

**ROLE OF NON TIMBER FOREST PRODUCTS TO LIVELIHOODS OF
RURAL HOUSEHOLDS: SETIT HUMERA, WESTERN TIGRAY,
ETHIOPIA**

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ABSTRACT

In Ethiopia Non Timber Forest Products (NTFPs) are used to supplement diet and households (HH) income. Despite the recognition of NTFPs importance to livelihood, there is little study made on their ecology, use and managements. Hence, this study was carried out to assess contribution of NTFPs to HHs income, to identify NTFPs

collected for income generation, to examine gender role in NTFPs utilization and to know access right of NTFPs collection in *Setit Humera*. The study employed stratified sampling from three wealth strata (poor, medium and rich) of one *Kebele* which was subdivided into eight *subkebeles* of which five were involved in the study. Data were collected through face to face interview with head of HHs and direct field observation. Results of the study revealed that regardless of wealth status 40 percent of HHs were participated in NTFPs collection. The commonly collected NTFPs for income generation were for: food, feed, fuelwood, construction materials and materials (including tool handles). The mean annual income obtained from NTFPs collection was statistically insignificant among the wealth groups. Nevertheless, average income Birr 1269, 1189 and 1031 was derived from NTFPs per year by the poor, medium and rich respectively. Moreover, collection and marketing of the NTFPs was dominated by men. Access to NTFPs was open with some restricted NTFPs types. Thus, it is essential to manage the woodland resources including NTFPs in order to sustain local peoples' livelihood and the environment. Furthermore, detailed and extensive research is essential in the near future in order to obtain more reliable information on the existing woodland resources utilization and management.

KEYWORDS: Access of NTFPs, gender role, HH income, availability of NTFPs, NTFPs.

INTRODUCTION

There is no a single as well as standard definition of NTFPs found in the literatures (Gary and Kristin, 2005; Ahenkan and Boon, 2011). NTFPs can be defined in broadest sense as “Any biological resources collected from wild by people for direct consumption or income generation on a small scale” (Shackleton and Shackleton, 2004). This definition is applied for this study.

NTFPs can be classified into different categories (Jeannette, 2000; Aramde, 2006). The common NTFPs type of categorization listed by the International Economic Botany Data Collection Standard (IEBDCS) is based on use categories namely: food, fuel, feed, medicine, construction materials and animal products (Andel, 2006). The categories by IEBDCS were adopted for this study.

For centuries, people of the tropical rainforest have been collecting NTFPs for subsistence and income generation (Pfund and Robinson, 2005). For example, an estimate done by WHO showed that 80% of the people living in developing countries use wild plants to meet some of their health and nutritional needs (Agbogid, 2010).

Similarly, in Ethiopia NTFPs are used to supplement diet and household income, especially during particular season in a given year (EARO and IPGRI, 2004). However, little effort has been made to study the ecology, use, and management of many NTFPs (Martinez, 2004), except for a few species and products of commercial importance (FAO, 2004*b*). Consequently, NTFPs are given less weight in policy and decision-making processes of natural resource management (Bishop, 1998; Berhanu, 2004).

In connection with this fact, there is little documented information regarding the contribution of NTFPs to the livelihood of the study area. Meanwhile, agriculture is given the highest attention for development of rural livelihoods and national economy by the government. However, agricultural expansion and practices are some of the plausible factors for deforestation and subsequent consequences such as soil erosion and degradation. Therefore, to avoid or minimize deforestation related negative result and to diversify the livelihoods of rural households, NTFPs can be a right alternative that deserves investigation at the study area. Hence, this study has explored role of NTFPs to livelihoods of the study area.

MATERIAL AND METHODS

Description of the study area

The study was conducted at Setit Humera which is found in Kafta Humera *woreda*, western zone of Tigray regional State, Ethiopia. Kafta Humera *woreda* has eleven *sub-woredas* (Figure 1). The study area is located approximately between longitudes of 36⁰36' to 36⁰37'E and latitude range of 14⁰16' to 14⁰17'N and with an elevation ranges from 581 to 607 m.a.s.l. There is no documented information about the particular study area. But, at *woreda level* it has high temperatures which rises to an average of 42 °C between April and June and fall to between 25 and 35 °C between June and February. The annual rain fall ranges from 400 to 650 mm, which is unimodal that lasts from June to September (LPTR, 2007).

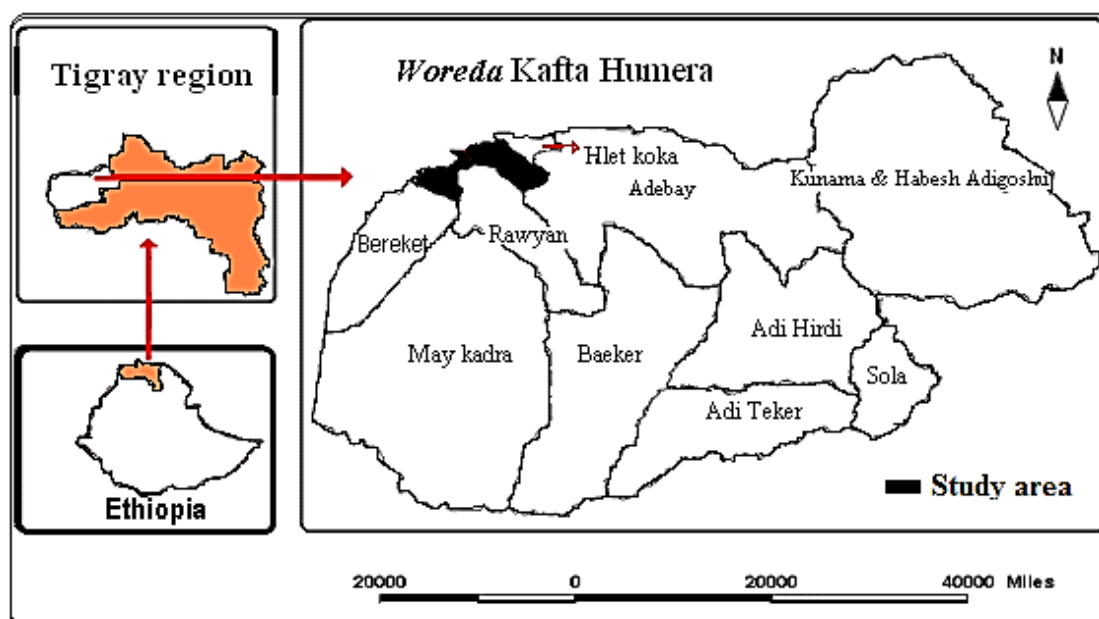


Figure 1: Location map of Kafta Humera *woreda* [Adapted and modified from Haile (2007)]

Methods of data collection, sample size and procedure

The data were collected through various data collection methods. The major data collection method is survey questionnaire. Sample households were selected and face-to-face interviews were held with heads of the HHs using semi-structured questionnaires. To enrich and cross check the information obtained from the survey, interview of key informants and direct field observation were also conducted. Key informants were selected based on their knowledge of the community, duration of stay in the area and knowledge of existing resources of the study area.

The number of sample households for interview was determined using the formula developed by Cochran (1977) cited in Haile (2007). Since HHs of the *kebele* at the study is less than 10,000 (i.e. 1,364). Hence, sample size required for the study was determined as 70 households.

As any other communities, there are wealth inequalities and difference among HHs of study area. Difference in wealth is believed to influence people's behaviors, coping strategies and views with regard to collection of NTFPs. Hence, stratification of wealth group was made based on assumption that community members have good sense of who among them is relatively prosperous. However, wealth ranking is sensitive issue to discuss with every member of community (Simon, 2000). Therefore, key informants were asked independently to stratify HHs into three wealth groups based on number of livestock and farmland size owned (LPTR, 2007; Ridgewell *et al.*, 2007; Muzayen, 2009).

Table 1: Criteria for stratification of HHs in wealth.

Indicators	Wealth categories		
	Poor	Medium	Rich
Size of Farmland (ha)	Less than or equal to 3	4-30	More than 30
Number of livestock	Less than or equal to 10	11-35	More than 35

The study involved one *kebele* (*kebele-I*), which is purposively selected for assessment, due to observation of NTFPs use by HHs and ease of accessibility to conduct the study. The *Kebele* was sub-divided into eight *sub-kebeles*. Five *sub-kebeles* were randomly selected. Fifteen HHs per a *sub-kebele* were sampled.

Data analysis

The quantitative data collected from respondents were summarized and statistically analyzed using SPSS.16 version software. The analysis was made employing descriptive statistics (mean, trimmed mean, standard deviation, range, frequency and percentage) and used to describe the socio-economic profile of NTFPs, at the study area. The qualitative information was also analyzed to crosscheck quantitative data and support the arguments obtained from the field.

RESULTS AND DISCUSSION

Socio-economic profile of the sample households

With regard to wealth status, there are variations in agricultural land sizes among respondents. The average farm size of the poor households was 0.24 ha, while the medium

wealth stratum households owned about 7 ha of farmland on average. The rich wealth group holds the largest land area in hectare, more than 12 folds of the medium wealth group land holding size. Similarly, the number of livestock owned among surveyed households show significant variations. Households in the poor wealth stratum owned as few as two livestock on average and the medium wealth group had about four folds of the poor wealth group, while the rich wealth group owned 35 times of the poor wealth group livestock number.

The main sources of income of the surveyed households

The households were described by their main source of income with regard to their wealth as well as regardless of their wealth status as below (Figure 2 and 3).

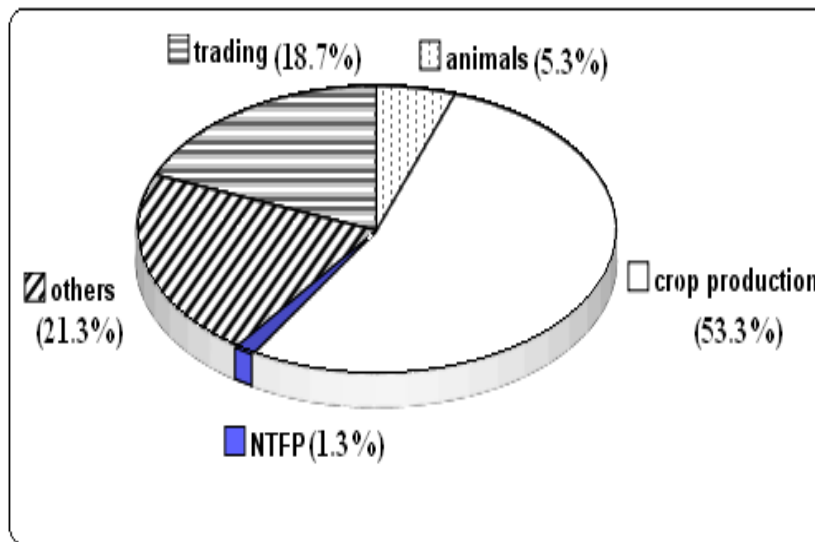


Figure 2: Main income sources of households regardless of wealth status.

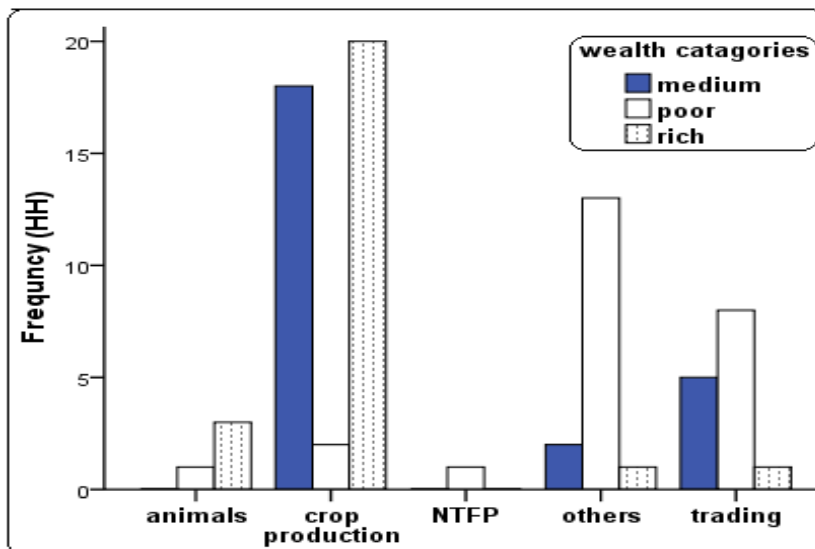


Figure 3: Main income sources of HHs with regard to wealth status.

Generally, the households were found to be dependent on activities of crop production, trading, animal husbandry, NTFPs collection and others (such as sale of local beer, hair dressing and government employee) as main source of livelihoods (Figure 3). However, this does not mean that a household have only one means of income. On the other hand, there are differences in the level of dependency on crop production among wealth groups. The dependency on crop production for household was found to be 2.67%, 24% and 26.67%, respectively for the poor, medium and rich wealth groups, while share of NTFPs was only 1.3% engaged only by poor wealth group (Figure 3).

Rural people involved in a set of activities such as crop production, animal husbandry and forest for their livelihoods in Ethiopia and elsewhere (Abeje, 2002; Chanthalangsy, 2009; Roy, 2010; Wakshum, 2010). Correspondingly, the results of this study confirmed that the households were dependent on similar activities as main source of income for their livelihoods.

Furthermore, NTFPs were recognized as main source of income particularly for a few households in the poor wealth group. In this regard, results of this study seems to agree with study of Kusters and Belcher (2004), and Shackleton (2004) who found that for many households uses of NTFPs are not their primary source of livelihood, but it is complementary. Thus, the results of this study indicated that there is a possibility that NTFPs can be an alternative means of income and/or integrated with other activities for livelihoods of poors wealth group at study area.

Involvement of households in NTFPs collection

The participation of households in collection of NTFPs regardless and with regard to wealth status was represented as below (Figure 4 and 5).

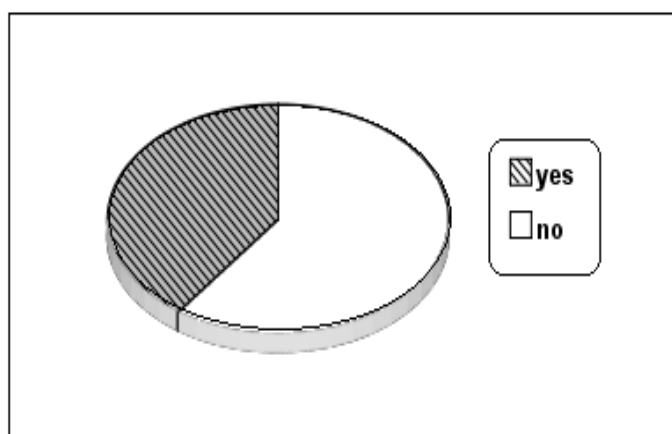


Figure 2: Proportion of the HHs involved in NTFPs collection in general.

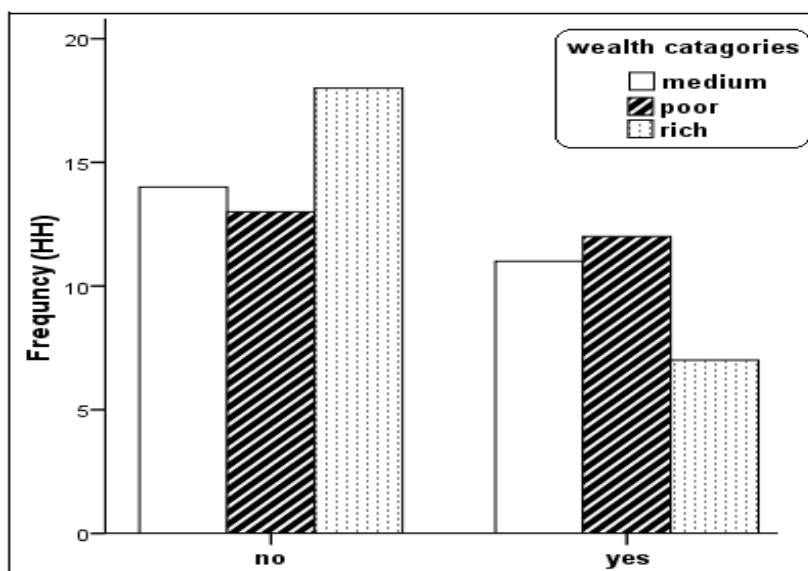


Figure 3: Proportion of the HHs involved in NTFPs collection by wealth status.

Figure 4 illustrates that 40% of households participated in collection of NTFPs, while the remaining 60% indicated that they did not participate in collection of NTFPs. Among those who were involved in NTFPs collection, 16.0%, 14.7% and 9.3% are poor, medium and rich wealth groups, respectively.

The results indicated that households involved in NTFPs collection is lower in contrast to other studies conducted elsewhere in Ethiopia. For instance, Aramde (2006) and Muzayen (2009) reported that 100% and 88.6% of surveyed households were involved in NTFPs collection in Menagesha Suba Forest and Harana Bulluk District Oromiya Regional State, Ethiopia, respectively. The possible reason for this difference might be majority of people at the study area are more involved in agriculture and other activities than NTFPs collection. However, this does not mean necessarily majority of the households have not used any NTFPs for different purposes. For example, regardless of their wealth status about three fourth of the households houses were built of wood from NTFPs.

In addition, it was indicated that collector households were not limited to one wealth group. This means that the surveyed households involve in NTFPs collection for diverse purposes regardless of wealth status. This was consistent with results of many case studies conducted in Ethiopia and elsewhere that reported people of different wealth status participated in NTFPs collection (Berhanu, 2004; Shackleton, 2004; Muzayen, 2009; Roy, 2010).

Furthermore, 97% of the collected NTFPs were used for household consumption and only 3% used for income generation among collector households regardless of wealth status. In this case, NTFPs collection among majority households was similar, that is mainly for home consumption. On the contrary, Muzayen (2009) reported that purpose of NTFPs extraction differs on the basis of wealth status and explained that income obtained from NTFPs collection is used for asset formation rather than for household consumption in the rich wealth group. Therefore, regardless of wealth status NTFPs exploitation for income generation was dominated by home consumption at the study area.

Available and commonly collected NTFPs

According to the surveyed households and direct field observation the following NTFPs were available and collected.

Table 2: Available NTFPs collected by households.

Use categories	Examples provided by respondents	HHs responded (%)
NTFPs for food	Wild vegetables [<i>Molokia</i> and <i>Wayka</i> (pod of <i>Abelmoschus fitchuneus</i>)] Fruits [<i>Gaba</i> fruit of <i>Zizyphus spina-christi</i> and <i>Mekie</i> fruit of <i>Balanites aegyptica</i>].	69.3.
NTFPs for fuel	Firewood and charcoal mostly derived from the acacia species.	100
NTFPs for construction	Poles and grasses for house construction, fencing and other purposes.	100
NTFPs for animal feed	Grass and herbs more available during the wet season,	90.6
NTFPs for materials	Forest product for bed making, mortar and tool handles (axe and agricultural tool).	86.6

The households listed available NTFPs found at the study area and showed similarity in listing the available NTFPs use categories (Table 2). But they were different in responding of the available NTFPs use categories. A household may or may not list the available NTFPs use categories. For instance, few households responded that only NTFPs for fuel and construction were available. Such variations in listing of available NTFPs among households are perhaps associated with personal experience, involvement in collection NTFPs and length of residence at the study area. Five NTFPs use categories were available and collected at the study area. Almost all of these use categories were reported in many case studies conducted in Ethiopia (Berhanu, 2004; Aramde, 2006). Hence, these NTFPs use categories available and collected were not unique to the study area.

From the available NTFPs use categories listed in the above Table 2, some of them are commonly collected for income generation. These were wild vegetable (*Molokia*: very popular at the study area for food), fuelwood and charcoal, poles for construction, grass (feed) and materials (for tool handle and bed making). These were collected from around farmlands, rangelands and from uncultivated woodlands of the study area.

In this regard, three of the commonly collected NTFPs types namely firewood, construction material and material for household utensils making were found in markets around Menagesha Suba forest area for income generation (Aramde, 2006). This implied that NTFPs were marketable products in addition to consumption at home at the study area. Besides, this implied that these products can be marketed to other places outside the locality for income generation.

According to the response of the collector households NTFPs type were collected in different extent. This was verified as fuelwood was collected by all HHs, 100% followed by grass (feed), 70% then poles, 33.33% and materials 3.33% this information was also ascertained by direct field observation conducted that recognized most of these types of NTFPs were common in streets or roadside and local market for income generation at the study area.

These results indicated that NTFPs collected and used were fuelwood, animal feed, construction material and materials for other use (such as bed, mortar and handle tools) in the order of priority. The reason for the collection of fuelwood by all collectors was due to the fact that it is the main source of fuel energy. This was supported by the investigation conducted on fuel supply and demand behavior of households in rural Tigray. In that biomass fuels, especially wood and dung, were primary source of fuel covering about 96% of total fuel consumption in the Region (TFAP, 1996 cited in Haile, 2007). Animal feed was also found to be second widely collected NTFPs. This was most probably due to the fact that majority of the households own livestock and may be also due to grass was marketable commodity in the locality. The same was true for collection of construction materials, in that about three fourth of the houses of the surveyed households were built of wood extracted from the NTFPs of the study area. Relatively collection of NTFPs for household utensil making was low presumably due to modern furniture were replacing the traditional or locally made household utensil such as seat and bed constructed from wood products obtained from NTFPs. Thus, NTFPs use categories and types were collected indifferent proportions. This provides an opportunity to prioritize which problems should be addressed first. For instance,

a species preferred for fuelwood is given priority than for material making in regeneration activities plan.

Contribution of NTFPs to income of households

The contribution of NTFPs and agriculture to income of households' was presented as below.

Table 3: Mean annual income of NTFPs and Agriculture for HHs economy.

Wealth strata	NTFP (Birr)	NTFP (%)	Agriculture (%)
Poor (n = 12)	1,269.2 [939.1]	15.00	5.83
Medium (n = 11)	1,189.5 [1,163.4]	14.00	59.55
Rich (n = 7)	1,030.7 [1,041.1]	10.00	62.14

Note: Mean [trimmed mean]

As depicted in Table 3 the contribution of NTFPs to the household annual income among the three wealth groups was not similar. The mean annual income from NTFPs to the poor wealth group was relatively highest (*Birr* 1,269.2), followed by the medium (*Birr* 1,189.5). The rich wealth group earns relatively less from NTFPs with an average annual earning of *Birr* 1,030.7. The variation within the poor wealth group was about *Birr* 330 (i.e. 1,269 - 939). This shows that the variation within the poor wealth group was highest, than the medium and rich wealth groups.

This results shows that compared with agriculture, NTFPs cover higher portion of mean annual income for the poor wealth group, while smaller proportion for the medium and rich wealth groups. Also, it was indicated relatively the poor and medium wealth groups derive more income from NTFPs collection than the rich. This was supported by study of Shackleton (2004), Sunderland and Ndoye (2004) and Muzayen (2009) reported that poor wealth group depends more on NTFPs than rich wealth group due to the fact that poor households have few asset bases to sustain their livelihood. Thus, the poor seems depend more on NTFPs for income generation.

Table 4: Result of correlation analysis.

HH characteristics	Pearson correlation (r)
Agricultural land holding (ha)	.002
Family size of household	.192
Length of residence in the study area	-.263
Level of Education	-.167
Number of livestock owned	-.008

- Dependent variable is income from NTFPs collection and * correlation is significant at 0.05 and ** at 0.01 level (1-tailed).

The results of correlation showed that all characteristics of the collector households were not correlated to income derived from NTFPs (Table4). This implied that all households' characteristics considered have no impact on income obtained from NTFPs in this study. Similarly, Muzayen (2009) reported in his study that family size and educational level of collector households were not correlated. While land holding and livestock size were correlated to income derived from NTFPs, which is converse to results of this study. It is conditional that such characteristics of households may or may not correlate to income derived from NTFPs. Hence, difficult to generalize that such characteristics of households have or have not impact on income generation from NTFPs harvesting. Moreover, results of one way ANOVA showed that there was no statistical significant difference ($P > 0.05$) in mean annual income obtained from NTFPs among the three wealth groups. In this case, results of this study seems in agreement with study that demonstrated use of NTFPs is not strictly wealth dependent (Aramde, 2006). This implied that regardless of their wealth status all wealth groups collect NTFPs.

Eventually, results of this study indicated that mean annual income derived from NTFPs in the study area was found low as contrasted to some studies conducted elsewhere in Ethiopia. For instance, study by Mohammed (2007) reported that mean annual income of Birr 1600 per household from NTFPs in South Western Ethiopia, which is about 1.4 times of the income reported in this study. Similarly, around Menagesha forest, NTFPs contribute about 27% mean annual income to households, which is also more than two folds of this study (Aramde, 2006). This variation may be subjected to many factors including household asset, culture and resources endowment of forests (quantity and quality of NTFPs) and location. Therefore, role of NTFPs to livelihoods must be assessed and evaluated in local context.

Gender and collection of NTFPs

Surveyed households' responses for gender differences in collection and marketing of available NTFPs were unlike. About 18.7% respondent said that both men and woman were involved in collection and marketing of NTFPs, while the 81.3% responded that men were main actors in collection and marketing of NTFPs. Based on the field observation the response of the majority respondent seems sound that men were dominant actors especially in collection of NTFPs.

Furthermore, respondent households were able to justify their answers, why they said men or woman was responsible for collecting and marketing of NTFPs. As a result, approximately

half of the respondents (49.3%) who said men were provided reasons for their statement. The reasons were summarized as: (i) matter of physical power (woman is weaker than man to do so), (ii) due to culture of the society, (iii) because of labor division and (iv) priority was given for men.

The reasons provided had the same meaning that they prove men were main actors in collection and marketing of NTFPs. Though implicit, based on one of the reasons provided it seems that there are some occasions women participate in both activities. In this case, results of this study was comparable with a study of Haile (2007) conducted in *woreda Kafta Humera* reported that collection of fulewood from forest has become responsibility of men (65 %), while 35% was contributed by women. In contrast to this fulewood collection in *Borana* areas was responsibility of women (Ridgewell *et al.*, 2007). Besides, Aramde (2006) reported that women were more involved in sale of NTFPs than men. Hence, such kinds of variations are real since gender is shaped by a given culture, social relations and natural environments (SCBD, 2010).

Access right of NTFPs

Access to NTFPs was open to the households. Open access mean in this case people of the study area collect most of the available NTFPs at any time and quantity they desire with some restrictions on a few NTFPs types. According to response of the majority households (78.7%) there are some restrictions on a few NTFPs by the government. Conversely, some proportions of the surveyed households (21.3%) were not conscious about existence of restriction on NTFPs at all. At the same time, majority of the households listed restricted NTFPs types and provide reason(s) for presence of restrictions on a few NTFPs.

Table 5: Restricted NTFPs as listed by respondents.

Restricted NTFPs types	HHs response (%)
Bush meat	54.9
Charcoal production	77.5
Cutting large tree for pole	77.5

Note: 4 HHs (did not give response to restricted type of NTFPs)

The reasons provided for presence of restrictions on a few NTFPs by some portion of the respondents (41.3%) were more or less similar, these were summarized as: because they increase deforestation, land degradation and extinction of wildlife.

One of the key informants, explaining his view while discussing about restricted NTFP types, said “Even if, there is restriction on some forest product and wildlife it should be noted that there is some illegal cutting of trees for different purpose, especially for charcoal production and sometimes hunting for bush meat (e.g. *Zagra* , local name).”

According to Kusters and Belcher (2004) land from which NTFPs extracted is often owned by state and in some cases traditional rule govern access, but in many cases access to the resource is open. So, this study seems consistent with that study. As considerable respondents confirmed that there exist some restrictions and provided reason(s) for the presence of restrictions on some NTFPs types. The reasons provided were relatively similar in the message they carry that was aimed at avoiding deforestation and associated wildlife decline or extinction.

CONCLUSION

This study revealed that regardless of their wealth status households were involved in diverse activities such as crop production, trading, animal husbandry, NTFPs collection and other activities. On top of that 40 percent of households were involved in collection of NTFPs. The major use categories of NTFPs were for: food, fuelwood, feed, construction and material. Some of these available NTFPs were identified as commonly collected for income generation.

Furthermore, the findings indicated that mean annual income generated from NTFPs collection was statistically insignificant among all wealth groups. However, relatively the income seems to increase slightly towards the poor wealth group. It was found in contrast, NTFPs covered smaller portion of mean annual income than agriculture of medium and rich wealth groups.

Also, the gender role in collecting and marketing of NTFPs indicated that men were main actors in collecting along with marketing in the locality. Moreover, access to most of NTFPs in the area was open with some restriction on a few NTFPs type. Therefore, taking into account such contributions of NTFPs, it is important to manage NTFPs in sustainable way, so as to sustain local people’s livelihood as well as the environment. Hence, detailed and longitudinal research is crucial in the near future in order to obtain more reliable information on the available woodland resources utilization and management.

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