in turn impacts the income generated, and middlemen take advantage of this as a reason for pay low prices to producers. In such situations the overall NWFPs industry becomes unattractive to a poor forest dependent dweller, and limits the potential benefit from NWFPs for local people. Similar situations are also reported by (Haggblade et al., 2002; Marhsall et al., 2003, te Velde et al., 2006)

Observation made by this study and information from respondents shows that, there is no organization and cooperation among NWFPs producers. Lack of organization and cooperation affect income generated due to high transaction costs, which in many situations prevents poorer households from transporting their products to distant markets. Similarly the absence of a cooperative body that oversees and protects the interests of the producers/collectors reduces the bargaining power due to lack of information about markets and prices. Newton et.al (2006) suggests that lack of organization that links collectors/producers to consumers significantly limits the commercialization of 74 percent of case studies considered by CIFOR projects.

Finally, access to NWFPs has an impact on consumption as well as income generation from the sale of NWFPs. The level of access that household have to forest resources is determined by the type of land use and property regime. Access to forests is far easier in open access regime than state property regime and more problematic in private property regime.

In the study area, the forest land which is a nature reserve is managed in collaboration between the government and the local community. The presence of nature reserve comes hand in hand with laws regulating access to the forest. These laws in some cases make it hard for people to have free access, because the forest management regimes fear that people will destroy the forest. In discussion with the respondents, this study learnt that before community forest practices were introduced in the area, people had already destroyed forest by conducting agriculture in the forest areas, burning, and mining. All these activities led to the dry of catchment area which supplied natural spring water to the communities around the forest. People argued that, rain became scarce and they were not able to get enough rainfall to grow their crops compared to the present moment the forest is under protection. Based on the results, the majority of the respondents said that the forest laws and regulations do to

not affect their livelihoods. This may be attributed to the fact that people grow along with other crops on their farms the same NWFPs available in the forests, and agriculture is the number one activity that supports their livelihoods. Alternatively, the minority group who feels that their livelihoods are not a priority of the forest management regime corresponds to the findings reported by (Robinson and Lokina, 2011). They argue that, even though laws and regulations help to improve and maintain the forest, it is at the expense of villagers' access to forest resources. The reason behind negative perception depends on to what extent the forest resources support the livelihoods of the people and if there are no close substitutes to forest resources.

b) Opportunities and constraints in the supply chain

The supply chain presented in chapter 4 gives the collectors/producers an opportunity to invest more in the NWFPs and subsequently generate considerable amount of income to support their lives. However, to benefit from the supply chain collectors/producers should organize themselves into a cooperative that will be there to protect their interest. This cooperative will be responsible for dealing with buyers instead of buyers dealing directly with producers. In this case the producers will have high bargaining power, up to date market information and prices, and they will be able to establish long term relation instead of the fragmented relationship they have now with buyers, and additionally there will be no competition among them. Buyers will then have no chance to pursue multiple strategies in order to exploit the producers by paying them lower prices. Likewise the number of intermediaries in the supply chain will be reduced and hence NWFPs producers will be able to receive higher prices than if the supply chain had many intermediaries.

6. CONCLUSION

Based on the interviews from the two case villages, NWFPs have a high potential for be an alternative for the improvement of livelihoods of people in the rural areas in Tanzania. Their potentials to generating income can be incorporated into rural development policies and other poverty alleviation strategies. Such policies and strategies should address major problems facing the NWFPs sub sector. Efforts should be made to map the location and type of products, establish local processing industries to produce value added products. Efforts should also be made to institutionalize all

NWFPs activities with a well-organized marketing channel and marketing information base.

Both men and women participate fully in NWFPs activities in the study area, but men accounts for more than fifty percent of all respondents involved in NWFPs activities. People in the study area collect several types of NWFPs which include fodder, tannins, latex and gum, medicinal and aromatic herbs, mushrooms, nuts, fruits, wild vegetables, roots and tubers and wild grains. People also engage themselves in butterfly farming, baskets and mats weaving, beekeeping and collection of cloves and cinnamon. However the most important NWFPs are fodder, honey and beeswax, cloves and cinnamon, nuts, fruits and medicinal and aromatic herbs.

People in this study area collect NWFPs for subsistence and commercial purposes. The subsistence use of NWFPs is divided into two groups, namely food and medicinal. The food category is the largest with different NWFPs species. On the other hand, the most commercially valued NWFPs in the study area are honey and beeswax, cloves and cinnamon, fruits, and nuts. In terms of income generating potential of different types of NWFPs, honey is perceived as being the most profitable followed by cloves and cinnamon. However the income is affected by several factors such, prices, demand, access to market, seasonal availability of NWFPs, capital, poor road infrastructures and lack of organization among producers.

For the commercially traded NWFPs, the main buyers are final consumers in both village and urban markets. It was also found that the supply chains that exist in the study area are fragmented in the form of producer to middleman to customer. The more the number of intermediaries the less the price received the producer. This kind of relationship is based on short term business transaction and likely to change in the future depending on prevailing market conditions and availability of products. To establish a long lasting business relationship and where transactions are transparent, this study recommends that people organize themselves into a cooperative. With such a body they will have high bargaining power, transparent business transaction, training, up to date market information and prices.

The access to forest resources in the study area is regulated by forest laws and regulation. More than fifty percent of respondents are aware of the existence of laws and regulation with regard to forest use, and they say the laws are clear. They also say

that, the government makes fair allocation of forest use rights, and they do not pay for any forest resources. However the effect of these laws and regulation on NWFPs collection and overall livelihoods of the people gave rise to different opinions. The majority of respondents say that the laws do not affect their livelihoods, while other group says that these laws and regulations are there to protect the forest and their needs are not the priorities of the forest management regime. As a group, all respondents said that they are ready to participate in different activities related to maintaining the forest, protecting the forest against fire, and allocation of use rights.

In depth research on the role of cooperatives in NWFPs trade and marketing is required, as few studies have been done on this topic. It would be useful to observe different modes of co-operatives, and to see the actual roles these modes play in marketing and trading of NWFPs. Also, it will be beneficial to assess management problems facing co-operatives that may lead to their collapse.

6.1. Limitation of the study

Language barriers, especially the interpretation of questions to fit the local language were a major problem in acquiring information from respondents. Additionally at some instances the respondents requested for some favors such as drinks and money in order to talk. People in these areas had been accustomed to this kind of practice as a result of previous researchers who had to give out money before they could provide information. Likewise, this research was conducted during the period that people were busy in farms harvesting their crops and had less time to be interviewed. More time is required to carry out this type research as villagers were not available at their homesteads. Finally, this research is a case study and therefore generalization is limited to the study area. There is no point to take the results as a general view of Tanzanian rural populations.

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APPENDICES

Appendix 1: Survey questionnaire for interview with respondents

Section A: Respondent's demographics and general information

1. Age

1	15-19	
2	20-29	
3	30-39	
4	40-49	
5	50-59	
6	60 and above	

2. Sex

Male	
Female	

3.

Single	
Married	
Divorced	
Widowed	

4. Education level

Primary school	
Lower Secondary school	
High school	
Vocational college	
University	
Others(specify)	

5. Employment

Public sector(school, health institution etc	
Farmer	
Entrepreneur	
Hired employee	
Seasonal jobs	
Unemployed	
Student	
Retired	
Others(specify)	

6. Are you a head of household? Yes () No ()
7. How many adults (18 years and above) and children live in your house hold?
8. How long have you been living in this area?.....
9. Do you have a land plot? Yes () No ()
10. How many plots do you have?.....
11. What kind of land plot is it and what is its size?.....
12. Do you have livestock? Yes() No(go to question 14)
13. How many livestock do you have?

Type of animals	Number
Cattle	
sheep	
Goats	
Horses	
Other(specify)	

14. Considering all sources, what is the income of your family?.....

15. What is the major source of income of your house hold? (Tick up to five items, 1 most important and 5 the least important)

Salary	
Farming	
Livestock	
Income from renting out land, equipment etc.	
Pension	
Non wood-Forest products	
Remittance	
Stipend	
*Unemployment	
*Social benefits (disability benefits, etc.)	

16. How far is the forest from your house (in kilometers)?.....

17. How do you get there?

Section B: Non-wood forest products.

1. Do you know what NWFP resources your forest has? (Tick one)

I don't know anything about NWFP resources	
Yes I know some resources	
Yes I know all resources	
Not sure	

2. To what extent do you depend on NWTFFP resources for your livelihood? (i) 0-10% (ii) 11-30% (iii) 31-50% (iv) 51-100% (v) I don't know

3. This question has three parts. First, what NWFPs resources do you harvest from forest? Indicate up to five resources in order of priorities (specify 1 to 5, 1 being the most important). Second, How many days or how many times a year do you spend harvesting the NWFP? Third, in your opinion which of the following NWFPs activity produces the most income? *Please mark up to 5 items with 1 being the most profitable and 5 the least profitable*

NWFP activity	Priority	Number of times/Days per year	Profitability
Collect(graze) fodder/hay for livestock			
Collect Tannins, dyes, latex, gums and resins			
Collecting medicinal and aromatic herbs and plants			
Collecting mushrooms			
Butterfly farming			
Basket and Mats Weaving			
Collect fruits(specify)			
Collect roots and tubers			
collect nuts(specify)			
Collect thatch and fibre grass			
Collect wild vegetables			
Collect wild grains			
Collect honey and beeswax(beekeeping)			
Game hunting(meat)			
Others(specify)			

4. Who is involved in collecting NWFPs?

Man	
Woman	
Children	

5. What is your purpose for collecting NWFP?

NWFP category	Subsistence	Commercial	Subsistence and commercial
Collect(graze) fodder/hay for livestock			
Collect Tannins, dyes, latex, gums and resins			
Collect medicinal and aromatic herbs and plants			
Collect Mushrooms			
Butterfly farming			
Basket and Mat weaving			
Collect fruits			
Collect wild grains			
Collect wild vegetables			
Collect roots and tubers			
Collect nuts(specify)			
Collect root and tubers			
Collect thatch grass and fibre			
Beekeeping forest land			
Game hunting(meat)			
Other use(Specify)			

6. To whom and where do you sell the most important NWFPs?

Companies/middlemen	Local market	
Final consumer	International market(export)	

7. Are you satisfied with your income? Why?

8. Do you have some ideas for improving income generation from NWFPs?

9. Do you think Companies/middlemen earn more than you from NWFPs? Why?

10. Can you produce according to the demand? Is the market seasonal?

11. How can the market for NWFPs be improved?

Section 3: Policy and forest use regime

1. Do you know the legal rules about forest management and forest resource use?

Yes	
No	
Some	
I am not sure	

2. Do you think these rules are clear?

Yes, they are all clear	
No they are not clear at all	
Some rules are clear	
Yes	
No	
Some	
I am not sure	

3. Do you think these rules consider the interests and needs of people in the community? How should they be improved?

4. If the community received easier access to forest resources, do you think it will destroy the forest? Why?

5. How should women participate in the decision making on how forest resources are managed and used?

6. Would you like to participate in decision making on how forests are used and managed? How?

7. In what decisions would you like to participate the most (mark 3)

Improvement of forest resources	
Maintenance of forests	
Allocation of use rights to harvest NWFPs	
Protection of forests from fires etc.	
Other(specify)	

8. Do you think EAMCEF/Government makes fair decisions on allocation of use rights?

Yes, always	
No, never	
Sometimes	
I am not sure	
Other(specify)	

9. Do you have any arrangement with EAMCEF/Government on accessing forest resources (NWFPs)?

I don't have any arrangement with EAMCEF/government on the use of forest resources	
I have informal arrangements with EAMCEF/government on the use of forest resources	
I have formalized arrangements with EAMCEF/government on the use of forest resources	
Other(specify)	

10. If you pay for NWFPs resources, how do you do that?

I pay informally in cash	
I pay in kind	
I work in forest as payment	
I don't pay	
Other(specify)	