



# **BASELINE REPORT FOR CASCAPE INTERVENTION WOREDAS**

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## List of abbreviations and acronyms

ACSI	Amhara Credit and Saving Institution
AGP	Agricultural Growth Programme
BoA	Bureau of Agriculture
CASCAPE	Capacity Building for Scaling Up of Evidence-Based Best Practices in Agricultural Production in Ethiopia Project
DA	Development Agent
ETB	Ethiopian Birr
FTC	Farmers Training Centre
GOs	Governmental Organisations
IT	Innovator team
NGO	Non-Governmental Organisation
PRA	Participatory Rural Appraisal
WoA	<i>Woreda</i> Office of Agriculture

## 1. Introduction

A baseline survey defines the pre-operation condition for the set of indicators that will be used to assess achievements. By comparing the conditions of similar indicators at some point during implementation and post-operation implementation (final evaluation), the baseline study forms the basis for a 'before and after' assessment or a 'change over time' assessment. Without baseline data to establish pre-operation conditions for any of the indicators, it is difficult to establish whether change at any level has in fact occurred.

A baseline survey should take place before or as soon as an activity begins. This does not necessarily mean that such surveys must be conducted within the first few months of activity implementation. Sometimes, it could be better to be conducted when the main implementation partners have a reasonable understanding of the context of the activity. This will allow time for the organization concerned to thoroughly plan the baseline survey and gain the commitment and involvement of local partners.

## 2. Objectives

The objectives of the baseline survey were:

- To compare the performance of different groups within villages.
- To quantify the outcome of the project between CASCAPE and non-CASCAPE villages.

## 3. Materials and Methods

### 3.1 Sample size and sampling technique:

The baseline survey employed stratified sampling method taking gender and farmers' status (model and non model farmer) as bases for stratification. Within each stratum, farmers were selected using simple random sampling method. As to the sample size, The following sample size was used for the study. In each one of the 16 CASCAPE intervention kebeles were 6 Male headed model farmers,6 Female headed model farmers,6 Female headed non-model farmers, and 6 Male headed non-model farmers were used.

In addition, from each one of the 2 non-CASCAPE intervention kebeles, 32 farmers were interviewed. Hence, the total number of farmers for the baseline survey were: 6 (farmers per category) \* 4 (categories) \* 4 (kebeles) \* 4 (woredas) + 2 (non-CASCAPE kebeles) \* 32 (farmers) = 384 + 64 = 448 farmers. Of course, all of them were interviewed and data

were collected from all targeted households. However, the team used only 437 farming households for the data analysis which is 97.5% of the targeted households. This was because some of the questionnaires were rejected due to improper data entry. (Table 1)

**Table 1:** Farmers' characteristics in the study area

Farmer category	District				
	Bure	Dera	Jabi Tehnan	South Achefer	Grand Total
MM	23	34	27	27	111
FM	21	18	19	20	78
MnM	26	19	23	22	90
FnM	26	25	24	27	102
NPF		31	25		56
Grand Total	96	127	118	96	437

MM=Male Model; FM=Female Model; MnM=Male non-model; FnM= Female non-model;  
NPF=Non project Farmer

### 3.2 Methods of data collection

Data were collected in two alternative ways. In South Achefer woreda, the ITs themselves were data collectors since this was the first woreda that was surveyed and it was assumed that the data collection could be done by ITs. This was done to collect quality data. However, at later on it was found that the work was time consuming and cumbersome. Hence, it was decided to do the survey for the rest three woredas by recruiting enumerators. Hence, Subject Matter Specialists (SMS) and other experts of each woreda were used as enumerators.

### 3.3 Duration

The survey was conducted in February and March, 2012 in all four woredas; South Achefer, Dera, Bure and Jabi tehinan. In South Achefer woreda, the data collection was done by the ITs, which takes more than two weeks. But the data collection from the rest three woredas was done by the enumerators in March.

### 3.4 Agro-environmental conditions

The CASCAPE woredas, where the baseline survey has been conducted, are located in mid altitude areas. However, there are some kebeles within them which are located in high and



low altitude areas. The topography is mainly characterized as plane with some undulated and rugged nature. The amount of mean annual rainfall and temperature are considered to be moderate and suitable for farming practices. These woredas relatively own fertile soils which are suitable to produce diversified types of crops.

The farming system, as we have described in the PRA report, is cereal dominated crop-livestock mixed farming system. The farming community in the project area are small holders who mainly produce for their subsistence.

## **4. Results**

In this section, we tables that show the different outputs of the baseline survey are presented. Based on the figures in the tables, narratives are stated to explain the particular circumstances and the results achieved.

### **4.1 Household conditions**

Model female and male headed households have larger family size than their non model counter parts (Table 2). The reason is that they relatively have large economic size and better income which enables them to support larger family size. The other truth observed in the study results is that the education level of the head of the household in both the model female and male headed households is better than the non model ones. This helps them to take technologies quickly, which in turn assist them to become a model farmer. On the other hand, the education level of female headed households is less than the male headed household heads.

Conversely, age of the household head does not make huge difference among farming households to be a model or non model farmer (Table 2). However, as a general truth, it is believed that young farmers are usually early adopters. Of course, most young farmers in our project woredas are landless which means they have limited opportunity to show their productivity and their inclination to new technologies which helps them to be a model farmer.



**Table 2:** General overview of households (average  $\pm$  standard deviation)

Parameters	FM	FnM	MM	MnM	NPF
Size of household	4.76 $\pm$ 1.72	3.97 $\pm$ 1.61	7.11 $\pm$ 2.55	5.98 $\pm$ 2.37	4.92 $\pm$ 1.96
Gender (% males per household)	44.73 $\pm$ 15.28	46.98 $\pm$ 15.8	52.04 $\pm$ 17.44	55.69 $\pm$ 18.32	50 $\pm$ 15.49
Age (average of household)	22.12 $\pm$ 5.28	22.1 $\pm$ 7.22	20.09 $\pm$ 4.39	20.35 $\pm$ 5.45	21.38 $\pm$ 7.83
Education level household head	1.3 $\pm$ 2.73	0.56 $\pm$ 1.72	3.4 $\pm$ 2.72	2.59 $\pm$ 2.8	2.37 $\pm$ 3.44
Age household head	42.65 $\pm$ 8.58	39.66 $\pm$ 10.14	42.58 $\pm$ 8.03	41.68 $\pm$ 10.56	38.98 $\pm$ 10.86
*Education level house hold head: years of education					

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers*

## 4.2. Assets of Households

The results presented in Table 3 indicate the differences in the living conditions of model and non-model farmers. Generally, it is believed that model farmers have better living conditions than otherwise. The difference in the quality of life between the model and non model farming household groups can be explained by the possession of different asset items. Model female and male farmer groups own more assets than their counterpart non-model ones. That means the quality of life of the model farmers is better than the non-model ones. The difference is also observed between the female and male headed household groups.

**Table 3:** Number of assets (average  $\pm$  standard deviation)

Asset type	Asset	Number owned currently				
		FM	FnM	MM	MnM	NPF
House items	Radio	0.64 $\pm$ 0.57	0.31 $\pm$ 0.49	0.99 $\pm$ 0.53	0.69 $\pm$ 0.46	0.49 $\pm$ 0.63
House items	Television	0 $\pm$ 0	0.01 $\pm$ 0.11	0.02 $\pm$ 0.22	0.04 $\pm$ 0.2	0.02 $\pm$ 0.13
Transportation (owned)						
House items	Phone (land or cell)	0.27 $\pm$ 0.48	0.15 $\pm$ 0.36	0.78 $\pm$ 0.79	0.29 $\pm$ 0.56	0.39 $\pm$ 0.62
Transportation (owned)						
Transportation (owned)	Iron corrugated roof	1.03 $\pm$ 0.44	0.8 $\pm$ 0.5	1.42 $\pm$ 0.74	1.08 $\pm$ 0.38	0.89 $\pm$ 0.41
Farm tools and machinery	Thatched roof	0.37 $\pm$ 0.55	0.58 $\pm$ 0.61	0.46 $\pm$ 0.56	0.32 $\pm$ 0.5	0.42 $\pm$ 0.5
	No of rooms	2.66 $\pm$ 1.26	1.91 $\pm$ 1.06	4.01 $\pm$ 2.29	2.82 $\pm$ 1.03	2.51 $\pm$ 1.27
	Toilet	0.93 $\pm$ 0.39	0.79 $\pm$ 0.46	0.99 $\pm$ 0.32	0.99 $\pm$ 0.24	0.95 $\pm$ 0.23
	Bed	0.97 $\pm$ 0.66	0.76 $\pm$ 0.61	1.47 $\pm$ 0.86	1.18 $\pm$ 0.79	1.16 $\pm$ 0.6
	Bicycle	0.03 $\pm$ 0.18	0.01 $\pm$ 0.12	0.17 $\pm$ 0.38	0 $\pm$ 0	0.05 $\pm$ 0.23
	Motorcycle	0 $\pm$ 0	0 $\pm$ 0	0.01 $\pm$ 0.11	0 $\pm$ 0	0 $\pm$ 0
Transportation (owned)	Vehicle	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
	Cart	0.07 $\pm$ 0.25	0.03 $\pm$ 0.16	0.23 $\pm$ 0.45	0.08 $\pm$ 0.28	0.05 $\pm$ 0.23
Farm tools and machinery	Hoe/mattock	2.01 $\pm$ 1.71	1.46 $\pm$ 1.53	3.26 $\pm$ 3.38	2.13 $\pm$ 1.89	2.23 $\pm$ 1.75
Farm tools and machinery	Hammer/iron bar	0.39 $\pm$ 0.79	0.24 $\pm$ 0.6	0.5 $\pm$ 0.97	0.43 $\pm$ 0.74	0.3 $\pm$ 0.6
Farm tools and machinery	Spade/shovel	0.79 $\pm$ 0.9	0.47 $\pm$ 0.86	1.39 $\pm$ 1.47	1.02 $\pm$ 1.19	0.67 $\pm$ 0.79
	Ox plough	0.89 $\pm$ 0.6	0.58 $\pm$ 0.61	1.69 $\pm$ 0.94	1.43 $\pm$ 0.74	1.09 $\pm$ 0.83
	Water pump	0.03 $\pm$ 0.18	0 $\pm$ 0	0.42 $\pm$ 0.92	0.14 $\pm$ 0.39	0.04 $\pm$ 0.19
	Tractor	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers*

### 4.3 Land Use and Ownership

Cultivated land ownership among model and non-model farmer groups are highly different. The difference is brought by renting and sharing activities. Usually model farmers are renting and sharing in cultivated land. This is true in CASCAPE wordas farming community.

Relatively, non-model farmers are either resource poor to share and rent in cultivated land or they are not efficient in their farming practices (Table 4).

The size of cultivated land ownership also varies between female headed and male headed households. Male headed households own larger size of cultivated land than the female headed households. The reason for the difference is again the renting and sharing activities. Male headed households usually rent and share in more cultivated land than the female headed households. This because women cannot plow, and usually do not have sufficient labour to carry out the whole farming activities.

However, there is no as such significant difference in the size of grazing land between the model and non-model as well as between the female headed and the male headed household groups. The reason is that all groups of households usually use a communal grazing land.

In forest land ownership, model farmers are relatively performed better. The reason is that forest trees, especially, eucalyptus trees are used as main means of earning cash in the farming community of the project area.

**Table 4:** Land ownership by land use type (ha, average  $\pm$  standard deviation)

Parameters	FM	FnM	MM	MnM	NPF
Homestead	0.2 $\pm$ 0.17	0.17 $\pm$ 0.16	0.31 $\pm$ 0.3	0.23 $\pm$ 0.2	0.18 $\pm$ 0.16
Cultivated land	1.13 $\pm$ 0.61	0.74 $\pm$ 0.5	1.76 $\pm$ 0.92	1.36 $\pm$ 0.76	1.44 $\pm$ 0.78
Grazing land	0.01 $\pm$ 0.05	0.01 $\pm$ 0.05	0.07 $\pm$ 0.18	0.02 $\pm$ 0.05	0.04 $\pm$ 0.1
Forest (bush)	0.03 $\pm$ 0.08	0.01 $\pm$ 0.04	0.08 $\pm$ 0.23	0.05 $\pm$ 0.15	0.01 $\pm$ 0.04

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers*

Both female and male model farmers have large cultivated plot sizes and plot numbers (Table 5). Similarly, male headed households cultivate large plot numbers and plot sizes compared to the female headed ones. The reasons for both cases are sharing and renting activities. Model farmers also own a large proportion of their cultivated plots which implies size of holding of cultivated land is one of the reasons for a particular farmer to be a model farmer.

**Table 5:** Land area and ownership (average  $\pm$  standard deviation)

Parameters	FM	FnM	MM	MnM	NPF
Plot size (ha)	1.08 $\pm$ 0.69	0.64 $\pm$ 0.62	1.73 $\pm$ 0.96	1.25 $\pm$ 0.84	1.26 $\pm$ 0.85
Number of plots	5.65 $\pm$ 2.12	4.23 $\pm$ 2	7.59 $\pm$ 2.33	6.77 $\pm$ 2.44	6.29 $\pm$ 2.3
Ownership (% owned by household head)	74.13 $\pm$ 30.55	66.36 $\pm$ 35.11	78.21 $\pm$ 24.24	74.91 $\pm$ 28.47	73.38 $\pm$ 28.5
Distance from home (minutes)	16.14 $\pm$ 17.11	14.86 $\pm$ 20.33	15.72 $\pm$ 17.76	14.13 $\pm$ 16.05	18.49 $\pm$ 24.13

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers*

#### 4.4. Soil characteristics and Land Ownership

The different soil characteristics such as colour, depth, texture are presented in Table 6. There was a difference in the amount owned land between model and non model as well as female and male farmers groups. However, the difference was mainly by chance.

**Table 6:** Plot characteristics of different households (% of total amount of soils per type)

Characteristics	Sub-characteristic	FM	FnM	MM	MnM	NPF
Soil colour	1 Black	6	9	9	11	26
	2 Dark brown	15	14	17	17	13
	3 Red	50	38	56	51	60
	4 White	0	0	1	0	0
	5 other	0	0	0	0	1
Soil depth	1 Shallow (<30 cm)	4	5	8	7	15
	2 Medium (30-60 cm)	23	30	28	26	28
	3 Deep (>60 cm)	44	26	47	46	57
Soil texture	1 Clay	64	51	66	67	66
	2 Sand	5	5	6	5	14
	3 Silt	3	5	10	7	20
Slope	1 Meda	54	44	64	57	71
	2 Tedafat (foothill)	14	15	17	19	21
	3 Dage (mid hill)	3	2	2	3	7

	4 Gedel or Areh (steep hill)	0	0	0	0	0
Degree of soil degradation	1 High	5	5	7	7	8
	2 Medium	28	21	25	24	19
	3 Low	22	17	28	32	39
	4 None	16	18	23	16	33
Type of irrigation	0 None	63	57	73	70	94
	1 flood/basin	3	2	3	2	2
	2 furrow	3	1	6	5	3
	3 spate	0	0	0	0	0
	4 sprinkler	0	0	0	0	0
	5 drip	1	0	0	1	0
	6 other	1	0	0	0	0

*Note: male model farmers (MM), female model farmers (FM), male non-model farmers (MnM), female non-model farmers (FnM) and non-project farmers (NPF). Empty cells are without value.*

#### **4.5 Crop Production by Household Type**

Due to ownership of relatively large plot size, model farmers plant more number of crops than the other farmers (Table 7). This difference is also observed between the female headed and male headed household groups. Both the model and non model farmers mainly plant those crops which are used for consumption purpose, like maize and teff. Model farmers are used to plant cash crops like onion and chat than the non model farmers. Conversely, non-model farmers focus more on food security gap filling crops like potato.

**Table 7:** Relationships between Crop type and household types (average  $\pm$  standard deviation)

Parameters	FM	FnM	MM	MnM	NPF
Crop diversity (# of crops per farm)	4.053 $\pm$ 1.58	3.09 $\pm$	5.24 $\pm$	4.79 $\pm$	4.61 $\pm$
Barley (% of farm area)	3.86 $\pm$ 8.65	2.82 $\pm$ 8.49	4.01 $\pm$ 7.27	3.38 $\pm$ 6.68	6.29 $\pm$ 10.1
chickpea (% of farm area)	1.18 $\pm$ 5.3	1.62 $\pm$ 6.98	1.03 $\pm$ 3.16	1.69 $\pm$ 5.15	2.2 $\pm$ 5.62
Coffee (% of farm area)	2.29 $\pm$ 12	2.46 $\pm$ 10.3	2.55 $\pm$ 6.29	1.6 $\pm$ 4.51	0.46 $\pm$ 2.07
fallow (% of farm area)	1.52 $\pm$ 11.6	1.11 $\pm$ 8.26	0.4 $\pm$ 2.66	0	0
Maize (% of farm area)	40 $\pm$ 24.1	38.7 $\pm$ 27.9	30.9 $\pm$ 17.3	34.6 $\pm$ 18.7	31.7 $\pm$ 20
Millet (% of farm area)	13.6 $\pm$ 17.6	13.1 $\pm$ 19.6	17.6 $\pm$ 19.5	17.3 $\pm$ 16.9	13.2 $\pm$ 15.5
Onion (% of farm area)	0.06 $\pm$ 0.55	0.22 $\pm$ 1.55	2.48 $\pm$ 9.66	0.89 $\pm$ 3.17	0
Other (% of farm area)	10.3 $\pm$ 22.4	5.6 $\pm$ 15	12.2 $\pm$ 17.6	7.91 $\pm$ 15	8.14 $\pm$ 12.6
Potato (% of farm area)	1.82 $\pm$ 5.09	2.37 $\pm$ 7.39	2.51 $\pm$ 5.21	2.69 $\pm$ 5.54	0.29 $\pm$ 1.62
Sugar Cane (% of farm area)	2.64 $\pm$ 12.7	0.1 $\pm$ 1.01	0.19 $\pm$ 1.44	0.32 $\pm$ 2.29	0
Teff (% of farm area)	14.8 $\pm$ 18.1	10.8 $\pm$ 17.6	16 $\pm$ 13.2	15.9 $\pm$ 14.3	20.9 $\pm$ 17.5
Tree crops (% of farm area)	2.62 $\pm$ 6.39	1.68 $\pm$ 4.89	4.25 $\pm$ 8.8	3.61 $\pm$ 7.83	1.88 $\pm$ 5.06
Wheat (% of farm area)	4.49 $\pm$ 8.78	2.15 $\pm$ 9.02	4.59 $\pm$ 8.11	4.05 $\pm$ 8.22	0.19 $\pm$ 1.47

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers*

#### 4.6 Manure and Mineral Fertilizer Application

Female headed household groups are better in manure application than the men counter parts. This is because female headed households are relatively economically weak in affording the expensive fertilizer (Table 8). In addition, female headed households are better in keeping the fertility of their homestead areas. For instance, in the chat and other crops which are planted in homestead areas, female headed households apply large quantity of manure. The gap in using manure between the model and non-model farmer groups is also narrow which indicates resource poor farmers are inclined more on using manure than artificial fertilizer.

All farming household groups apply large amount of manure per hectare on cash crops and crops which are planted in homestead areas. As everyone can easily understand, transporting and applying manure in distant plots from homestead areas is a very difficult job.

**Table 8:** Manure application (kg/ha) per crop and household types (average  $\pm$  standard deviation)

Crop type	FM	FnM	MM	MnM	NPF
Barley	200 $\pm$ 0	2933.33 $\pm$ 1885.6	2538.1 $\pm$ 2509.6	1500 $\pm$ 1708.8	133.33 $\pm$ 0
Chat	4933.3 $\pm$ 3002.2	0	3173.33 $\pm$ 2281.1	3800 $\pm$ 6011.99	0
Coffee	11200 $\pm$ 10245	4000 $\pm$ 0	2628.57 $\pm$ 1957.6	4653.3 $\pm$ 6457.62	4400 $\pm$ 565.69
Maize	1519.8 $\pm$ 2229.3	1516.03 $\pm$ 1787.5	1917.38 $\pm$ 2148.7	1839.8 $\pm$ 2352.44	1991.36 $\pm$ 2784.04
Millet	822.22 $\pm$ 167.77	800 $\pm$ 0	946 $\pm$ 1238.6	968.25 $\pm$ 874.52	475 $\pm$ 377.49
Onion	2000 $\pm$ 0	1600 $\pm$ 0	4800 $\pm$ 0	3500 $\pm$ 1942.51	0
Others,	3542.9 $\pm$ 3699.9	1980 $\pm$ 3392.9	2326.64 $\pm$ 4714.4	2649.2 $\pm$ 5490.74	0
Pepper	2778.6 $\pm$ 2766.3	2721.43 $\pm$ 2911.3	8259.53 $\pm$ 19106	3827.6 $\pm$ 3411.57	4740.35 $\pm$ 7195.64
Perennial fruits	0	0	1600 $\pm$ 0	0	0
Potato	11800 $\pm$ 18845	933.333 $\pm$ 611.01	2548.72 $\pm$ 1252.6	3571.4 $\pm$ 4730.07	1600 $\pm$ 0
Sugar cane	2150 $\pm$ 1754	0	12000 $\pm$ 7211.1	2000 $\pm$ 0	
Teff	100 $\pm$ 0		1800 $\pm$ 1616.6	1066.7 $\pm$ 832.666	1355.56 $\pm$ 1638.88
Tree crops	4439.3 $\pm$ 3362.3	18216.7 $\pm$ 38131	4261.37 $\pm$ 8751	7409.3 $\pm$ 13028.3	1266.67 $\pm$ 788.81
Wheat	800 $\pm$ 565.69	0	4775 $\pm$ 7514.6	2217 $\pm$ 1827.05	0

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers*

In majority of the crops, the rate of DAP application per hectare bases is greater for non-model farmers for maize and in some of the crops which looks strange (Table 9). Their main reason for this might be due to errors during data collection or problems in defining the model and non model farmers.

**Table 9:** DAP application (kg/ha) per crop and household types (average  $\pm$  standard deviation)

Crop type	FM	FnM	MM	MnM	<b>NPF</b>
Barley	93.641	177.09	103.54	128.93	115.14 $\pm$ 100.76
Chickpea	200				0
Coffee	96	200	141.66	116.67	0
Maize	150.09	146.34	187.1	203.8	160.02 $\pm$ 120.81
Millet	112.07	122.62	126.35	129.74	129.88 $\pm$ 77.62
Onion			122	91.467	0
Others, specify in remarks	169.79	233.33	101.55	140.69	40 $\pm$ 0
Pepper	214.19	246.35	316.46	272.56	233.64 $\pm$ 150.74
Perennial fruits			200		0
Potato	112.21	129.2	90.267	86.314	400 $\pm$ 0
Teff	114.3	138.72	127.82	133.23	85.44 $\pm$ 69.76
Tree crops				300	0
Wheat	165.79	163.89	245.18	217.93	24 $\pm$ 0

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers*

The result of the survey for urea application indicates similar result as that of DAP application. The rate of application per hectare is greater in non-model household groups than the model ones (Table 10).



**Table 10:** Urea application (kg/ha) per crop and household types (average  $\pm$  standard deviation)

Crop type	FM	nM	MM	MnM	NPF
Barley	93.64 $\pm$ 100.25	177.09 $\pm$ 142.54	103.54 $\pm$ 99.20	128.9253 $\pm$ 177.42	115.14 $\pm$ 100.76
Chickpea	200 $\pm$ 0	0	0	0	0
Coffee	96 $\pm$ 0	200 $\pm$ 0	141.66 $\pm$ 130.51	116.6667 $\pm$ 117.85	0
Maize	150.1 $\pm$ 80.47	146.34 $\pm$ 116.77	187.1 $\pm$ 204.79	203.7969 $\pm$ 198.62	160.02 $\pm$ 120.81
Millet	112.1 $\pm$ 53.75	122.62 $\pm$ 93.25	126.35 $\pm$ 129.64	129.7367 $\pm$ 96.43	129.88 $\pm$ 77.62
Onion			122 $\pm$ 144.25	91.46 $\pm$ 45.09	
Others	169.8 $\pm$ 191.67	233.33 $\pm$ 235.7	101.55 $\pm$ 119.34	140.68 $\pm$ 123.99	40 $\pm$ 0
Pepper	214.2 $\pm$ 151.91	246.35 $\pm$ 169.54	316.46 $\pm$ 398.24	272.56 $\pm$ 314.23	233.64 $\pm$ 150.74
Perennial fruits	0	0	200 $\pm$ 0	0	0
Potato	112.2 $\pm$ 77.003	129.2 $\pm$ 115.9	90.267 $\pm$ 54.94	86.31 $\pm$ 90.37	400 $\pm$ 0
Teff	114.3 $\pm$ 131.15	138.72 $\pm$ 92.77	127.82 $\pm$ 125.28	133.23 $\pm$ 115.75	85.44 $\pm$ 69.76
Tree crops	0	0	0	300 $\pm$ 0	0
Wheat	165.8 $\pm$ 101.29	163.89 $\pm$ 61.84	245.18 $\pm$ 297.61	217.92 $\pm$ 240.32	24 $\pm$ 0

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers*

#### 4.7 Pesticide Application

In pesticide application, model farmers are performing better than the non-model ones, in this case we can cite the wheat crop as an example. There is also significant difference in the rate of application of pesticides between female headed and male headed household groups. This is related with the rate of adoption of new technologies and the difference in the purchasing power of the two groups. The other possible reason might be, female headed households focus majorly in home garden crops which do not require pesticides (Table 11).

**Table 11:** Pesticide application (ETB/farm) per crop and household types (average  $\pm$  standard deviation)

Crop type	FM	FnM	MM	MnM	NPF
Barley	0.75 $\pm$ 3	3.92 $\pm$ 9.75	2.30 $\pm$ 7.25	1.19 $\pm$ 5.46	0
Chat	600 $\pm$ 0	0	395.83 $\pm$ 447.4	376 $\pm$ 447.08	0
Chickpea	0	6.14 $\pm$ 16.25	0	0	7.78 $\pm$ 23.33
Coffee	0	0	0	0	0
Fallow	0	0	0		0
Garlic	0			0	0
Haricot bean	13.33 $\pm$ 23.09		40 $\pm$ 89.44	65 $\pm$ 91.92	142.86 $\pm$ 250.71
Millet	10.52 $\pm$ 19.35	9.68 $\pm$ 16.74	33.38 $\pm$ 43.81	21.2 $\pm$ 32.74	19.79 $\pm$ 43.33
Onion	0	0	1296.67 $\pm$ 1227.7	251.11 $\pm$ 389.7 6	0
Others	2.5 $\pm$ 10	5.59 $\pm$ 15.85	57.67 $\pm$ 172.35	57.64 $\pm$ 175.57	43.33 $\pm$ 142.26
Pepper	0	0.71 $\pm$ 3.95	0	0	1.13 $\pm$ 7.12
Perennial fruits	0	0	0	0	0
Potato	0	0	3.64 $\pm$ 17.06	0	0
Sugar cane	0	0	0	0	
Teff	6.61 $\pm$ 17.75	7.04 $\pm$ 19.03	11.34 $\pm$ 23.81	11.14 $\pm$ 30.57	0
Tree crops	0	0	0	1 $\pm$ 3.87	0
Wheat	5 $\pm$ 10.90	0	19.91 $\pm$ 29.39	9.29 $\pm$ 19.13	0

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers*

#### 4.8 Crop yield performance

Model farmers harvest larger volumes of products per hectare and they have absolute advantage in producing perennial fruits and sugar cane. This could be due to the rate of application of inputs and using improved technologies (Table 12). But in cereal crop production like maize, millet and wheat, the yield per hectare does not show much difference between the model and non-model groups of farmers.

The gap in yield per hectare in female headed and male headed household groups is also very large. Male headed households are better in cereal crops; while female headed households on the other hand are good in vegetables and tree crops, like chat.

**Table 12:** Yields (kg/ha) per crop and household type (average  $\pm$  standard deviation)

Crop type	FM	FnM	MM	MnM	NPF
Barley	1077.8 $\pm$ 445.3	1323.8 $\pm$ 613.7	2368.22 $\pm$ 2347.4	1778.7 $\pm$ 1819.6	1621.7 $\pm$ 1792.9
Chat	1626.7 $\pm$ 862.8	28 $\pm$ 0	680 $\pm$ 336	643.2 $\pm$ 674.6	0
Chickpea	1233.3 $\pm$ 526.3	1933.3 $\pm$ 3411.7	1477.8 $\pm$ 1081	1620 $\pm$ 774.3	1488.9 $\pm$ 603
Coffee	488 $\pm$ 497.7	527.05 $\pm$ 699	1081.4 $\pm$ 1015.3	971.94 $\pm$ 761.7	800 $\pm$ 800
Fallow	200 $\pm$ 282.8	100 $\pm$ 47.1	440 $\pm$ 433.7	0	0
Garlic		40 $\pm$ 0	0	160 $\pm$ 0	0
Maize	2512.5 $\pm$ 1241	2075.7 $\pm$ 1888	3177.03 $\pm$ 2597.1	3461.4 $\pm$ 4611.2	3009.4 $\pm$ 2728.7
Millet	1356.5 $\pm$ 670.3	1447.3 $\pm$ 2108.9	2059.26 $\pm$ 2503.9	1696.9 $\pm$ 1613.8	1719.8 $\pm$ 907.3
Onion	1600 $\pm$ 0	1600 $\pm$ 0	8021.6 $\pm$ 7299	6432.1 $\pm$ 4071.6	0
Others	1013 $\pm$ 981.7	1318.9 $\pm$ 2679	5403.4 $\pm$ 28115	1541.8 $\pm$ 1480.2	1538.4 $\pm$ 1709.8
Pepper	1565.8 $\pm$ 2025.2	2180.6 $\pm$ 5751.6	2249.27 $\pm$ 4186.4	1466.8 $\pm$ 2235.9	1076.1 $\pm$ 1043.2
Perennial fruits	1600 $\pm$ 0	66.7 $\pm$ 94.28	680 $\pm$ 396	0	
Potato	3498.5 $\pm$ 2382.2	3446.2 $\pm$ 2635.8	5508.7 $\pm$ 5167.6	4466.7 $\pm$ 3707.5	7200 $\pm$ 7919.6
Sugar cane	8 $\pm$ 19.6	0	16826.7 $\pm$ 28730	800 $\pm$ 1131.4	0
Teff	1018.3 $\pm$ 780.9	1038.5 $\pm$ 1219.5	1206.3 $\pm$ 870.6	1079.14 $\pm$ 687.4	850.47 $\pm$ 737.5
Tree crops	811.6 $\pm$ 1140.2	815 $\pm$ 1017	1573.7 $\pm$ 2143.5	550.4 $\pm$ 854.4	1211.9 $\pm$ 2619.3
Wheat	1473.7 $\pm$ 969.1	1947.6 $\pm$ 1171.6	3123.1 $\pm$ 4097.8	2373.7 $\pm$ 2364.2	400 $\pm$ 0

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers*

#### 4.9. Crop sale

The results the crop sale analysis for the different farmer groups is presented in Table 13. Model farmers get more money by selling different types of crops. Similarly, the male farmer groups are better than the female one in the earnings from crop sales. This could be due to the fact that model and the male farmer groups have higher productivity levels and large cultivated land when compared to their counter parts.

**Table 13:** Sales (total value, ETB) per crop and household types (average  $\pm$  standard deviation)

Crop type	MM	FM	MnM	FnM	NPF
Maize	5294.22 $\pm$ 14647.1	1030.09 $\pm$ 2277.36	9120.47 $\pm$ 32918.47	2973.44 $\pm$ 4909.27	1938.75 $\pm$ 4080.99
Teff	691.5 $\pm$ 3880.3	318.24 $\pm$ 658.13	672.3 $\pm$ 1584.49	950.47 $\pm$ 2994.79	271.38 $\pm$ 453.22
Barley	16.67 $\pm$ 92.36	23.15 $\pm$ 119.24	81.7 $\pm$ 359.94	0 $\pm$ 0	71.88 $\pm$ 234.95
Wheat	112.5 $\pm$ 643.92	124.07 $\pm$ 431.73	281.06 $\pm$ 1882.54	141.04 $\pm$ 919.15	0 $\pm$ 0
Pulses	143.33 $\pm$ 647.39	0 $\pm$ 0	132.98 $\pm$ 930.88	58.44 $\pm$ 413.38	243.75 $\pm$ 957.81
Tubers	24.33 $\pm$ 111.09	1.85 $\pm$ 13.61	382.31 $\pm$ 2091.49	116.82 $\pm$ 651.3	28.33 $\pm$ 139.53
Vegetables	2942.62 $\pm$ 8859.38	1582.41 $\pm$ 3015.09	7314.54 $\pm$ 22201.16	3434.83 $\pm$ 6919.43	4071.46 $\pm$ 10901.26
Coffee	64.58 $\pm$ 273.56	88.89 $\pm$ 489.77	261.17 $\pm$ 1480.23	240.91 $\pm$ 1123.1	209.38 $\pm$ 1371.82
Chat	33.33 $\pm$ 258.2	50 $\pm$ 286.65	774.47 $\pm$ 3954.06	413.25 $\pm$ 2310.05	0 $\pm$ 0
Other	494.25 $\pm$ 927.12	264.26 $\pm$ 551.73	9043.64 $\pm$ 40912.66	4131.14 $\pm$ 16583.71	1049.27 $\pm$ 2954.93

for male model farmers (MM), female model farmers (FM), male non-model farmers (MnM), female non-model farmers (FnM) and non-project farmers (NPF).

#### 4.10 Livestock Ownership

All the CASCAPE woredas farming system is characterized as cereal dominated livestock mixed farming system. Oxen and cows are kept in most households; especially oxen are found in almost all farming households and taken as an important asset as they are used for traction. Bulls, heifers, and calves are kept in many households. Sheep and goats are commonly found in numbers across many of the small holder resource poor farming households. But donkey, horses and mule are found in few numbers of households. The number of livestock kept is taken as a measure of wealth.

The results of the baseline survey indicate that the number of livestock owned in the model and non-model farming household groups varies significantly (Table 14). Model farming households own more numbers of livestock than the non-model farming household groups. The number of livestock owned also varies greatly between the female headed and the male headed household groups. Male headed households possess larger number of livestock than the female headed farming households. Model farmers are also good at adopting modern beehives. The non-model female and male headed households do not own even a single modern beehive.

**Table 14:** Number of livestock ownership by household types (average  $\pm$  standard deviation)

Type and breed		FM	FnM	MM	MnM	NPF
Oxen	Local	1.19 $\pm$ 1.29	0.61 $\pm$ 0.8	2.44 $\pm$ 1.15	1.68 $\pm$ 0.98	1.4 $\pm$ 1.06
	Improved	0 $\pm$ 0	0 $\pm$ 0	0.02 $\pm$ 0.13	0.01 $\pm$ 0.1	0.02 $\pm$ 0.13
Bull	Local	0.36 $\pm$ 0.58	0.12 $\pm$ 0.38	0.83 $\pm$ 0.91	0.35 $\pm$ 0.56	0.71 $\pm$ 1.01
	Improved	0 $\pm$ 0	0.02 $\pm$ 0.2	0 $\pm$ 0	0.02 $\pm$ 0.14	0.02 $\pm$ 0.13
Cows	Local	0.73 $\pm$ 0.96	0.33 $\pm$ 0.64	1.82 $\pm$ 1.4	1.03 $\pm$ 0.96	1.17 $\pm$ 1.17
	Improved	0 $\pm$ 0	0.01 $\pm$ 0.1	0.05 $\pm$ 0.23	0.01 $\pm$ 0.1	0.05 $\pm$ 0.39
Heifer	Local	0.51 $\pm$ 0.72	0.23 $\pm$ 0.49	1.08 $\pm$ 1.19	0.62 $\pm$ 0.81	0.62 $\pm$ 0.85
	Improved	0 $\pm$ 0	0.01 $\pm$ 0.1	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
Calf	Local	0.54 $\pm$ 0.89	0.29 $\pm$ 0.67	1.17 $\pm$ 1.21	0.73 $\pm$ 0.9	0.79 $\pm$ 0.93
	Improved	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0.03 $\pm$ 0.26
Goats		0.21 $\pm$ 1.06	0.06 $\pm$ 0.34	0.5 $\pm$ 2.14	0.22 $\pm$ 0.92	0.28 $\pm$ 1.15
Sheep		1.45 $\pm$ 2.35	0.82 $\pm$ 1.37	2.45 $\pm$ 2.7	1.79 $\pm$ 2.44	0.98 $\pm$ 1.88
Donkey		0.12 $\pm$ 0.46	0.07 $\pm$ 0.29	0.47 $\pm$ 0.71	0.34 $\pm$ 0.68	0.4 $\pm$ 0.7
Mule/horse		0.04 $\pm$ 0.19	0.03 $\pm$ 0.17	0.26 $\pm$ 0.5	0.08 $\pm$ 0.28	0.07 $\pm$ 0.26
Poultry (chicken, geese, ducks, fowls)	Local	4.06 $\pm$ 6.19	2.06 $\pm$ 2.92	7.56 $\pm$ 19.52	4.22 $\pm$ 5.83	4.93 $\pm$ 7.68
	Improved	0.59 $\pm$ 3.23	0.24 $\pm$ 1.58	0.27 $\pm$ 1.07	0.61 $\pm$ 2.4	0.12 $\pm$ 0.65
Bee hives	Traditional	0.1 $\pm$ 0.5	0.02 $\pm$ 0.2	1.11 $\pm$ 3.19	0.23 $\pm$ 1.3	0.97 $\pm$ 3.5
	Transitional	0 $\pm$ 0	0 $\pm$ 0	0.03 $\pm$ 0.21	0 $\pm$ 0	0 $\pm$ 0
	Modern	0.08 $\pm$ 0.31	0 $\pm$ 0	0.33 $\pm$ 0.98	0 $\pm$ 0	0.1 $\pm$ 0.45

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers*

### 4.11. Expenditure for Livestock

As a general truth, a farmer who owns more numbers of livestock spends more on livestock (Table 15). Model farmers, who own larger number of livestock, spend a greater proportion that exceeds the difference in ownership ratios. That means, model farmers spend more amount of money per unit of livestock kept. They spend especially much on hay and concentrates, which the non-model farmers largely depend on pastures obtained from communal grazing lands.

The gap is also largely visible between the female headed and male headed household groups. This arises from the difference in the number of livestock owned and the difference in the spending power of the two groups.

**Table 15:** Livestock expenditures by different household types (average  $\pm$  standard deviation)

Product/service name	FM	FnM	MM	MnM	NPF
Hay	77.18 $\pm$ 187.41	60.45 $\pm$ 185.04	199.48 $\pm$ 389.63	93.86 $\pm$ 189.99	136.84 $\pm$ 251.57
Concentrate	7.54 $\pm$ 35.77	0 $\pm$ 0	83.07 $\pm$ 288.81	4 $\pm$ 19.74	33.16 $\pm$ 103.45
Supplements (minerals)	28.06 $\pm$ 71.52	16.66 $\pm$ 44.11	219.97 $\pm$ 1465.98	38.04 $\pm$ 58.44	42.39 $\pm$ 84.9
Veterinary services	63.21 $\pm$ 78.66	37.35 $\pm$ 70.12	134.75 $\pm$ 174.05	93.97 $\pm$ 113.81	52.56 $\pm$ 64.89
Bull service/Artificial insemination (improved breeds)	0 $\pm$ 0	0.67 $\pm$ 4.75	0.37 $\pm$ 2.35	1.8 $\pm$ 10.58	0.05 $\pm$ 0.4
Herdsman	88.76 $\pm$ 339.31	31.33 $\pm$ 135.4	237.83 $\pm$ 809.54	82.21 $\pm$ 309.47	137.05 $\pm$ 465.05
Others	0 $\pm$ 0	9.66 $\pm$ 56.84	29.17 $\pm$ 243.35	42.75 $\pm$ 193.86	14.21 $\pm$ 65

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers*

## 4.12 Livestock product utilization and sale

Model female farmer groups are better in butter production than the non-model ones. Similarly, both male and female model groups of farmers are better in egg production (Table 16)

**Table 16:** Livestock production utilization and sale by household types (average  $\pm$  standard deviation)

Livestock product	FM	FnM	MM	MnM	NPF
Butter	9.6	21	43	18	44.2
Eggs	231.3	178.1	354.5	209	310.5
Manure	1330				
Milk	236.2	257.2	348.4	288.7	294.6
Others (sold)				800	
Processed honey	47.5				40
Raw honey	103.7	20	37.8	31	28.7
Renting out lvst			92		
Skins/hides	1.8		1.9	2	1.5
Wool		1		101	
Butter	5.4	20.9	72.3	6.8	43.3
Eggs	265.8	242.5	523.5	159.2	258.2
Manure					
Milk	168.6	227.1	274.8	218.4	173.9
Others (sold)					
Processed honey	3.5				
Raw honey	170		38.7	31.5	29.9
Renting out lvst			124.4		
Skins/hides	1.30384		0.72	2.2	0.8
Wool				140	

Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers; Values in ETB/farm.

### 4.13 Labour and Income

Most non-model farmers earn their income by renting out their labour. Non-model female headed households also make their earnings from informal means. However, model farmers are good at petty trading, model female headed households being the best from all groups (Table 17).

The other important point here is to note the differences among the different household groups in income obtained from rent. The male model farmers usually have one or more houses in the nearby towns or in some cases in big cities, like Bahir Dar. This is one of the criteria for a given farmer to be a model farmer. In this case, they rent the houses out and collect some amount of money per monthly bases.

**Table 17:** Sources of income from non-farm activities by households (average  $\pm$  standard deviation)

Description	FM	FnM	MM	MnM	NPF
Casual labour	23.68 $\pm$ 178.81	281.05 $\pm$ 950.27	66.75 $\pm$ 311.6	247.18 $\pm$ 966.58	60.71 $\pm$ 334.35
Sale of home crafts	107.24 $\pm$ 658.42	83.12 $\pm$ 336.01	42.89 $\pm$ 276.76	0 $\pm$ 0	0 $\pm$ 0
Sale of fuel wood/charcoal/other wood products	111.43 $\pm$ 561.85	108.11 $\pm$ 421.92	314.77 $\pm$ 938.64	245.85 $\pm$ 875.41	107.14 $\pm$ 593.25
Petty trading	566.67 $\pm$ 1451.03	146.56 $\pm$ 476.42	440.23 $\pm$ 1567.95	236.62 $\pm$ 728.65	109.64 $\pm$ 381.4
Occasional employment	27.19 $\pm$ 140.81	90.54 $\pm$ 480.91	43.37 $\pm$ 293.09	14.49 $\pm$ 120.39	64.29 $\pm$ 481.07
Employee (salaried)	176.36 $\pm$ 995.79	20.55 $\pm$ 175.56	90.72 $\pm$ 595.06	188.57 $\pm$ 857.96	228.04 $\pm$ 1355.08
Remittance	0 $\pm$ 0	0 $\pm$ 0	71.43 $\pm$ 460.11	14.49 $\pm$ 120.39	0 $\pm$ 0
Rent	19.29 $\pm$ 101.76	18.92 $\pm$ 124.61	391.22 $\pm$ 1203.92	63.66 $\pm$ 263.67	49.29 $\pm$ 255.61
Government transfer	0 $\pm$ 0	27.4 $\pm$ 234.08	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
Retirement fund	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	21.74 $\pm$ 180.58	0 $\pm$ 0
Micro-credit **	1456.31 $\pm$ 1537.01	954.32 $\pm$ 1251.5	1173.12 $\pm$ 1326.09	1497.56 $\pm$ 1341.27	1383.93 $\pm$ 1646.79
Gift	7.14 $\pm$ 53.45	0.68 $\pm$ 5.81	148.81 $\pm$ 940.33	94.2 $\pm$ 494.64	0 $\pm$ 0
Other	26.23 $\pm$ 151.63	131.2 $\pm$ 523.71	657.8 $\pm$ 4835.6	129.67 $\pm$ 558.07	55.02 $\pm$ 413.22



#### 4.14 Access to Markets

Model and non-model as well as male and female farmer groups live together. Hence, being a member of one of the farmer groups does not have much effect on the distance or access to markets. The differences presented in Table 18 among the different farmer groups could be by chance.

**Table 18:** Access to markets by different household types (km, average  $\pm$  standard deviation)

Description	Crop type	FM	FnM	MM	MnM	NPF
Farm gate (to consumer)	Pulses	0.08 $\pm$ 1.01	0.06 $\pm$ 1.01	-0.06 $\pm$ 1.01	0.06 $\pm$ 1.01	-1 $\pm$ 0
	Cereals	0.08 $\pm$ 1.01	0.06 $\pm$ 1.01	-0.08 $\pm$ 0.97	0.04 $\pm$ 0.99	-1 $\pm$ 0
	Vegetables	0.08 $\pm$ 1.01	0.06 $\pm$ 1.01	-0.04 $\pm$ 0.98	0.06 $\pm$ 1	-1 $\pm$ 0
	Fruit	0.08 $\pm$ 1.01	0.1 $\pm$ 1.04	-0.04 $\pm$ 0.94	0.06 $\pm$ 0.96	-1 $\pm$ 0
	Coffee	0.08 $\pm$ 1.01	0.06 $\pm$ 1.01	-0.06 $\pm$ 1	0.06 $\pm$ 1.01	-1 $\pm$ 0
	Chat	0.08 $\pm$ 1.01	0.06 $\pm$ 1.01	-0.06 $\pm$ 1.01	0.06 $\pm$ 1.01	-1 $\pm$ 0
	Other cash crops	0.1 $\pm$ 0.97	0.08 $\pm$ 0.99	-0.06 $\pm$ 0.96	0.04 $\pm$ 0.97	-1 $\pm$ 0
	Livestock	0.1 $\pm$ 0.96	0.08 $\pm$ 1	-0.06 $\pm$ 0.98	0.06 $\pm$ 1	-1 $\pm$ 0
	Animal products	0.08 $\pm$ 1.01	0.06 $\pm$ 1.01	-0.06 $\pm$ 1.01	0.47 $\pm$ 2.41	-1 $\pm$ 0
Collector	Pulses	0.58 $\pm$ 2.19	0.06 $\pm$ 1.01	0.24 $\pm$ 1.74	0.16 $\pm$ 1.21	-0.69 $\pm$ 1.57
	Cereals	0.83 $\pm$ 2.64	0.38 $\pm$ 1.5	1.14 $\pm$ 3.01	0.47 $\pm$ 1.74	0.07 $\pm$ 2.45
	Vegetables	0.33 $\pm$ 2.02	0.06 $\pm$ 1.01	0.04 $\pm$ 1.31	0.06 $\pm$ 1.01	-1 $\pm$ 0
	Fruit	0.08 $\pm$ 1.01	0.16 $\pm$ 1.22	-0.06 $\pm$ 1	0.06 $\pm$ 1.01	-1 $\pm$ 0
	Coffee	0.55 $\pm$	0.06 $\pm$	0.24 $\pm$	0.06 $\pm$	-1 $\pm$ 0

Description	Crop type	FM	FnM	MM	MnM	NPF
		1.85	1.01	1.76	1.01	
	Chat	0.08 ± 1.01	0.06 ± 1.01	0.1 ± 1.64	0.24 ± 1.51	-1 ± 0
	Other cash crops	1.13 ± 2.65	0.35 ± 1.55	1.2 ± 2.57	0.61 ± 1.91	0.48 ± 2.5
	Livestock	0.08 ± 1.01	0.04 ± 1	0.12 ± 1.62	0.06 ± 1.01	-0.76 ± 1.2
	Animal products	0.44 ± 2.59	0.04 ± 1.01	0.41 ± 2.31	0.2 ± 1.4	-0.76 ± 1.2
Local market	Pulses	2.1 ± 3.44	0.96 ± 2.54	1.47 ± 2.91	1.25 ± 2.45	1.28 ± 3.11
	Cereals	3.75 ± 3.71	3 ± 3.22	3.7 ± 3.49	2.49 ± 2.73	3.62 ± 3.23
	Vegetables	0.3 ± 1.3	0.22 ± 1.27	1.04 ± 2.59	0.56 ± 1.84	-0.07 ± 2.37
	Fruit	0.46 ± 1.96	0.24 ± 1.29	2.25 ± 6.41	0.73 ± 2.09	0.62 ± 2.81
	Coffee	0.9 ± 2.52	0.2 ± 1.1	1.25 ± 2.93	1.08 ± 2.5	-0.35 ± 2.04
	Chat	0.08 ± 1.01	0.39 ± 2.32	0.76 ± 2.74	0.81 ± 2.4	-0.88 ± 0.6
	Other cash crops	1.46 ± 2.61	1.47 ± 2.71	2.55 ± 3.14	2.22 ± 2.6	3.15 ± 3.2
	Livestock	2.24 ± 3.74	1.38 ± 2.59	3.56 ± 5.04	2.24 ± 2.78	0.59 ± 2.8
City market	Pulses	2.1 ± 4.32	1.04 ± 2.88	2.36 ± 4.62	3.12 ± 5.79	-0.12 ± 2.63
	Cereals	3.43 ± 4.87	2.13 ± 3.9	3.72 ± 4.98	4.08 ± 5.83	1.15 ± 4.05
	Vegetables	0.45 ± 1.93	0.08 ± 1.01	0.4 ± 2.17	0.38 ± 2.35	-0.76 ± 1.2
	Fruit	0.73 ± 2.49	0.2 ± 1.24	0.5 ± 2.3	0.08 ± 1.04	-0.46 ± 1.92
	Coffee	1.31 ±	0.08 ±	0.49 ±	0.06 ±	-1 ± 0

Description	Crop type	FM	FnM	MM	MnM	NPF
		3.37	1.01	2.52	1.01	
	Chat	0.46 ± 1.99	0.06 ± 1.01	0.33 ± 2.21	0.5 ± 2.47	-1 ± 0
	Other cash crops	0.83 ± 2.6	0.29 ± 1.73	1.22 ± 3.15	1.51 ± 4.53	0.48 ± 2.69
	Livestock	2.82 ± 4.47	2.02 ± 3.88	3.93 ± 5.67	3.73 ± 5.84	0 ± 2.35
	Animal products	3.07 ± 5.84	1.63 ± 3.32	3.73 ± 5.63	3.37 ± 5.3	-0.52 ± 1.66
Farmers' cooperative	Pulses	0.08 ± 1	0.06 ± 1.01	-0.02 ± 1.01	0.39 ± 1.97	-0.88 ± 0.6
	Cereals	0.23 ± 1.23	0.25 ± 1.34	1.87 ± 7.96	0.35 ± 1.31	-0.5 ± 1.48
	Vegetables	0.08 ± 1.01	0.06 ± 1.01	-0.06 ± 1.01	0.16 ± 1.22	-1 ± 0
	Fruit	0.08 ± 1.01	0.06 ± 1.01	-0.06 ± 1.01	0.06 ± 1.01	-1 ± 0
	Coffee	0.08 ± 1.01	0.04 ± 1.01	-0.06 ± 1.01	0.06 ± 1.01	-1 ± 0
	Chat	0.08 ± 1.01	0.06 ± 1.01	-0.06 ± 1.01	0.06 ± 1.01	-1 ± 0
	Other cash crops	0.59 ± 3.26	0.2 ± 1.4	0.37 ± 1.87	0.06 ± 1.01	-0.88 ± 0.6
	Livestock	0.08 ± 1.01	0.29 ± 1.72	0.18 ± 1.98	0.06 ± 1.01	-1 ± 0
	Animal products	0.08 ± 1.01	0.46 ± 2.3	0.18 ± 1.98	0.06 ± 1.01	-1 ± 0
To processor/in dustry	Pulses	0.08 ± 1.01	0.06 ± 1.01	-0.06 ± 1.01	0.06 ± 1.01	-1 ± 0
	Cereals	0.08 ± 1.01	0.06 ± 1.01	0.61 ± 2.96	0.3 ± 1.96	-1 ± 0
	Vegetables	0.08 ± 1.01	0.06 ± 1.01	-0.06 ± 1.01	0.06 ± 1.01	-1 ± 0
	Fruit	0.08 ± 1.01	0.06 ± 1.01	-0.06 ± 1.01	0.27 ± 1.86	-1 ± 0
	Coffee	0.08 ±	0.06 ±	-0.06 ±	0.06 ±	-1 ± 0

Description	Crop type	FM	FnM	MM	MnM	NPF
		1.01	1.01	1.01	1.01	
	Chat	0.08 ± 1.01	0.06 ± 1.01	-0.06 ± 1.01	0.06 ± 1.01	-1 ± 0
	Other cash crops	0.08 ± 1.01	0.06 ± 1.01	-0.06 ± 1.01	0.27 ± 1.86	-1 ± 0
	Livestock	0.05 ± 1.01	0.06 ± 1.01	-0.06 ± 1.01	0.06 ± 1.01	-1 ± 0
	Animal products	0.22 ± 1.63	0.04 ± 0.81	0.22 ± 1.95	0.18 ± 1.54	-0.96 ± 0.2

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers. NB: Products not sold at a specific market should be left out in the analysis.*

#### 4.15 Information Access

Unexpectedly, the difference in the access of information between model and non-model as well as between female headed and male headed household groups is not significant. But as one can easily predict, the local authorities serve as the main sources of information for all groups of farming households. Universities and research centers provide little information for the farming community (Table 19).

Male headed household are by far better than the female headed ones in using mass medias as a source of information. Even if female headed model farmers own radios, they do not usually use it or do not allocate their time to listen the radio programs. This result reminds us the triple roles of women in our society cultural set ups.

Different credit institutions, particularly The Amhara Credit and saving Institution /ACSI/, contributed a lot as a source of information for the farming community. This result coincides with the result obtained during the PRA survey.

**Table 19:** Access to information by different household types (average  $\pm$  standard deviation)

Description	FM	FnM	MM	MnM	NPF
Indigenous knowledge, experience	94.87 $\pm$ 22.2	84 $\pm$ 36.85	90 $\pm$ 30.14	86.32 $\pm$ 34.55	77.59 $\pm$ 42.07
Farm research group/FTC	37.18 $\pm$ 48.64	29 $\pm$ 45.6	29.09 $\pm$ 45.63	30.53 $\pm$ 46.3	22.41 $\pm$ 42.07
Local authorities (DAs, ARDPLAC, REALC)	98.72 $\pm$ 11.32	96 $\pm$ 19.69	97.27 $\pm$ 16.36	95.79 $\pm$ 20.19	96.55 $\pm$ 18.41
Cooperatives	28.21 $\pm$ 45.29	28 $\pm$ 45.13	41.82 $\pm$ 49.55	33.68 $\pm$ 47.51	39.66 $\pm$ 49.35
NGOs	1.28 $\pm$ 11.32	5 $\pm$ 21.9	7.27 $\pm$ 26.09	9.47 $\pm$ 29.44	10.34 $\pm$ 30.72
Universities, RARIs	0 $\pm$ 0	1 $\pm$ 10	3.64 $\pm$ 18.8	2.11 $\pm$ 14.43	0 $\pm$ 0
Community based organizations	3.85 $\pm$ 19.36	12 $\pm$ 32.66	4.55 $\pm$ 20.93	10.53 $\pm$ 30.85	8.62 $\pm$ 28.31
Micro-finance groups	51.28 $\pm$ 50.31	41 $\pm$ 49.43	52.73 $\pm$ 50.15	63.16 $\pm$ 48.49	51.72 $\pm$ 50.41
Mass media (radio, TV, internet)	8.97 $\pm$ 28.77	14 $\pm$ 34.87	31.82 $\pm$ 46.79	20 $\pm$ 40.21	15.52 $\pm$ 36.52

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers. NB: Values in % of farmers receiving information from specific medium.*

All groups of farming households receive almost all types of agricultural information. There is no as such a big difference among the different groups of households in this regard. But male headed households are by far better in attending/participating different types of trainings. This shows that the gender issue is still need a magnificent attention, particularly in training and access to improved technologies (Table 20).

All the four categories of households have poor information access or awareness about storage facilities and collective selling. The results of the PRA survey indicated that market problem is the top priority problem in majority of the villages. If new and improved storage facilities are introduced and if the farmers know the advantages of collective selling their

marketing problems might be improved significantly. The results of the baseline survey in this regard, are very important for future interventions.

**Table 20:** Type of information obtained (average  $\pm$  standard deviation)

Description		FM	FnM	MM	MnM	NPF
Agricultural practices	Use of compost	98.72 $\pm$ 11.32	92 $\pm$ 27.27	97.27 $\pm$ 16.36	94.74 $\pm$ 22.45	96.55 $\pm$ 18.41
	Pesticides	87.18 $\pm$ 33.65	76 $\pm$ 42.92	95.45 $\pm$ 20.93	88.42 $\pm$ 32.17	87.93 $\pm$ 32.86
	Staggered production	25.64 $\pm$ 43.95	18 $\pm$ 38.61	37.27 $\pm$ 48.57	28.42 $\pm$ 45.34	43.1 $\pm$ 49.95
	Inorganic fertilizers	94.87 $\pm$ 22.2	87 $\pm$ 33.8	91.82 $\pm$ 27.53	87.37 $\pm$ 33.4	86.21 $\pm$ 34.78
	Use of manure	96.15 $\pm$ 19.36	85 $\pm$ 35.89	90.91 $\pm$ 28.88	90.53 $\pm$ 29.44	82.76 $\pm$ 38.1
	Intercropping	83.33 $\pm$ 37.51	66 $\pm$ 47.61	82.73 $\pm$ 37.97	84.21 $\pm$ 36.66	60.34 $\pm$ 49.35
	Improved seeds	93.59 $\pm$ 24.65	86 $\pm$ 34.87	90 $\pm$ 30.14	90.53 $\pm$ 29.44	89.66 $\pm$ 30.72
	Water pump	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0	0 $\pm$ 0
	Water tank	17.95 $\pm$ 38.62	8 $\pm$ 27.27	23.64 $\pm$ 42.68	26.32 $\pm$ 44.27	34.48 $\pm$ 47.95
Livestock practices	Improved breed	58.97 $\pm$ 49.51	46 $\pm$ 50.09	74.55 $\pm$ 43.76	63.16 $\pm$ 48.49	70.69 $\pm$ 45.92
	Improved husbandry	55.13 $\pm$ 50.06	38 $\pm$ 48.78	67.27 $\pm$ 47.14	64.21 $\pm$ 48.19	55.17 $\pm$ 50.17
	Improved fodder	52.56 $\pm$ 50.26	40 $\pm$ 49.24	65.45 $\pm$ 47.77	58.95 $\pm$ 49.45	53.45 $\pm$ 50.32
Training and development support on:	Financial support	35.9 $\pm$ 48.28	24 $\pm$ 42.92	49.09 $\pm$ 50.22	44.21 $\pm$ 49.93	32.76 $\pm$ 47.34
	Irrigation practices	35.9 $\pm$ 48.28	22 $\pm$ 41.63	60 $\pm$ 49.21	40 $\pm$ 49.25	51.72 $\pm$ 50.41
	Crop production	51.28 $\pm$ 50.31	32 $\pm$ 46.88	71.82 $\pm$ 45.19	52.63 $\pm$ 50.2	63.79 $\pm$ 48.48

	and/or utilisation practices					
	Pest & disease control	46.15 ± 50.17	32 ± 46.88	78.18 ± 41.49	47.37 ± 50.2	62.07 ± 48.95
	Livestock and/or utilization practices	33.33 ± 47.45	24 ± 42.92	63.64 ± 48.32	42.11 ± 49.63	55.17 ± 50.17
	Animal health & breeding services	33.33 ± 47.45	32 ± 46.88	60.91 ± 49.02	47.37 ± 50.2	70.69 ± 45.92
	Post-harvest management	38.46 ± 48.97	29 ± 45.6	73.64 ± 44.26	56.84 ± 49.79	48.28 ± 50.41
	Soil & water conservation	78.21 ± 41.55	59 ± 49.43	85.45 ± 35.42	75.79 ± 43.06	82.76 ± 38.1
	Natural Resource Management	70.51 ± 45.89	52 ± 50.21	76.36 ± 42.68	69.47 ± 46.3	55.17 ± 50.17
Market linkages + business support services	Market information	67.95 ± 46.97	55 ± 50	75.45 ± 43.23	70.53 ± 45.83	55.17 ± 50.17
	Storage facilities	12.82 ± 33.65	7 ± 25.64	36.36 ± 48.32	20 ± 40.21	36.21 ± 48.48
	Contract farming	2.56 ± 15.91	4 ± 19.69	7.27 ± 26.09	4.21 ± 20.19	15.52 ± 36.52
	Collective selling	5.13 ± 22.2	4 ± 19.69	13.64 ± 34.47	8.42 ± 27.92	15.52 ± 36.52
	Credit services	53.85 ± 50.17	47 ± 50.16	68.18 ± 46.79	71.58 ± 45.34	65.52 ± 47.95

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers. NB: Values in % of farmers receiving information from specific medium.*

Development agents visit almost equally all categories of farmer households. But women usually do not go to FTCs to get best practices and new technologies as men are doing,

which is true in our society cultural set up. On the other hand, distance to development office does not have contribution for a farmer to become a model farmer (Table 21).

**Table 21:** Contact with DAs (average  $\pm$  standard deviation)

Description	FM	FnM	MM	MnM	NPF
DA visits (#/month)	2.19 $\pm$ 1.99	1.91 $\pm$ 1.75	2.5 $\pm$ 1.72	2.29 $\pm$ 1.76	2.59 $\pm$ 2.55
Distance to DA office (km)	3.25 $\pm$ 3.25	3.38 $\pm$ 3.54	3.4 $\pm$ 3.66	2.95 $\pm$ 3.59	1.93 $\pm$ 1.7
FTC visits (#/year)	8.9 $\pm$ 11.79	4.56 $\pm$ 8.64	16.3 $\pm$ 16.92	12.73 $\pm$ 16.89	14.11 $\pm$ 14.47

*Note: MM - male model farmers; FM- female model farmers; MnM-male non-model farmers; FnM- female non-model farmers; and NPF-non-project farmers. NB: Values in % of farmers receiving information from specific medium.*