Socioeconomic study report in the Babile Elephant Sanctuary

Prepared

as part of the

"Enhanced Management and Enforcement of Ethiopia's Protected Area Estate Project"

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List of Acronyms

BES	Babile Elephant Sanctuary
DBE	Development Bank of Ethiopia
FAO	Food and Agricultural Organization
ha	hectare
HAB	Household Asset Building
HH	Household
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
RuSACCOs	Rural Saving and Credit Cooperatives
WB	World Bank

Executive Summary

This study considers a range of socioeconomic characteristics of households residing in the Kebeles at Fedis and Midega Tolla woredas, adjacent to Babile Elephant Sanctuary. The aim is to provide a concrete information about the livelihood engagements, access to public goods and financing schemes employed by the households to obtain a clear understanding about the relative importance, use and management of local resources. Such understanding helps to design market-based schemes that improve the livelihood performance of the community (people) through improved economic contribution (profit) while simultaneously ensuring a sustainable management of natural resources (planet) through creating a harmonized co-existence between the households and the sanctuary.

The households produce some high market value products that could enable them earn higher income, and contribute to animal – protein and national income. The commercially valuable products that these households produce include livestock (oxen and goats with high fattening potential), groundnut, khat and honey bee. If production operations are organized based on marketing principles of customer value (quality over quantity), the area is suitable to fatten livestock, essential not only to enable this households generate higher-returns, but also ensure the supply of animal-protein. Yet, there are considerable bottlenecks that hamper the capacity of the households to commercial their products.

Water and some productive public assets that are important to enable the households take advantage of the existing opportunities are either underdeveloped or absent in the area. Infrastructure, such as road and health and veterinary services are bumpy and poor. The area is excluded from financial services due to religion and stringent requirements, which demand the poor and unemployed youth an initial saving and collateral. The households, as a result, make savings at their homes and use easily accessible and affordable financing schemes, such as selling khat, groundnut and goat, and borrowing from friends and relatives. The households in the study area do not practice traditional self-help finance mobilization and credit schemes, such as equip. Whereas such schemes are essential to respond to immediate household consumptions, and the absence of tailored and inclusive financial access, establishing a tailored community managed revolving loan funds by supporting the RuSACCOs can be essential to serve and support the communities to transform their subsistence agriculture into profitable agribusiness.

1. Introduction and Background

Understanding the socio-economic conditions, land and other assets ownership, availability or absence of productive public goods, as well as perceptions and opinions of communities is a critical element of policy development, planning, and collaborative and gainful (natural) resources use and management (Liswanti *et al*., 2012). In particular, an understanding of household (HH) socioeconomic characteristics is relevant for policy makers and development workers to plan on resource allocations, to respond to social, economic and ecological changes and vulnerabilities, as well as to create a harmonized, reconciled and friendly co-existence between communities and protected environs (FAO *et al.,* 2016). In natural resource endowed environments, household characteristics, such as age, sex, size, education, landholding and livelihood engagement can play productive and profitable or undesirable and destructive roles (FAO *et al.,* 2016). Previous studies, for example, report that educated personnel usually see high-returns from forests and engage less in extraction and deforestation for their livelihoods (e.g. Adhikari, Di Falco, & Lovett, 2004; Godoy & Contreras, 2001). Large sized households have the capacity to engage in diverse and harmonized income generating activities including forest products (Bakkegaard, Nielsen, & Thorsen, 2016); it can also inverse if such workforce possesses limited knowledge and skills, as well as lack the awareness to recognize and turn existing forest related and non-forest opportunities into gainful occupation.

Existence of alternative livelihood engagements enable households to diversify their livelihoods and generate income from multiple sources (Haggblade, Hazell, & Reardon, 2005), and thus can reduce their dependence on protected areas. The ability to engage in diversified income generating activities differ by gender, that in so many cases, particularly in developing countries, men more likely engage in profitable and high income activities (e.g. Wickramasinghe, Perez, & Blockhus, 1996; Cavendish, 2000; Fisher, 2004). Age is also a determinant factor as households headed by young age personnel could have the energy and able to exploit existing opportunities while the elderly may prefer to engage in activities that require less energy and generate moderate income. Alternatively, older people may possess rich experience and better knowledge on how to manage and sustain natural resources (such as forest and wildlife) (de Merode, Homewood, & Cowlishaw, 2004).

Against the above conceptual understating and background, this socioeconomic and rural financing scheme study was conducted as part of a larger research that aims to achieve improved conservation of forestry and agrobiodiversity resources through a landscape management approach by promoting community-based natural resource management within and around Babile Elephant Sanctuary in Eastern Ethiopia. Part of the national initiative to create an enabling conditions for effective management and to respond to the challenges that threaten the sustainable conservation of the protected areas in Ethiopia, this particular study set out to ascertain the livelihood activities of the inhabitants within and around the sanctuary. It also aims to distinguish market-based opportunities that can ensure the sustainable conservation

of natural resources (planet) and simultaneously improve the livelihood performance of the community (people) through improved economic contribution (profit); thus, ensure a harmonized and sustainable co-existence between the inhabitants and the sanctuary.

In doing so, this study, therefore, was designed from a bottom-up analysis so as to learn the practical socioeconomic characteristics and common livelihood strategies as well as the natural physical environment and human interactions through active engagement of the farm households adjacent to the sanctuary. To obtain necessary and sufficient information that enable the inhabitants to move toward being ecologically, socially and economically sustainable community (Viswanathan *et al*., 2009), the survey incorporated demographic characteristics, main sources of livelihoods (agricultural and non-agricultural), household income and expenditure, as well as land and other assets ownership (and size). It also incorporated questions related to institutional resources such as utilities-natural and non-natural (water, energy) and infrastructure (roads, information communication, educational, health and veterinary centres). Academic research has defined these institutional resources as engines to improve the productivity and marketplace economic exchanges, which in turn improve household income and livelihood performance (e.g., Barrett, 2008; Jayne, Mather, & Mghenyi, 2010). Availability (and quality) of health centres, for example, helps to keep communities healthy and productive and to prevent them from zoonotic diseases transmittable from wildlife to adjacent inhabitants.

1.1. Study objectives

1.1.1. General Objective

The overall goal of the study is to achieve improved conservation of forestry and agrobiodiversity resources by selecting a priority model landscape, implementing integrated activities through a landscape management approach and by promoting community-based natural resource management. This study also aims to contribute to the national protected area and biodiversity management initiative.

1.1.2. Specific objectives

- Conduct household survey and describe the socioeconomic characteristics of local communities/households
- Analyze data and describe the types of local livelihoods, the challenges and opportunities to engage farmers in sustainable livelihood activities

2. Study approach and methodology

The study was conducted in the selected Kebeles at Fedis and Midega Tolla woreda. The residents of these Kebeles live and operate in and around Babile Elephant Sanctuary.

2.1. Description of the study area

Figure 1 presents the Kebeles covered by this study. Agudera, Aneni and Riski Kebeles are located at Fedis, a woreda which is about 25 km from Harar city; Harar is about 530 km from Addis Ababa is in Eastern Ethiopia. The capital town of Fedis is Boko. Kerensa and Lencha Kebeles are at Midega Tolla woreda; this woreda is 55 km from Hara (or 30 km from Fedis woreda). Midega Tolla's capital is Midega. In terms of political administration, both woredas (and also the Kebeles) are administered within the Oromia national regional state. The Kebeles are situated adjacent to Babile Elephant Sanctuary.

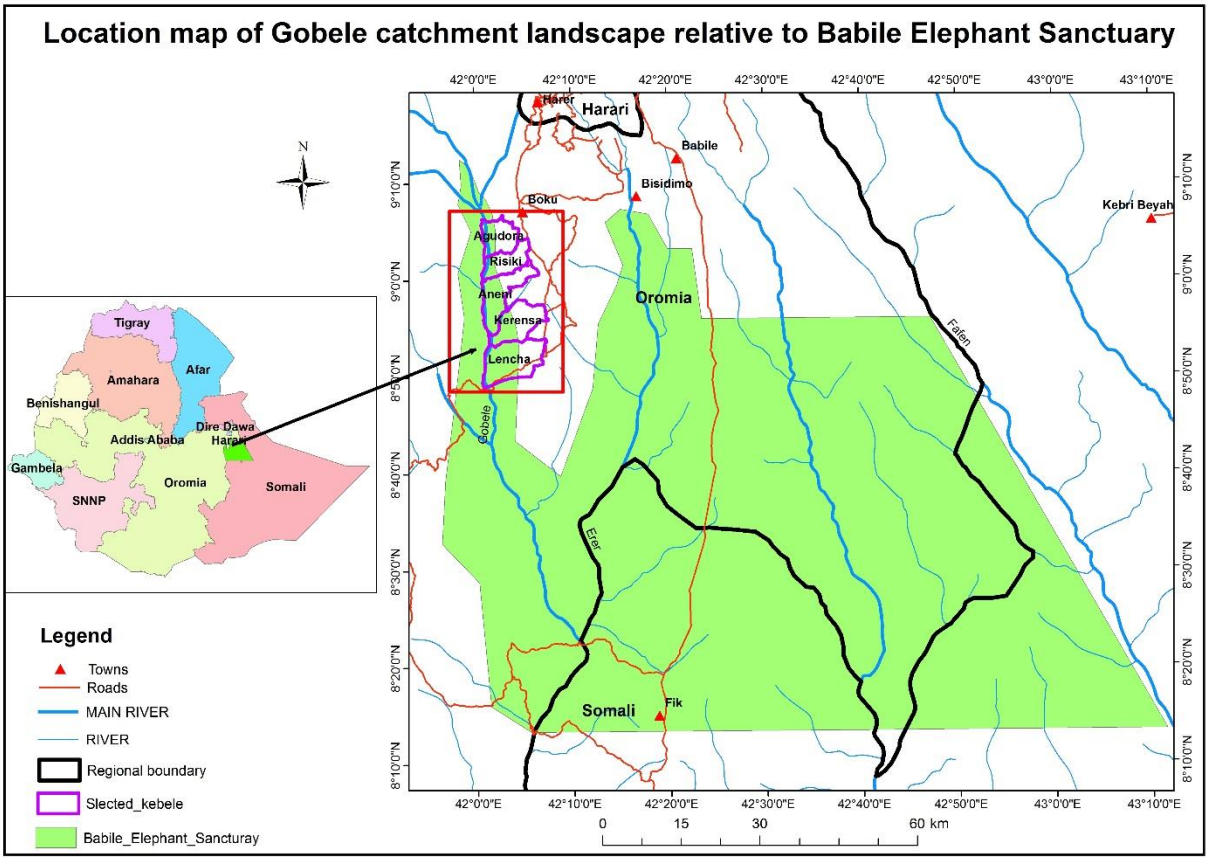


Figure 1. Relative location map of the study area

2.2. Methods

2.2.1. Determination of the sample Size

Socio-economic survey tools need to be designed to collect information necessary to concretely and contextually understand the local livelihood practices, resource use and the relative importance of environmental resources for local (village) households and local resource management schemes (FAO *et al*., 2016, Liswanti *et al*., 2012). Because of multidimensional nature of the socioeconomic characteristics of households which some are physical, environmental and social and others economical, collecting qualitative and quantitative data, through triangulated approaches, enables to capture the required information in depth and breadth while offsetting the limitations of using each alone (Morgan, 2014). Following the recommendation of Morgan (2014), this study employed triangulated methods

(personal observation, key-informant interviews, focus group discussions and survey questionnaire) to collect both the qualitative and quantitative data from primary and secondary sources.

To collect the primary data, the researcher observed the study area to personally learn from the lives and practices of the communities, as well as the natural physical environment and marketplaces and conducted interviews, using a structured interview protocol (Yin, 2003). The interviews were conducted with key informants including administrators and experts (#10) (Figure, 2) and livestock traders/brokers (#3). Focus group discussions (#4) were also held with community members at four Kebeles, each group constituting 8 participants (Figure 2). This primary qualitative data collection followed the principle of saturation that further interviews and discussions no longer provide new information, and that selected respondents are key informants who provide necessary and sufficient information representing the entire households (Mason, 2010).

A structured survey questionnaire was used to collect demographic characteristics, main sources of livelihoods, household income and expenditure, land and other assets ownership (and size), utilities-natural and non-natural (water, energy) and infrastructure from 150 household (HH) respondents selected from five (5) Kebeles (3 Kebeles from Fedis Woreda and 2 Kebeles from Midega Woreda), which are adjacent to the sanctuary. Following the recommendation of Field (2009) and Kaiser (1970) for sample size >100 of a KMO > 0.4, we use KMO (Kaiser–Meyer–Olkin measure of sampling adequacy) to check the adequacy of our sample size and the result (KMO = 0.506; $X^2(36) = 108.96$, $p<0.01$) shows that our sample size is adequate for further analysis and we have no reasons to worry.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.506
Bartlett's Test of Sphericity	Approx. Chi-Square	108.96
	df	36
	Sig.	.000

2.2.2. Selection of households

To select the 150 HH respondents as a unit of analysis, this study employed a two-stage sampling. First, the woredas adjacent to the sanctuary were selected, followed by the selection of the more adjacent Kebeles to accommodate households who have direct and frequent interaction with the sanctuary. Here, an important remark is that this study does not assume that inhabitants in relatively distant Kebeles from the sanctuary do not, at all, have interaction with and impact on the sanctuary and their socioeconomic characteristics are not important. It rather conceives that their impact and interaction is highly likely to be captured by the survey conducted in the adjacent Kebeles because of similarities in most socioeconomic aspects. Table 1 summarizes the Kebeles, population, household and sample size.

Table 1: Summary of total households (HH) and samples size from each Kebele

Name of Woreda/Kebele		Total population (2010 E.C.)	Number of HHs	HHs sample included in the survey
Fedis Woreda	Agudara	6,010	1310	30
	Aneni	3,999	699	30
	Riski	8,885	1937	30
Sub-total		**18,894**	**3,946**	**90**
Midega Tolla Woreda	Kerensa	6,474	1,423	30
	Lencha	8,435	1,854	30
Sub-total		**14,909**	**3,277**	**60**
Total			**543**	**150**

And second, the lists of households of each selected Kebele were obtained from respective Kebele's administrators. Consequently, sample households were selected through a systematic random sampling, with the first unit at a random start and every 10^{th} for the remaining until 30 households are selected from each Kebele, to control selection bias (Duflo & Kremer, 2005). Secondary information was obtained from the archives of the respective Kebele's offices and other concerned offices/bureaus (Agriculture/Rural Food Security) of the woredas at Fedis and Midega Tolla.

Finally, filled survey questionnaires were checked for completeness and information clarity. Data were recorded in SPSS version 20, MS Excel and prepared tables in word document. The recorded data are then analysed using descriptive statistics (frequencies, percentages and mean), correlations to measure associations and relationships between some demographic variables and socioeconomic aspects, as well as principal component analysis to reduce the collected data into a manageable set and locate few dimensions that characterise the livelihood and financial sources of the communities. The results are described below.

Figure 2: Partial view of pictures of the researcher conducting interviews and discussions during the field survey

3. Socioeconomic characteristics of households

It is explained in the introduction section that an understanding of household socioeconomic characteristics is essential to design development policies and strategies and social programs that promote an equitable distribution, use and management of resources. To help do so, this section presents and discusses the findings from the socioeconomic survey, analysis of characteristics and the livelihoods of the communities in the study area (i.e., in selected Kebeles of the Fedis and Midega Tolla woredas). The households travel to Harar for different economic transaction and it takes them, by vehicle, up to 1:30 to 2 hrs (from Fedis) and 3 to 3:30 hrs (from Medega) due to the bumpiness of the road. They trek, during market days, their animals to sell either at Boko (Fedis) or Midega. It takes the sellers 4 to 5 hrs to trek their animals from the Kebeles at Midega to access the livestock marketplace at Boko (Fedis) and, likewise 4 to 5 hrs from the Kebeles at Midega to trek and sell their animals at Midega marketplace.

3.1. Household Socioeconomic characteristics in the study area

3.1.1. Demographic characteristics

Table 2 presents the population characteristics (age, marital status, family size and composition, household headship, key income earner (bread winner) in a HH and education level of the HH head) of the study area. The average age distribution of the respondents in the study area is approximately 39 (respondents at Fedis woreda approximately aged 40 while respondents at Midega are about 36 years of age). The average age indicates the existence of productive work force. Of the respondents

included in this study, on average, 89% are married (90% married at Fedis), 7.3% widowed, and 1.3% each single, divorced and separated; because respondents are heads of households, single may imply to no spouse for some reason (either separated or not officially married). On average, according to this survey, a household in the study area have approximately 7 members[1] with an approximate composition of 4 males and 3 females. This average family size is above the national household size average (4.6 or approximately 5 persons) (CSA, 2016). Of the total households (150), 89.3%) are headed by men while the remaining are head by women. Approximately, 48% of the respondents perceive that the key breadwinner in a household is the husband (male) and 34% of the respondents consider that both husband and wife (parents) make the living fir the household. The higher perception that both parents engage in making a living for their family is not a surprise as women (wives/mothers) actively engage in different livelihood activities, such as selling khat and groundnut.

Households participated in this study were also asked about their education level (see Figure 3 and Table 2). The majority (about 61%) did not attend any formal or informal education, 29% have attended up to grade 8 and 9% followed some basic literacy programs. The majority of the respondents did not attend school may entail to lack of some fundamental knowledge and skill, which may lead to facing socioeconomic difficulties, such as difficulties in making key and informed decisions and choice in their production and marketing activities..

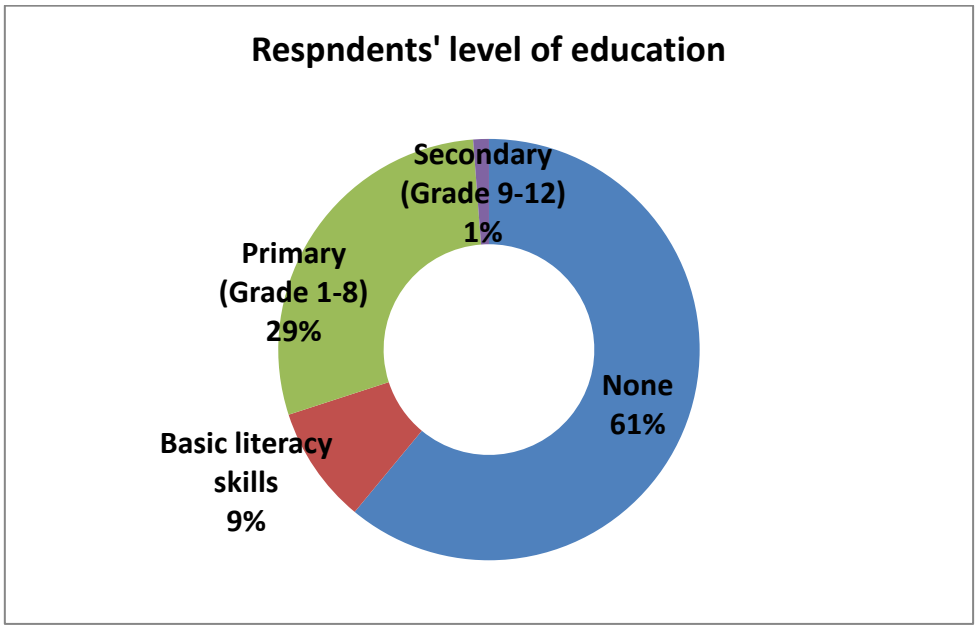


Figure 3: Education level of respondents

[1]According to the population statistics report of the woredas (as shown on Table 3, the average family size per household in the woredas is 5.

Table 2: Demographic characteristics of study area (based on survey)

Characteristics		Fedis Woreda			Woreda average (Fedis)	Midega Tolla Wored		Woreda average (Midega)	Total average
		Agudora	Anneni	Riski		Kerensa	Lencha		
Age distribution (average)		38	40.8	41.3	40	38	34	36	38.5
Marital status	Single	-	-	3.3	1.1	-	3.3	1.7	1.3
	Married	93.1	83.9	93.4	90	100	73.3	86.7	88.7
	Widower/widow	6.9	16.1	3.3	8.9	-	10	5	7.3
	Divorced	-	-	-	-	-	6.7	3.3	1.3
	Separated	-	-	-	-	-	6.7	3.3	1.3
Family size (average)		7.7	6.7	6.9	7	6.3	5.9	6	6.6
Family composition (average)	Male in a HH	4.1	3.7	3.4	3.7	3.3	2.9	3	3.5
	Female in a HH	3.6	3	3.5	3.4	3	3	3	3.2
HH (percentage)	Headed by male	86.2	83.9	86.7	85.6	100	90	95	89.3
	Headed by female	13.8	16.1	13.3	14.4	-	10	5	10.7
Breadwinner in a HH (percentage) (as perceived by respondents)	Only husband/father	37.9	25.8	60	41.1	56.7	60	58.3	48
	Only wife/mother	13.8	9.7	6.7	10	3.3	6.7	5	8
	Husband and wife	48.3	38.7	26.6	37.8	36.6	20	28.3	34
	Every member in the HH	-	19.4	6.7	8.9	-	3.3	3.7	6
	Parents and sons who don't attend school	-	3.2	-	1.1	3.3	3.3	4.7	2.3
	Parents, and all sons and daughters who don't attend school	-	3.2	-	1.1	-	-		1.7
Education level (percentage)	None	75.9	68.1	53.3	63.5	56.7	60	58.4	61
	Basic literacy skills	-	9.4	10	9.7	3.3	13.3	8.3	9
	Primary (Grade 1-8)	17.2	19.4	36.7	24.4	40	26.7	33.3	28.8
	Secondary (Grade 9-12)	6.9	3.2	-	2.4	-	-	-	1.2

Table 3: Population statistics according to Woreda reports (2010 E.C)

Description	Fedis woreda			Midega woreda	
	Agudora	Aneni	Riski	Kerensa	Lencha
Population	6,010	3,999	8,885	6,474	8,435
Male	3,062	2,001	4,520	3,311	4,272
female	2,948	1,998	4,365	3,163	4,163
Household	1,310	699	1,937	1,423	1,854
Average family size/HH	4.6	5.7	4.6	4.6	4.6

3.1.2. HH monthly income, expenditure and annual saving

The monthly income and monthly expenditure as well as annual savings of the respondents are shown in Figure 4 and Figure 5. The monthly income for the majority (73.%) of the households in study area is between ETB 500 and 1,500. On average, the households spend, for different commodities (Figure 4), monthly about birr 956 and their average annual saving is approximately birr 1,597.95. The differences in monthly expenditure ($t = 0.25$), $df = 148$; $p<0.803$) and annual saving ($t = 1.34$), $df = 148$; $p<0.182$) of the households of the two woredas are insignificant. As indicated on Figure 6, the households spend much of their income on food, followed by purchasing of cloth and footwear, transportation, purchasing education for their children, energy, family health, animal health and khat.

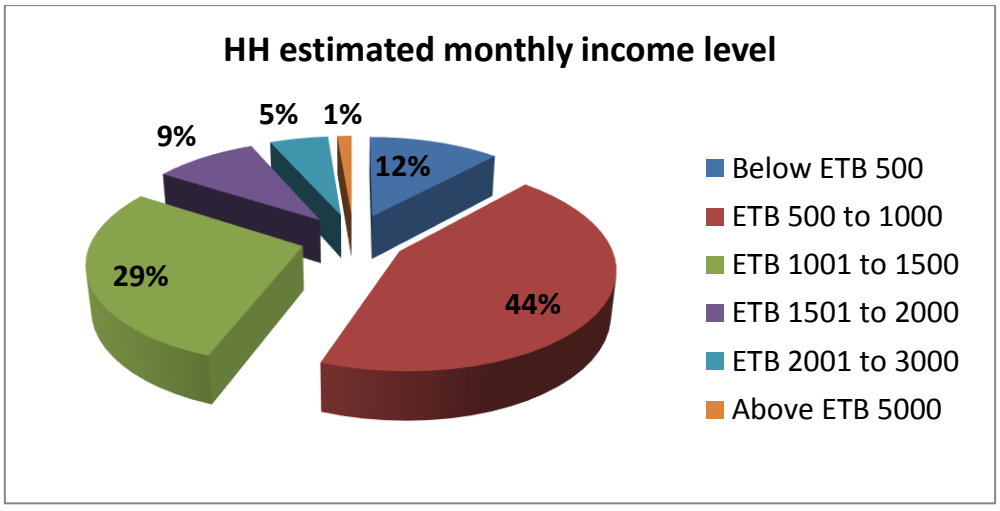


Figure 4: Monthly income level of respondents

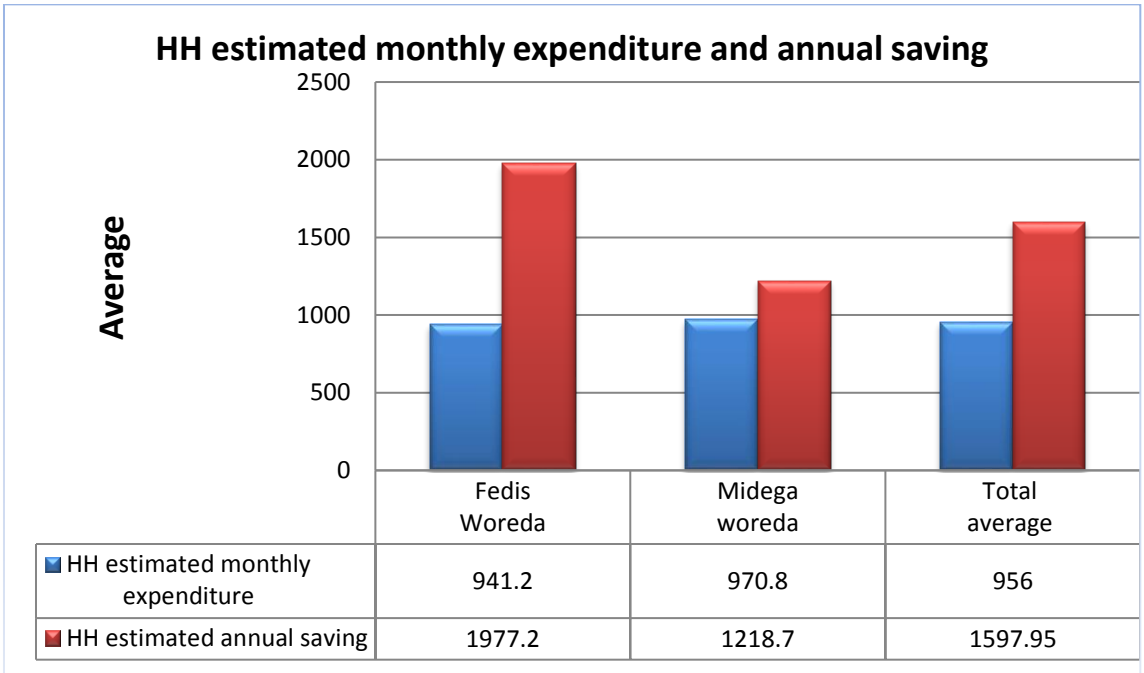


Figure 5: HH estimated monthly expenditure and annual saving of respondents

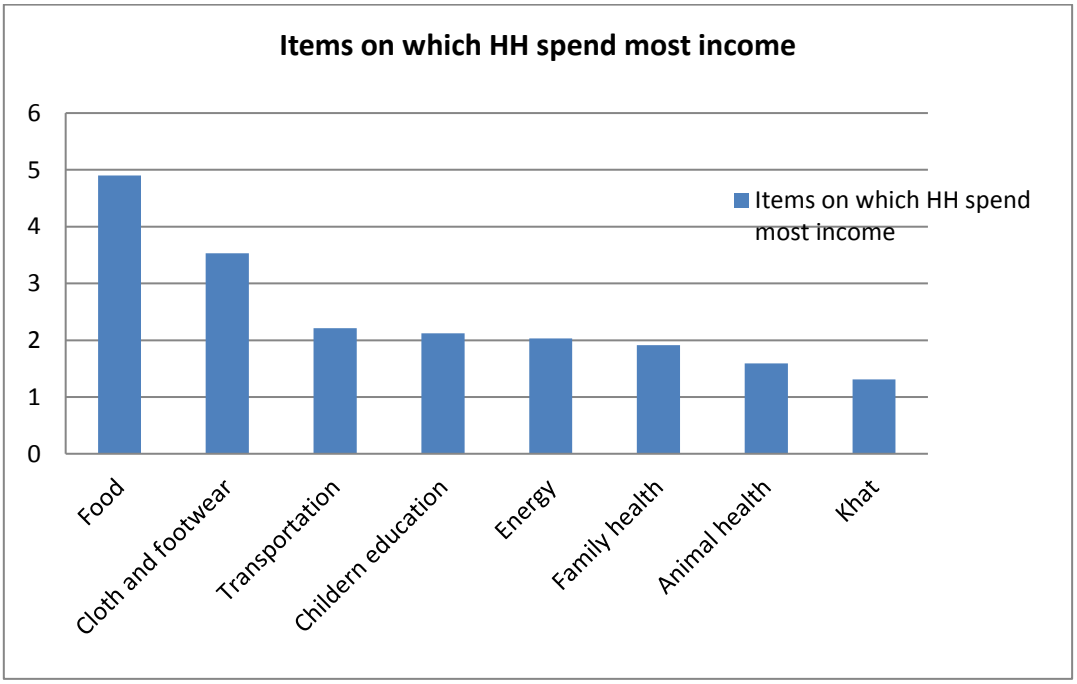


Figure 6**:** Commodities on which households usually spend their income

3.1.3. Landholding and other physical assets ownership

Landholding makes the top in the list of productive public assets that rural smallholders see a greater potential to lift themselves out of poverty, ensure food security and promote rural development (Barrett, Reardon & Webb, 2001). Landholding in that respect is very important to the households of the residents of the Kebeles at Fedis and Midega Tolla woreda; the households in the study area are known for intercropping use of their land. On average, the households in the study

area own about 1ha at Fedis and 1.5 ha at Midega Tolla (the average landholding in the study area is 1.25 ha) (see Figure 7). Based on their landholdings, the households fit the definition of the smallholder farmer who owns land of less than 10 ha (FAO, 2012). Whereas the minimum landholding size in the study area is as small as 0.25 ha; the average landholding of the households in the study area is above the national average smallholder landholding, which is 1.17 ha (CSA, 2014). These smallholder farmers proportionate their small plots of lands to grow (through inter-cropping) sorghum, maize, groundnut, khat and vegetables (mainly chilli pepper).

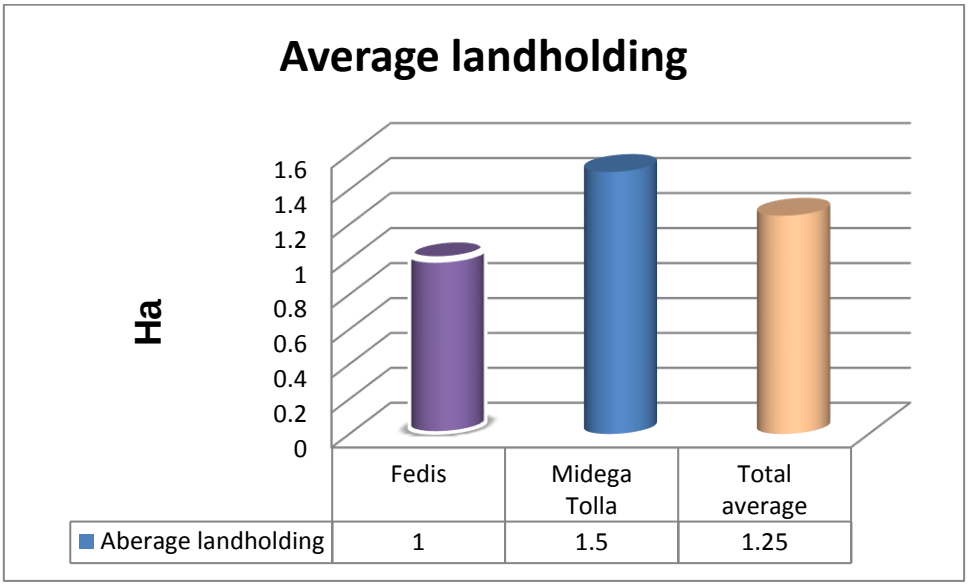


Figure 7: Average landholding of households in the study area

Table 4: Estimated proportion of land use for different crops

Crop[2]	**%age of usage**	**Remark**
Cropping sorghum, maize, groundnut and others	75.25	Intercropped with the others, the farmers estimate that **groundnut** covers up to 25% of their land.
Khat	24.35	
vegetables	0.4	

In addition to landholdings, physical assets ownership explains the socioeconomic status of communities. Ownership of houses (and number/status of rooms), beds, mobile phones, radio, TV and other equipment, such as motorbike and generators, signify the lifestyle, interaction (information exchange and communication) and usage of agricultural equipment, such as generator, to improve production yield (Ojiako *et al*., 2009). To help us understand the socioeconomic status of the households in the study area, the study captured physical assets ownership as shown in Table-5.

About 68.6% respondents live in a village house with 1-room while approximately 30.2% and 1.2% live in houses with 2-rooms and 3-rooms, respectively. A small

[2] Note: The estimation of the farmers land coverage is almost congruent with the estimation made by the agriculture experts in the woredas.

percentage of the respondents also own houses in nearby town(s): 2.7% own a house with 1-room, 2.7% own a house with 2-rooms and 2% own a house with 3-rooms. 8% have 1-bed, 3.3% own 2-beds and 2% own 3 and above beds. About 62% households have mobile phones. Owning mobile phone, in this information and knowledge age, most important to obtain market (such as price) information and interact with the rest of the market environment. While most households do not have radio, only 35.3% are blessed to obtain regional and national information through their radios. The household's non-ownership of TV could be associated not only with lack of capacity to purchase TV, but also the absence of electricity. None of the respondents own bicycle, motorbike and generator.

Table 5: Households ownership of physical assets (other than land)

Description		Fedis woreda			Midega Tolla		Total avg.
		Agudora	Anneni	Riski	Kerensa	Lencha	
House at village (%age.)	1-room	67	83	80	60	53	68.6
	2-rooms	27	17	20	40	47	30.2
	3-rooms	6	-	-	-	-	1.2
House at nearby town (%age.)	1-room	3.3	6.7	-	-	3.3	2.7
	2-rooms	-	-	3.3	10	-	2.7
	3-rooms	-	-	3.3	-	6.7	2
	Don't have	96.7	93.7	93.3	90	90	92.6
Bed(s) (%age.)	1-bed	13.3	3.3	3.3	16.7	3.3	8
	2-beds	-	-	16.7	-	-	3.3
	3 & above beds	-	3.3	6.7	-	-	2
	Don't have	86.7	93.3	73.3	83.3	96.7	86.7
Bed-nets (%age.)	1-bednet	16.7	13.3	6.7	36.7	26.7	20
	2-bednets	-	-	-	-	3.3	0.7
	Don't have	83.3	86.7	93.3	63.3	70	79.3
Mobile phone (%age.)	1-mobile	53.3	73.3	50	53.3	63.3	58.6
	2-mobiles	-	-	-	6.7	-	1.4
	3-mobiles	-	-	-	10	-	2
	Don't have	46.7	26.7	50	30	36.7	38
Radio (%age.)	1-radio	40	23.3	30	40	43.3	35.3
	Don't have	60	76.7	70	60	56.7	64.7
TV	1	-	-	-	-	3.3	
	Don't have	100	100	100	100	96.7	
Bicycle	Don't have	100	100	100	100	100	
Motor bicycle	Don't have	100	100	100	100	100	
Generator	Don't have	100	100	100	100	100	

3.1.4. Livestock ownership

In Ethiopia, many smallholder farmers practice a mixed farming (cropping and livestock raising) (Bond, Tilahun, & Mengistu, 2013). In many farmer households, livestock resources serve as a source of food (e.g., milk and meat), wealth accumulation in the form of physical lives in a stock, income generation (selling of

animals and animal products) and to flexibly manage natural resources (destock in the dry seasons and restock when pasture is abundantly available). Ownership of livestock in that respect is a major element of livelihood for smallholder households. Households at Fedis and Midega Tolla woreda are typically known for their stall fattening of Harar senga and beefed goats (ሙክት). In the same understanding, the households in the selected Kebeles at Fedis and Midega Tolla own, on average, above 2 cattle (with the highest mean per household of cattle at Aneni Kebele), about 3 goats, 1 sheep, less than 1 camel, about 1 donkey, about 3 chiken and less than one (1) bee hive per household (Table 6). With regard to bee hives, 277, 365, 387, 826 and 719 are traditional.

Table 6**:** Households livestock ownership **(avg = average)**

Livestock type	**Fedis Woreda**						**Midega Tolla woreda**				**Total avg.**
	Name of Kebele						**Name of Kebele**				
	Agudora		**Anneni**		**Riski**		**Kerensa**		**Lencha**		
	Total	HH avg.	Total	HH avg.	Total	HH avg.	Total	HH avg.	Total	HH avg.	
Cattle	3,096	2.4	4,073	5.8	4,811	2.5	2,736	1.9	4,355	2.4	2.6
Goats	2,893	2.2	3,994	5.7	4,432	2.3	5,650	4	4,784	2.6	3
Sheep	980	0.8	1,686	2.4	1,386	0.7	1,456	1	1,584	0.9	1
Camel	583	0.5	397	0.6	598	0.3	147	0.1	382	0.2	0.3
Donkey	1,513	1.2	1,852	2.7	1,980	1	1,336	0.94	1,681	0.9	1.2
Chicken	4,652	3.6	4,400	6.3	4,520	2.3	4,117	2.9	3,739	2	3
Bee hives	282	0.2	385	0.6	390	0.2	828	0.6	739	0.4	0.4

3.1.5. Economic status of respondents

With their smallholdings, majority (56%) of the households participated in this study rate themselves as middle-class and approximately 33% rated themselves as poor (see Figure-8). Sixteen (16) female household heads (most of them widowed) participated in this study. Eight (8 or 50%) of them rate themselves as very poor and poor while seven (7 or 43.8%) consider themselves as middle-class. This could partially justify the pointed gender difference in socioeconomic status that female-headed households engage in less lucrative and low-return activities (Fisher, 2004). Taking male as a base gender, the correlations in Table-5 also portray some significant gender difference in level of education ($r = -0.183$; $p<0.01$), household monthly income (-0.164; $p<0.05$), and economic status (-0.165, $p<0.05$).

The correlations (male as a base category or coded as 1 and female coded as 2) suggest that female-headed respondents possess lower education, as well as have lower income and economic status as compared to male-headed households.

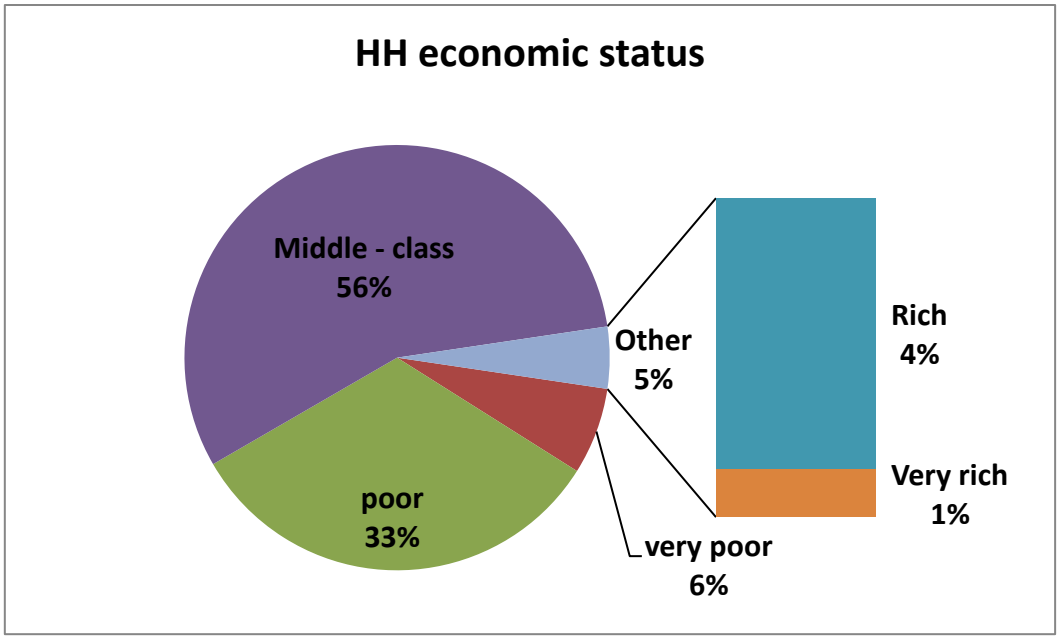


Figure 8: Households economic status

In addition to analysing the economic status of the respondents, the study also checked the correlation of economic status with HH monthly income, annual saving, monthly expenditure, age, HH family size and education level to check whether the results confirm the claims of previous studies that these factors positively influence or have positive relationship with the economic status of households (e.g., de Aghion *et al*, 2009). Table 7 presents the correlations. There is a positive and significant correlation of economic status with HH monthly income ($r = 0.385$, $p<0.01$), with annual saving ($r = 0.497$, $p<0.01$), with monthly expenditure ($r = 0.454$, $p<0.05$) and a negative and significant correlation with gender of respondents ($r = -0.165$, $p<0.05$). This study did not find significant correlation between economic status and age in the study area. Table 7 also depicts the correlation between economic status and education level, which is also not significant. Other positive and significant correlations also include HH income with their expenditure ($r = 0.557$, $p<0.01$) and HH income with their annual saving ($r = 0.279$, $p<0.01$). Obviously, households with more (expectation) of income purchase more goods and save any excess. A finding from this study that disputes the theoretically conceptualization (i.e., households with higher expenditure save less) the positive and significant correlation between HH monthly expenditure and annual saving ($r = 0.227$, $p<0.01$). This interesting finding could be explained that as people divide their income into expenditures and savings, the households with the higher income save a proportion of their income and these households dominate the number of respondents in this study who mostly consume their income and save less. Understandably, the correlation between HH monthly expenditure and family size is positive and significant ($r = 0.168$, $p<0.05$).

Table 7 also presents the correlation of education level with some socioeconomic indicators to testify that individuals engage in lucrative activities to generate income, know how to mobilize and economize resources and focus on family planning

(Adhikari *et al*., 2004; UNESCO, 2006). This study did not find significant correlation of respondents' education level with either income, saving, age or family size.

Table 7: Correlation of some important demographic variables

		1	2	3	4	5	6	7	8
1	Respondent's level of education	1							
2	Household monthly income	.029	1						
3	HH monthly expenditure	.057	.557**	1					
4	Annual saving	.044	.279**	.227**	1				
5	HH Richness (economic status)	.005	.385**	.454**	.497**	1			
6	Age of the respondent	.117	.081	.047	-.045	.052	1		
7	Family size of HHs	.133	.055	.168**	-.077	.095	.403**	1	
8	Gender of respondent	-.183*	-.164*	.017	-.054	-.165*	.070	.017	1

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

3.1.6. Main sources of livelihood

Although rural communities generate the bulk of their income from agricultural activities, they also engage in non-agricultural activities to obtain working capital to invest in their agricultural activities or complement their agricultural income (Barrett *et al*., 2001; Woldehanna & Oskam, 2001). Figure 9 shows that the same is also evident in the study area as most of the households generate their income from cropping and livestock reproduction, and a few others also make a living by engaging on collecting firewood and making charcoal, as well as casual job. A few also earn income from remittance and petty shop.

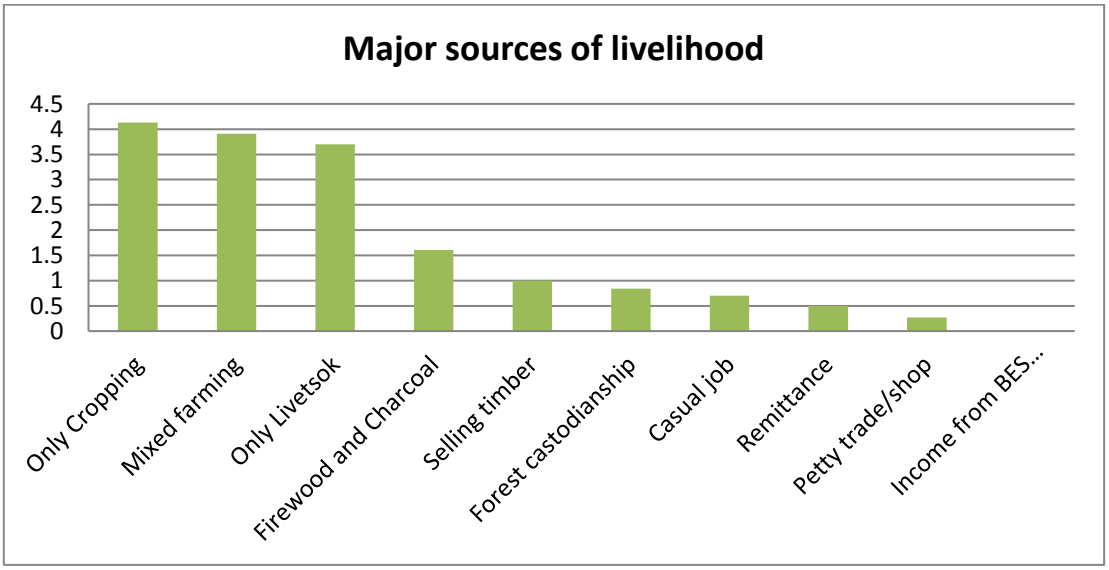


Figure 9**:** Sources of livelihood of households in the study area

3.1.7. Agricultural production: types, composition and status

Depicted in Figure 10, the households in the Kebeles at Fedis and Midega Tolla woredas produce different types of agricultural products for their livelihoods (see also Figure 11 for products pictures). These include livestock (goats, cattle, sheep, camels, donkey, chicken), cereals (sorghum, maize and rarely wheat), vegetables (chilli pepper and rarely cabbage and onion) and pulses (haricot bean and chick pea). They also produce oilseeds (mainly groundnut), khat, fruit (scarcely mango at Fedis) and honey bee. The communities produce most of the agricultural products primarily for subsistence (self-consumption). Khat and groundnut are mostly (90 to 95%) for commercial.

Note: it is important make a note here that the households produce sorghum and maize as staple food (i.e., for self – consumption). Evidenced by the discussion with the woreda experts and farmers, as well as the primary quantitative survey, the Kebeles at Fedis produce more groundnut, khat and sorghum than the Kebeles at Midega. Chilli pepper is largely produced by the Kebeles at Midega Tolla. Because of their pastoral and agro-pastoral livelihood operation, households at Lencha and Kerensa largely focus on livestock production, including honey bee.

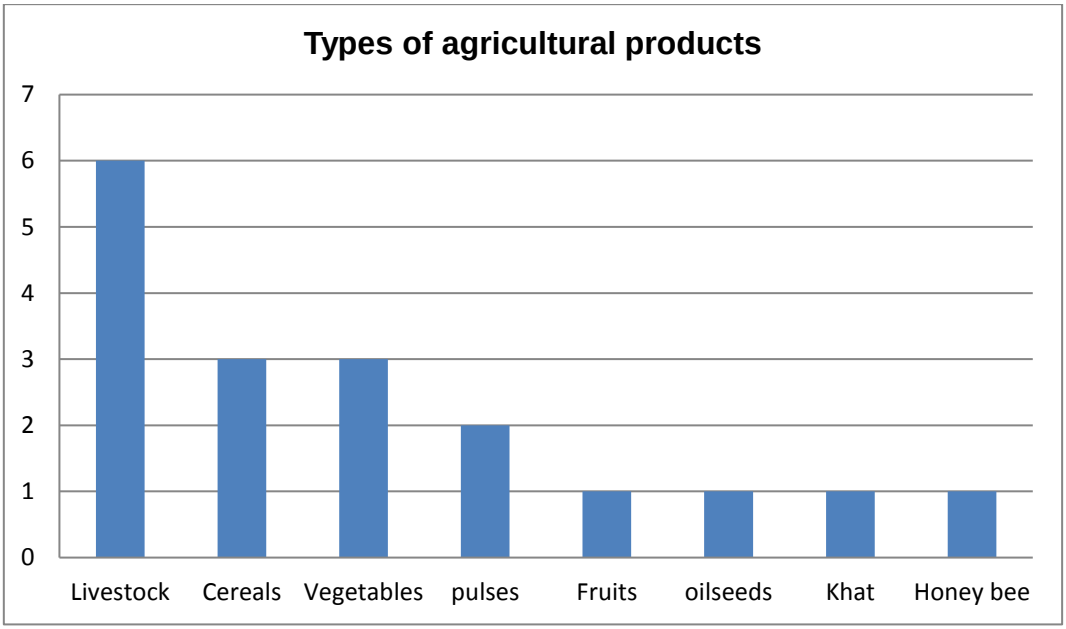


Figure 10**:** Types of agricultural products in the study area

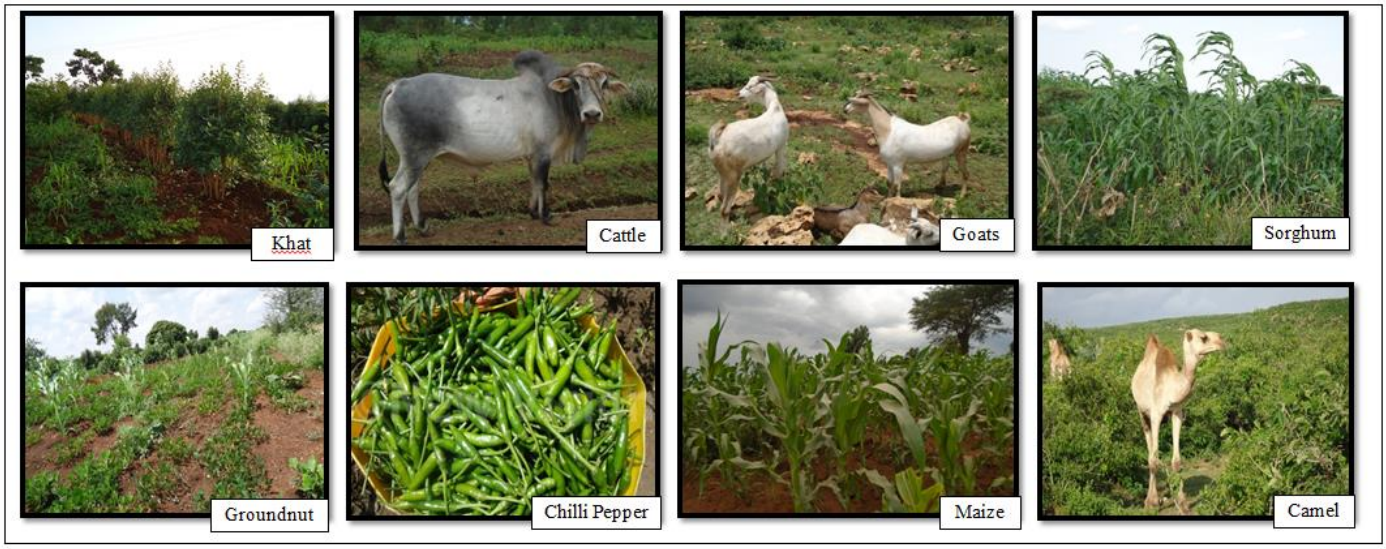
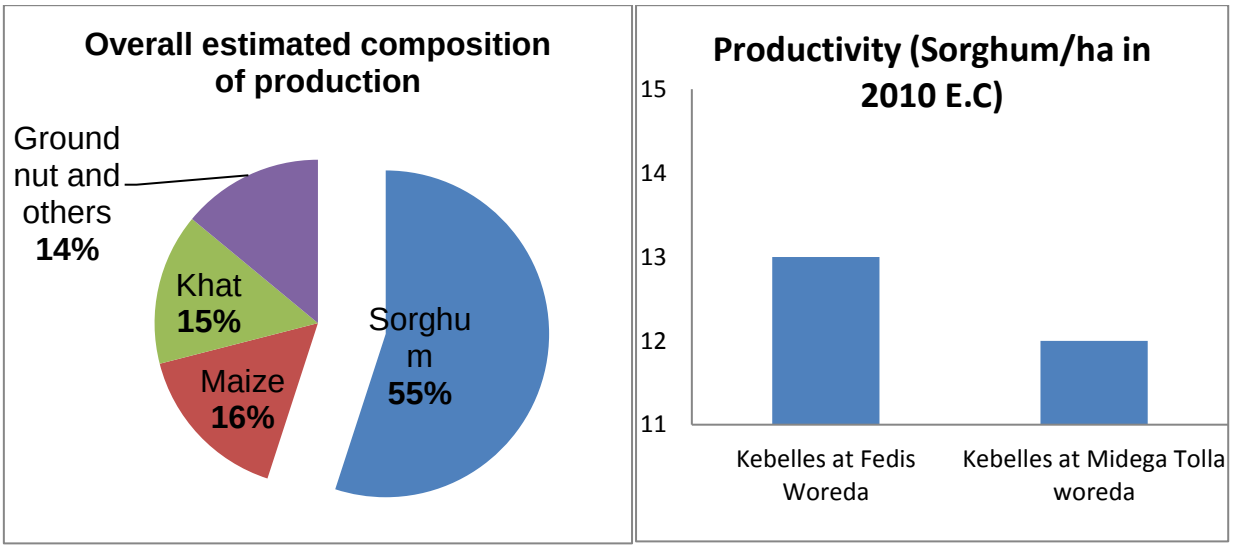


Figure 11: Some of the products produced by the study woredas

The farmer households participated in this study indicated that sorghum constitutes a higher proportion (55%) of their production. At Fedis, the households estimate that 59% of their production output is sorghum while sorghum contributes about 51% of their production at Midega Tolla. As indicted on Figure 12, groundnut and khat are more produced by the farmers at Fedis compared to the farmers at Midega Tolla. This finding is substantiating the evidence provided by the agriculture experts in the woredas.



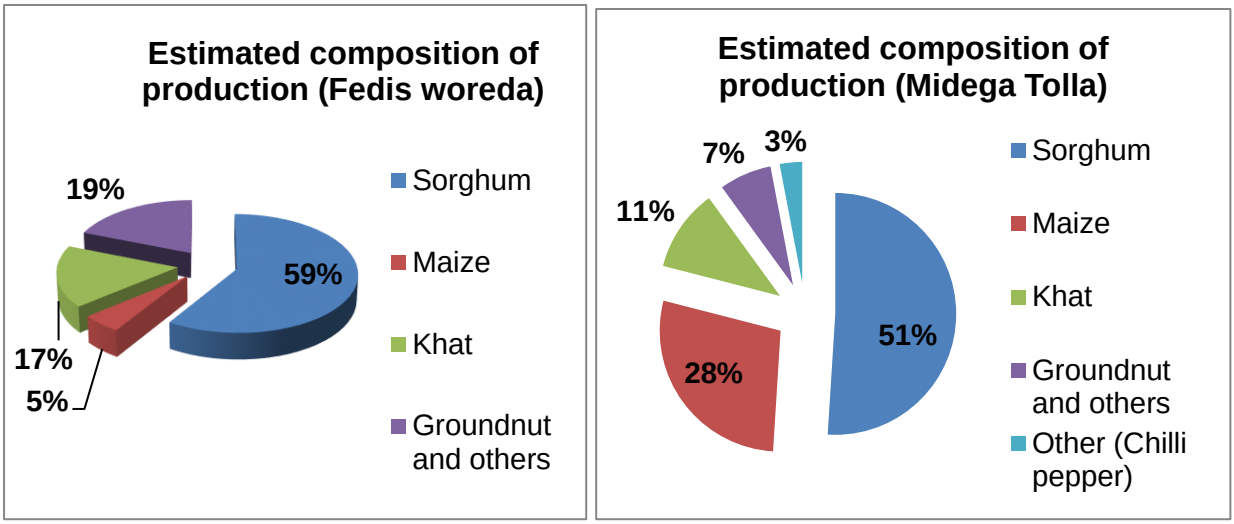


Figure 12**:** Estimates of production composition and productivity

About 94% of the households included in this study expressed that their agricultural production is decreasing over the last five years (Figure-14) for the reasons reported in figure-14. The main reasons pinpointed by the farmers that cause their agricultural production to decrease include: decrease in land possession due to population growth, frequent drought, increase in price of inputs, not using enough fertilizer, weed[3] and erosion. The farm households are clearing forests of the sanctuary for agricultural expansion and charcoal making (see Figure 22); thus forcing the sanctuary land coverage to shrink from time to time.

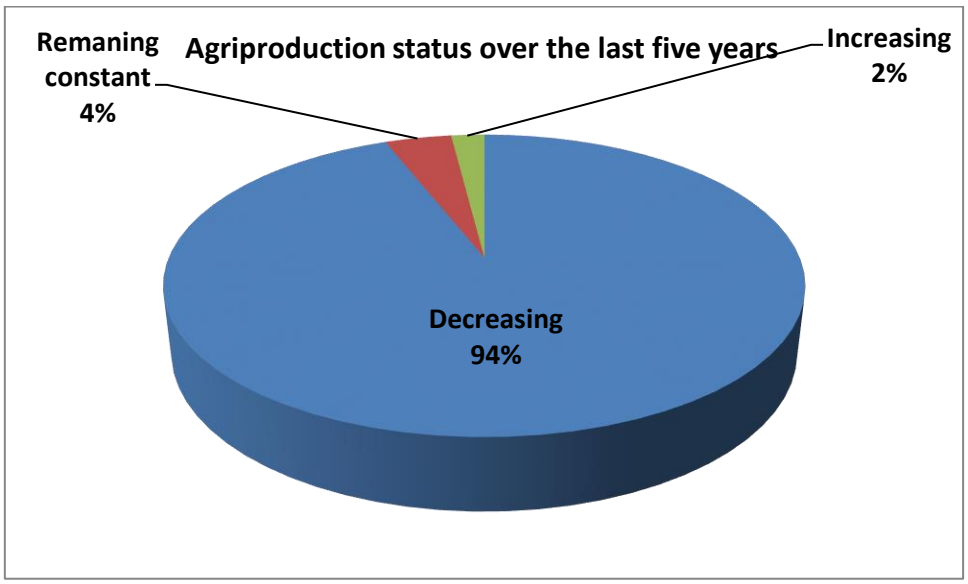


Figure 13: Agri-production status over the last five (5) years in the study area

[3] The farmers cry of **striga** (commonly known as witchweed), is a parasitic plant, invading their farmlands, and is a serious pathogens of the cereal crops.

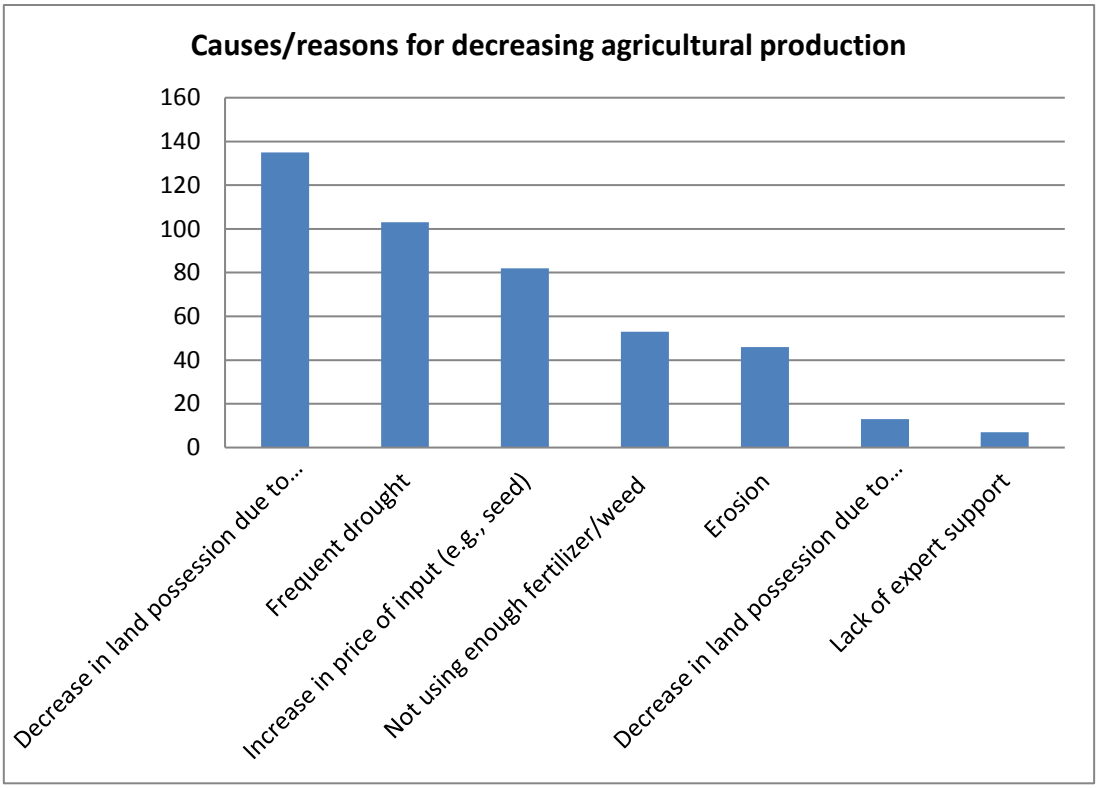


Figure 14**:** Causes/Reasons for decreasing agricultural production

3.1.8. Most frequently marketed products

Majority of smallholder farmers are characterized by selling what is surplus of their consumption to meet their immediate cash need, to obtain working capital or to invest on equipment aiming at improving their productivity (Poole, 2017). This also holds true to the smallholder farmers of the selected Kebeles at Fedis and Midega. Figure-15 contains the products that the farmers frequently supply to the market for sale. Evidence from the qualitative discussions with the farmers and the quantitative survey substantiates that the farmers mainly produce and sell (90 to 95% of their produce) khat and groundnut. Almost all respondents report that they sell chicken and eggs. Majority of the respondents indicate that they often sell goats and middling market oxen. Their marketable products, such groundnut, khat, goats and oxen suggest the potential to engage the households in promising business opportunities essential to improve their livelihoods.

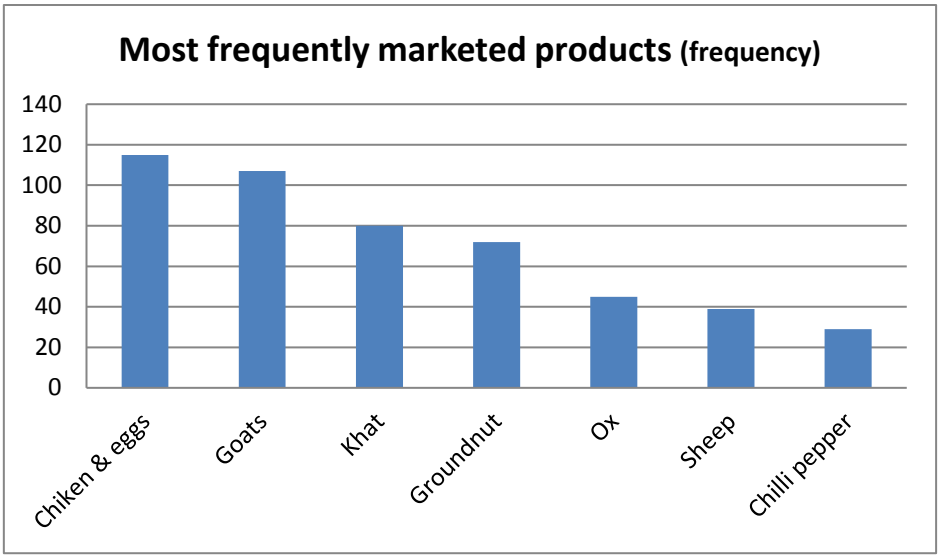


Figure 15: Most frequently marketed agricultural products by households

3.1.9. Source of drinking water and energy

Rural communities can use different sources to satifay their water demand. Figure 16 shows the pictures taken of during the field study. Households (100%) rate self – made pond and rain water as their main source of drinking water (Figure 17). Drinking water from unprotected sources might or can expose the households to waterbore diseases, and thus hamper their day-to-day activities and their overall productivity. The finding on the households' source of energy demonstrates that approx. 90% depend on firewood and solar while a small proportion use coal and electricity (Figure 18). The users of electcity are those located along the way of the electricity from Harar to Boko (Fedis woreda) and Midega (Midega Tolla woreda).

Figure 16: Pictures taken of during the field study: pond and a farmer drnking water fetched from the pond

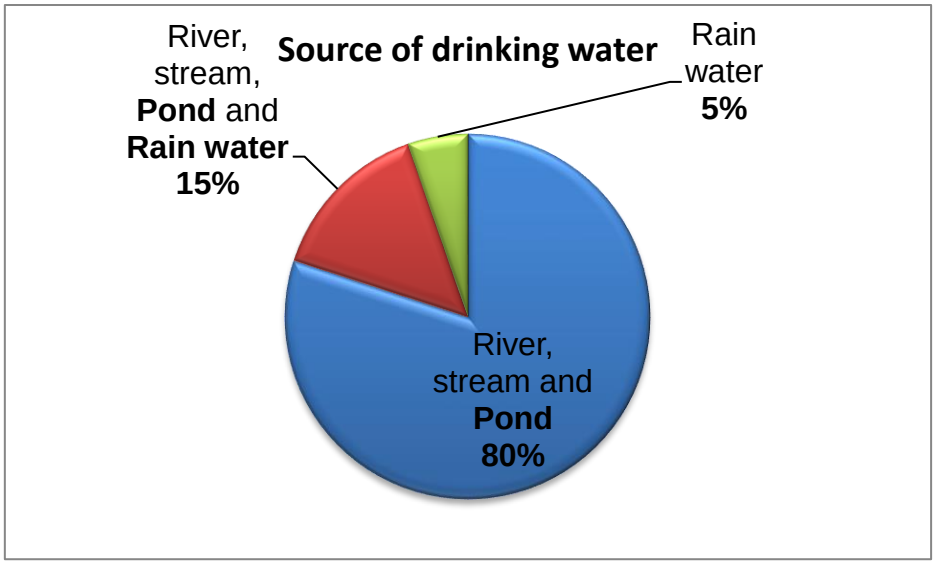


Figure 17: Sources of drinking water in the study area

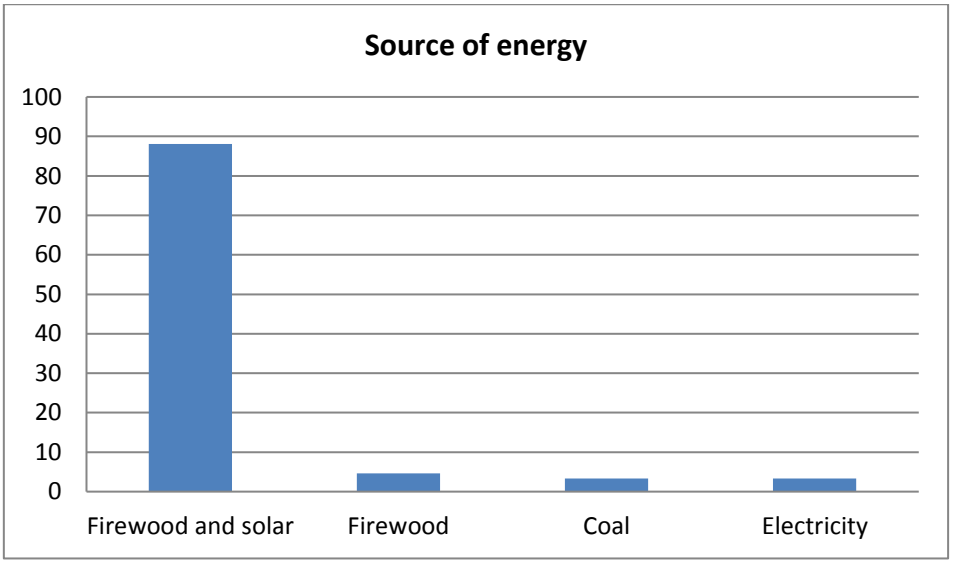


Figure 18: Sources of energy in the study area

3.1.10. Infrastructure

3.1.10.1 Availability of school centres in the study area

Table 8 presents the responses from the respondents about the availability of schools. Primary school (grades 1 – 8) is available while junior school (grades 8&9) and secondary school (grades 11&12) are not available. After completing grade eight (8), their children travel to nearby town to attend higher grades (grades 9-12).

Table 8: School availability

School level	Fedis woreda (Kebeles)	Midega Tolla Woreda (Kebeles)
Primary school (grades 1 – 8)	√	√
Junior school (grades 9 & 10)	X	X
Secondary school (grades 11&12)	X	X

3.1.10.2. Public health and veterinary center availability in the study area

There are extension workers who provide health and veterinary services at the Kebeles level. The communities, however, complain that the health and veterinary centers do not have the necessary and sufficient equipment. In addition to ill – equipped health centers, there is high turnover of health professionals. Administrators and the community in the study area unanimously pronounce the existence of very poor public health and veterinary services (Figure 19).

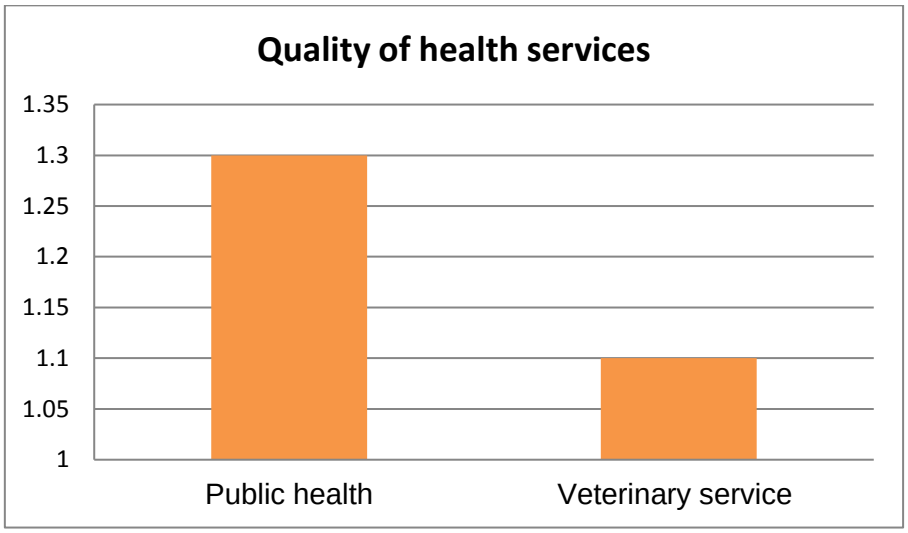


Figure 19: Quality of health and veterinary services

3.1.10.3. Access road, transportation, financial institutions and marketplaces

Access to productive institutional resources (road, transportation, financial institutions and marketplaces) is vital for livelihood performance; these resources are in relatively poor condition in the study area. Usually during our study period, it took us 2:00 to 2:30 hrs to reach at Boko/Fedis (25 kms from Harar city) and up to 4 hrs to arrive at Midega (55 km from Harar city). The underdeveloped and bumpy gravel road was not easy for our vehicles to soak through. It is in that respect that the respondents rated the road, 1.8 out of 5 points, implying that their road access is poor (Figure 20). The respondents also confess that transportation is available but not sufficient (mean = 2.5). Figure 20 also presents that the respondents rated their access to financial institutions (mean = 1.7) and marketplaces (mean = 1.8) as (very) poor. Associated to their limited access to financial institutions, among other things, majority of the respondents (52%) save their money at home, 8% in banks and 5% at Oromia microfinance Sc. 35% responded that they did not have any saving. This, however, does not necessarily indicate that they do not at all make saving in any form but in monetary terms as saving can also be made in physical assets, such as livestock. For example, a household can sell a fattened bull for ETB 30,000. This household can use ETB 5,000 for household consumption and with the remaining ETB 25,000 can purchase two (2) young bulls (6 months to one year age) with a high fattening potential for further fattening; this is customary in the woredas. The households in the study area do not use traditional saving mechanisms, such as equip.

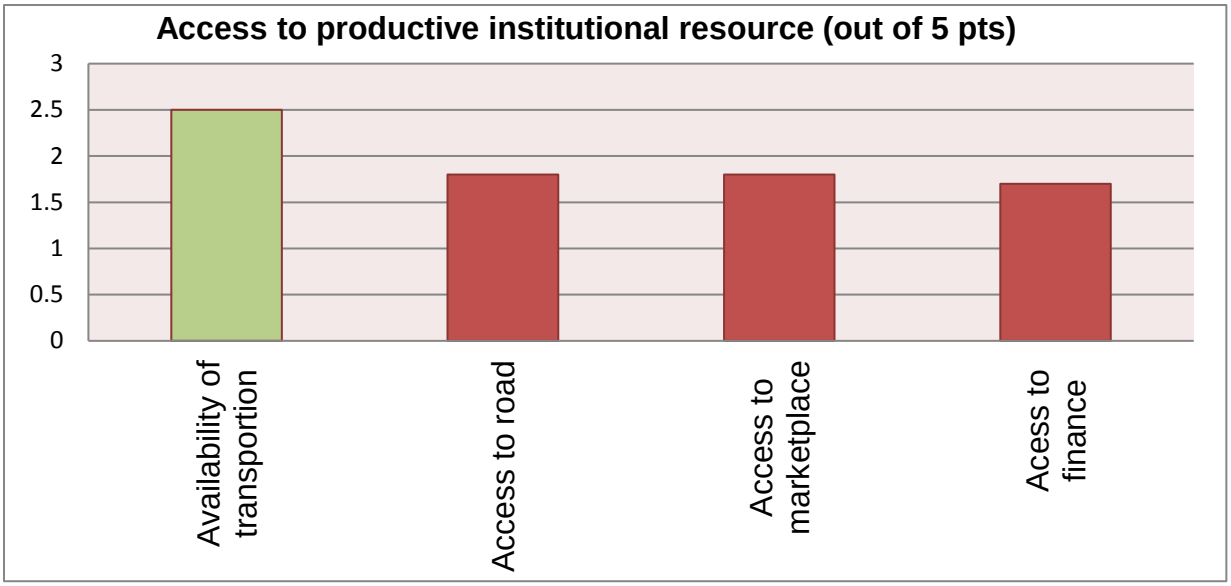


Figure 20: Access to productive institutional resources (rate out of 5 points)

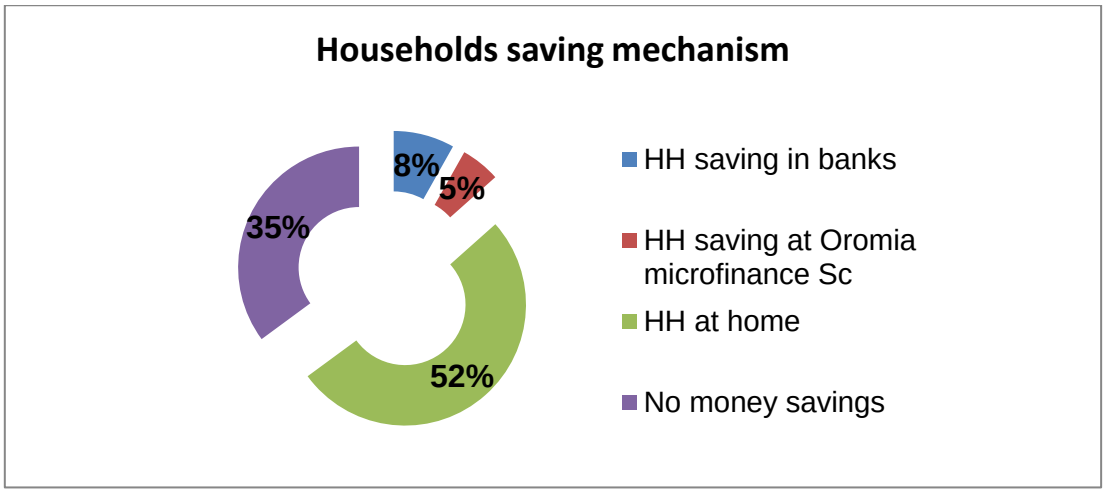


Figure 21: Households saving mechanisms

3.1.10.4. Information communication (Mobile and Radio) network

Communication network facilitates the flow and sharing of information and understanding between people, and about government policies/directions, markets and economic exchanges. Among the different media networks, rural communities, these days, use radio and mobile network to access and share information. Our discussants noted that radio and mobile play an important role in their lives; the discussants exclaimed that this part of Ethiopian is amongst the most users of radio. Mobile phones also enable the farm households to exchange information about khat, livestock and groundnut market conditions. *There are, however, times that mobile network becomes sporadic and communication is difficult*."

3.1.10.5. Electricity and post-office services

Evidence obtained through triangulated approaches, including personal observation, interviews and discussions with local administrators and survey (Table-9) confirms that there are no electricity and post-office in the selected kebeles.

Table 9: Availability of public services

Services	Connection/availability	Remark
Electricity	Not connected	Note that some households situated along the line where electricity is expanded to electrify the towns of Boko (Fedis) and Midega (Midega Tolla) are beneficiaries of electric service.
Post-office	Note available	

3.2. Potential (promising) Business opportunities

This sub-section explicates (from the above results and discussions) the most promising agribusiness opportunities that could transform the smallholder farmers into profitable businesses. As explained in the results and discussions sub-section, the households at Fedis and Midega Tolla produce agricultural products primarily for self-consumption (except khat and groundnut which are mainly for commercial) and any surplus for small exchanges with local communities in local market. Some of their produce, for example, sorghum and maize mostly serve as staple food for the households. The Kebeles also produce commodities essential for regional, national and export markets. The following briefly describes the products and services that can enable the households to operate as businesses that produce marketable products for profit if an enabling environment is created.

3.2.1. Marketable products

The Kebeless at Fedis and Midega woreda undertake agricultural practices to produce khat, groundnut, livestock and honey bee, which can earn the households a better life if commercialized properly.

a) ***Khat***: Khat (*Chata edulis*) is the most important cash crop in Eastern Ethiopia (Hararghe) and a big business for many people and towns/cities, stretching from Chiro to Jigjiga with the main distribution centers at Aweday, Harar and Dire Dawa. This perennial crop, with its leaves used for their stimulating effect, is an important source of income for different classes of society (youth, women and men) as producers, sellers (traders), brokers, loaders and unloaders, as well as drivers. As experts noted, the Hararghe khat is also exported to nearby countries (Djibouti, Somali land and Somalia), Middle east, and also is exported as far as England; thus generates foreign earnings. The Kebeles (particularly at Fedis woreda) in this present study are prominent producers of khat by intercropping with sorghum, maize and groundnut. The farmers noted that they are expanding their khat production as khat enables them earn income twice a year and producing the exportable khat (which they call it "***Hamerkot***") can be sold at ETB 800 to 1,500/kg. Farming a 0.25 ha enables to obtain up to 50 kg khat, which thus allows the farmers to earn about ETB 40,000; this revenue generation is twice a year. Because the farmers earn better benefit from khat (e.g., income twice a year), there is some worry among witnesses (including the experts we spoke to)

that the farmers may replace their other produces with khat and use their whole parcel of land to produce only khat; witnesses also claim that the decline of Harar coffee is due to replacement by and the expansion of khat. Supporting the farmers to engage in the high-market value and exportable type of khat (quality than quantity) could enable them earn higher returns, create assets and invest in their livelihoods, including purchasing a better education for their children.

b) ***Livestock production (fattening)***: the Kebeles at Midega Tolla woreda are regarded as pastoral and agro-pastoral Kebeles and reproduce cattle, goats and camels. The Kebeles at Fedis woreda are also producers of cattle, sheep, goats and camels. The woredas are known for producing and fattening meat bulls, commonly known to as 'Harar Sanga'. The farmers in the Kebeles practice a 'stall - fattening or feeding' and market their fattened bulls in the markets at Fedis, Midega and Harar. Fattened bulls (or sanagas) are not only traded at local and domestic (Addis Ababa and Adama) markets, but also exported, through a cross-border trade, to neighbouring Somaliland and Somalia and all the way to Middle east. Recently, the cross – boarded livestock trade is declining due to recent conflicts in Eastern Ethiopia. Some experts also state that large scale traders do not come to the marketplace at Fedis and Midega because of the limited fattening capacity of the farmers. Through a stall – feeding (i.e., confining and feeding of animals for fattening), majority of the farmers fatten in small quantity (usually one or two oxen). Evidence from personal marketplace observation, and discussion with experts, traders, brokers and farmer groups shows that fattening is a profitable business as a well-fattened Sanga can be sold between ETB 30,000 and 40,000. Organizing the farmers into peasant associations (or farmer cooperatives) and providing financial service (loan) can enable to solve quantity fattening and supply problems and to exploit this profitable business farmers.

c) ***Groundnut:*** Next to khat, groundnut is a high market value crop in the study woredas. Whereas all the farmers in the study Kebeles produce groundnut, it is largely produced at Fedis woreda. The farmers intercrop groundnut with mainly sorghum and also maize. They supply 90 to 95% of their produce to market and sell it at about Birr 6 to 7/kg.

d) ***Honey bee production***: Honey has a high market value both at domestic and export markets. Households in the Kebeles of Fedis and Midega Tolla woredas practice mostly traditional and small – scale bee keeping and honey production. For example, out of the 1,085 beehives in the three (3) Kebeles at Fedis woreda, 1,057 (or 97.4%) beehives are traditional. Likewise, 1,545 (98.6%) beehives out of 1,567 beehives in the two (2) Kebeles of Midega Tolla woreda are traditional. Supporting the farmers to modernize their bee keeping and honey production can help them to produce and supply high quality honey to earn higher returns.

e) ***Chilli pepper (vegetable)***: the study woredas are not that producers of much vegetables. The one with market potential that the households at Kerensa and Lencha Kebeles (Midega Tolla Woreda) is pepper for making chilli (ሚጥሚጣ). This

product has high market value and is demanded almost in many parts of the country and particular in Harar and Dire – Dawa as a sauce to accompany and garnish different dishes including raw meat. Capacity building and supporting the farmers to enhance their production and productivity and linking them to national market can enable them to supply chilli pepper in volume and high quality.

4. Locational advantage and Existence of Institutions

Location is an important livelihood factor for technical and commercial (economic) reasons. The study area is situated at an important locational juncture in Easter Ethiopia. The area is close to the cross – border trade with Djobouti, Somaliland and Somalia. In this area, a number of economic exchanges, including khat, livestock, food items, cloth and electronics equipment are frequently traded from and into Ethiopia. Even if most of the respondents of this study rarely recognize the benefits of their location, some of them and experts acknowledge the positive impact of the location and the cross – border transaction in khat, livestock, food items, clothes and equipment on the livelihoods of the residents. What is more, the area is located where higher learning and research institutions (namely, Haramaya, Dire – Dawa and Jigjiga Universities) undertake research and provide community services. The respondents acknowledge that Haramaya University occasionally provides them with improved seed varieties, capacity building trainings and technical support.

5. Challenges in the study area

Potential and promising agribusiness opportunities in and around Babile Elephant Sanctuary are not yet adequately exploited, and the agricultural practice of farm households is largely for subsistence. The failure to adequately exploit the opportunities could be attributed to bottlenecks or lack of or limited access to productive public resources and services. Lack of and/or limited access to productive resources and services includes water scarcity (frequent drought), access to road, land, finance, technical support and capacity building. Qualitative and quantitative survey findings utter the following as major factors that undermine to seize and convert the existing opportunities into realized benefits. Construct

i) ***Chronic shortage of Water***: Water is a necessity to human livelihood and access to water is regarded as a prerequisite for poverty alleviation. This important resource is chronically scarce in the study area. This is frequently affected by drought. Protected public borehole is also absent and the people use self – established and unprotected ponds (*see pictures below*) as a source of drinking water, water animals and for irrigation. These (ponds) water sources are mainly available during rainy seasons and intensively for cash crop irrigation; thus dry in the dry season. Not only are the farm households face chronic shortage of water, they can also be exposed to waterborne diseases from drinking unsafe water from the unprotected ponds. It demands availing alternative water sources, such as boreholes, and supporting the farmers to practice other supplementary water harvesting mechanisms through water and sanitation development projects.

Small landholding and weed (striga)invasion: Landholding (work premise): Landholding is instrumental to promote rural development. Some households, own as small as 0.25 ha. The households assort their small lands into multipurpose and intercropping occupancy. What is more, the farmers cry of striga (commonly known as witchweed), is a parasitic plant, invading their farmlands, and is a serious pathogens of the cereal crops. A feasible solution to this problem could be providing technical support and capacity building to focus on and practice high-yielding agricultural production in their small plots of land.

ii) ***Limited access to finance***: Households complain that limited access to finance constrain them to engage in profitable agribusiness activities, such as fattening and petty shop, as well as to practice modern beekeeping and to establish farmers' cooperatives. According to the experts and discussants, most households satisfy their cash needs by selling khat, groundnut and livestock (especially goats to satisfy ad hoc and immediate household consumption) their agriculture products and borrowing from friends and relatives and borrowing from rich households. Using the financial products and borrowing from formal and (micro)financial institutions is limited due to religion and stringent requirements (initial saving and collateral). A few others (particularly the poor) have been benefited from the HAB program entailed to benefit the food insecure households to engage in asset creating livelihood activities. The HAB program has a limited outreach and does not accommodate households not registered as Safety Net beneficiaries. Even the HAB beneficiaries protest that the mount (ETB 4,000) is so small to undertake profitable livelihood activities.

iii) ***Underdeveloped infrastructure (road)***: Road or transportation that serves an economic environment to operate smoothly and interactively is underdeveloped in the study area. The area is characterized by bumpy gravel road, which consumes much of takes' time and puts vehicles to serve a shorter economic life. The situation undermines economic actors (primary producers, traders and consumers) to smoothly integrate and to conduct economic exchange. Underdeveloped road causes quality of product quality to deteriorate. It also hampers the development of hospitality services.

iv) ***Limited market (value-chain) integration for smallholder commercialization***: Households claim that their integration with the market is very limited and they mostly serve the local markets with small volume exchanges. Their limited market integration can owe to a number of factors, including the underdeveloped road, limited access to finance, limited integration with subsequent value chain actors and business knowledge to practice market-oriented and modern large-scale production. Their transaction is mostly with itinerary/rural traders who penetrate through to reach the marketplaces at Boko (Fedis) and Midega (Midega Tolla).

v) ***Unexploited economic value of the sanctuary and forest clearing for agricultural expansion and charcoal making***: Tourism is not at all a business for bread making in this side of the sanctuary. Almost all the households acknowledge the sanctuary for its importance as a source for firewood collection, charcoal making (*see picture below*) and animal pasture. Only a few understand that the sanctuary is important as a source of clean air and shelter of their bee hives. As majority of the inhabitants hardly recognize the market value of the sanctuary, they disregard its importance and the elephants (ይህ ኣውሬ ምን ያደርግላቸኋል) and expand their farmlands by clearing the trees/forest, as can be seen in the picture below.

Figure 22: Sanctuary forest clearing for agri-expansion and charcoal making

6. Suggestions and concluding remarks

To exploit the available agribusiness opportunities, it is necessary to resolve the institutional bottlenecks.

- Explained in different parts of this study, water shortage, bumpy road and limited access to finance are rated among the core bottlenecks that undermine the households to transform their agricultural activities into profitable agribusinesses. With limited financing sources, it can be hugely difficult for the households to convert their agricultural production, including high-market value products, such as livestock, groundnut, honey bee and khat, to their benefits. This study suggests an establishment of a community-based revolving loan fund, through supporting RuSACCOs, to resolve the (working) capital constraints of the farmer households (*the establishment of this fund is provided in a separate document*). In addition to creating access to finance, creating an enabling institutional environment by developing the road (in consultation with Ethiopian road authority) and establishing

accessible and suitable marketplaces can permit the households to integrate with subsequent value chains.

- Water harvesting mechanisms and constructing protected boreholes is a serious issue that cannot be postponed for tomorrow. Resolving the chronic water shortage in this area demands finding sustainable approaches for water supply and harvesting. It may require partnering with development agents, such as UNICEF, that work on Water, Sanitation and Hygiene (WASH) to design water and sanitation development projects and mobilize funds for accelerated and sustainable water supply.
- It is already explained that commercialization of the farmers produce by linking to regional, national and international supply chains and markets can enable the households to earn higher-returns and thus increase their income (Samual & Sharp, 2007). Before integration, however, it is vital to conducted a value-chain study to understand the (the production, purchasing power, influence) capacity of the value chain actors in the market transaction and exchange. The value chain study can examine potential factors that may lead to non-smooth, unfair/inclined to one or a small group and inconsistent interaction and transactions, which may disappoint any of the value chain members and force them to abandon the chain. Insights from such study can help to design intervening approaches (such as building the capacity of chain members through training; forming cooperative groups/associations to supply in large volume and to bargain for better terms of exchange) to establish a smooth, fair and consistent value-chain.
- The elephant sanctuary can contribute to the livelihood performance of the adjacent communities if due attention is given to **tourism**. To make the sanctuary as a tourist destination and tourism as a source of livelihood, it is necessary to create an enabling environment (roads, marketplaces, sanctuary development works, services and facilities) and promote/publicize the sanctuary.

In conclusion, commercializing the products of the smallholder farmers by integrating with the value chains can allow them to earn higher-returns. The smallholder literature has already documented that smallholders with higher-returns and income purchase consumable goods to improve their family welfare and invest in agricultural inputs and equipment to modernize their agricultural operation (e.g., Govereh, Jayne, & Nyoro, 1999; Jaleta, Gebremedhin, & Hoekstra, 2009; Maertens, Colen, & Swinnen, 2011). They also improve their “personal savings” or participate in “community-based resource mobilizations, such as ‘Equip’ to accumulate capital to purchase modern agricultural equipment and technologies to transform their subsistence agriculture into a high-yielding and large scale production (Jaleta *et al*., 2009; Lewis, 2002; Pingali & Rosegrant 1995). With their higher returns, the households can also contribute initial capital to form a ‘self-saving loan group’ and ‘smallholder cooperatives’. As smallholder cooperatives, they can collectively bargain for better market exchanges and overcome quantity and quality supply problems, as well as to benefit themselves from large-scale input purchase and from transaction

cost reduction resulted from large volume supply to markets. An important approach is, therefore, to promote self-financing mechanisms achieved by means of earning higher-returns through integrating the households to regional, national and international agro-processing enterprises, supply chains and markets.

At the basis of such market integration, however, is the reorientation of the mindset of the smallholders farmers to accommodate a marketing-based worldview and to transform their operation from a subsistence production into a market-oriented production (Teklehaimanot, Ingenbleek, & van Trijp, 2017). Marketing training (marketplace literacy education) can be an important approach to shape the mindset of the farmers and to improve their market knowledge to focus on market-oriented production (Teklehaimanot *et al.,* 2017). It also demands the development of and enabling infrastructure (road, transportation and ICT facilities) (Barrett, 2008).

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Appendix: Survey questionnaire, interviews and focus group discussions

Enhanced Management and Enforcement of Ethiopia's Protected Area Estate Project

Household survey questionnaire

Respondents consent:

Dear participant of this survey, the Ethiopian Biodiversity Institute (EBI) is conducting a study on Babile Elephant Sanctuary in order to implement a sustainable and integrated landscape management project on selected priority landscape. Green MEMIs PLC is commissioned by the EBI to carry out the study and to propose an integrated management plan for a selected landscape in and around the sanctuary. The objective of this survey is to collect data on socioeconomic characteristics of households, particularly on livelihoods, access to credits, agrobiodiversity, knowledge on the use of different medicinal and edible plants, and microfinance schemes. The data will only be used for the purpose of the project. Your name will not be disclosed, will not be used in the report and will remain anonymous. Hence, we would like to ask your consent to proceed with the survey.

1. Yes, I agree and willingly provide the information. _____
2. No, I don't agree and I am not willing to provide the information. _____

Dear Interviewer (enumerator):

You will be assigned to a village from where you are going to collect the data. In the village where you are assigned, there are respondents selected for this study's data collection. The list of respondents in each village will be hand in to you before you start the interview, and please be strict to the list of respondents you received. After the data collection training and before you start the interview (data collection), please study the questionnaire carefully, and make sure you understand the questions and how you fill the responses of the respondent. You must keep regular contact with the researcher to discuss new developments/questions. Make a note of any useful new development(s) not included in the questionnaire, and brief the researcher at the end of each field day. Thanks, in advance, for you are handy.

Basic Information:

Questionnaire number: _____

Date of Interview: _____

Name and signature of enumerator: _____

A. Household socioeconomic characteristics

1. Name of the area*:*

a) Name of the Woreda _____

b) Name of the village _____

1. Approximate distance of your village from:

a) The main road (in hours) _____hrs.

b) The nearby marketplace (in hours) _____ hrs.

2. a. Name of the respondent _____.

a) Age of the respondent _____years

b) Gender of the respondent: i) Male ii) Female

3. Marital status:	Tick (√)
Single	□
Married	□
Widower/widow	□
Divorced	□
Separated	□

4. Household size and composition:

a) Family size (number of people in a household) _____.

b) Number of males in the household: _____.

c) Number of females: _____.

5. Respondent's level of education level:		Role of respondent in the household	
None	□	Husband/father	□
Informal basic literacy skills	□	Wife/mother	□
Primary (Grade 1-8)	□	Elder son/daughter	□
Secondary (Grade 9-12)	□	Son/daughter	□
Certificate	□	Grandfather/mother	□
College diploma and above	□	Uncle/aunt	□

6. Please indicate the number of children with respect to their level of education and age in your household.

Level of education	Child(ren)	Age (in years)
Grade 1-5		
Grade 6-8		
Grade 9-12		
Currently attending university/college		
Graduated from a university/college		

7. Consulting educated children when making important decisions and taking actions.	Never				Always
	1	2	3	4	5

8. Main source of livelihood (very Important = 5; important = 4; average =3; less important = 2; Least important = 1; Not important at all = 0)

Source	**Level of Importance**
a) Crop farming (including khat and groundnut)	
b) Mixed farming (cropping plus livestock)	
c) Livestock production (e.g., stall fattening)	
d) Forest custodian (keeping)	
e) Selling forest products	
f) Firewood collection and selling	
g) Casual job (daily labourer, e.g., Mason)	
h) Petty shop/trade	
i) Remittance from family member or relatives	
j) Financial returns from tourism services of the sanctuary	
If other (specify):	

9. Household income

Rough estimate (in Birr) of your household's monthly income?	Tick (√)
Below ETBirr 500	□
ETBirr 500 to 1,000	□
ETBirr 1,001 to 1,500	□
ETBirr 1,501 to 2,000	□
ETBirr 2,001 to 3,000	□
ETBirr 3,001 to 4,000	□
ETBirr 4,001 to 5,000	□
Above ETBirr 5,000	□

10. Who works (on income generating activities) in your household?

Only husband/father	□	In number (#)
Only wife/mother	□	
Only son(s) who do not attend school	□	
Only daughter(s) who do not attend school	□	
All sons and daughters	□	
Every household member	□	

11. Household expenditure and saving

a) How much do you roughly spend monthly? _____ ETBirr.

b) On which one of the following do you spend more? (ranking, 5 = highest; 1 = least)

	Ranking
Food items	
Clothing and foot wears	
Energy (e.g., kerosene)	
Transportation	
Family health services	
Animal health services	
Children school fee	
Alcohol	
Stimulants (e.g., khat, coffee)	
If other (specify):	

c) How much do you roughly save annually? _____ ETBirr.

12. Given the rough estimates of your household's monthly income, expenditure and annual saving, you consider yourself:
    a) Very rich b) Rich c) middle-class d) poor e) very poor

13. What economic benefits do you obtain from Babile Elephant Sanctuary?
    i. _____
    ii. _____
    iii. _____
    iv. _____
    v. Nothing

14. Land ownership

Our household has its own land?	Yes □	No □

Classification	Roughly in hectare		
	Current	Before 5 years	Before 10 years
Land for cropping			
Land covered by khat			
Land for vegetables			
Land covered by fruits			
Land covered by trees			
Land under non-agricultural uses			
Barren and uncultivable land			
Grazing land (or land for fattening)			
Land suitable for irrigation			
Irrigated land			

15. Imagine your agricultural production for the last five (5) years, it is

a) Increasing
b) Remaining constant
c) Decreasing

16. If your answer to **Q15** is increasing or decreasing,

It is increasing because:		It is decreasing because of:	
I use quality seeds this time	□	Decreasing in land possession due to population growth	□
Increase in usage of organic fertilizers	□	Decreasing in land possession due to sanctuary expansion	□
Increasing usage of fertilizers and pesticides	□	Erosion	□
Irrigation has improved	□	Not using enough fertilizer/pesticide	□
Increase in household's labour force in	□	Decrease in household's labour force	□
I bought better agricultural tools	□	Increase in price of inputs (e.g., seed)	□
I receive more experts support this time	□	Lack of experts support	□
Other (specify)……		Other (specify)……	

17. Agricultural production

a) crop cultivation

Crops	Tick (√)	Rough percentage compared to other crops
Khat	□	
Groundnut	□	
Coffee	□	
Maize	□	
Sorghum	□	
Wheat	□	
Barely	□	
Millet	□	
Other (specify) _____		

b) what vegetables, fruits, pulses, spice or oilseeds do you produce? Please list.

	Vegetables	Fruits	Pulses	Spices	Oilseeds
1					
2					
3					
4					
5					
6					

What other items do you produce?

a) _____

b) _____

c) _____

c) Livestock and poultry

Category	In number (#)
Ox	
Cow	
Sheep	
Goats	
Donkey	
horse	
Mule	
Camel (if any)	
Chicken	
Other	

18. Please list the five (5) major products that you supply to market.

i. _____

ii. _____

iii. _____

iv. _____

v. _____

19. Imagine the prices you have received for your products at different selling times, the extent of your satisfaction with the prices is:

a) Very high b) High c) Average d) Low e) Very low

20. What market/economic benefits does your village obtain being situated nearby to the Ethio – Djibouti and Ethio – Somalia boarder?

	Market/economic benefits	Also if there are disadvantages
1.		
2.		
3.		
4.		
5.		

21. How important are the following organizations to your livelihood? (very important = 5, important = 4, average = 3, less important = 2, not important = 1)

Organization name	**Rate**	**Please mention the benefits you obtain**
Harar Brewery		
Hamaressa Edible oil factory		
Dire – Dawa food complex		
Babile Mineral water factory		
Haramaya University		
Dire – Dawa University		
Jigjiga University		

22. Physical and financial assets currently owned by the household

Physical assets	Yes = 1, No = 2	Number (#) (in case of house, number of rooms)
House (at village)		
House (at nearby town)		
Bed(s)		
Bed-nets		
Mobile phone		
Electronic equipment (Radio, TV, etc).		
Bicycle		
Motor cycle		
Generator		
Other (specify) _____		
Financial assets		
Saving with banks	Yes = 1, No = 2	Number (#) (e.g., # of equips)
Saving with Microfinance		
Equip		
Personal saving at home		

23. What is the main source of drinking water for your household?

Source:	Tick (√)
Private borehole	□
Public borehole	□
Protected spring	□
Unprotected spring	□
River, stream, lake, pond	□
Rain water	□
Other (specify) _____	

24. Source of energy for your household:

	Tick (√)
Firewood	□
Coal	□
Kerosene	□
Biogas	□
Solar	□
Electricity	□
Other (specify) _____	

25. Infrastructure (public goods) and services

Road	
i) Access to road	a) very poor, b) poor, c) average , d) good, e) very good
ii) Transportation	a) not available, b) less available, c) available d) Highly available
School	
k) Primary school	a) not available b) available
ii) Junior school	a) not available b) available
iii) Secondary school	a) not available b) available
Public health center	
i) Availability	a) not available b) available
ii) Quality	a) very poor, b) poor, c) average , d) good, e) very good
Veterinary service	
i) Availability	a) not available b) available
ii) Quality	a) very poor, b) poor, c) average , d) good, e) very good
Information communication services	
i) Radio broadcast	a) not available b) available
ii) Television broadcast	a) not available b) available
iii) Mobile network	a) not available b) available, but poor c) available and good
iv) telephone (e.g. wireless)	a) not available b) available
v) Post office	a) not available b) available

Electricity	
i) Connection	a) not connected b) connected
ii) Power availability	a) Rarely available b) reasonably available c) mostly available
Financial Institutions	
Access to financial institutions (banks, microfinance)	a) very poor, b) poor, c) average , d) good, e) very good
Marketplace	
Access to markets	a) very poor, b) poor, c) average , d) good, e) very good

Interview question for village key Informants

1. What basic activities do you and others in this village do for living?
2. Do you need loan financing to perform your livelihood activities?
3. What financial sources are available in this village/woreda to borrow from?
4. How good or bad is access to financing sources (e.g., microfinance) in this village?
5. Which financial sources are more reliable in your village? Why?
6. Which lenders require a villager to fulfill what to borrow (e.g., activity/business type; initial saving/capital; economic status (rich, middle-class, poor); collateral; individual vs group; gender, age group)?
7. How reasonable is the collateral (if any) compared to the amount of loan? Is the amount of loan sufficient to cover your financial need?
8. Which financial sources require interest? How reasonable is the interest rate?
9. What loan repayment options do lenders provide to households?
   i. Payments (once at the end agreed fixed period; equal installments; anytime money is earned/obtained)
   ii. Time/season convenience (e.g., harvesting time)
   iii. Money or cash/in kind (e.g., livestock, cereals)
10. How useful are the existing financing sources to what you currently do? What are the major strengths of each source?
11. What unexploited income generating activities do you foresee in your village? Why have you or other households not yet started the income generating activities? Could it be due to lack of finance?
12. What are the major limitations of the current financing sources in your village/woreda?
13. What do you suggest to improve the limitations of the existing financing sources?
14. What new financing packages do you recommend for your village?

Thanks for your time and cooperation!