CONTRIBUTION OF NON-TIMBER FOREST PRODUCTS TO RURAL HOUSEHOLD ECONOMY AND CONSERVATION: A CASE OF RURAL MUFINDI DISTRICT, IRINGA REGION, TANZANIA

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ABSTRACT

Non Timber Forest Products (NTFPs) are highly valued worldwide and available in catchment forests in Tanzania. They play an important role in contributing and sustaining household's livelihoods around forest areas. A study was conducted to analyse the contribution of NTFPs to rural household economy and conservation. Data was generated through household questionnaires, key informant interviews, Focus Group Discussion and researcher direct observations. Quantitative data were analysed using SPSS software while content analysis was applied for the qualitative data. Findings have shown the differences of market trends between NTFPs and agricultural products. Results disclose that, most (86.7%) rural households engaged in agriculture activities. It was observations that, agricultural produce is more on market despite its market price fluctuation that was associated seasonality. Furthermore, NTFPs were sold when in surplus at household levels. Analyses further indicated that NTPFs business was largely conducted by female respondents than males. Respondents indicated a number of challenges facing the NTFPs business including: securing a sustainable resource supply, accessing market information and developing ways of overcoming uneven power and barriers to market entry. The study recommends that government should employ more forest officers and provide education on direct economic importance of NTFPs to improve rural household business environment.

INTRODUCTION

In the recent decades, there has been increasing concern on the contribution of NTFPs to community livelihoods, development and poverty alleviation among rural people (Abdulla 2013). Most people living in the world adjacent to forest reserves depend on the NTFPs to sustain their daily needs. Therefore, any conservation efforts of such resources should recognize how the host communities interact with them (Abdulla 2013). NTFPs being a constituent important source for the livelihoods across million people worldwide e.g. NTFPs contributes to poverty reduction through income generation and foreign exchange (Brian *et al*. 2011).

NTFPs are highly valued worldwide and available in catchment forests in Tanzania, which play an important role in contributing and sustaining to household livelihoods living around forest areas (Mbwambo *et al.* 2014). However, minimum attention has been given to the NTFPs. Despite NTFPs not being most important in producing income generating products, they do contribute significantly to household's income, food security and household's health care (FAO 2016). They are as well crucial in providing multiple social and cultural services (Ojea *et al.,* 2016; Endamana *et al.* 2016).

Although management of forests is expected to focus on both timber and non- timber

components, in most cases emphasis has been put on timber production (Rowland *et al.* 2016; Ickowitz *et al.* 2014). Studies indicate that, NTFPs offer different opportunities not provided by agriculture or any other economic sectors in rural areas (REDD 2010; FAO 2016; Sorenti 2017). However, there is a challenge existing on accurate evaluation of NFTPs as revenue to local people. Moreover, the importance of NTFPs in household income is not well known due to the absence of a systematic and rigorous data collection system at national levels in many developing countries (FAO 2012).

Mufindi District is among biodiversity rich areas where small scale business on NTFPs is common. However, the extent to which the business contributes to household's income of the participating communities and conservation implications are yet to be understood (Mufindi District Council 2013). The specific objectives of the study were to (i) identify the most preferred NTFPs by the households, (ii) evaluate the economic activities that provide more income to the household's members, (iii) examine market chain and conservation practises of prioritized NTFPs, (iv) determine challenges associated with NTFPs business and conservation efforts in the study area.

MATERIALS AND METHODS

Study Area

Mufindi District lies between latitude 8° 00′ – 9° 15′ South and longitude 34° 35′ – 35° 55′ East. The district is bordered by Iringa Rural District to the North, Morogoro Region to the east, Njombe District to the South, and Mbeya Region to the West. It is situated about 80 km from Iringa Municipality and borders Kilolo to the northeast and Kilombero to the southeast. Two distinctive features, specifically the Eastern Highlands and the Mufindi Plateau characterize Mufindi District (Figure 1).
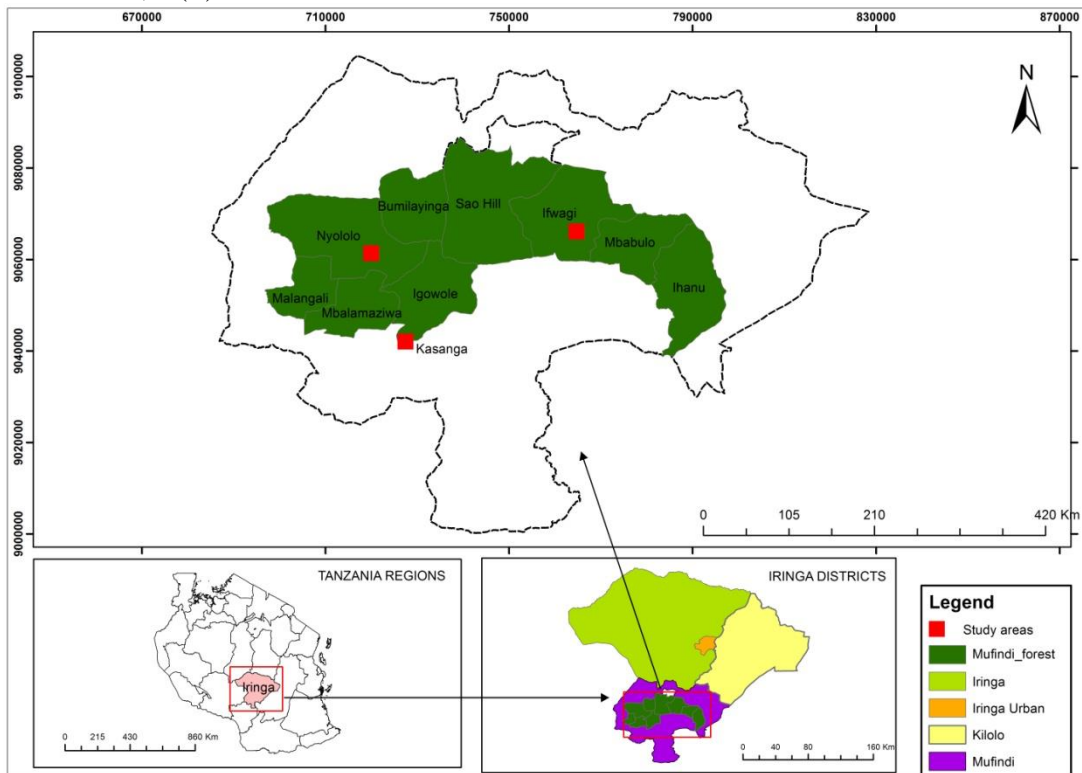
Figure 1. Map of Tanzania showing study villages in Mufindi district, Iringa region.
Source: IRA (Institute of Resource Assessment, GIS lab, 2018)

Mufindi District covers 7,123km², which is about 19.9% of the total area of Iringa Region (Mufindi District Council 2013). Most (652,630 hectares (ha) equivalent to 91.6 %) of the total land area, is arable land used for crop production and the remaining 59,670 ha (8.4 % of total area) is either covered by forest reserves, Rocky Mountains or water bodies (Mufindi District Council 2013).

The major economic activity in Mufindi district is agriculture. National Agriculture Sample Survey (2008) report shows that Agriculture Sector ranked first in regards to the selling of both annual and permanent crops. Cash income comes from selling crops (55.5 %), selling live livestock and their products (6.9 %) casual cash earnings (16.6 %), different businesses, (9.2 %) and (5.7 %) is wages and salaries. In addition, significant cash earnings (3.5 %) come from outside the District as remittances while forest products account for1% of the income of Mufindi inhabitants (Mufindi District Council 2013).

The major ethnic group is the Hehe who constitute about 85% of the entire population (Mufindi District Council 2013). Other ethnic groups are Bena, Pagwa and Kinga that makes the remaining 15 % (*Ibid*). The later, migrated into the District from neighbouring Njombe and Makete districts in search of business, agricultural land and employment (Mufindi District Council 2013).

The population of Mufindi District increased from 282,071 people in 2002 to 317,731 in 2012, contributing about 34 % of the population of Iringa Region (URT 2013). Based on 1988-2002 annual average growth rate of 1.5 %, the district is estimated to have minimum population growth rate at 1.4% compared to other districts and is below Iringa regional average of 1.6 % as well as the national average growth rate of 2.4% (Mufindi District Council 2013).

Sampling design and sample size

A sample size of 5% as a representative of the total population was used in three selected villages. For the questionnaire interviews were head or spouse of the household was selected. A total of 120 respondents were thus sampled for the study. This was purposively for comparing the economic contribution and conservation of NTFPs between the three areas.

Data collection

Data for the study were obtained from two sources: primary and secondary. Primary data was collected through household interview, key informants, Focus Group Discussion and Researcher direct observation. Secondary data were obtained through documentary review where by various documents related to the study including journal, articles, books, reports from government offices and electronic sources from the Internet and published and unpublished documents were used.

Household Interviews

Household interviews were conducted using both closed-ended and open-ended questions, the respondents for the questionnaire interviews were head or spouse of the household. These interviews were randomly selected with the aid of the village record.

Some of the key issues addressed in the questionnaire include: the types of NTFPs preferred, challenges or opportunities of NTFPs, as well as how has the market chain extended from the prioritized economically valuable NTFPs in the study area. Other issues that were collected using this technique were the demographic information of the interviewee, their socio-economic information, information on variety of NTFPs collected, use thereof, sells volumes, and market situation.

Focus Group Discussions (FGDs)

A semi-structured participatory discussion was conducted to gather information with a small but variable number of discussants

between 6-12 both male and female of above 20 years old was considered, the groups were therefore selected from the surveyed population within the three selected villages. The FGDs importance is to draw upon respondents' attitudes, feelings, beliefs, experiences and reactions in a way in which would not be feasible using other methods including observation, one-to-one interviewing, or questionnaire surveys.

Key Informants

Unstructured interview was conducted to capture information during the discussions these were, village executive officers (VEOs), village chairmen (VCs), Forest officers and knowledgeable. The information captured during these discussions include revenues generated from NTFPs, contributions made by the NTFPs to local communities' livelihood, as well as challenges and strategies to promote conservation and use of NTFPs.

Direct Observation

Direct observation was used as a method that involves seeking of information using sense of sight, which thus allows the researcher to observe the community daily life and their interaction with NTFPs business around. The observation guided the researcher and gave an opportunity to look on what is taking place and gather the expected data on the physical and human settings due to the nature of the study for an effective expected data collection.

Data analysis and presentation

Both quantitative and qualitative data analysis procedure was used. The quantitative data coded, edited and analyzed using Social Package for Social Science (SPSS). Descriptive statistics frequencies, means percentages; table and graphs propositions was employed. The data in structured form was analyzed quantitatively and measured objectively to become statistically valid. This helps to deduce the meanings, concepts, definitions, characteristics, metaphors, symbols, and description of things to generate reliable population based and generalized data and establishing cause-and-effect relationships (Amaza *et., al,* 2009). The data in unstructured form was analyzed by qualitative data and manipulated manually using the content analysis method (Bernard, 1988).

RESULTS AND DISCUSSION

The most preferred NTFPs in the Mufindi District

Nine species of NTFPs were reported as important by the interviewed interviewees in the study area. The mentioned preferred NTFPs include: firewood, wild fruits, wild vegetables, mushroom, honey, fodder, ropes, bamboo and brooms. Table 1 present the various NTFPs and the percentage of respondents that recognized them. In the study areas various NTFPs were acknowledged different.

Table 1: Reported preferred NTFPs and percentage of respondents who mentioned them as important in the study area [N=120]

S/N	Preferred variable (NTFPs)	Respondents preference Yes	No
1.	Firewood	100%	0%
2.	Wild fruits	100%	0%
3.	Wild vegetables	100%	0%
4.	Mushroom	34.2%	65.8%
5.	Honey	76.7%	23.3%
6.	Fodder	65.8%	34.2%
7.	Ropes	65.8%	34.2%
8.	Bamboo	42.5%	57.5%
9.	Brooms	23.3%	76.7%

Economic activities which provide more income to the households of the studied areas

When asked about households economic activities in the areas, a majority (86.7%) of respondents mentioned agriculture as key while the remainder thought NTFPs were important household income earning activity.

Similar feedbacks were also given during focus group discussions and key informant interviews. Further discussions revealed that, agriculture was categorized as important economic activity households and NTFPs as supplementary income generating activity. Similar findings had also been reported by Endamana *et al.* (2016) who said that forest products resources as food security for the livelihood serves to supplement existing food resources for subsistence and income generation

The results indicate that agriculture plays a very important role in providing food and income for the majority of the households (FAO 2014). Also, it accounts for an average of 45% of Gross Net Product and 60% of total export earnings (Majule 2008).

Agriculture is dominated by smallholder farmers who depend mostly on rain fed agriculture; therefore there is a need for supplement products from other sources to sustain the household food security (Mongi *et al.* 2010). Other studies conducted

elsewhere have indicated that NTPFs are of increasing potential when it comes to households' incomes and they have expanded the opportunities among rural livelihoods (Kalu and Anigbere 2011).

A comparison of gender engagement in the NTFP business in the areas indicated that, there were more (65%) women who were engaging in the business as compared to men. The reason for this trend could be that the business was regarded as supplementary to household income. Most men assisted females to purchase basic household requirements especially for their children and food. Further, most men preferred to engage in high pay income generating activities such as cash crops cultivation and honey business.

Despite such straight forward gender engagement in household income generating activities in the areas, during focus group discussion and key informants interview respondents revealed that NTFPs were important household sources of income and food supplement during dry season and when there were low yields from agriculture. Chikamai *et al.* (2000) reported that, failure of crop production or bad weather (dry season) NTFPs used to provide household food security through supply of various products from the forest as an alternative source.

Table 2:   Sources of income in Mufindi district

Sources of income	N	Mean	SD	t-vale	Sig
Agriculture	120	1.0000	.00000	8.152	0.0000
NTFPs	120	1.3583	.48152	8.152	0.0000

*Statistically significant at 0.05 and 0.01 level of significance, ns = not statistically significant at 0.05 level of significance, t = test statistics

The findings show that NTFPs do contribute to the household income in the study area. The mean income from NTFPs (M= 1.3583, SD= .48152. N= 120) was significantly greater than zero, t (119) = two –tailed p= 0.000), providing evidence that the NTFPs

are effective in contributing household income by supplementing other sources. The study observed both agriculture and NTFPs are the activities done in the study area, although most of the respondents were conducting agriculture activities which were

revealed to be in a higher percentage (86.7%), still the communities around used NTFPs as a source of food surplus in different season. Thus, NTFPs contributes significantly to the household income in the study areas.

Market chain and conservation practises of the prioritized NTFPs in the study area

Largely, of the 75% of the interviewed individuals and groups said that most of the people collected NTFPs for household use and a few sold them to earn some money. If the business did not get profit the household suffer food shortage and NTFPs business is used as supplement to increase food security. The results are similar to those of van Schalkwyk *et al.* (2012) who reported on market availability that market provide the opportunity to generate income also

drive production to meet consumer demand in terms of quantity and quality.

The majority (65.8%) of the respondents reported that the main buyers of their NTFPs are both the villagers and the middlemen from town (Table 3). According to them, NTFPs markets were localized largely because they had no options. Previously, Mukul (2011) had reported that local markets for NTFPs were important especially for poor people as they are accessible, less technological and requires minimal capital investment is needed cause they are fewer intermediaries involved than in international markets, thus they depend on NTFPs either as a part of their diet or as a source of income through availability of market.

Table 3: Reported market chain locality and percentage of the priotized NTFPs sold in the study area

Localities	Types of NTFPs sold	Main buyers	Frequency	% Response
Mtili	Honey, wildfruits & mushroom,	Villagers	34	28.3%
Kasanga	Ropes, fodder, firewood & *cunnighmamiana spp*	Middlemen from town	7	5.8%
Nyololo njiapanda	Bamboo, wildfruits, honey, vegetables, ropes, fodder & firewood	Both	79	65.8%
	Total		**120**	**100%**

Source: Field survey (2018)

Challenges association with NTFPs business and conservation efforts

There were problems associated with collection of NTFPs and the respondents mentioned them including harassment, (gender, wild animals), distance, market and license there were presented in Figure 2. Respondents revealed that there is unavailability of NTFPs throughout the year. Though some NTFPs are throughout the year but most of NTFPs are seasonal hence there is time that they do not have the products on which they depend most.

Conservation efforts/ Practices done in the study area

Majority of respondents revealed there is government support given by the village government in the study villages. Despite the support given by the government to the stakeholders on the conservation practises, majority of the respondents revealed that there are practises, and people responsible to oversee on what is really done are the government officials which include village executive officers (VEOs), village chairmen (VCs) and forest officers who make sure that it is discussed through the village

meetings concerning the protection of the forest, that is cooperated among them and the community they lead. Some of these

practises used including making glades, patrols, licence and conservation education
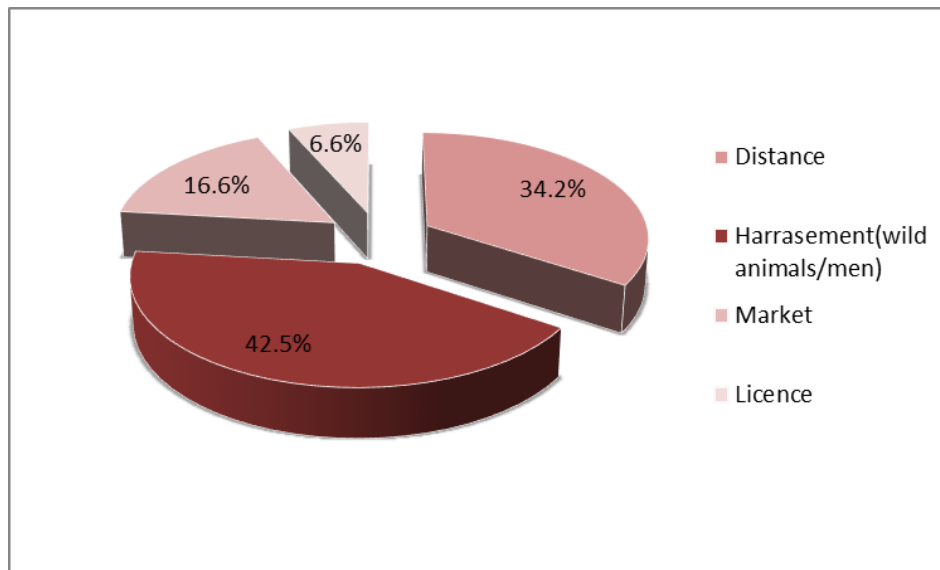

Figure 2: Reported challenges in collecting/selling of NTFPs. *Source*: Field survey (2018)

Socio-economic factors contributing to the trends of NTFPs collection in the studied villages

The socio-economic variables have significantly influence the collection of firewood, wild fruits, wild vegetables, mushroom, honey, ropes, bamboo, fodder and brooms**.** That to say, when factors influence the adoption of NTFPs it reflects the trends of the resources availability. Hence, personal and socio-economic variables in the study area were considered as important variables, which influence the participation in NTFPs collection this included; gender, age, level of education, occupation, marital status and years stayed in the village. The study findings reveal that the assessment and adoption of a strategy depends on the characteristics of the strategy and the perception of the adopter (Scott 2012).

CONCLUSION AND RECOMMENDATIONS

Base on the study objectives of the study on the contribution of NTFPs to rural

household economy and conservation. Various NTFPs which are economically preferred in the area of study were firewood, wild fruits, wild vegetables, mushroom, honey, ropes, bamboo, fodder and *cunnighmamiana spp.*

Notably respondents' economic activities found in the study area as sources of food and income is from NTFPs business and agriculture activities ie; crop production and livestock keeping. Therefore, finding from the study revealed that, even if most of the rural households (86.7%) engaging in agriculture activities as their main livelihood economy despite the market price fluctuation still they need to supplement their family household income in commercializing and selling of NTFPs.

Majority of the local communities in the forest areas are involved in the gathering of NTFPs because the business empowers them and boost up their livelihood. Thus, enabling them to continue to contribute to the up keep of their households in particular and their social system in general. NTFPs are also used for household

consumption including food, medicine, and recreational purposes.

Since collection of NTFPs is also influenced by respondents' socio-economic variables, and the business is mostly done by women than males in the study area, the business cannot be possibly prevented, and since the community have shown their willingness to support and participate in any community forest programme and conservation efforts in the management of the forest. The Government should without delay initiate community forest programmes in contributing their household economy.

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