5

LIVELIHOOD RESOURCES & STRATEGIES OF SMALLHOLDING FARMERS

Ethiopia is one of the least developing countries in the globe and its name has been illustrious with famine and drought for decades. Food insecurity is majorly the outcome of unsatisfactory livelihood strategies leading to irreparable damage in the lives of the poor keeping them in the vicious circle of self-insufficiency. Yet, the identification of the various factors which deter the capabilities of rural households in their healthier choice of livelihood strategies in the country has received petite attention despite its threat over the poor. Majority of the country's population live in rural areas and depend on rain-fed subsistence agriculture, and agriculture still remains the principal means of livelihoods and majority of the production yield from agriculture comes from small-scale farmers. Nevertheless, the small-scale traditional producers have come under a high pressure to cope up with challenges of livelihood reconstruction, food insecurity and poverty (Yishak G., et. al. 2014).

The country perhaps is best known as the destination of the worst famines in African history: as a symbol of contemporary African poverty and failure of development. Recently, about 15 million people are facing the El-Niño devastative weather impact and are in a dire need of a direct food aid and the figure is estimated to increase ("El-Nino impacts Ethiopia" , 2015). In addition to this, it was posed that the situation is worsening despite the massive resources invested for food security and humanitarian aid programs. To combat situations like this, the government of Ethiopia in 2003 with the collaboration of donor organizations established the 'New Coalition for Food Security' where safety net programs were promoted as crucial ways to protect household assets

against various shocks and for the creation of assets with labor based public works (NCFSE, 2003 as cited in Bristol T. and Lane C., 2010). The implementation of safety net was started in 2005 and reached out for about 8 million people and from then the program has been extending to reach out for more along with other Food Security Programs such as Household Asset Building Program (HABP) (MoARD, 2009).

The major goal of Productive Safety Net Program (PSNP) is to address basic food necessities for chronically food insecure societies in a way that can prevent asset depletion at a household level and to create assets at community level. Although, the struggle to mitigate food insecurity at household level in the remote areas of Ethiopia dated long back coupled with lots of efforts being put forward by different governmental and non-governmental donor organizations, yet there remains a challenging goal of securing food at household level (Frankenberger, T. R., et. al., 2007). The long term irreparable damages of food insecurity on the livelihoods of the poor highly reduces their self-sufficiency.

In Ethiopia, where majority smallholding farmers dominate the subsistence agriculture of the overall nationwide economy, they often face lack of livelihood capitals and are highly prone to livelihood related risks. The livelihood strategies they use are at the center of development and for the poor in remote areas wellbeing mainly entails having enough food and shelter for their household with basic levels of security. Nonetheless, the livelihood strategies they employ to ensure the basic livelihoods will mainly depend on the combined effects of livelihood assets which takes into account of the vulnerability context in which they subsist in, institutions and policies and the processes that influence them (Ellis F., 2000). Analysis of livelihood by using an asset framework could enhance approval of the way that combination of activities and assets are crucial to secure livelihoods. The precise linkage between livelihood and food security puts forward that

food security could be achieved when an equitable growth guarantees that the vulnerable and poor have a sustained livelihood (Ayalneh B., 2010). Moreover, this requires an adequate understanding about the livelihood strategies of the vulnerable and resource poor farmers at micro level of designing and implementing strategies which takes into account of the livelihood needs of the local people. Therefore, an end to end consideration of alternative livelihood strategies that rural households adopt is indispensable to bring any improvement. This is very crucial not to consign the limited resources available for rural development basing on unproven assumptions about the resource poor and their livelihood strategies (Tesfaye L., 2003).

Furthermore, the appraisal of local development impact usually focuses exclusively or excessively on how much increased production and cash or jobs are created, rather than meeting point on the range of broad livelihood issues. Meaning, changes in the way people live may be as important as the more obvious changes in how and what they achieve (Ashley C. and Carney D., 1999). Though, achieving food security in most developing nations continues to be a foremost public policy challenge, paucity of information on the causes of food insecurity worsens the challenge. Such information is necessary to properly target support and aid, assess whether the progress is achieved and to develop an appropriate intervention to assist those in need (Smith, Lisa C., and Ali S., 2007).

In this regard the livelihood approach is a multipurpose approach as it focuses on the ways of understanding the priorities and practical realities of poor households, what they actually employ to make their living, the assets they have access to and their adoption echelon coupled with the challenges faced while dealing with the reality. The rationale behind is the better the awareness, the finest the intervention designs. Moreover, understanding the livelihood strategies and realities on the ground will assist programs that address food security to be highly effective in identifying

better means of appropriate strategies and interventions. In addition, livelihood approach seeks out to develop a sympathetic of the issues that lie behind peoples' choice of livelihood strategies and head to reinforce the issues that promote flexibility and choices through livelihood diversification; the higher their ability to withstand stresses and shocks (Ayalneh B., 2010).

The other fact is the fact that rural households' livelihood strategies and their adoptions are diverse and heterogeneous geographically, economically and among different social cohesions (Tesfaye L., 2003). Different households also adopt different livelihood strategies accordingly with their particular status of various asset holdings. Thus, it is important to recognize their strategies in securing their livelihoods. This particular study similarly basis on the notion that households have their own means and forms of asset accumulation and strategies for livelihood. It assumes that people already have numerous productive and creative activities and have developed strategies which incorporate livelihood diversification to their own culture, tradition and context. Thus, any attempts to be made in the intervention of livelihood strategies and food insecurity challenges, it should take into consideration of the local livelihood strategies majorly adopted. Therefore, in this particular chapter, the study attempts to see the livelihood resources, strategies and choices of Kilte Awelalo area smallholding farmers in their struggle to achieve food security goal.

5.1 Livelihood Assets

Livelihood assets that households own connote the basic stepping blocks with which households carry out production, engage in various labor markets and partake in joint exchange with other households. These assets include experience and skills of household members as in the form of human capital, their relationships within the broader communities (social capital), their natural

environment (natural capital), physical and financial resources (Arega B., Woldeamlak B., and Melanie N., 2013). This reflects the fact that different geographic locations provide different resource endowments, along with the fact that people face different constraints accordingly which enforces them to employ different strategies to achieve livelihood outcomes (Barrett, C. B., Reardon, T., Webb, P., 2001).

In the study areas, it was observed that possession of these assets vary among households and geographically. For a better sympathetic of livelihoods especially of the poor, the study has employed Sustainable Livelihood Framework developed by Department For International Development (DFID). The major components of the framework which are assumed to impact livelihoods are Human capital, Natural capital, Physical capital, Social capital and Financial capital. These components of the framework summarize other minute components and influences on livelihoods. However, this does not provide a comprehensive list of components and issues to be considered (DFID, 1997). As suggested by the framework, this particular study has adapted various sub components of the framework to meet the requirements of given circumstances and due considerations.

5.1.1 Human capital

Human capital refers to the knowledge, skills and good health that collectively enable people to perform various livelihood strategies and accomplish their livelihood objectives. At household level, human capital is a factor of the amount and quality of labor available and this varies accordingly to the household size, leadership potential, skill levels, health status, etc. Several people consider lack of education or ill health as a core dimension of poverty (DFID, 1997).

The major human capital assets for rural households incorporate the household size, education, age, health status, experience in farming activities and etc. Along with these, a skilled labor force is regarded as a crucial human resource in bringing up development. Households' human capital is comprised of both the qualitative and quantitative characteristics of its independent members which help them generate income. In Ethiopia, human capital is extremely low whereby posing a huge trait for food security due to the adverse synergies between labor productivity and poor education, nutritional and health status (Devereux S., 2001).

General background of household members

Men and women have different access to decisive economic resources and power to make the choices that affect their day to day lives as a result of the state of gender relations which exists in a given society. The undeviating result of this is witnessed in the unequal responsibilities and roles women have and the control and access they have to crucial resources in a household. Women are decisive parts of the rural economy where they contribute significantly in the production of food and cash crops and subsistence farming (MoARD, 2009). For this study, total number of household members out of the 370 sample households who are incorporated as part of the assessment are 1998 members.

Table 5.1 Household characteristics by Age and Sex

		Sex		
	Age distribution	**Male (%)**	**Female (%)**	**Total (%)**
1	0-7	146 (7.3)	173 (8.7)	319 (16.0)
2	8-14	311(15.5)	247 (12.3)	558 (27.9)
3	15-25	183 (9.1)	217 (10.9)	400 (20.0)
4	26-45	187 (9.4)	204 (10.2)	391 (19.6)
5	46-64	83 (4.2)	101 (5.0)	184 (9.2)
6	65 and above	94 (4.7)	52 (2.6)	146 (7.3)
	Total	1004 (50.2)	994 (49.7)	1998 (100.0)

Source: Survey result, 2015

Out of 1998 household members, 1004 (50.3%) were males and remaining 994 (49.7%) were females. According to CSA also, the national figures also revealed that size of female population takes 49.7% whereas the rest accounting for 50.3% was the male population (CSA, 2014). Majority of the respondents are found in the age group of 8-14 followed by the age group 15-25. The percentage difference in each age category between male and female followed a similar pattern. In addition to this, the age group of the sample households revealed that children between ages of 0 to14 consisted of 43.89%; the age group 15-64 accounted for 48.79% and lastly old age 65 and above amounted 7% of the total sample households.

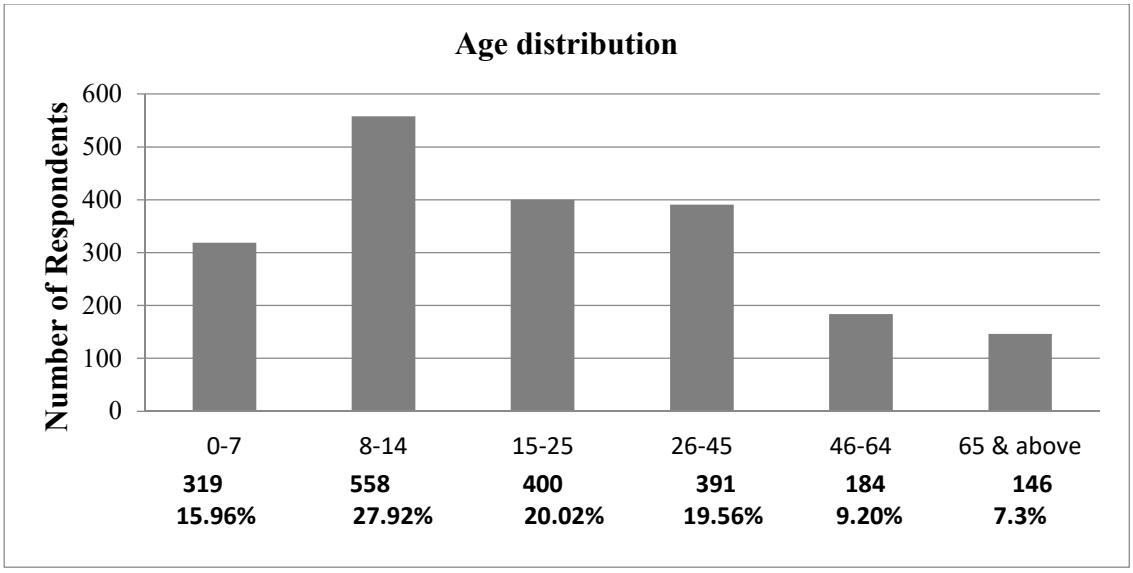
According to CSA (2014), child age refers to the population in the age group of 0 to 14 years and requires a huge investment for socioeconomic supports like health and education. It was also asserted that the size of this age group in comparison to the rest of the age groups is one another indirect indicator of the current fertility level in a country. The higher the relative size of this age group as compared to the other age groups, the higher the fertility rate and vice versa. Similarly, the Inter Censual Population Survey conducted in 2014 revealed that child population consists of 41.5% of the total population in the country (CSA, 2014). Accordingly, the study areas have a relatively higher child population rate as can be seen from the result above.

Moreover, the productive or working age group which consists of the population between the age of 15 and 64 is regarded as a highly productive age group and is helpful in various segments of the country's economy. This age group accounts for 55.4% of the total population in Ethiopia (CSA, 2014). However, this particular study's survey as revealed in the figure 5.1 below, the middle age consists of 48.78% of the total sample population which was relatively lower than that of the country's average working age group. Finally, the old age group: the population which is age 65 and above takes the national share of 3.1% (CSA, 2014) and takes the smaller proportion

as compared to the child and working age group. However, the survey found that the share of the old and group to be 7.3% of the total population which is slightly higher as compared to the national figure.

The overall dependency ratio which is defined as people in the age of 0-14 and above 65 divided by those people between age group of 15-64 of the sample households was found to be 0.95. In addition, the survey found that the mean average age of respondents to be 24.51 which is below the national average age of 44 years. According to Tesfaye L., (2003), in rural areas the younger the farmers are the more likely to be poor than the older farmers due to the less possession of resources accumulation.

Figure 5.1 Age distribution among the respondents



Source: Survey result, 2015

From the above figure 5.1, it is apparent that the share of members of households in each of the age groups has a tendency to decline as age increases. The relationship between age and productivity has been put forward by the life cycle hypothesis of human capital theory. It predicts that during the early life cycle productivity increases with age and then after decreases with age

late in life cycle as the depreciation of human capital surpasses the investment. In general, a productive age is normally considered to be in between 18 and 49 (Michael T., 2011). Though, in this particular study testing the hypothesis is not the major concern, during the survey it was observed that this productive age showed a discrepancy where majority were considered to be productive starting at the age of 15 and ending in the mid 70's. In various studies, age is considered to be an integral part of livelihood assets which facilitates livelihood strategies to undertake economic activities to craft ends meet.

Similarly in the study areas, it was observed that households with higher number of working age groups tend to have a better utilization of resources to make ends meet, nevertheless this does not refer to households with exceptionally higher number of working age groups with limited resources to utilize them. Historically, households with higher number of children were considered to be generally rich as compared to others with the assumption that there is abundance of resources availability to utilize the human capital in a household.

Table 5.2 Household members' occupation and educational background

	Farmer	Housewife	Student	Child farmer	Daily laborer	Not able to work due to age	Unemployed	Total
Illiterate	190	202	0	0	16	269	0	677
Read and write	32	41	20	0	0	0	0	93
Less than 8th Level	118	68	603	10	17	6	2	824
9-12 level	30	6	217	0	45	22	54	374
TVET-graduate (Technical and Vocational Educational Training)	0	0	8	0	0	0	6	14
College Diploma	0	0	0	0	0	16	0	16
Total	370	317	848	10	78	313	62	1998

Source: Survey result, 2015

With regard to the educational background of the sample households, 51% of household members with a full time occupation as a farmer are illiterates followed by 31% with education level less than level 8^{th} and 8% with education level between 9-12^{th} level. In case of this study, all the interviewed respondents are smallholding farmers where their main livelihood depends on agriculture and it is a highly dynamic occupation where various production techniques and technologies and their respective practices could do better with higher comprehension and education. In similar lines, housewives account for about 15% of the total sample population where majorities (67%) of them are illiterates. In most cases housewives have duties related with the housework including fetching water for home consumption purpose, raising children, preparation of food and other similar duties.

Though the contribution of housewives' goes beyond this, they are the ones who are in a position of preparing meals and storage of leftovers which can directly impact food and nutritional security of a household. As discussed in the previous chapters, education basically enhances their capability for distributing nutritionally adequate food among the members of the household accordingly with their age needs. Thus, literacy level of housewives is crucial in activities especially related with preparation of nutritionally adequate food and its distribution among members, treatment of drinking water and etc. which can enhance the quality of human capital.

Regarding household members who are currently enrolled as students in primary and secondary schools, they account for 42% of the total sample population. In most rural parts of Ethiopia, the average age for joining a formal education is 7-8 years of age (CSA, 2014). Thus, from the sample respondents, approximately about 89% of respondents in the age group of 8-25 are enrolled in primary and secondary schools and around 92% have joined formal primary

education which typifies the strong efforts and initiatives taken for achieving Government of Ethiopia's objective of reaching out primary education for all (GTP, 2010).

Smallholding farmers start off with own labor from household members mainly with male members of the family who have the capability to support the agricultural duties on the fieldwork. In the study areas, it was observed that children in the age of 12-14 usually begin to support agricultural fieldwork with the household head. However, the study found that only 0.5% of the total sample population have children participating in as child farmers, which supports the above statement where majority of the children in the age group of 8-25 are devoting majority of their time in primary and secondary schools. Furthermore, member of sampled households who are participating as daily laborers outside of agriculture who are engaging in nearby manufacturing industries accounted for 3%.

Table 5.3 Household size

No.	Household size	Frequency	Percent
1	1	9	2.4
2	2	18	4.9
3	3	51	13.8
4	4	28	7.6
5	5	54	14.6
6	6	107	28.9
7	7	40	10.8
8	8	50	13.5
9	9	8	2.2
10	10	5	1.4
	Total	370	100.0

Source: Survey result, 2015

Household size is also another decisive factor which can possibly determine the human capital quality and food security condition of households. In residences where the number of

members who are living under the same roof is high, the number of mouths to feed and related costs increases in parallel. The study found that, majority of the households in the study areas were having a household size of 6. In addition to this, the average household size of the study area is around 5.4 with a maximum household size of 10 members. The average household size at national level for rural areas is 5.1, and the regions average rural household size is 4.8. This shows that the average household size of the study areas is relatively larger than both the country's and the region's; Tigray, average rural household size (CSA[3], 2013). From this, it can be seen that such type of a relatively larger household size may possibly impact the quality of human capital and food security condition of households in the study areas.

5.1.2 Natural capital

Natural capital as a term is used to connote the natural resource stocks out of which useful livelihood flows and services are derived. DFID, (1999) asserted that "*None of us would survive without the help of key environmental services and food produced from natural capital*". For this particular study, natural capital assessment incorporated farmers' land ownership status, land size, soil fertility status and the agro ecology in which the household works.

Table 5.4 Farm land holdings and ownership status of farmers

	Ownership			**Total**
Farm Land	Own	Shared in	Rented	
Yes	286 (77.3%)	0	6 (1.6%)	292 (78.9%)
No	0	52 (14.1%)	26 (7%)	78 (21.1%)
Total	286 (77.3%)	52 (14.1%)	32 (8.6%)	370

Source: Survey result, 2015

As discussed, cultivable land availability among sample households is one major determinant of livelihood and food security condition. The survey found that from the total sample

population. 78.9% have access to a cultivable land, out of which, about 77.3% utilize their own and 1.6% have rented in additional land. Moreover, 21.1% of the households revealed that they don't have access to cultivable land. Majority of them also added that they get land for cultivation through sharing in where they will share the crop they produce with the land owner/s, in most cases half share.

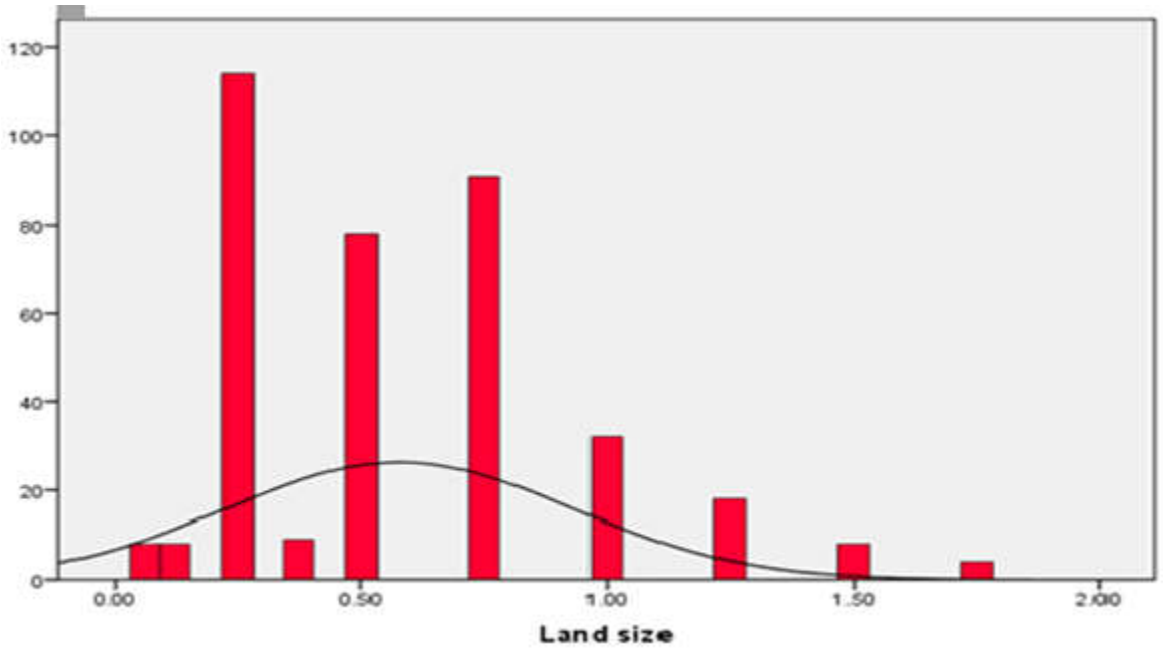
Table 5.5 Farmland ownership and Land fertility level

	Fertility level			
	Highly fertile	Moderately fertile	Infertile	Total
Own	75	129	82	286
Rented	0	0	6	6
Total	75	129	88	292
Shared in	0	18	34	52
Rented	0	9	17	26
Total	0	27	51	78

Source: Survey result, 2015

With regard to fertility level of land, households who own enough land for cultivation have a better fertile land than those who share and rent in. Moreover, during the survey it was observed that households with no or less access to land were forced to work on and develop less fertile and infertile lands. Though here the ownership to land is better as compared to similar researches findings, yet access to land should be available to the rest as their main livelihood depends on agriculture.

Figure 5.2 Land size pattern among sample households



Source: Survey result, 2015

Other than the land ownership and fertility level, the size matters too. The survey also found that the average cultivable land size distribution per households to be 0.57ha. In addition, majority about 30.2% have land size of 0.25 ha (Hectares). According to Bureau of Planning & Finance Tigray Region (2015), the average cultivable land size per households in the *Woreda* is 0.63ha. Thus, the average cultivable land size holding of farmers is less than that of the average set by the Bureau of Planning & Finance Tigray Region. This is also one hindrance for farmers in the study areas where about a quarter do not own land, leaving them with the limited option of filling their gap through renting or sharing in a relatively low fertile land.

Referring to the region's average land holding size in 1997, it was about 0.31ha and this figure has diminished to 0.19ha in 2006 mainly due to population pressure and the incapability of the nonfarm sector to offer employment opportunities for the farmers. This average figure of

landholding size in the region is by far less than the minimum size required for production with the given current productivity (Tagel G., 2008).

One of the foremost techniques for enhancing land fertility is fallowing where farmers allow a cultivated land to lie idle during a growing season so as to conserve soil moisture. In the study areas, farmers who have left their land idle in the past growing season as fallowing or due to lack of labor were very limited in number. As land is the main input for their subsistence, and in areas where land distribution per household is low, fallowing is a figment of an imagination. This on the other hand will further deteriorate land fertility condition in the study areas.

Table 5.6 Reasons for uncultivated land across the study areas

Reason for not cultivation	**Study areas**			**Total**
	Ayenalem	**Genfel**	**T. A. Sanded**	
Fallow Land	8	6	6	20 (5.4%)
Lack of labor	3	2	2	7 (1.9%)
Total	11	8	8	27 (7.3%)

Source: Survey result, 2015

In addition to the above, respondents were also inquired the reasons if there they have left a land uncultivated in the last harvesting season. Though majority of the farmers are aware about the importance of fallowing, due to various deterring reasons, only 5.4% of the total households left the land idle for a limited period of time without being sown just to restore the fertility as a main reason. Whereas, farmers who have left their land idle due to lack of labor accounted for about 1.9% of the total sample population. Other similar studies in the region also found that reduction in fallowing activities and the expansion of farmland to high hills and steep slopes have

exacerbated the loss of soil fertility and persistent soil erosion leading to shortage of land and degradation (Tilaye T., 2004).

5.1.3 Physical capital

Physical capital consists of the basic infrastructure and producer goods which are prerequisites to sustain livelihood. In DFID's Sustainable Livelihood Framework (1997), the infrastructural base comprises of changes to the physical environment which assist people to attain their basic necessities and enhance their productivity whereas producer goods consist the equipment and tools employed by people to function efficiently for more productivity. Accordingly, under infrastructure, the following components are set to be essential for a sustainable livelihood;

- Secured shelter and buildings
- Adequate water supply and sanitation
- Affordable transportation
- Clean, affordable energy, and finally
- Access to information

In concomitant to the above, it has also been added that infrastructure also comprises of public goods which are used without a direct payment and other private assets such as shelters, energy supplies, water, etc. Whereas, producer goods can be owned by a group or individual or accessed with fees and rentals, just a common asset with a more sophisticated equipment (DFID, 1997). For this particular study, under this sub section variables which are assumed to be created by economic production like house type (shelter conditions), health and sanitation facilities, livestock holdings and farm input use are incorporated. In addition to this, access to affordable transportation, access to market information, water supply and irrigation use are also incorporated.

Table 5.7 House type and number of rooms

Number of rooms	House Type				Total
	Grass roofed and grass walls	Grass roofed and mud walls	Galvanized iron roofed and mud walls	Galvanized iron roofed and Cemented walls	
1	8	16	64	4	92 (24.9%)
2	0	44	121	9	174 (47%)
3	0	9	79	0	88 (23.8%)
4	0	6	10	0	16 (4.3%)
Total	8 (2.1%)	75 (20.3%)	274 (74.1)	13 (3.5%)	370 (100%)

Source: Survey result, 2015

Majority of the households subsist in a minimalist semi-traditional houses made of a galvanized iron roof with a mud wall. It was observed that the walls of majority houses are not fully made of mud. With the abundance of sandstone in the study areas, the walls are majorly formed with complete stone structures and a tiny mud layer in the inside structure. The following picture represents a sample house from the study area.

Figure 5.3. Pictorial representation of sample house structure in the study areas

Source: Survey result, 2015

The result also revealed that the maximum number of rooms in modernly built houses with galvanized iron roof and cemented walls is limited with two and less than two rooms. In addition to this, the total number of rooms in households living in minimalist traditional houses with grass roof and grass walls was found to be limited with only one room. Furthermore, 84.5% of the respondents asserted that they have an outdoor separate kitchen where they process all the food. The total average number of rooms was found to be 2.08 rooms and comparing this figure to the average number of members of household, on average 2.64 people subsist per room in the study areas.

In concomitant to this, about 90% of the total households do not have electricity service at all whereas the remaining revealed that they have access to electricity through line extensions made to nearby churches and other organizations. With regard to tap water service, no household from all the three study areas was found to have access to a tap water. In general, it was observed that utility services like electricity and tap water accessibility is highly limited in the *Woreda*. It was also found that there is no significant difference among the three study areas regarding the structural arrangements and other auxiliary divisions and elements of housings. Yet, high congestion, electricity limitedness coupled with water access limitedness affect the quality of human capital in a household. For instance, high congestion creating disturbances and water access limitedness increasing burden of women and girls fetching water from far places and finally electricity unavailability keeps children from utilizing their time for their education.

Water Supply and sanitation

Water is a necessary part and condition for health, life and human dignity. In severe conditions, there may not be sufficient available water to sustain basic needs. In these kinds of situations, provision of safe sufficient water at least for a survival level is of a crucial importance. The

challenges related with access to a clean water is a huge concern in developing nations where about 3.4 million people die each year just with water related diseases where about one billion people around the nation lack access to a safe water supply (Drop of Water, 2015). Moreover, young girls and women travel miles a day to fetch water for their families. In Ethiopia, the population with access to a clean water accounts for 42% of the total population and sanitation access is limited to only 21% of the total population. The challenge is more severe in the rural parts of the country where young girls and women fetch water from unprotected ponds which is unsafe for drinking and which in turn leads to sickness and infections of children. The challenge has also multiple impacts on the education of young girls as they are mostly engaged in fetching water each morning to help their families (Drop of Water, 2015).

Access to a clean and safe drinking water is a crucial prop up for the rural poor in Ethiopia, where drinking water from protected sources is considered as a luxury which was available to only 18% of the country's population in the 1990's (MoARD, 2009). As a result, the Growth and Transformation Plan of Ethiopia has incorporated and has been working on aiming for an improved access to a potable clean water supply and improved sanitation with hygiene services in rural Ethiopia (GTP, 2010). In line with this, it can be seen from Table 5.8 below that, households with access to a safe and clean drinking water were 69.5% of the total population. The rest, those who do not have access to a protected drinking water get their water from nearby unprotected ponds and streams.

Table 5.8 Clean drinking water accessibility

Response	Frequency	Percent
Yes	257	69.5
No	113	30.5
Total	370	100.0

Source: Survey result, 2015

The study found that as compared to the country's and region's clean water accessibility from previous years and taking into consideration of the study areas' agro ecological consignation, there is a relatively better access to portable water. Similar to this, the Growth and Transformation Plan (GTP) (2010) report revealed that water supply coverage in the country has improved from 19% in 1990's to 65.8% in 2010 (which comprises 62% rural and 91.5% urban). Moreover, as access to a private tap water service is not available, households with access to a clean drinking water get their water from a protected communal tap. However, still the protection and safety of the communal tap is not a full safety guaranteed drinking water. As a result, there is a need for additional techniques to treat the water before putting it for consumption. Yet, only about 8.6% of the total respondents averred that they treat the water at home before consumption, out of which 8.1% by boiling and the rest 0.5% (Two households) use water guards.

The *Woreda* is well known for its relatively higher number of nongovernmental donor organizations as compared to other parts of the region as well as the country and majority of them engage in water supply oriented supports and services in the area. During the interview with the development agents assigned by the government for the three study areas, it was noticed that the number of protected communal tap water services is still limited in number. It was found that in Tahetay Adikesanded 5, in Genfel 6 and Ayinalem 8 protected communal tap water services were located. Nonetheless, both development agents and local heads of the *Tabias* revealed that the number of protected communal water taps which are currently working is limited. Some due to lack of water and maintenance problems have stopped working and it was also added that there is a lack in the sense of communal ownership to the taps. Once broken, there is no one to maintain them on time which forces people to use unprotected water sources like nearby ponds.

Finally, the study found that the average distance between the communal water taps and households residences is 1.89 KMs. This is a one way average distance and reveals that women and young girls on average need to travel 3.78 KMs a day on average to sustain and support their family water needs. As a consequence, there is still a dire need for an improved intervention for enhancing the coverage of communal taps in the study areas.

Table 5.9 Sanitation Facilities

Sanitation facilities availability	**Frequency**	**Percent**
Yes	202	54.6
No	168	45.4
Total	370	100.0
Type of Sanitation facility	**Frequency**	**Percent**
Pit private	192	51.9
Pit communal	10	2.7
Bushes and nearby river beds	168	45.4
Total	370	100.0

Source: Survey result, 2015

With regard to sanitation facilities, households having access to sanitation accounted for 54.6% of the total population were as the rest were not having any access other than going to nearby bushes and riverbeds. From the total households who are having access to sanitation facilities, 95% (192) of them were having their own private sanitation facility, whereas the remaining 5% (10) households were having communal pit facilities.

According to WB (2015), the number of population with access to improved sanitation facilities has shown some limited and slow improvement in the last five years. In 2011, the percentage of population with access to improved sanitation facilities was 23% and currently it has reached 28% of the total population. As compared to other countries, Ethiopia takes one of the last

places regarding sanitation facilities (WB, 2015). However, the above results in table 5.9 revealing sanitation facilities access of 54.6% of the sample population in the *Woreda,* which is higher than the total figure set by World Bank for the country as a whole. In similar lines, the Growth and Transformation Plan (2010) report revealed that sanitation coverage has increased from 4% in 1990's to 60% in 2009, with rural coverage of 56% and urban 88%.

Health Facilities

The study incorporated health centers/posts facilities availability in the study areas as part of primary health assessment. These facilities have a direct impact on the welfare of individuals and high repercussions on the productivity potentials of households. Physical wellbeing of households in rural areas is obligatory for their better participation capabilities in various livelihood options and to gain a better access to livelihood assets. The study found that in the three study areas, there are three health extension posts for each of the areas initiated by World Vision, a nongovernmental donor organization. These health extension posts facilitate distribution of crucial vitamins and other supplements to mitigate malnutrition especially for children. Though, the name is a health extension post, it neither provides any medical assistances nor have any facilities and human resource to support that.

Table 5.10 Access to health centers

No.	Study areas	Health centers access		Total
		Yes	No	
1	Ayenalem	34	119	153
2	Genfel	31	90	121
3	T. A. Sanded	22	74	96
	Total	87 (23.5%)	283 (76.5%)	370

Source: Survey result, 2015

Households' access to health centers facilities in the three study areas was found to be highly limited and it was found that only 23.5% of the total households have a nearby access to health centers. The rest, have to travel miles to reach to a nearby heath center. The approximate mean distance between households' residence and nearby health center was found to be 5.61 KMs, with a minimum of 2.2 KMs and a maximum if 8.9 KMs. The colossal distance coupled with the limited access to health posts affects the health conditions and working abilities of households especially for women in cases of special assistances. The actual health service coverage in the three study areas incorporates 1 common municipal hospital, one-one each health-extension posts for the three areas, and two clinics for Ayinalem and Genfel.

With regard to serious illness in the household member, the study found that from 370 total sample households, 80 (21.6%) of them revealed that at least one of their family members got seriously ill in the previous year and the rest exhibited that their household members stayed in good health. Seriousness of illness was taken into consideration with the time span of the illness, i.e. three months and above was taken as serious condition. Accordingly, it was found that serious illnesses were higher as compared to other studies made in Tigray region. World Food Program revealed that the region with household members having serious illness of three months and above was on average 1.8% (WFP, 2009).

Moreover, the type and nature of diseases varied across the three study areas for those who had been seriously ill. The major illness reasons as put forward by the sample respondents in descending order include Malaria, diabetes, HIV/AIDS, Diarrhea, Kidney and eye problems. Households also added that the illness was highly faced by children and the elderly age group, where children (9.2%), women (4.3%), Elderly (4.9%) and the rest said that the illness affects all the age groups in their household. In addition to this, a similar finding to WFP's (2009) was that

the major diseases which are affecting children under the age of 5 were diarrhea followed by malaria and finally fever, whereas for the elderly age group, eye and kidney problems were the major illnesses.

With this being said, issues related with the treatment methods employed to cure the ill member of their household was also assessed. It was found that majority of the sample respondents' (92.4%) most important source for treatment of household member/s is by checking in the nearby municipal hospital followed nearby health center. The rest 7.6% revealed that they took traditional healers to combat the illnesses they faced with. Moreover, from the respondents who took their household members to health facilities, majority (59.7%) revealed that they were satisfied with the service provided by the nearby health center, 12.2% highly satisfied and the rest 24.3% were unsatisfied with the health service provided.

Lastly, the respondents were inquired about details of human loss of life in the last one year, if there was. Accordingly, 38 (10.3%) sample households revealed that they had loss of life in the last one year. The major reasons for the loss of life was include in descending order, aging (4.1%), HIV/AIDS (3.2%), Diabetes (2.2%) and Cancer (0.8%). From this result, it can be seen that there was no loss of life from the sample respondents due to malnutrition, however, it can be seen that the high prevalence of the unnatural death from HIV/AIDS.

Livestock Holdings

Livestock holding is one of the most crucial assets that farm households heavily depend on to safeguard and set a protection boundary to their household from shocks and vulnerabilities. It is considered as a security especially in cases of crop failures by generating income from sale of the livestock and/or its produce and household consumption purposes. Its role as a source of high

protein food is critical for a human kind. In addition, livestock is also taken as a good measure index for wealth in the rural areas. Farm households with higher number of livestock are considered as wealthy farmers in rural communities of Ethiopia (Adugna E., 2008).

Table 5.11 Livestock Availability

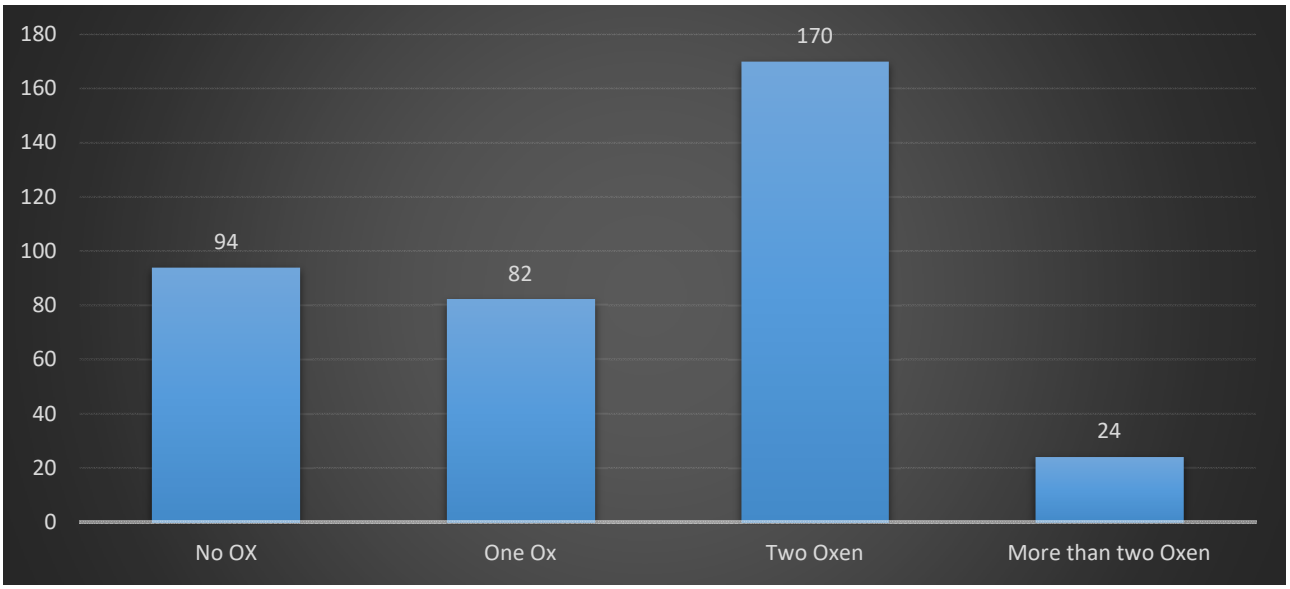
Livestock		Maximum	Sum	TLUs Per Household
Oxen	Before a year	4	514	1.39
	Now	4	500	1.35
Cow	Before a year	4	334	0.90
	Now	3	284	0.77
Calve	Before a year	4	296	0.80
	Now	3	367	0.99
Horse	Before a year	3	22	0.06
	Now	3	22	0.06
Donkey	Before a year	3	335	0.91
	Now	3	334	0.90
Goat	Before a year	10	38	0.10
	Now	6	26	0.07
Sheep	Before a year	21	393	1.06
	Now	8	315	0.85
Total	**Before a year**	**21**	**1932**	**5.23**
	Now	**8**	**1848**	**4.99**
Chicken	Before a year	30	1276	3.45
	Now	10	818	2.21

Source: Survey result, 2015

During the survey, it was found that there is no significant difference in the distribution of total livestock unit among the three study areas and accordingly, the results were clustered to make final conclusions with reference to the Tropical Livestock Units (TLUs) and per household average holdings. The study revealed that out of the total 370 sample households, 331 households (89.4%) own livestock despite the fact that the numbers of livestock unit per household were not significantly large. The average livestock holdings in Tropical Livestock Unit for the sample households was found to be 4.99. As comparing to the previous year, there was a decrement by

0.24 livestock units per household. In addition to this, households who do not own; cow accounted for 39.5%, 25.4% oxen, 33% calf, 97.3% horse, 33.8% donkey, 81.4% sheep and 98.4% sheep. Similar studies conducted in Tigray region also revealed that livestock ownership was relatively low as compared to other regions in the country. On average 17.9% in the region owned 1 cattle, 1.2 goats/sheep and 2.6 poultry. In addition to this, only 5% of households owned goats/sheep and 10% households' poultry (WFP, 2009).

Figure 5.4 Oxen ownership



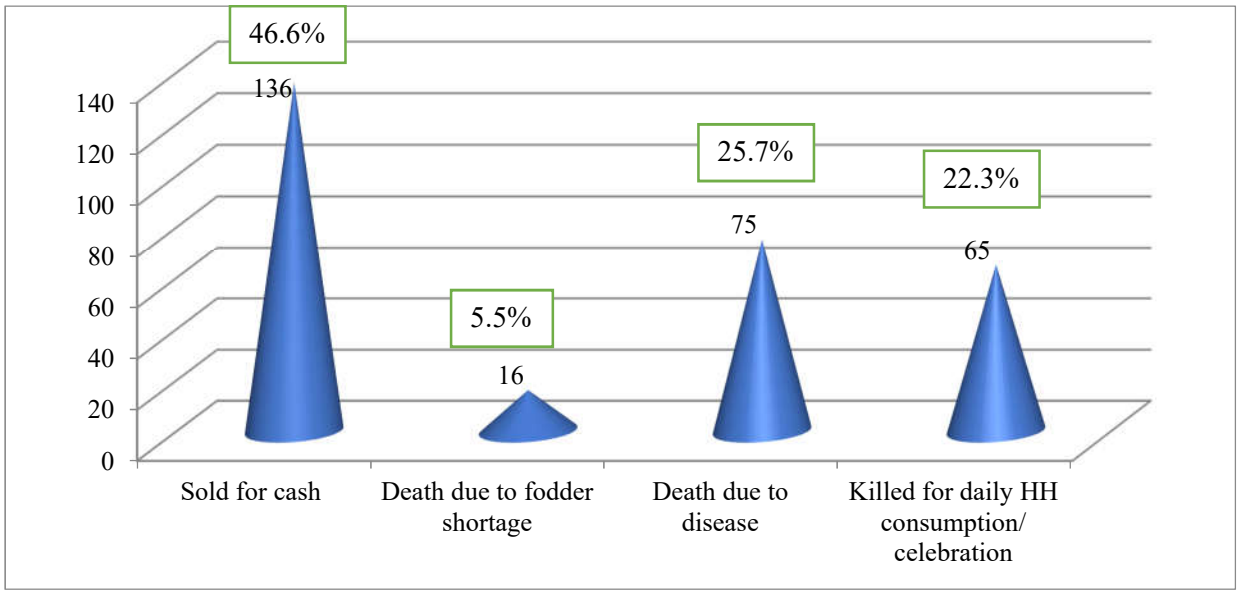
Source: Survey result, 2015

Conferring oxen ownership for rural households is given a special emphasis as it has a crucial importance in crop production as main source of power for traction, its relative better source of income and consumption in the remote areas of Ethiopia. Accordingly, it was found that about 25.4% of the total sample respondents did not own any oxen, 22.2% one ox, 45.9% two oxen and finally 6.5% owned more than two oxen. The average oxen holding per household in the study areas was found to be 1.35, and as comparing to the average oxen ownership of households in the previous year (1.38 Oxen per household), there was a slight decrement noticed 2in the current year.

Concomitantly, for the proper use of oxen as a power source for traction, at least there should be two oxen in a household. Accordingly, household member with enough number of oxen were found to be 52.4% whereas the remaining 47.6% were not having enough number of oxen for traction power.

Furthermore, households who do not own oxen or households with one ox get additional oxen for traction by borrowing from relatives or friends (37%), through exchange of labor (4.1%) and the remaining 2.7% by hiring from others. However, from the interview, it was observed that hiring oxen is not that much a common practice in the study areas. In most instances, households with one ox, search for another household owning the same and merge together to have enough source of traction power for both households. During this kind of arrangements, no cash payments are made in between other than feeding the ox. The other alternative as a means for acquiring oxen for oxen-less farmers is through offering human labor for ox owners to work on their farm for agreed number of days.

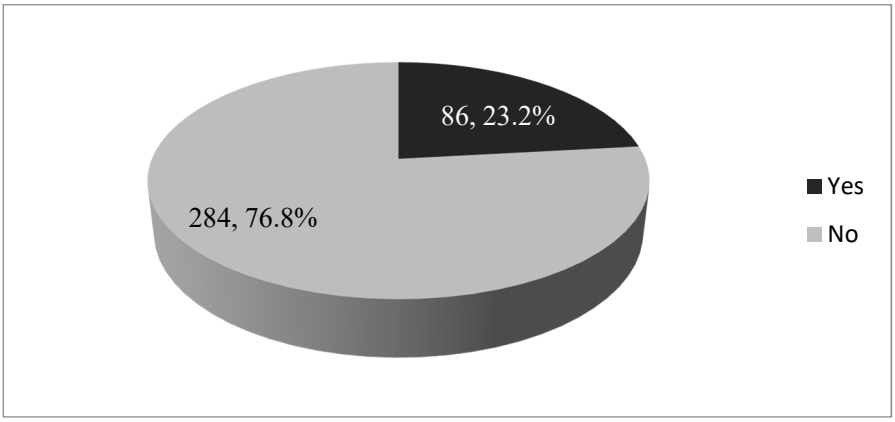
Figure 5.5 Reasons for livestock unit decrement



Source: Survey result, 2015

As can be seen from figure 5.5 above, the major reason posed for livestock decrement among households in the study areas is sale for urgent needs of cash. Livestock in rural areas is considered as one of the major productive assets and source of food which keeps households secure in cases of shocks and vulnerabilities. Moreover, it was found that death due to various diseases was another major reason for decrement in livestock unit. In line with this, direct consumption for cultural feasts and religious celebrations was also another major reason behind the decrement of livestock holdings among the sample households. Another crucial finding was there were deaths due to fodder shortage which is a critical condition if not given a high emphasis may lead to a bigger impact.

Figure 5.6 Access to veterinary services



Source: Survey result, 2015

As can be seen from the above figure 5.6, majority of the respondents (76.8%) were not having access to veterinary services. This was also found to be a supportive finding to the above statement regarding the decrement of livestock due deaths from various diseases. Livestock holdings are important safeguards in times of vulnerabilities and insecurities. Nonetheless, the above figures reveal that there is yet much to be done regarding accessibility to veterinary services so as to enhance the safety measurements against the lives of livestock.

Agricultural Inputs

The strength of any agricultural revolution is the access to modern agricultural inputs for farmers. These agricultural inputs range from fertilizers, improved seeds, irrigation and chemicals for crop protection to knowledge of adoption. Improved seeds are vital for an enhanced crop production and are inevitably critical for farm productivity and profitability. Fertilizer provides important nutrients to the soil to keep the fertility which is essential for higher productivity. Enhanced adoption of fertilizers and improved seeds were seen largely in the agricultural productivity in Asia during Green Revolution in the 1960's though it had its own drawbacks.

Similarly, irrigation is also an essential component for an enhanced yield and growth as it enables farmers to produce in off season times, renders a potential for multiple harvests and bring an additional land for cultivation. Furthermore, adoption of chemicals for crop protection such as pesticides, herbicides, insecticides and fungicides help control harmful weed species, plant diseases and insects which affect crops. Lastly, machinery and technical knowledge improve the effectiveness of human labor and enhance productivity (SAHEL, 2014). Hence, the study has incorporated these crucial assets as part of physical assets assessment as it directly impacts the livelihoods of the smallholding farmers.

Table 5.12 Use of traditional and modern agricultural inputs

Response	Yes	No
Manure	267 (72.2%)	103 (27.8%)
Irrigation	181 (48.9%)	189 (51.1%)
Modern Fertilizer	314 (84.9%)	56 (15.1)
Improved seed	298 (80.5%)	78 (19.5)
Pesticide	100 (27.0%)	270 (73.0%)
Herbicide	247 (66.8%)	123 (33.2%)
Motor Pump	110 (29.7%)	260 (70.3%)

Source: Survey result, 2015

From the above table 5.12, it can be seen that use of manure mostly derived from feces of animals is adopted widely by farmers' as a source of fertilizer in the study areas. The use of this organic manure by the smallholding farmers has an immense value for keeping and enhancing the natural fertility of the soil. Moreover, adoption of modern fertilizer and improved seeds take the largest figures among the sampled households. Significant number of households employ modern fertilizers and improved seeds as their crucial inputs for crop production. A study done on food security trend in Ethiopia revealed that adoption of chemical fertilizers, improved seeds and other crucial modern agricultural inputs on average enhance productivity 25 quintals per hectare while the average yield under traditional farming is 11 quintals per a hectare. The yield difference mainly indicate how these agricultural inputs are vital in boosting domestic food grain production (Ahmed A., 2008).

However, with regard to irrigation, there is yet much to be done as more than half of the households do not have the access and means for employing irrigation. Farming in the area is majorly dependent on the rain fed system as the erratic nature of the weather is not that of a promising type to be dependent on. This on the other hand has been highly impacting the farming households and has kept them vulnerable to various shocks. During the survey, it was noticed that households who adopt modern irrigation were able to produce varieties of cash crops such as vegetables and fruits for commercialization purpose apart from crop production.

Irrigation is one of the most important technology for farming households especially for those in areas with recurrent drought and erratic rainfall patterns. To enhance food availability, the promotion of irrigation, use of low cost inputs and adoption of drought resistant crop varieties are among the crucial factors (Tsegay G., 2009). Lastly, it was found that only 29.7% of the total sample respondents own a motor pump as an input in the agricultural production. Motor pump in

areas like the study areas where there are no running rivers, erratic rainfall and limited water reserves, it stands as an inevitable input for accessing water from ground and protected dams. It was also noticed that households with motor pumps were able to engage in other cash crops and yard vegetables production. No respondent was having any other means such as pedal pumps, motor tractor and other allied machineries.

Infrastructural Facilities

Infrastructural accessibilities such as roads, telecommunications and rails are key integral parts for remote areas development and the essence of having better infrastructural facilities like roads facilitates and strengthens rural-urban linkage (DFID, 1997). Concomitant to this, it creates legroom for flow of better opportunities for farmers with marketable items, and in cases of extreme circumstances like drought, it facilitates ease for aid distribution, supports and migration for coping up with vulnerabilities. Similarly, access to markets, distance to main road and the distance to the main market were brought up by respondents as crucial factors for their livelihood. Here, distance refers to the nearest possible distance quantified in KMs from the households' residence to the nearest market place and main road. In addition, Adugna E., (2008) asserted that market access and other supplementary public infrastructure provisions create opportunities of diversified and better income through providing diversification of livelihood strategies with off/non-farm employment, better input accessibility and transportation facilities.

During the survey, it was noted that mobile networks and network distribution towers were highly limited, except Genfel, the two study areas Tahetay Adikesanded and Ayenalem were having a highly limited access to mobile networks. Farmers as well as various governmental and

donor organizations staffs need to travel miles to get connections. This on the other hand hampers farmers from getting well-timed market information and other development efforts in the *Woreda*.

The study also found that the average distance from households' residence to the main road is about 4.34KMs, where the minimum distance to the main road from the sample household's residence was 1Km with a maximum of 8KMs. Similarly, the average distance to the main market from households' residence was 6.12KMs with a minimum of 3KMs and maximum of 12KMs. In terms of time, approximately on average it takes 1.26Hrs to reach to the main market for the sample households with a minimum time of 30 minutes and maximum of 2 hours. The average distances and time taken to cover these distances highly affect the livelihoods of the people especially in cases like of the study areas where means of transportation facilities are very limited.

Moreover, households who are relatively located nearer to markets have better chance of increasing their diversification opportunities and will in turn improve their food security condition (Adugna E., 2008). Other studies also revealed that households with better access to markets have a stimulated cash crops production and petty trade participation putting them in a better position in diversifying their income. In remote areas where market physical access is costly and causes products and factor failures, households' production patterns partly diversify for satisfying their own demand (Barrett, C. B., Reardon, T., Webb, P., 2001).

As this particular study focuses on smallholding farmers, the means farmers employ to deliver their products to markets was given due emphasis to accessibility of transportation to identify farmers with marketable goods. Accordingly, the study found that the number of farmers using vehicle as a means of transportation was highly limited, only 4.3%. Whereas, majority of the farmers (44.6%) use animals and animal carts to deliver their products to the main market.

However, during the survey it was noted that households who deliver their products by themselves (human power) accounting for 41.6% are either the ones who are very near to the market or the ones with small production yield. However, looking at the average distance of the market from the farmers' house which is approximately 6.12KMs, it is possible to take a broader view to the fact that farmers' production yield sufficiency is limited to employ other means of transportation. The rest 9.5% revealed that they have less/no products at all for marketing.

As part of the infrastructure, access to information or communications is put as an essential part in integrating remote areas for a sustainable livelihood (DFID, 1997). The aspects of access to market information as indicated by Shaun et. al. (2008) as cited in Cuong L. V., et. al., (2013), the fundamental market information as a data on the price of a commodity is inclusive to the possible market demand conditions. The main objectives behind these data are primarily to support farmers in enabling them to scrutinize the market for better decisions on either to sell their produces or negotiate for higher prices rather than sitting just as price takers (Cuong L. V., et. al., 2013).

Table 5.13 Access to market information

Response	Frequency	Percent
Yes	32	8.6
No	338	91.4
Total	370	100.0

Source: Survey result, 2015

As can be seen from the above table 5.13, majority of the households do not have any means and access to market information regarding prices of commodities and possible market demands. Only few of the total sample respondents have access to information about the market prices and demands. In addition to this, the means to access to information for few sample respondents include local radio stations (4.1%), contacts with sellers in markets (2.2%),

cooperatives (1.9%) and finally *Woreda* administrators and development agents (0.5%), with descending order. During the survey, it was observed that majority do not even have the essence and feeling of having the right market information due to their subsistence production. They asserted that there is no urgency of having market information as there is neither much to deliver nor to take back home.

5.1.4 Social capital

The term social capital in the context of livelihood framework refers to the social resources in which households draw in their quest to achieve their livelihood objectives. There is a great deal of debate to what exactly the social capital refers and consists of, though in the case of Sustainable Livelihood Framework according to DFID (1997), the following have been incorporated as part of social capital.

- **Networks and connectedness:** either horizontal (between individuals sharing common interests) or vertical (Patron/Client) which enhance people's ability to work together and trust,
- **Membership to formalized groups:** comprises obedience to mutually agreed or commonly accepted norms, rules and sanctions, and
- **Relationships of trust, exchanges and reciprocity:** expanding their out-reachable access for bigger institutions like civic and political bodies, reduction of transaction costs which may lay a basis for an informal safety net among the poor.

These three subject matters under social capital are highly interrelated to one another. For instance, membership to formal associations and groups could extend access to other institutions (DFID, 1997). Different distinct proxies on behalf of social capital can be used like membership

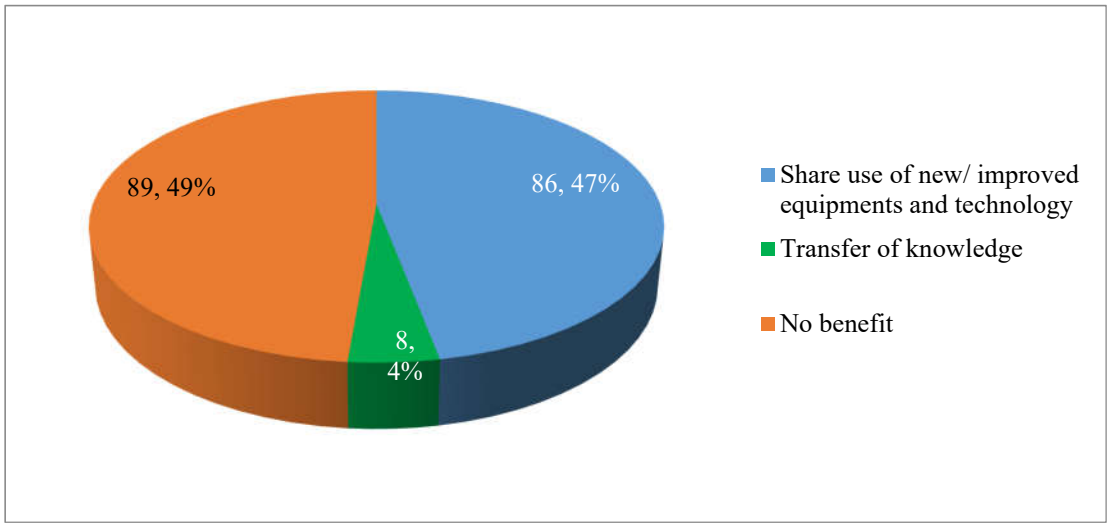
in agricultural cooperatives and associations, incidences of mutual help in cases of hard times, trust to one another in cases of borrowing and lending, etc. (Bezemer D. J. and Lerman Z., 2002). Social capital refers to a wider social claim in which individuals and households can draw through their belongings in social groups across varying degrees of comprehensiveness in a society at large. Moreover, social capital refers to the ability to secure benefits through membership in social networks and social structures (Krishna A., 2000). It incorporates reciprocity between households and within communities based on social ties and trust (Moser C., 1998).

Economic opportunities and strengths are not taken in a vacuity, but within specific socio cultural contexts. Cultural and social institutions have impacts in the day to day lives of poor households' access to resources. In the study areas, the smallholding farmers' social arrangements are mostly used to bridge the gaps in resources like land, labor, capital and livestock. The level of interaction among others in social networks can facilitate economic agents to reduce transaction costs and can address constraints to access originating from imperfect markets. In addition to this, social capital deciphers access to crucial market information and customers, employment and other similar business opportunities, loans (formal and informal), advances in cash, inputs with credit, sharing of resources like skills for marketing and production and for coping mechanisms like migration opportunities (Davis S., 1996). Accordingly, the study has identified distinct forms of social relations which can facilitate the access to basic livelihood resources in the study areas and these incorporated issues like membership status to various formal and informal institutions and their benefits of participation coupled with trusts among the selected sample farmers and resource sharing.

As mentioned above, households' membership to formalized groups and associations is one crucial proxy for social capital in the livelihood framework. Social networks which facilitate labor

and farm equipment sharing as well as their membership in community groups are incorporated. In this particular study, households' membership in various formal and informal associations and groups is incorporated with the assumption that their membership has an impact in their livelihood, diversification and coping strategies. Accordingly, the study found that about 49.5% of the total sample households to be members of famers/peasants associations, whereas the rest 50.5% were not members. Moreover, households who are members of these associations were inquired about the benefits they have acquired by being a member.

Figure 5.7 Benefits of membership to farmers/Peasants associations



Source: Survey result, 2015

As can be seen from the above figure 5.7, households who are members to peasant associations revealed almost a fifty-fifty importance of being a member. As asserted by majority who are members 89 (48.7%), there is no benefit at all of being a member and it was noticed during the survey that their major reason is mainly attributed due to its high time consumption in working hours. While 86 (47%) of the members revealed that being a member in peasant associations has a huge benefit in sharing improved equipment and technology and the rest 8 (4.3%) asserted that being a member to peasant associations has a benefit in transfer of knowledge. For both non and

off-farm livelihood strategies, it appears that social networks which facilitate sharing of labor and farm equipment and membership to community groups are significant assets for the poor (Galab S., *et al*., 2002).

Moreover, local social associations such as *Idir*[2] and *Equib* [3] are also incorporated in the social capital assessment. These institutions are the most important social associations in most rural parts of the region which are used for collaborating labor sharing, credit access facilitations and other supports.

Table 5.14 Membership to social associations

No	Membership details	Frequency	Percent
1	Idir	216	58.4
2	Equib	5	1.4
3	No membership to any association	149	40.3
	Total	370	100.0

Source: Survey result, 2015

Accordingly, the study found that majority of the households (58.4%) are members of *Idir* whereas limited number of households are members in *Equib* (1.4%). In line with this, the study found that 53.8% of the total households who are members in the above listed social associations revealed that they have not benefited by being a member to these associations. They firmly asserted that there is no use of being a member to these associations other than financial resources and working time loss. Whereas, the rest 46.2% asserted that they have been benefiting by being a member of the association especially through labor sharing, credit access and support in crisis

[2] The *Idir* is an informal financial and social institution which provides a much wider range of services including financial and material assistance and consolations for a member in the event of difficulties as well as entertainment.
[3] Equib is a local financial agreement of saving across mutual interest of people which in turn will be used for investment

times. Here, number of households engaging in *Equib* is limited due to the financial requirements to join any formed *Equib* group. Moreover, from the beneficiaries, the study tried to assess the significance of these associations among different wealth groups and food security condition of the smallholding farmers, nevertheless, there was no significant difference among beneficiaries and benefits acquired from these association. In Ethiopia, traditional associations like *Equib*, *Idir* and labor sharing culture assure members of the association access to credit, labor shares and various supports (Berehanu E., 2007).

Similar other Studies have also tried to depict the importance of these institutions in enabling households to mobilize resources especially during times period of crisis, assistance in labor access and credit, to find clients and customers information for off-farm businesses and generally to acquire market information, and finally at a lower level of income be the difference between the pauperization and survival (Little P. D., 1997). Range of formal and informal associations which are associated with production and redistribution can enhance or constrain the way in which households pursue economic opportunities (Start D., and Johnson C., 2004).

The last part in social capital is the trustworthiness among the smallholding farmers, and the study found that majority of the respondents about 85.7% have trust over their community members especially in cases of lending and borrowing, whereas the rest 14.3% have less trust in times of lending and borrowing. This shows that there is a high trust among the farmers which is highly important in cases of lending and borrowing of assets to fill the deficit gaps they face. Furthermore, in cases of vulnerabilities, trust stands in-between as a bridge for a healthy contact and assistances between the farmers. According to DFID (1997), trust is one capital built over social ties which can facilitate cooperation and stand as an informal safety net among the poor and can play a major role in reducing transaction costs.

5.1.5 Financial capital

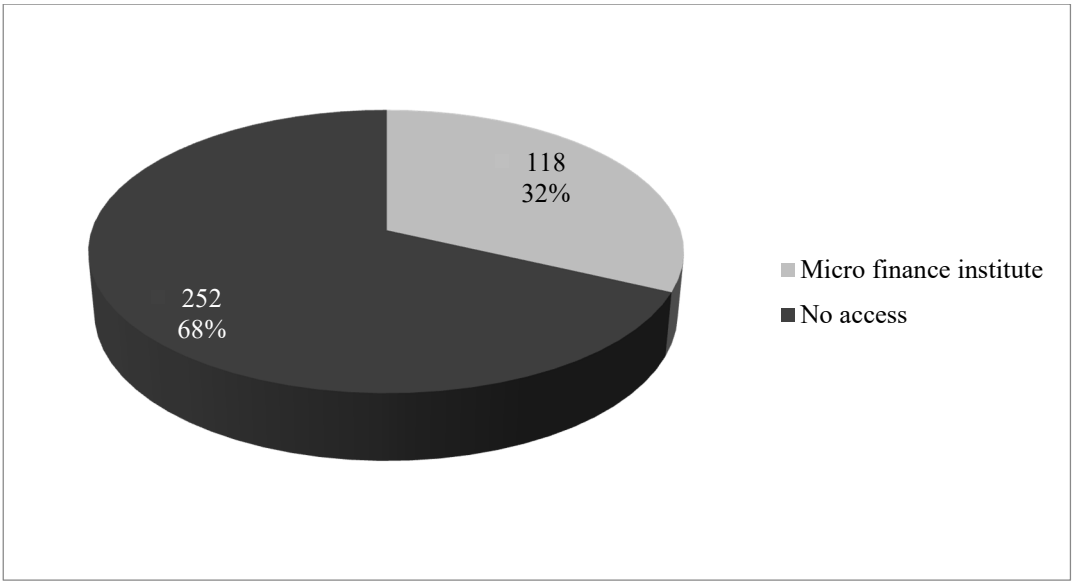
Financial capital refers to the financial resources which people use to accomplish their livelihood objectives (DFID, 1997). It encompasses the availability of cash or equivalent which enables people to adopt various livelihood strategies. Sources of financial capital include formal and informal credit accessibilities, household's savings and remittances from family members working outside home place (Bezemer D. J., and Lerman Z., 2002). In line with this, the study analyzed sample household's access to; formal and informal credit, savings habits and off & non-farm activities as proxy measures for financial capital.

In many instances, financial capital is a pre-requirement to attain other capital such as physical capital. The furthermost commonly reported challenge for entrepreneurship is investment capital inadequacy and access to credit. In the case of smallholding farmers, availability to agricultural credit system especially for subsistence farmers with limited savings and capital is a crucial component of farmers' development programs. Various literatures support the fact that access to credit is a vital source for earning future income, where households who have received credits to farm and those who have invested it to the intended purpose were found to be better off than the ones who do not. In Ethiopia, credit for agriculture is one of the core support systems rendered by the government majorly coupled with other nongovernmental donor organizations.

With regard to credit, the study made two categories viz. formal credit and informal credit access of households to financial resources as part their financial capital assessment. Formal credit access includes access to microfinance, cooperatives credits, development banks and formal banks whereas the informal credit category incorporates local money lenders, friends and relatives and *Euib*. Regarding the formal credit access of smallholding farmers in the study areas, the study

found that majority of the farmers do not have access to formal credit services as can be seen in the figure 5.7 below.

Figure 5.8 Access to Formal Credit



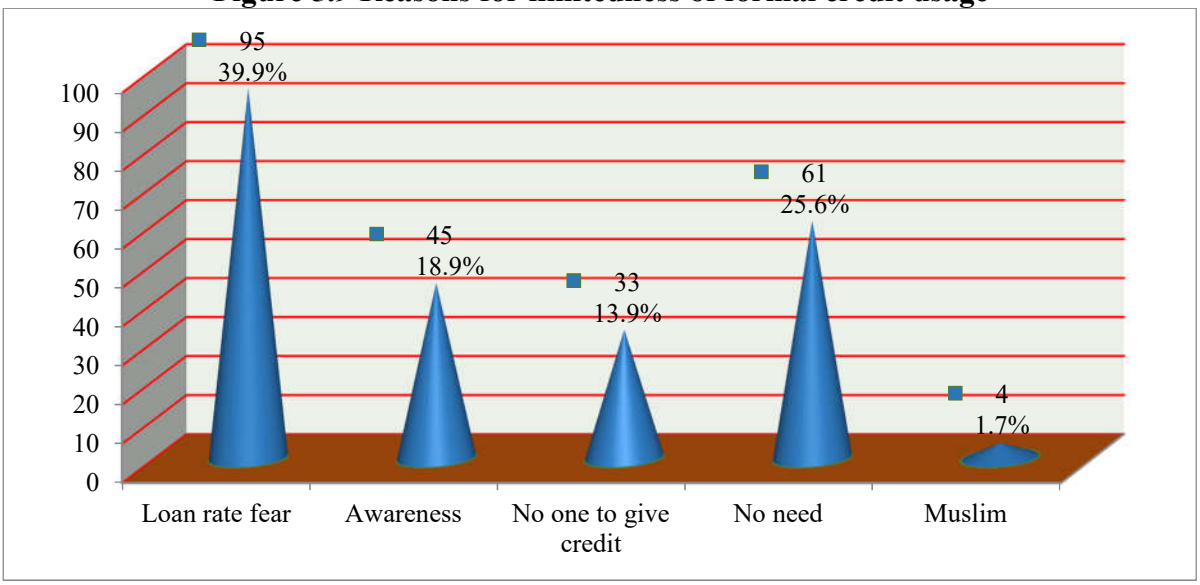
Source: Survey result, 2015

The study shows that about 68% of the total sample smallholding farmers do not have access to formal credit services. In addition to this, from the households who are having access to formal credit service, all of them were getting access through microfinance institutions. The well-known and the solitary operating microfinance institution in the study areas is Dedebit Microfinance Institution. With this regard, the Woreda Food Security Task Force committee (WFSTF) asserted that the government has a strategy designed and being implemented to pledge access for rural micro-financing to smallholding farmers where farmers are provided favorable access to credit services by means like in-kind repayment coupled with relaxed repayment period arrangements. This was arranged mainly to protect farmers from rush sales during harvest times over supplies, to give confidence to farmers for better prices of their products and to insure enhanced production of food commodities. A similar study made in the Southern Ethiopia revealed

that the main source of agricultural credit service is a crucial determining factor to credit access. In addition, it asserted that in Ethiopia agricultural credit service is one of the major institutional supports provided to smallholding farmers in rural areas. In general, credit service is provided by governmental and nongovernmental organizations. Nevertheless, majority of credit access to smallholding farmers is generated by governmental microfinance institutes and cooperative bureaus (Adugna E., 2008).

This study has made an attempt to look through the reasons behind the sample farmers' limited utilization of access to formal credit services.

Figure 5.9 Reasons for limitedness of formal credit usage



Source: Survey result, 2015

The study also assessed the reasons behind why majority of the farmers were not utilizing the fruits of access to formal credit. The reasons in descending order were loan rate fears, followed by no need for credit, awareness about credit services, no one to provide formal credit service and finally due to religious views (Muslims). The result majorly reveals a dire need for awareness creation on the importance of credit among the smallholding farmers. A similar study made on the

rural livelihoods resilience in Eastern Ethiopia village parts revealed that villagers were not cable enough either to innovate or introduce new technologies mainly due to lack of financial support and limitedness of services related to it. In concomitant to this, it asserted that most of the governmental and nongovernmental aids were based on a direct food aid whereas farmers would have rather been benefited if credits and development oriented programs were provided in a way to enhance their income base (Nelli N., 2011).

Regarding savings habits of smallholding farmers, the study found that 68.1% of the total sample smallholding farmers do not have the habit of using formal saving institutions, whereas the remaining use formal savings institutions. Savings habit by majority poor smallholding farmers who are living below subsistence is unfeasible, although it is a crucial base for future investments, productive activities and betterment of livelihood strategies. Similar studies also revealed that poor households spend nearly all their incomes on food and other basic necessities for their family members and thus for them generating a sustainable savings is difficult and are mostly run under vicious circle of debt (Adugna E., 2008). In addition to the formal credit sources availability and usage, the study also incorporated access to non-formal credit sources as proxy measure to financial capital of smallholding farmers. The major non-formal credit sources include credit from local money lenders, friends and relatives and *Equb*.

Table 5.15 Access to Non-Formal Credit Sources

Access to Non-Formal Credit Sources	Frequency	Percent
Local Money lenders	8	2.2
Friends and relatives	191	51.6
Total	199	53.8
No access at all	171	46.2
Total	370	100.0

Source: Survey result, 2015

Accordingly, the study found out that majority of the households have access to a non-formal credit sources and out of which majority have access from 'Friends and Relatives' and limited number of households use local money lenders (2.2%). Similar studies on livelihood resources of smallholding farmers and their access to credit revealed that majority of them (about 31.1%) use local money lenders as their major credit source (Adugna E., 2008). Moreover, Berhane H., (2009) revealed that one unit increase in credit availability increases annual income of households by a factor of 0.242. The study also asserted that there is a positive and significant relationship between access to credit and household income. In the highly drought prone areas of Ethiopia with incidences of high failures in crop production and limited rainfall distribution, enhanced access to credit can fill food gaps of households and can assist households diversify their livelihood options (Arega B., et. al., 2013).

5.2 Income diversification strategies

Crop production is one of the major income and consumption source for the majority of sample smallholding farmers. Even though agriculture dominate the livelihood strategies of rural smallholding farmers in the study areas, the sector's capacity has been deteriorating due to various reasons like increase in population size, weather conditions and natural resources depletion. This situation has imposed on people a wakeup call and gaze for alternative means of livelihood options for survival. In recent days, significant numbers of rural farming households engage in various income diversifying strategies away from the purely crop production towards other income generating activities to ensure their household food security and livelihood improvements (Yishak G., et. al. 2014).

Table 5.16 Participation of households' in off/non-farm activities

No	Income Sources	Response	Percentage
1	Only Crop Production	243	65.7
2	Rent of assets like animals for traction, land and others	2	0.5
3	Casual Laborer in Agriculture	23	6.2
4	Daily laborer	78	21.1
5	Self employed	16	4.3
6	Artisan	8	2.2
	Total	370	100.0

Source: Survey result, 2015

From the survey, it was observed that majority of the respondents solely depend on agriculture (crop-production) as their major income and consumption source. In parallel with this, other sources of income like engagement in off and nonfarm activities were also identified. As can be seen from survey result in table 5.16, about 34.3% of the total sample households combine allied off farm and non-farm activities with agriculture whereas the remaining majority do not have any other source of income other than agriculture (crop production). From this, participation in off farm activities of renting agricultural assets like farm animals for traction and land, working as casual laborers in agriculture and participation in nonfarm activities like daily laborer in nearby manufacturing industries, self-employment, and as artisans were found to be the few major activities among the farmers. Moreover, the study found that the average annual income of households participating in off/non-farm activities was 13,748.31 Birr / 202.7USD (Current exchange rate of USD 21.4) with maximum of 36,000 Birr and minimum of 1,200 Birr. During interview with the Early Warning coordinator, it was asserted that due to farmers' literacy level and skills limitedness, their employability and income generating capacity in nearby manufacturing industries has been highly deterred.

Table 5.17 Households' income sources as compared to the previous year

Response	Frequency	Percent
Increased	99	26.8
Similar	102	27.6
Decreased	164	44.3
Unknown	5	1.4
Total	365	98.6

Source: Survey result, 2015

Regarding the income sources of the households, it was found that majority of the farmers' income sources have decreased as compared to the previous year. From these, majority income source decrement was noticed among poor households, whereas majority increments were noted from better-offs. Major reasons behind this were natural resources depletion and drought. Some households revealed that they used to engage in charcoal production, however in the past few months due to depletion of charcoal producing trees, they have left their production. Moreover, other studies also revealed apicultural produces are very famous for the three study areas especially. However, due to natural disasters like drought led to depletion in the natural vegetation and floral stock of the *Woreda* and thus production has been highly limited (Tinsaye T., 2015).

Conclusion

This chapter of the study dealt with livelihood resources and strategies of smallholding farmers in the rural drought prone parts of Northern Ethiopia taking Kilte Awelalo *Woreda* of Tigray region as study area. The three identified study areas from Kilte Awelalo were Ayenalem, Genfel and T. A. Sanded and 370 households were included as part of the assessment. In addition to this, Sustainable Livelihoods Framework was employed as a regulatory conceptual framework for the study. One major finding is that the despite the low level of crop productivity which is mainly

attributed by local weather and environmental conditions, the livelihoods of majority smallholding farmers remains undiversified. Their primary source of livelihood mainly depends on the rain fed small-scale agriculture.

With regard to human capital, the study incorporated sex distribution, household size, education, age, health status and etc. as proxy measures. Major finding regarding age distribution of household members was that majority were found in child age group (between 0 to 14 years) which requires a huge investment for socioeconomic supports like health and education and also reveals in a relatively higher fertility rate of the study areas. In addition, the survey found that the mean average age of respondents was 24.51 which was by far below than the national average age of 44 years. With regard to education, there is a remarkable participation of children in schools where about 92% were enrolled in a formal primary education typifying Government of Ethiopia's objective of reaching out ‘primary education for all’. Another feature which was noticed was average household size was relatively higher which creates a difficulty for families' food security and related parallel costs of living.

Regarding natural capital, the study covered land size and ownership status and its fertility as major proxies. For smallholding farmers who are basically dwelling in rural areas, land stands as decisive factor for their livelihoods. In the study areas the land size holdings were found to be highly fragmented and by far less than the national and regional average land holding figures. Regarding ownership, majority own land and the rest who do not own were sharing in or renting a very low fertile land as they are unable to get access to fertile ones. Regarding physical capital, the study incorporated house types and room number, drinking water supply and sanitation, livestock holdings, health facilities and finally infrastructural facilities accessibilities as major components of physical capital. Major findings were high congestion and no electricity supply in

all the three study areas affect the quality of human capital in households. Taking into account of the study areas' agro ecological consignations, it was observed that there is a relatively better access to portable drinking water. However, as there is no private tap water service and limited protection of the communal tap services, there is a need for treatment of water before household consumption. It was also noticed that the number of communal taps were found to be highly limited in number and there is a sense of lack of ownership and protection for the taps.

Moreover, majority of the respondents use municipal hospital and health centers as important source for treating sick household member/s, only very limited number of households took to traditional healers. The study also found that there was no loss of life due to malnutrition though it was noticed a high prevalence of unnatural deaths from HIV/AIDS. In addition to this, almost half of the households were not having enough number of oxen to use as a source of traction power and they mainly get access from neighbors and relatives in exchange for feeding of the animal. It was also noticed that there was a slight decrement in the total livestock holdings of households as compared to the previous year mainly due to sale of animals for cash. Apart from this, the average distances and time taken to cover far distances highly affect the livelihoods of the people especially where means of transportation facilities are very limited.

In the study areas, traditional associations like *Equib*, *Idir* and labor sharing cultures are benefiting farmers in getting access to credit, labor shares and various supports. Moreover, it was observed that there is a high trust among the farmers which is a crucial factor in cases of lending and borrowing. In concomitant to this, Dedebit Microfinance Institution is the well-known and the solitary operating microfinance institution in the study areas. However, there is yet much to be done in outreaching the services of microfinance institutions in parallel with awareness creation on the importance of credit among the smallholding farmers.