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Role of Forest-Farm Interface Landscape Management Practices on Rural Households Livelihood: The Case of Gurafarda and Arsi-Negele District, Southern Ethiopia

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Abstract
In the Ethiopian context, forest-farm interface landscapes are areas created through encroachment, officially unclassified as either forest or agricultural lands, found under intensive economic activities (crop farming, grazing, and forest products exploitation) possibly un-sustainably by those without defined legal entitlement. As far as viewed, there are no adequate site specific empirical studies on use and management of forest and trees in an agricultural landscape in relation to local livelihoods and agricultural production in Ethiopia. Therefore, the overall objective of this study was to assess and document existing forest and on farm tree management practices livelihood contribution for rural small holder communities found at the forest-farm interface integrated landscape mosaics in Guraferda and Arsi Negele district.Data was collected using household survey taking a total of 218 randomly selected households from the two districts. The two study sites from each district were selected on the extent of deforestation i.e high deforestation and low deforestation sites. The data were analyzed using appropriate descriptive statistics and chi-square test. Descriptive and inferential statistics were used for analyzing demographic and different socioeconomic characteristics of sample households. The comparisons of different households' characteristics between the two contrasting sites were done using inferential statistics with χ^2-test and t-test.The results of the study revealed that there is high forest product extraction and minimum forest management in high deforestation sites, while high crop and livestock production is low for low deforestation sites. In all sites of the study districts, the income share of activities in decreasing order were crop, livestock , forest, and non-farm activity, However, comparatively, there is a significant difference in share of forest income 30%(218) and 13%(218) at p=0.000 in nearest zone to forest and further zone, respectively. In addition to this, share of crop income 33 %(218) and 58%(218) at p=0.000 in nearest zone to forest and further zone, respectively. In both districts there should be up dated policy intervention and better land use planning regarding forest resource conservation.
Keywords: livelihood assets, rural household income, forest income, dependence on forest income

1. Introduction

1.1. Background

Forests are means of livelihood for many of the rural communities in Ethiopia (Wondie & Temesgen 2013). Rural communities depend on forests and forest resources to meet the demand for energy and construction materials, and to diversify their livelihoods. However, deforestation for the expansion of agricultural and pasture lands, and for settlement areas, has been reducing forest resources and local communities benefts (Wondie & Temesgen2013; lemenih & Kassa 2014; Reynolds et al. 2015). Deforestation and habitat fragmentation are critically a ecting forest size and the ecosystem services that they can provide as well as causing losses of biodiversity (Wright & Muller-landau 2006; laurance et al. 2009; Aerts et al. 2011; Mekuria et al. 2011; Mekuria & Veldkamp 2012). In the Ethiopian context, forest-farm interface landscapes are areas created through encroachment, officially unclassified as either forest or agricultural lands, found under intensive economic activities (crop farming, grazing, and forest products exploitation) possibly un-sustainably by those without defined legal entitlement. Such landscapes varied in the causes of their creation, and temporal and spatial extensions, and are often crammed with wildlife and human conflicts. Though such areas serve communities as critical livelihood sources, they are also spaces with little understanding about their management by the research community, and hence the extension service has little contribution on how to optimize gains from these interactions and sustainably manage the resources. The forest products used by smallholders and communities are often poorly understood or underappreciated even though they play crucial roles in supporting local livelihoods. Farmers use tree resources as an important additional source of income, especially when crop prices decrease (Idol et al., 2011). Previous studies of the southern Ethiopian highlands have improved understanding about the condition, biodiversity, and economic importance of the area, as well as several management challenges and drivers of deforestation (e.g. Chilalo, and Wier-sum, 2011; Takahashi, and Todo, 2012 and 2014;

Aerts et al., 2013 and 2015; Belay et al., 2013; Hylander et al., 2013).However, there was gap on documenting existing smallholders forest farm interface landscape management practice as well as viable management of forests and trees on such mosaic landscape in Ethiopia in general and in the two study sites in particular. Rural household income usually comprises income from crops, livestock, off farm activities, forest products and others except in pastoralist communities. According to Cavendish forest has three possible roles in the livelihoods of rural poor: 1) by supporting the current consumption, 2) by providing valuable safety net and 3) by providing a possible pathway out of poverty. Individuals weigh costs and benefits of their decisions in specific action situations both in institutional analysis and transactions cost economics.

Thus, in this study, factors related to the characteristics of participants involved, benefit drawn, importance of the resource for livelihood are considered as important determinants of the management of forest farm interface landscapes.

1.2. Statement of the Problem

Preventing environmental degradation and alleviating poverty are the major challenges of sustainable development. The study focuses on those households because they are at the greatest risk of livelihood loss under foreign investment in highland forests. Being the frontiers of forest and non-forest land uses, forest-farm interface landscapes characteristically possess dynamic socio-ecological context, diverse and conflicting interests including wildlife and human conflicts. Though such areas serve communities as critical livelihood sources. However, there was gap on documenting existing smallholders forest farm interface landscape management practice and there was no study carried out regarding livelihood improvement options and sustainable as well as viable management of forests and trees on such mosaic landscape in Ethiopia in general and in the two study sites in particular. The present study is, therefore, aimed at filling the information gap by assessing interaction between forests and agriculture land management practices and implications on the livelihood of the people in Guraferda and Arsi Negele district.

1.3. Objective of the study

The overall objective of this study is to assess and document existing forest and on farm tree livelihood contributions for rural smallholder communities found at the forest-farm interface landscape mosaics in Guraferda and Arsi Negele districts.

2. Literature review

2.1. Forest cover change in the Southern Ethiopia

As in past millennia, natural forests will continue to be converted to agriculture in developing countries to enable livelihood support. Forests have (indirectly) had an important role in increased levels of consumption over time. In 2005 it was estimated that 11.9% of the Ethiopian territory was covered by forest (0.13 million km2) and that these forest areas had been declining at a rate of 1.1% annually between 2000 and 2005 (FAO, 2005 as cited by Garedew, 2010).

2.2. Overview of forest farm interface

Forest –Farm interface is the zone within or near forests occupied by smallholder farmers that is historically remote from markets and typically difficult to access (Fisher and Hirsch, 2008). It often includes both *ambiguous lands*, or lands cultivated by people who do not have official use rights (Sato, 2000)

2.3. Forest-Farm Interface Landscape Management in general

Forest management is the process of planning and implementing practices for the stewardship and use of forests and other wooded land aimed at achieving specific environmental, economic, social and/or cultural objectives. (FAO, 2005).A recent Forest Resources Assessment (FAO, 2010) estimated the global forest cover at just over 4 billion hectares, which is 31% of total land area of the world.

2.4. Role of forest-farm interface landscapes to locals livelihood

According to (Ellis, 2000), livelihood is defined as that which comprises: ‘‘the assets(natural, physical, human, financial, and socialcapital), the activities, and the access to these(mediated by institutional and social relations)that together determine the living gained bythe individual or household.’’Recent studies from around the world show that forests are important sources of household incomes in many developing countries. For instance, the income share of bamboo shoot cultivation in Southern China is, on average, about 13.3%, and ranges from 0-50% across different villages (Hogarth and Belcher, 2013). Studies from Ethiopia also indicate that forest income has an imperative contribution to rural household economy. For instance, a case study from the Bale Highlands of Southern Ethiopia indicate that forest income contributes between 24% to 52% of the household income of the low income and high income groups, respectively and a total of 54% households earn

more than half of their income from the forest products (Yemiru,T., *et al*., 2010). Another study from Southwestern Ethiopia shows that income forest-based products contribute about 50% to the total household cash income (Chilalo and Wiersum, 2011). (Berhanu,D., 2004) also found that 87% of the local communities in Gore district of Southwestern Ethiopia generate 23% of their income from collection of NTFPs. In a nutshell, all of these studies generally point that forests are useful sources of household income in Ethiopia but their actual importance within the household economy greatly varies from one place to another.

3. Materials and Methods

3.1. Study area

This study was conducted in two different districts which are located in Southern part of Ethiopia; namely Guraferda and Arsi- Negele districts. Guraferda is found in the southwest part of Ethiopia, in Bench Maji Zone about 630 km southwest of Addis Ababa. It is located between 6° 45′ to 7°00′ N latitude and 35°00′ to 35°15′ E longitude. The total population of Bench Maji Zone in July 2014 is estimated at 786,421 of which 83% are rural population CSA., 2014. Guraferda district is one of the districts in the Zone and has a total population of 43,137.Since 2001, people from around North Shoa, Gondar and Wollo migrate in to the area in search of farmlands. As a result, it became home for a multitude and diverse population.

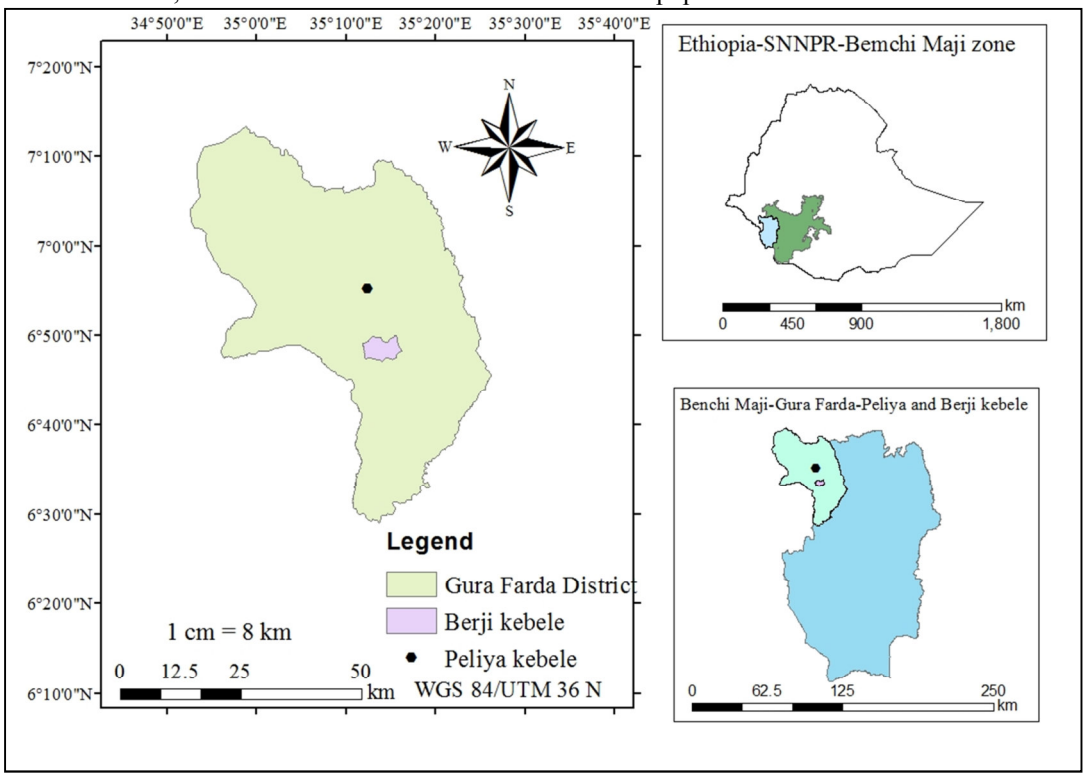

Fig 1: Location map of the study area / Guraferda

Whereas the second district where The other area of study was Arsi Negele, which is found in the south central part of Ethiopia, in West Arsi Zone. The West Arsi Zone has an area of 2,410 km^2 and is located some 250 km south of Addis Ababa. It is located at 7° 27' N and 38° 53' E and in the Oromia Regional State, Arsi Zone. The district has a population of 320,384 with much of the population living in forest-farm landscapes. The four largest ethnic groups reported in Arsi Negele were the Oromo (85 %), the Amara (7%), the Kambaata (3%), and the Soddo Gurage(1%); all other ethnic groups made up 4% of the population. Oromiffa was spoken as a first language by 83%, 12% spoke Amharic, and 3% spoke Kambaata; the remaining 2% spoke all other primary languages reported. The majority of the in habitants were Muslims, with 75% of the population reporting they practiced that belief, while 20% of the population said they were Ethiopian Orthodox Christianity, and 5% were Protestant. The area has been inhabited by Muslim Oromo agro-pastoralists for over one hundred years,(Source OFWE report)

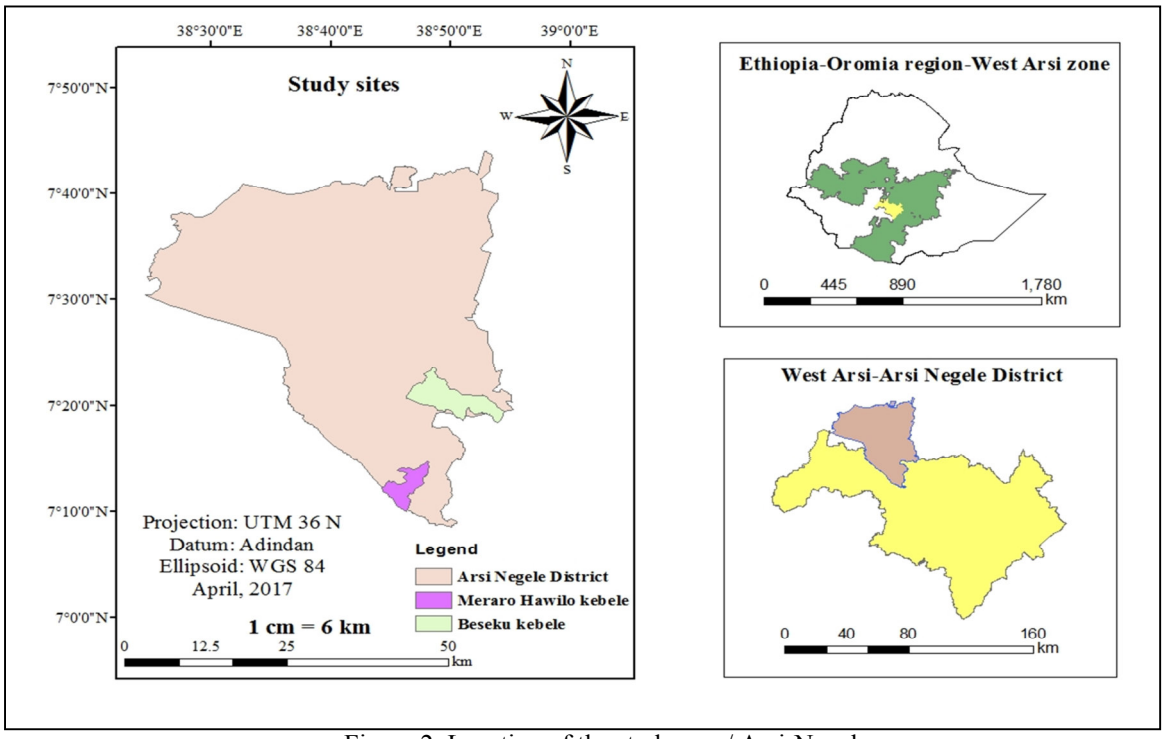

Figure 2. Location of the study area/ Arsi-Negele

3.2. Data collection and sampling

Based on the degree of deforestation; two contrasting kebeles (PAs) (areas with extreme high and extreme low deforestation) have been selected purposively from each district. In addition to this, each study site or PA was categorized or stratified into two different zones; namely, site nearer to forest as zone 1 and site far from forest as zone 2. As above description, Guraferda destrict from SNNPRs and Arsi-Negele from Oromiya region have been selected. In similar manner Berji and Pelya from Guraferda purposively selected as low deforestation and high deforestation PA's respectively. Similarly from Arsi-Negele Destrict Beseku and Merarohawulo PA's were purposively selected as low and high deforestation PA's respectively. Then for both destricts, each PA's were further stratified in to two zones, as zone 1-site nearer to forest and zone-2, site far from forest.

3.2.1. Sample Size and technique

Random sampling technique was used to select sample respondents from each zone. Sample units for formal survey have been selected randomly using the probability proportional to sample size technique based on the number of farm households in each PA as well as in each zone. This study covered total of 218 households, 103 and 115 household from Guraferda and ArsiNegele district as well 86 from Zone 1 and 132 from zone-2 respectively. Total households included in this study were 218, of which 81% (41.2% from *Guraferda* and 39.8% from *ArsiNegelle woreda*) and 19% (6% from *Guraferda* and 13% from *ArsiNegelle woreda*) were male and female headed households, respectively.

Table-1 Sample of respondents versus Zone

	Sample Woreda's							
	Guraferda Woreda				Arsi-Negele Woreda			
	Berji		Pelya		Beseku		Merarohawulo	
Zones	Total	Sample	Total	Sample	Total	Sample	Total	Sample
Zone-1	143	23(39%)	112	18(41%)	479	28(40%)	288	17(37%)
Zone-2	223	36(61%)	163	26(59%)	702	41(60%)	492	29(63%)
Total	366	59(100%)	275	44(100%)	1181	69(100%)	780	46(100%)

N.B Zone 1 and 2, nearest and furthest site from forest.

3.2.2. Data Sources and Types of Data Collected

This study used both primary data and secondary information sources. The primary data were collected using questionnaire surveys and Participatory Rural Appraisal (PRA)/ Rapid Rural Appraisal (RRA) techniques. Primary data was obtained through key informant interview, focus group discussions, and household survey to collect socio-economic data related to livelihood activities and forest use. Several secondary data sources in the form of published and unpublished research reports and administrative records were also consulted.

3.3. Data Analysis

The statistical data was coded, rearranged summarized, entered and analyzed using SPSS version 20 and Microsoft excel 2010. Demographic characteristics and socio economic condition of respondent households in site were analyzed using descriptive statistics such as percentage, frequencies, means and standard deviation. The comparisons of different households' characteristics were done using inferential statistics like χ^2-test and t-test.

4. Results and discussion

Table.2 Characteristics of communities

		Guraferda		Arsi-Negele	
		Zone-1(%)	Zone-2(%)	Zone-1(%)	Zone-2(%)
Education	Illiterate	28	23	27	26
	Grade 1-4	11	17	8	20
	Grade 5-10	2	15	3	10
	> Grade 10	0	4	1	5
Sex	Female	0	10	9	16
	Male	39	51	30	45
Marital status	Married	27	46	40	43
	Other-Wise	13	14	12	18

Small holder communities who found at zone-1 were mostly less educated, male headed as well as mostly divorced than communities at zone 2, this might be due to lack of access to market, infrastructure and related issues

Table3. Asset difference across sites

		Guraferda		Arsi-Negele	
		Zone-1	Zone-2	Zone-1	Zone-2
Age	Mean	33	42	39	45
	SD	7.65	11.37	10.32	7.16
TLU	Mean	5	3	12	7
	SD	3.43	1.85	8.43	4.31
physical asset	Mean	268	612	395	715
	SD	118.71	265.63	105.31	127.42
Crop land	Mean	2	3	1.53	2.27
	SD	1.32	2.36	0.48	0.35

From the above table the result shows that respondents around zone-1 were mostly youths, have high number of live stocks , have lower value of physical asset and they do have less crop land coverage .regarding livestock population, communities in Arsi-Negele's do have higher TLU than Guraferda , while in terms of total land the reverse is true.

4.1. Major livelihood activities of the study area

4.1.1. Crop production

Variables	Zones	Min	Max	Mean	SD
	Zone-1	1	6	5	3.62
Sorghum	Zone-2	2	14	11	2.25
Barley	Zone-1	2	17	13	6.51
	Zone-2	4	28	18	5.75
Rice	Zone-1	2	14	12	3.37
	Zone-2	5	20	16	3.21
Wheat	Zone-1	4	21	19	8.63
	Zone-2	10	32	24	5.21
Maize	Zone-1	2	28	18	13.41
	Zone-2	7	40	26	14.72

Agricultural production is the most important economic activity in the area. Most farms are mixed crop–livestock systems; therefore, livestock rearing is also common though it comes after crop production in perceived socioeconomic importance. This conclusion is drawn during the PRA and FGDs when participants mentioned the great decline of grazing areas and livestock numbers due to cropping area expansion, and the perception of higher food security due to crop production).

The production rate of those dominant agricultural crops vary from site to site. In both Guraferda and Arsinegele districts production of dominant crops in yield and area coverage for both districts is higher in sites farther from forest and in low deforestation Table 4. Annual crop production Via Zones areas.

But as compared to Guraferda, crop production potential is higher in Arsi-Negele than Guraferda.

As indicated in table above, the production rate of those dominant agricultural crops vary as the distance vary. Production rate of dominant crops in yield and area coverage is higher in sites farther from forest than nearer one.

4.1.2. Livestock production

Compared to respondents in each study kebeles, respondents in low deforestation sites were practicing livestock rearing better than the high deforestation site.

As compared to Guraferda, livestock production potential of Arsi-Negele is higher, due to grazing land accessibility and fodder from crop residues availability.

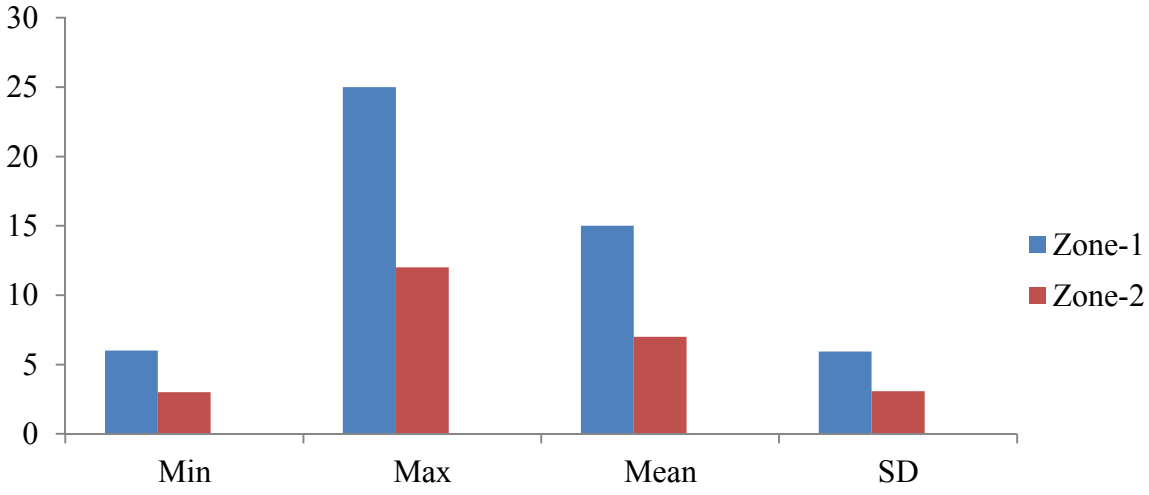

Fig-3: Livestock production Potential of HHs Via Zones

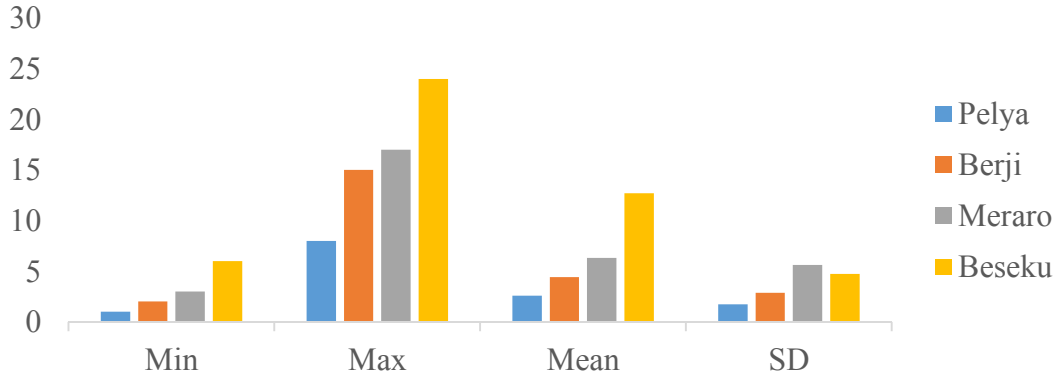

Fig-4: Livestock production of HHs Via kebele's

The reason for livestock reduction, as group discussion participants expressed, is shrinking of grazing land as a result of conversion to commercial and farmer level agricultural lands. Livestock production potential of respondents was higher in zone 2(Site far from forest than zone 1(Site near to forest). Livelihood strategies in the study area include forest products collection, crop production, livestock production, and off-farm activities (petty trading and daily labor). Important finding in the current study was that the absolute and relative forest and all other three income components differed between the households of high deforestation and low deforestation sites in both districts. Though differences in the amount and share of income between the two sites in both districts were observed for all income sources, statistically significant differences were found in all income sources between the sites, within the district, all at $p< 0.05$

4.1.3. Contribution of forest products to local livelihood

In the current study, crop production dominates the livelihoods of households in the study area. In fact, as the sole source of shade for crops and feed for livestock was the surrounding forest which provides grasses and/or woody plants year round. However, the current study revealed that provision of shade value and grazing or browsing feed was not the only attribute of the forests, but the forest is also a source of many other products like honey, fuel wood, hand crafts, and construction materials, that, through their subsistence and cash income, are of importance for household livelihoods. Forest income contributes 32% and 16% to the total income in moist evergreen afromontane forest (Guraferda) and dry afromontane forest (Arsi-Negele), respectively, which was the third to crop and livestock income in Arsi-Negele cases and second to crop production income in Guraferda cases, even without inclusion of income from shade value for crops, fodder and grazing.If the income from fodder and grazing was accounted, total forest income would have been higher, illustrating further the importance of forests for household income in the study area.

Table 5.Mean annual household income (in ETB) from different forest products.

Forest Products	Pelya(N=44) Mean ± SE	Berji(N==59) Mean ± SE	Meraro(N=46) Mean ± SE	Beseku(N=69) Mean ± SE
Honey	1614 ± 121.4	762 ± 93.6	1145 ± 71.3	312 ± 83.5
Fuel wood	1276 ± 104.9	396 ± 138.4	1958 ± 156.5	564 ± 123.6
Forest Coffee	1148 ± 34.6	269 ± 117.2	134 ± 127.8	65 ± 168.2
Others	121 ± 22.1	138 ± 46.8	89 ± 132.9	95 ± 91.5
Total	4158 ± 141.7	1563 ± 142.5	3326 ± 158.2	1036 ± 187.4

Table.6 Mean annual household income (in ETB) Via Zones from different forest products

Forest Products	Zone 1- Site Near to forest(N=86) Mean ± SE	Zone2- Site far from forest (N=132) Mean ± SE
Honey	1146 ± 127.42	557 ± 81.4
Fuel wood	1278 ± 163.27	450 ± 118.1
Forest Coffee	1033 ± 136.13	170 ± 108.2
Others	105 ± 147.25	122 ± 76.3
Total	3562 ± 132.36	1299 ± 124.51

From the above table 5 and 6 The forest income share found in the current study is comparable to other studies. The share of forest income in the total annual household income was 15% in Chiradzulu District in Mali, 23% in Gore District, Southwestern Ethiopia, (B., Debela, 2004). The lower income share in the current study compared with the aforementioned studies could likely be attributed to the low engagement of households in extraction activities, and most importantly to the limited enabling production andmarketing environment in the current study area, particularly for some economically valuable products such as spices. Therefore the current study confirmed that the communities in the interface forests have the potential to produce honey as communities in the forests do.

Livelihood strategies in the study area include forest products collection, crop production, livestock production, and off-farm activities (petty trading and daily labor). Important finding in the current study was that the absolute and relative forest and all other three income components differed between the households of high deforestation and low deforestation sites in both districts. While average income from crop production took the lion share in both districts, its contribution was slightly higher at low deforestation PA's (57 and 60%) than at high deforestation PA's (31and 29%) in Arsi-Negele and Guraferda, respectively, which confirms the fact that those highly forest dependent communities do have small cropland size, so that they produce low share of crop yield than the others. Likewise, while income from livestock production was the second share in Arsi-Negele cases where as income from forest product takes the second share in Guraferda cases. Income from livestock importance was relatively lower at low deforestation sites than higher deforestation site (32% and 43%) in ArsiNegele and (15% and 27%) in Guraferda districts respectively.With regard to forest income, with average share of (24% and 43%) in high deforestation sites and (8% and 22%) income from forest in low deforestation sites of Arsi Negele and Guraferda districts respectively was third after livestock and crops in Arsi-Negele cases while second after crop in Guraferda districts.Thisis because of communities in high deforestation sites of study area mostly engaged in illegal logging and charcoal as well as fuel wood extraction than communities in less deforested area, that is why income from forest share is high in high deforestation than lower one. In addition, as destrict wise, forest income share is high in Guraferda than Arsi-Negele because of communities in Guraferda are forest dependent where as in Arsi-Negele are pastoralist and agriculturalist

Table 7. Mean annual income (in ETB) of Smallholder households from different sources.

Sources	High deforestation PA Pelya (N=44) Mean ± SE	%	Low deforestation PA Berji(N=59) Mean ± SE	%	Comparison test at value (df)	P-value
Crop Income	2853.73 ± 632.76	29	4315.8 ± 221.47	60	14.231(102)	0.000
Livestock Income	2623.86 ±451.53	27	1060.41 ± 137.62	15	8.723(102)	0.000
Forest Income	4158.14 ±571.69	43	1563.56 ± 368.23	22	13.032(102)	0.000
Non-farm income	126 ± 82.123	1	212.27 ± 153.75	3	26.453(102)	0.000
Tot	9761.73 ± 528.39	100	7152.04 ± 587.35	100	18.124(102)	0.000
	Meraro (N=46)	%	Beseku(N=68)	%	Comparison test	P-value
Crop Income	4267.39 ± 836.27	31	7404.35 ± 678.56	57	19.612(114)	0.000
Livestock Income	5857.39 ± 589.58	43	4087.94 ± 973.15	32	14.629(114)	0.000
Forest Income	3325.09 ± 478.97	24	1035.31 ± 832.42	8	21.127(114)	0.000
Non-farm income	204.83 ± 517.54	2	416.9 ± 614.75	3	12.238(114)	0.000
Tot	13654.7 ± 612.58	100	12944.51 ± 741.67	100	19.334(114)	0.000

As the result from table 8 shows that, higher number of smallholder communities in high deforestation sites highly relies/depends on forest products than communities in low deforestation sites, that is why as extraction rate increase, the forest resource decline at alarming rate in such sites. In addition to this the forest in Guraferda is moist evergreen afromontane forest, so that communities in both high deforestation sites and low deforestation sites of the district extract high number of NTFP's. With regard to Arsi-Negele, the forest is dry afromontane forest, so that communities in this environment highly engaged in crop production than the other sources. Though differences in the amount and share of income between the two sites in both districts were observed for all income sources, statistically significant differences were found in all income sources between the sites, within the district, all at $p< 0.05$

Table-8 Mean annual income (in ETB) of Smallholder households Via Zone's from different sources.

Sources	Nearest Site to forest Zone-1 (N=86) Mean ± SE	%	Furthest Site Zone-2(N=132) Mean ± SE	%	Comparison test at value (df)	P-value
Crop Income	3984.67 ± 674.31	33	5860 ± 438.27	58	17.53(218)	0.000
Livestock Income	4325.25 ±151.13	36	2571 ± 436.72	26	14.26(218)	0.000
Forest Income	3561.42±578.54	30	1298.52 ± 382.63	13	16.42(218)	0.000
Non-farm income	164.35± 321.43	1	315.62± 561.24	3	13.36(218)	0.000
Tot	12036± 542.16	100	10045.14 ± 497.85	100	15.12(218)	0.000

Regarding respondents income share, communities living near to the forest as compared to communities who are living far from forest do have higher share of livestock and forest income but , lower crop and non-farm income

5. Conclusions

The major forest products collected from the interface in the study area were honey from beehives, wild honey, spices medicinal plants, cultivated coffee, wild coffee, and fuel wood. Honey from beehives, spices, wild honey and cultivated coffee are collected mainly for commercial purpose. Fire wood, medicinal plants, wild gesho, and wild coffee were collected for subsistence, but many of the forest products were used for both household's consumption and income generation. The results confirm that forest is the most important contributor to household income next to crop and livestock production. Its income support 43 % in Pelya, 22% in Berji, 24 % in Meraro and 8% in Beseku PA average annual income of local people. The major dominant livelihood activities in both district in order of share is income from crop, livestock and forest respectively.The dominant agricultural crops in order of importance and productions in Guraferda were rice, sorghum and maize, where as in Arsi-Negele wheat, Barley and Maize.Crop and non-farm production income with such sources is higher in farther site from forest than nearest site, but income source from forest and livestock is higher in nearer site. Both agricultural productivity and forest product availability is declining due to seasonal anthropogenic factors. Lack of market access has been seen as a problem for unbalanced utilization and harvest of forest and agricultural products.

6. Recommendations

- Forest products contribute share of local community livelihoods. Therefore conservation and better management of forests is thus very essential to sustain local people livelihoods.

- The extraction ways and trade of some forest products like charcoal, local construction materials and firewood which are relatively destructive may threat the forests, hence the collection of another NTFPs should be encouraged in the study area.
- In put used for local arake or katkala production like fuel wood consumption should be replaced by energy conserving stoves.
- Land certification program should be revisited for the district in order to ensure sustainable natural resource management system as well as to increase social stability on such mosaic landscape.
- There should be well-organized, strong and effective policy intervention to safeguard the natural forest patch that exist within interface from further destruction. These policy interventions should attempt the active involvements of local communities at the same time governmental and nongovernmental organizations for effective natural resources conservation within the district.
- Further research should be conducted in the study area to examine the level to which fuel wood (Fire wood and charcoal), local construction material, traditional beehives preparation from wood can mask (influence) the contribution of NTFPs to forest conservation.
- Further research should be conducted on value chain of each dominant agricultural and forest product to bring poverty alleviation mechanisms.
- Further researches should be done especially on loss of biodiversity related to natural forest conversion within such mosaic landscape.

References

Alemayehu, M., 2010. Contribution of Forest Products Extraction to Livelihood Support and Forest Conservation in Masha and Andracha Woredas, Southwestern Ethiopia. *MSc thesis,* Addis Ababa University, Ethiopia.

Banerjee, A., and Chowdhury, M., 2013. Forest degradation and livelihood of local communities in India: *Journal of Horticulture and Forestry*. 5(8), pp. 122-129.

Babulo, B., B. Muys, et al., 2008. "Household livelihood strategies and forest dependence in Bled, Slovenia**:** 237-247.concern. ZEF Policy Brief No. 7.

Debonne, N., 2015.The impact of migration on tropical deforestation. An agent-based modelingapproach for Guraferda, Southwest Ethiopia. *MSc thesis, in* Geography, Faculty of science and bio-engineering sciences, virile universities Brussels.

Dejenie, A., 2011. Impact of resettlement on woody plant species and local livelihood: The case of Guraferda Woreda in Bench Maji Zone, South Western, and Ethiopia. *MSc thesis*, Addis Ababa University, Ethiopia.

Demel, T.,2005. Deforestation, Wood Famine, and Environmental Degradation in
Ethiopia's Highland Ecosystems: Urgent Need for Action

Ethiopian Forest Action Program, 1994. Ethiopian forest action program. The challenge for development: (final draft), Addis Ababa, Ethiopia.

Enterprise, A. F., 2010. New Established Forest Enterprises, Arsi Negele, Ethiopia.

Ewers, R. M., 2006. Interaction effects between economic development and forest cover determine deforestation rates. *Global Environmental Change* 16 (2):161-169.

FAO., 2014. State of the world‘s forests: enhancing the socioeconomic benefits from forests. http://www.fao.org/3/a-i3710e.

Fisher, R., and P., Hirsch, 2008. "Poverty and Agrarian-Forest Interactions in Thailand.

Gardei, S., 2006.Local valuation of forests in South West Ethiopia. Non timber Forest Products Research and Development Project in SW Ethiopia, Wageningen, and Student research Series No. 6. Netherlands.

Gardon *et al.,* 2003.Traditional tropical agricultural landscapes, especially those managed by resource-poor farmers, are typically composed of a mosaic of several land use types and the relationships between these land uses are a necessary consideration when the potential of such landscapes to contribute to conservation of biodiversity is evaluated.

Garrity, 2004.Agroforestry can be part of poverty reduction strategies by increase of on-farm food production and provision of cash income, when accompanied by marketing strategies and enterprise development.

Gatzweiler, F. W., 2007. Deforestation of Ethiopia's Afromontane rainforests

Gesesse, D., and Christiansson C., 2008. Forest decline and its causes in the south-central rift valley of Ethiopia: *Human impact over a one hundred year perspective*. Ambio 37(4): 263-271.

Getachew, M., Sjaastad, E., Vedeld, P., 2007. Economic dependence of forest resources: A case from Dendi District, Ethiopia. *Forest Policy andEconomics*, 9: 916 – 927.

Guillozet, K., and J. Bliss, 2010. A Political Ecology Approach to Understanding Competing Gessesse Dessie and Kleman J. 2007.Pattern and magnitude of deforestation in the south central rift valley region of Ethiopia. Mountain Research and Development 27(2): 162-168.

Getachew, M., Sjaastad, E., Vedeld, P., 2007. Economic dependence of forest resources: A case from Dendi

District, Ethiopia. Forest Policy and Economics, 9: 916 – 927.
Hartmann, I.,2004. "No Tree, No Bee – No Honey, No Money": The Management of Resources and Marginalization in Beekeeping Societies of South West Ethiopia: *Paper submitted to the Conference.*
Hoekstra, D.A., E.Torquebiau, and Badege ,B., 1990. Agro forestry: potentials and Research Needs for the Ethiopian Highlands. Agroforestry Research Network, ICRAF. Nairobi, Kenya. 21:115
Kitessa, H., 2013. Effects of coffee forest management and fragmentation on plant communities and regeneration patterns in Afromontane moist evergreen forests in South West Ethiopia. *Doctoral Dissertation*, Wageningen University, NL. ISBN: 978-90-8826-3170.
Houghton, J. T., 1995. Climatic Change 1994: Radioactive Forcing of Climatic Change and Evaluation of IPCC IS92 Emission Scenarios. Intergovernmental panel on climate change. Cambridge University press, Cambridge, UK.
Hurni, H.,1990. Degradation and conservation of the soil resources in the Ethiopian highlands. In: African Mountains and Highlands: Problems and Perspective. Marceline, Missouri (USA).
Idol et al., 2011.Farmers use tree resources as an important additional source of income, especially when crop prices decrease.
IFMP., 2002. Integrated forest management project, Synopsis. Adaba-Dodola Integrated Forest Management Project.
Lemessa, D., Hylander, K., and Hambäck, P., 2013. Composition of crops and land-use types in relation to crop raiding pattern at different distances from forests, Agriculture*, Ecosystems and Environment,* 167, 71-78.
Mamo, G., E. Sjaastad, et al., 2007. "Economic dependence on forest resources: A case from millennium ecosystem assessment. Ecosystems and Human Well-being: Synthesis.
Mekonnen, et al., 2013. In rural Ethiopia, a majority of the households make use of non-timber forest products (NTFPs) for different purposes, ranging from food, feed, energy, and medicine to income generation and cultural practices.
Messay, 2011.Ethiopia is one of the country characterized by fast environmental conversions and modifications attributed to various adverse human actions, like expansion of farm plots at the expense of vegetated land, massive fuel wood and charcoal production, overgrazing and encroachment of farmsteads into vegetated lands
Michael, A., and Ian, T., 1998.Assessing the potential of Forest product activities to contribute to rural incomes in Africa.
MoARD., 2009. Ministry of Agriculture and Rural Development; Agricultural Investment potentials of Ethiopia, Addis Ababa.
Mirutse, G., Zemede, A., and Zerihun ,W., 2010. Ethno medicinal study of plants used by Sheko ethnic group of Ethiopia. *Journal of Ethno pharmacology* 132:75–85.
MoA ,1990. Munessa Shashemene State Forest Project Management Plan. F. M. P. D.
Mohammed, W., 2014. Traditional uses of non-timber forest products in southwest Ethiopia: Opportunities and challenges for sustainable forest management.
Mohammed, N., Ronju, and K., 2010 .Village Common Forests in Chittagong Hill Tracts, Bangladesh: Balance between Conservation and Exploitation.
Mulugeta, L., and Tadesse ,W., 2010.Moreover, the rate of deforestation and forest degradation in Ethiopia fueled by resettlement programs, migration, biofuel development initiatives and ever-present poverty
Neima, A., 2008. An analysis of socio- economic importance of Non-Timber Forest Products for rural households: Case study from Bale Mountains National Park, Ethiopia. *MSC Thesis*. Department of Forest and Landscape Faculty of life science, Denmark.
Neumann and Eric ,H., 2000 Commercialization of Non-Timber Forest Products: Review and Analysis of Research Center for International Forestry Research.
NTFP., R., and D., Project, 2009. Non-Timber Forest Products Research and Development Project South-West Ethiopia; Forest landscape sustainability and improved livelihoods through non-timber forest - product development and payment for environmental services Grant ENV/2006/114-229
Pender, J., Place, F., and Ehui, S., 2006. Strategies for sustainable land management in the East African highlands. Washington DC: International Food Policy Research Insitute.MoA.
Poulsen, G., 1973. CADU Forestry Activities. Asela, Ethiopia, Chilalo Agricultural Development Resource Claims in the Ethiopian Highlands. IUFRO Small Scale Forestry.
Reusing, M., 1998. Monitoring of Natural High Forests in Ethiopia. GTZ. Addis Ababa.
Rojahn D.A., 2006. Incentive mechanisms for a sustainable use system of the montane rain forest in Ethiopia. PhD Dissertation, Christian Albrechts University, Germany, pp. 6 -105.
Sato, J., 2000. "People in Between: Conversion and Conservation of Forest Lands in Thailand."
Sebsebe, D., Mengistu,W., and Yilma ,D., 1996. Ethiopia's Natural Resource Management
Shylajan, C.S., and Mythis, G., 2007. Community Dependence on Non-timber Forest Products: A Household

Analysis and its Implication for Forest Conservation, Indira Gandhi Institute of Development Research, Mumbai.

Sutcliffe, J.P., 2009.The Extent and Economic cost of Deforestation in Southwest Ethiopia: A Preliminary Analysis, Mizan Teferi and Huddersfield.

Shackleton, S.,Campbell, B.,Lotz-Sisitka, H.,and Shackleton, C.,"Links between the local trade in natural products, livelihoods and poverty alleviation in a semi-arid region of South Africa," *World Development*, vol. 36, no. 3, pp. 505–526, 2008.

Tadesse, W., Gole, D., Demel, T., and Vlek, P.L.G., 2002. Human impacts on Coffea arabica genetic pool in Ethiopia and the need for its in situ conservation. Pp.237–247. In managing plant genetic diversity (J. Engels, V. Ramanatha Rao, A. H. D. Brown, and M. Jackson). CAB International/ IPGRI.

Tamirie, H., 1997. Desertification in Ethiopian highlands. Rala report 200: 76-86.

Tejaswi, Pillena,B., 2008. Non-Timber Forest Products (NTFPs) for Food and Livelihood Security: An Economic Study of Tribal Economy in Western Ghats of Karnataka, India. Thesis for partial fulfillment of the requirements for the joint academic degree of International Master of Science in Rural Development from Ghent University (Belgium).

Tieguhong, and Nkamgnia, 2012, Tieguhong, et al., 2009. Sub Saharan population greatly depends on forests for their livelihoods

Tilahun, T., and Mirutse, G., 2010. Ethno botanical study of wild edible plants of Kara and Kewego semi-pastoralist people in Lower Omo River valley, Debub Omo Zone, SNNPR, Ethiopia. *Journal of Ethno biology and Ethno medicine*, 6: 23.

Yemiru,T., Roos, A.,Campbell, B. M., and Bohlin, F., 2010."Forest incomes and poverty alleviation under participatory forest management in the bale highlands, Southern Ethiopia," *InternationalForestry Review*, vol. 12, no. 1, pp. 66–77

Chilongo, T.,"Livelihood strategies and forest reliance in Malawi, 2014." *Forests Trees and Livelihoods*, vol. 23, no. 3, pp. 188– 210,