

The contribution of Non-Timber Forest Products to the Rural Livelihood: The case of Yayo district, Illu Ababora zone, Oromia regional state, western Ethiopia.

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Abstract

Different studies in different parts of Ethiopia have shown that many rural households depend on NTFP for both subsistence and cash income. However, information on the contribution of forests in household income is not extensively documented in some parts of the country. This study was aimed to generate information on the type and income contribution of non-timber forest product for local livelihoods and the level of dependency on the Yayo Coffee Forest Biosphere Reserve. A total of 105 households were interviewed during formal questionnaire survey from four (4) Yayo forest adjacent *kebeles*. Focus group discussions and key informant interviews were also done in four (4) *kebeles*. The qualitative data was summarized and quantitative data analyzed using descriptive statistics and multiple linear regressions using SPSS version 20. The results indicate that the people in the study area depend on different income sources. The Non-Timber Forest Products are the main sources of household income which contributing 44.7% to the total household income, followed by crop income (34.32%). Forest Coffee contributes the largest proportion of the total NTFPs income (74.9 %). In relative term income contribution of NTFP to poor and medium households, were above half of their total household income, 55.5% and 57.5% respectively, while for rich household it contributing about 35% of the total HH income. In contrast, in absolute term contribution it is the rich household, which extracts NTFP highly. This implies that high dependency of the different wealth categories on the forest. Factors that significantly influence income from the forest include

the total land holding, HH wealth status and forest coffee land holding. Yayo forest plays important role in the rural household livelihoods. Therefore a forest management strategy that involves the local people participation in forest management practices may contribute positively in rural livelihood improvements and will reduce forest destruction.

Keywords: Non-Timber Forest Product, Rural Livelihoods, forest coffee, income sources, Wealth status.

1. INTRODUCTION

1.1. Background Information

Non-Timber Forest Products (NTFPs¹) are any product or service other than timber that is produced in a forest (CIFOR, 2004). They include fruits, nuts, vegetables, fish and, medicinal plants, resins, essences, and a range of barks and fibers such as bamboo, rattans, and a host of other palms and grasses". Non-timber forest products (NTFPs) constitute an important source of livelihood for millions of people across the world (CIFOR, 2004). Probably the majority of rural households and a large proportion of urban households in developing countries, depend on NTFP to meet some part of their nutritional, cooking and/or health needs (Byron and Arnold, 1999).

As stated by different researchers the majority of farming communities in Ethiopia are forest dependant for their livelihood and subsistence use (Demel *et al.*, 2010; FDREPPCC,2008;Gardei 2006; Getachew *et al.*, 2007; Mohamed, 2007; Mulugeta, *et al.*, 2003). According to Gardei (2006), more than 65 percent of the households who were involved in NTFP's did earn more than one thousand Birr (about USD 100 a year from the production of NTFP's alone, while around half of the people use the forest to generate cash income. The most important NTFPs that generate substantial income to rural household and foreign currencies in Ethiopia are coffee, honey, and natural gums and resins. Mulugeta, *et al.*, (2003) also explained that the average annual cash income generated per household from oleo-gum resin was estimated to be US\$ 80.00. One of the geographic areas in Ethiopia that is fully un-quantified is the Yayo Coffee Forest Biosphere Reserve. Due to its diverse ecosystem and rich biodiversity, the Biosphere has a rich products, but the role that these forest resources play in the rural livelihoods is little documented (limited to the high value coffee production). This study was aimed to generate information on the type and contribution of non-timber forest product for local livelihoods and the level of dependency on the Yayu Coffee Forest Biosphere Reserve resources. The information generated is expected to contribute to the improved management of the forest by incorporating the need of local people and to national economic statistics from forestry.

¹ NTFP is Non-Timber Forest Product

2. METHOD AND MATERIALS

2.1. Study area description

2.1.1. Geographical location and Biophysical characteristics

The research was conducted at Yayo district on Yayo coffee forest biosphere reserve. The Yayo coffee forest is one of the 58 national forest priority area in Ethiopia. It is located about 560 km from Addis Ababa toward western, and 38km from Mettu town toward east. It lies between 8°21'– 8°26'N latitude and 35°45'–36°37'E longitude within an altitudinal range of 1200 to 2000 m.a.s.l (Fig. 1). The Yayo districts have three climatic zones: These are highland; temperate and lowland. Such diverse climatic conditions and habitats partly contributed to the occurrence of high plants and animals species diversity. It is characterized by a uni-modal rainfall distribution which extend from May to October and declines in November. The average annual precipitation makes vary from 1,191.6mm to 1, 960.7mm with mean daily temperature 23⁰C ranging from 18.59⁰c to 27.88⁰c. The study area (Yayo district) is divided into three conservation zones, Core zone, Buffer zone and transition zone (Tadesse,2003). The Yayo National forest priority biosphere covers about 58,460 hectares. The dominant plant species in Yayo forest ecosystem are *Albizia gummifera* (*Hambabessa*) and *Cordia africana* (*Waddessa*) (Tadesse,2003).

The total population of the woreda accounts 51,217 which 25,887 and 25,330 are males and female population respectively. In general, the woreda has a total household of 9917 who resides in the rural kebeles and one Kebele of Yayo town (YWAO, 2013 report).

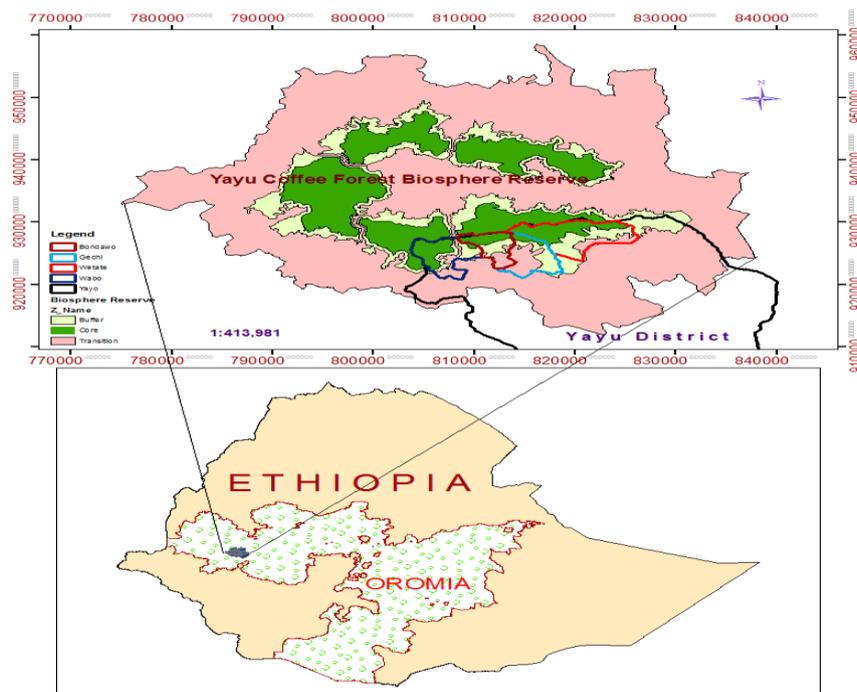


Figure 1 Study area map

2.2. Sampling technique and procedures

Multistage stratified sampling techniques were used to select the study population. This has been done in the following procedure: First, one district namely Yayo district was selected purposefully on the bases of socioeconomic characteristics and involvement in forest collection. Next, from the selected district, a total of 4 forest adjacent *kebeles*²(*Waboo, Bondo, Geci, Wixete*) based on their dependency on NTFP were selected. From the selected *kebeles* 5% of the total households live in the respective *kebeles* were taken as sample households with a total 105 sample households. Two key informants as well as village leaders, *kebeles* leaders, DAs and *Woreda* forestry experts were interviewed were selected from each village for interview. The household selection was made randomly after wealth ranking.

2.3. Methods of Data Collection and Analysis

Various data collection tools were used to collect the required information. Formal survey questioner to collect quantitative data from the selected households and focus group discussions and interview were used to gather mainly qualitative information. The qualitative data was qualitatively interpreted while ,the quantitative data was analyzed by descriptive statistics and the econometric analysis. The analysis was subjected to the Statistical Package for Social Sciences (SPSS) version 20.

3. RESULTS

3.1. Socio-economic character stics of sample household

The majority (89.5%) of the sample households were male headed whereas only 10.5% were female headed. The age of the respondents ranged from 21 - 82 years with the mean age of 45.96 years. About 96.19% of the sample households were in productive working age (under 65 years), while only 3.81 % of the households were older than 65 years. Out of the sampled households widows made up 7.6%, divorced 2.9% and 88.6% married, while only 1% of the samples households were single. Family size ranged between 1-11 persons, with a mean of 5.52 which is almost similar with the Ethiopian national average family size. About 39% of the respondents were illiterate, while 35.2%, 21% and 4.8% had a primary school, secondary school and college level, respectively.

3.2. The main income sources and their contributions to the total household income

The farming practice in the study area can be described as mixed farming system. The people in the study area depend on crop production, forest product collection, livestock husbandry, off/non-farm activities (petty trade and wage employment) and

² *Kebeles*=is the local administrative unit(*Pisant Asosation, PA*)

own farm woodlot for their livelihood. About 55.2% and 32.4 % of the sampled HHs ranked crop production and NTFP as their first priority income source while 8.6% of the sampled household own woodlot, 2.9% of the sampled household animal husbandry and 1% of the sampled household off-farm activities take as their first priority income sources.

The total household income is the sum total of income from the above five income categories. The maximum total annual income of the sampled households in the study area was 234220.00 ETB with mean and minimum income 36013.19 ETB and 3070.00 ETB, respectively. However much of the income goes to household subsistence rather than cash saving. Non Timber Forest products, Crop production, off/ non-farm activities, livestock and own woodlot trees contribute to the total household income in the order of 44.7%, 34.32%, 11% and, 8.987% and 1%, respectively (Figure 2).

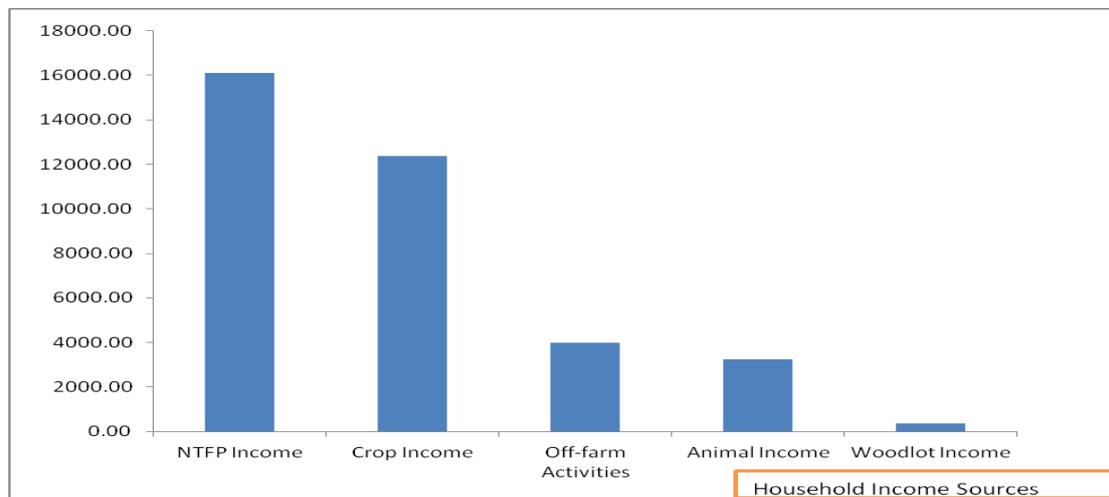


Figure 2: The Major Sources of income and their mean contribution (ETB / year/ hh)

3.3. Types of Non-Timber Forest Product and their income contribution

3.3.1. Types of Non-Timber Forest Products

In the study area, forest coffee, fire wood, wide honey, wide spice and farm inputs were identified as the first major types of forest products have been extracted from the forest. Limited medicinal plant and forest grass are also reported. Finding from focus group discussions indicate that the communities' donot allowed to extract the forest products like Timber, forage and forest grazing.

Of the sampled almost all (98.1%) households engaged in forest product collection as their sources of income even though the forest product preference is vary among households (Table 3). As stated by focus group discussion the most important forest product which many households depend on, was fire wood. Nearly all households (95.2) in the study area engaged in the forest for firewood collection, only about 4.8%

of households were not responded. This implies that many households in the study area were depending on the forest for their household energy consumption. In this study area no one has responded firewood collection for cash income earning.

Forest coffee is the very important and high value commercial forest product, which of the NTFP that about 83.8% of the sampled household were engaged on. About 20% and 12.4% of the sampled households were engaged on Wide spice and wide honey respectively. As stated on focus group discussion, in the study area the practice of traditional medicinal plant and animal feed collection were common, but their monetary value were undefined. Because of the undefined unit price of these products, we couldn't get their proportional income contribution to the total forest income (Table 1).

Table 1:Types of NTFPs available in the study area

Types of forest product	Frequency	Percentage (%)
Fire wood	100	95.2
Forest Coffee	88	83.8
Wilde spice	21	20
Wide honey	13	12.4
Medicinal plant	0	0
Animal feed	0	0
Total household forest engagement	103 hh	98.1%

3.3.2. Non-Timber Forest Product Income contribution

In the study area Non-Timber Forest Products are the main sources of household income contributing 44.7% to the total household income, followed by crop income. The total income derived from the Non-Timber Forest Product by the sample households varies from 0 to 62,838 ETB with a mean of 16086.94 ETB per annum.

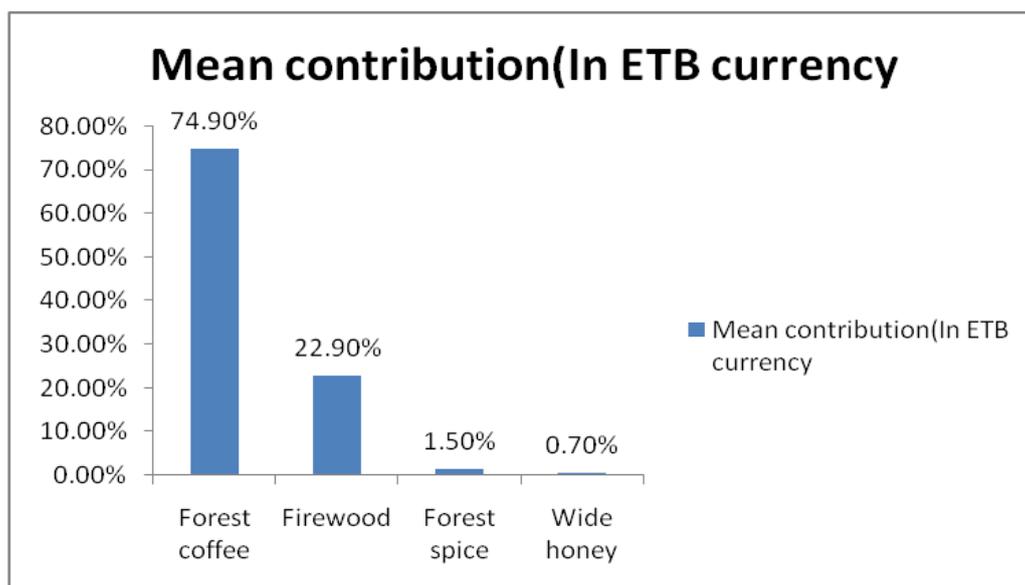


Figure 3:Types of Non-Timber Forest Product and their mean income contribution

Among the above forest product forest coffee constitutes the largest proportion of the total forest income (74.9 %). Firewood, forest spice like as cardamom and wild Honey also cover the remaining share 22.9%, 1.5% and 0.7% respectively. The household’s income from forest coffee collection ranged from 0-56000 ETB with 12745.48 ETB mean annual income that utilized both consumption at house as well as for cash income (Figure3).

3.4. Importance of NTFP income by wealth category

Forest income contribution was different among different wealth categories. Forest products contribute about 9839.03 ETB (57.5%) of annual household income for the poor, above half of their mean total household income (17110.17), 17160 ETB (55.5%) for the medium and 21261ETB (35%) for the rich household. In relative term income contribution NTFP contribute to poor and medium households, above half of their total household income, while for rich house hold it contributing 35% second to crop production (48%). But in absolute contribution it is the rich household, which extracts NTFP highly. This implies that high dependency of the different wealth categories on the forest. Farther analysis was done by using one-way ANOVA to check whether households in different wealth status have differently significant interaction with total income from the NTFPs. The analysis result revealed as there is no significant difference among the dependency of three wealth status. This means the households surrounding the forest are all depend for their livelihood (Table 3).

Table 2: Analysis of variance: Mean total Non-Timber Forest income by different wealth categories

NO.	Wealth category	Mean	t-value	Sig.
1.	Poor	9839 ^a	1.192	0.236
2.	Medium	17160 ^a	0.682	0.497
3.	Rich	21261 ^a	0.376	0.708

3.4.1. NTFPs preference by wealth category

Households in different wealth category might have different need for different forest products to fulfill their household requirements. The income ratio of different wealth class to each other is often used to test which forest product is mostly extracted by which wealth class (Table 4).

Table 3: NTFP preference by wealth category as measured by income ratio

Forest income Source	Household mean NTFP income (birr) by wealth Class			Ratio	
	Poor	Medium	Rich	Rich/poor	Rich/medium
Wild coffee	6635	13921.43	17680	2.66	1.26
Wild spice	118.46	46.96	580.23	4.9	12
Fire wood	3769.86	3016.36	4865.39	1.29	1.61
Honey	135.71	117.14	112.86	0.83	0.96

The relative total NTFP income ratio of rich to poor households was 2.16, which was greater than 1 and which shows that greater dependency of rich than poor on NTFPs. The income ratio of rich to poor for wild coffee (2.66), for spice (4.9) and firewood (1.29) were greater than 1; whereas the ratio for wild honey (0.83) was less than 1. The rich to medium ratio (rich/medium) also showed similar trend to that of the rich to poor ratio (Table 4). This implies that rich households depend more on forest for income in all types of NTFP except in the cases of wild honey.

3.5. Determinants of NTFP income

In view of the fact that non-timber forest product is the very important income sources in the study area, the linear regression analysis was done to identify the household characteristics that could affect the household income generation from the forest negatively or positively. Among 7 (seven) HH characteristics included in the

model as independent variables, four(4) of them were shows statistically significant result. The total land holding in hectar($P<0.001$) and HH wealth status($p<0.1$) were related with household total NTFP income positively and significantly(Table5). This implies wealthy HHs and household that have large size of total land is more likely to be a collector of forest products. This is may be because of the HH's total land holding is the sum total of forest coffee land holding as well as other land use type(farmland,grazing land,homestead/woodlot) and because of that coffee land holding is one of the criteria for wealth status classification in the syudy area. While, income from garden coffee ($p<0.05$) and respondebts age were negatively and significant related with NTFP income(Table5). This shown us the HHs that have lagre garden coffee production potencial were less engaged in NTFP collection as well as the older the hh age the less capability to extract NTFP and less dependent on income from NTFPs. However other variables, like respodent sex, family size and educational level were not shown significant diference with total NTFP income(Table5).

Table 4:- Regression analysis results

	Variables	Coefficient	p-value
1.	Respondent sex	-0.010	0.915
2.	Respondent age	-0.167	0.085*
3.	Family size	0.021	0.826
4.	Respondent's wealth status	0.190	0.078*
5.	Total land holding in ha	0.539	0.000***
6.	Respondent's educational level	0.042	0.655
7.	Income from garden coffee	-0.327	0.003***

Significant level: * $p<0.1$, ** $p<0.05\%$ and *** $p<0.01$

4. DISCUSSION

The local people in the study area depend on a number of income sources. Crop production, animal husbandry, forest product, off/non-farm activities and own farm trees are main household's income sources. Several studies have observed the rural people dependency on such portfolio of income source for livelihood. They combine the income from forest product with income from other farm and off/non-farm activities to improve their welfare. In the study area (*Wabo, Bondo, Gechi and Witete kebeles*) NTFP is the most crucial sources of household annual income and this study supports the notion of high dependency of rural populations on the forest for their livelihood .

In this study area the NTFP contributes about 44.7 % to the total annual household income. It is the most primary source of household income followed by crop production (34.3%). This finding is similar with studies conducted in different areas in Ethiopia. For instance, Naima (2008) also reported that NTFP as the primary income source (54%) of rural households followed by income from crop production in Oromia Regional State, Bale maountain national park and Mohamed (2007) that revealed household NTFP income contribution about 49.% followed by Crop income in SPNN, Bench maji ans sheka zone.

In contrast this finding exceeds the findings in some other areas in the country. Dendi district Getachew *et al.* (2007) 39%, at Harana Buluk Muzayen (2009) 35%, in southeastern part of the country at Liban by Mulugeta *et al.*, (2003) 32%, at Arsi Negele Asfaw (2008) 29.09% and at Menagesha suba Aramde (2006) reveals 27.4% of the total household income from NTFP next to crop production. In Zimbabwe at shendi district Cavendish (2000) also reported the contribution NTFP 35% of total household income.

In this study different types of forest products were identified, forest coffee, firewood, wild spice and wild honey in their order of income contribution. Despite their unquantified monetarial value, medicinal plant and animal fouders are also identified as NTFP collected by srounding communities. In the case of study conducted at Harana Buluk forest area by Muzayen(2009) the order was forest coffee, firewood and wild honey while in the case of Mohamed(2007) at Bench maji and Sheka zone, forest coffee, wild honey and wild spice. In this study among the four fisible income contributor NTFPs, forest coffee is the first forest income contributor (74.9%) which is inline with the findings by Mohamed(2007) from Bench maji and Sheka zone (69%) and Muzayen (2009) at Harana Buluk forest area(61%) of total NTFP icome.

It is interesting to see that the mean difference in forest income among the three wealth status. In this study rich household (**21261ETB**) households extract higher income in absolute term than poor (**9839ETB**). Many NTFPs related studies were reported simiral results. For instance, study at Gore by Berhanu (2004), at Dendi District by Getachew *et al.*(2007) and at haranaBuluk by Muzayen(2009). This is mostly due to the fact that wealthy households can afford the labour requirement since they usually have larger family size than poor and can also afford to pay for the production costs and also it's the richer hh whose have large size of forest coffee land as stated during focus group dicusion. But in relative terms the poor depend more on NTFPs than the rich. This is mainly due to the fact that poor households have few asset bases and mostly depend on NTFPs extraction and use to sustain their livelihoods than other household income categories. Most of them rely on natural resources mainly NTFPs as a source of income and subsistence due to their limited alternative source of income. This study revealed that rich households relatively less dependent on forest products than poor. This result inline with the works of Cavendish (2002) in Zimbabwe, Berhanu (2004), Getachew *et al.* (2007) and Muzayen(2009) in Ethiopia, conclude that rich households extract more income from

the forest in absolute terms, but less in the share in the total household income comparing to poor.

In terms of determinants of total NTFP income, the total land holding in hectare and HH wealth status were related with household total NTFP income positively and significantly. The positive relation between NTFP and total land holding implies that household that have large size of total land is more likely to be a collector of forest products. This may be due to that total land holding is the sum total of forest coffee land from which high coffee production is and other land use type. This study agrees with the study at Bench Amji and Sheka zone by Mohamed (2007) and at Harena buluk by Muzayen (2009) who stated that households with wild coffee land generate more income from NTFP more than those households who don't have wild forest coffee land.

The positive sign between wealth status and total NTFP income shows the rich households generated more income NTFP than the poor households, which supports the statistical result. The reason for this could be that rich households have a better potential to extract forest products than poor. This is similar with the statistical findings of many researchers in the country, such as, Getachew (2007), Birhanu (2004), Asfaw (2008) and Naima (2008). While, the negative sign between the total income from garden coffee and the total income from NTFP implies that less dependency of the HHs those have high potentials of garden coffee production than the HHs those who have no garden coffee land.

5. CONCLUSION AND RECOMMENDATION

5.1. Conclusion

The rural people in the study area depends on diverse livelihood activities including crop production, forest products collection, livestock husbandry and off/ non-farm activities and also they depend on the limited own farm tree. The contribution of the Yayo forest to the adjacent rural household's income is very important even though it was not well recorded and given more attention. Therefore policy makers and developmental initiatives that targeted to Yayo forest conservation and protection should give more attention to the surrounding rural livelihood sustainability. Income from the forest product collection supports rural people through regular consumption, gap felling during seasons of grain shortfall as well as income specialization despite of wealth status. In absolute terms the rich household categories extract more NTFPs income than the poor households even though the poor household categories are more dependent on NTFP extraction in relative term. Similarly household those who have large size of total land in ha benefits more from NTFP than those have small land holding. On the other hand HHs those who have large cultivated garden coffee production are less dependent on the income from NTFPs than those who have no garden coffee land. Therefore, dealing with the surrounding communities' perceptions toward the domestication system, thus integration of coffee with crop and livestock production in the form of agro forestry system which is already initiated by some

HHs, could provide solution for both short term and long term livelihood improvement while reducing pressure on the forest resources. Policies that aimed to deprive the community of the right to use nearby forest, without providing any alternative income sources, could affect the livelihoods of many rural community, therefore a forest management strategy that involves local people participation in forest management practices may contribute positively in rural livelihood improvements and to reduce forest destruction.

5.2. Recommendation

Based on the findings of this study, we recommended the following points.

- The policies that targeted the Yayo forest coffee biosphere should take in to account NTFPs as a visible and potential income sources for forest adjacent community.
- Encouraging domestication, specially of wild coffee and spice, will improve both the productivity and the quality of the produce.
- Current honey production system is totally traditional which could not generate better quality and quantity product of honey, therefore, it is recommended to look into its improvement through better production system.
- Adding value to commercialized NTFPs, specially of coffee processing, will improve the households' income and mitigate forest destruction through improving livelihood of the people.
- Enhancing the perceptions of rural communities, toward the commercializations of traditional medicinal plants.
- Further studies should required on Yayo Coffee forest biosphere current Deforestation and Degradation status as well as other forest related problems.
- To generate more conclusive information at national level on the income contribution of forest resource to the rural dwellers, similar studies should be conducted in other parts of the country where as such study was not conducted.

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