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LIST OF ABBREVIATIONS

OWWDSE	Oromia Water Works Design & Supervision Enterprise
BoANR	Bureau of Agricultural and Natural Resource
CPB:	Cooperative Promotion Bureau
CSA	Central Statistical Authority
DA:	Development Agent
EPE	Environmental Policy of Ethiopia
EPLUA:	Environmental Protection and Land Use Authority
FC:	Field Canal
GTP	Universal Growth and Transformation Plan Access Plan UAP
I&D:	Irrigation & Drainage
IMO:	Irrigation Management Organization
IWRM	Integrated Water Resource Management
IWUA:	Irrigation Water Users' Associations
JICA	Japan International Cooperation Agency
KA	Kebele Administration
MOM	Management, Operation and Maintenance
MoWRIE	Ministry of Water Resources Irrigation &Electricity
OIDA	Oromia Irrigation _ Authority
QC:	Quaternary Canal
SMS	Subject Matter Specialist
ToT	Training of Trainers
TTI	Teachers Training Institute
UAP	Universal Access Plan
WRMP	Water Resources Management Policy
WSDP	Water Sector Development Programme

EXCUTIVE SUMMARY

The project site or Firi-Qabso kebele is located int in the East Hararge administrative zone MelkaBello a distance of 28 km from the woreda capital and 425 from Addis Ababa. The site is accessible through Deder-Harawacha- Harew Town all weather road.

One among the strategic focus for improvement in agriculture is small scale irrigation development which is considered as pillars for sustainable food supply, diversified and high market value crop production. Oromia Irrigation Development Authority (OIDA) the client or project owner - has awarded the study and design works of small-scale irrigation development projects to Oromia Water Works Design & Supervision Enterprise (OWWDSE)–the consultant.

Following this, detail feasibility and design study was conducted to construct Firi-Qabso t small scale irrigation in order to reduce poverty and to increase productivity at household level.

For the purpose of socio-economic study, both quantitative and qualitative data were collected. And both primary and secondary data sources were used**.** The structured survey was conducted at the level of 30 randomly selected beneficiary households. Apart from the HH survey, community group members and key informants were used as primary sources of qualitative data.

Secondary data were also collected from woreda line departments such as office of agriculture, education, health etc, were included in the socio-economic investigation using structured questionnaires. Moreover, Central Statistical Authority (CSA) and different publications as well as available literature were also searched referred to consolidate the study.

Data collected for the objectives of this study were analyzed using appropriate statistical soft ware of Statistical Package for Social Sciences (SPSS) version 20

Farming system of the woreda as well as the project area is Crop-Livestock integrated production in which livestock husbandry and cropping are practiced in association. The interactions are based on using animal tractions, manure (in cropping) and crop residues as animal feeds. Interactions are more frequent in the midland o the Woreda where cereals are the major crops grown.

Based on the 2007 population and housing census report of (CSA, 2007), the Population of the district is projected to **211,762** rural population and **20,770** urban population **in 2017 year**. From the total population of 214,790 and **20,970 is rural and urban population**, respectively **in 2018 year**.

The survey results regarding the marital status of the respondents indicate that 90 percent are married while 6.7 per cent claimed to be single. Educational levels of the household respondents shows that 55.2, 3.2, 9.7 per cent of the respondents found to be in illiterate, read and write and those who attended 1-4 grade category. Household heads those who have primary level education (from grade5-8), 9-10 grades and grade 11-12 are 25.8, 3.2 and 3.2per cent while 3.2 per cent of the family heads claimed that they have college education. The majority of the population in the project area belongs to the Oromo ethnic group. According to the household

survey result, farming mainly farming is the major source of income for about 100 % of the surveyed families while trade , farming and daily laborer as a sole source of income is for about 7%,13 and 13.3%of the families.

Major crops (rain-fed)

Livestock production is a major component of the farming system. It is also one of the economic activities for traction powers, provision of dairy products, transportation and for household income generation. Oxen are selected for speed and endurance in pulling traditional ploughs. Small ruminants and chickens are generating additional incomes for the community. Traditional

The major land use types in the command area include cultivated land, grazing land, bushes & shrubs, and scattered settlement. Among the use types, cultivated land takes the largest proportion (75%) followed by bushes& shrubs land (15), settlement land (5%), and grazing land (5%). On the cultivated lands coffee is the dominant crop, and other crops such as sorghum, maize, sweet potato, H. bean, sugarcane, banana, and other lowland oil crops are cultivated under traditional way of farming practices

Land tenure refers to the type of ownership or use rights of land. These are private, communal or state ownership. At Woreda level, land holding per farm family ranges from less than 1 hectare t o4 hectares in which26,605 households possess <1 hectare 3,653 1-2hactare and 772 possess 2-3hactar hectares with an average holding size of 1.2 hectares

According to the information obtained from office of education, total number of formal and non-formal educational institutions include: 88, 59 and 4 grade 1-4 , 5-8 and 9-10, schools respectively were found in the woreda while there are only2 ,11-12 schools. In project kebele there are 5,4 and8 1-4, 5-8 and 1-8grades level schools, respectively with total number of 1736, 791 and 2527 male and female students, respectively.

In the study area woreda, the health institutions found to serve the population include: health posts, clinics and health centers. Almost all of the health facilities found in rural areas belong to public sector except some private clinics and rural drug venders found in towns and district capitals. The health institutions in the woreda constitute health center, health stations and heath posts with health professionals. The major means of transportation used by inhabitants to go to health institution is on foot, human shoulder, animals and vehicles. Among top ten diseases of the area, results of household survey and woreda information prioritize typhoid as is highly prevalent in the area following U.r.t infection, wound, helmenthiasis,

The total population supplied with potable water supply in the wereda in 2016/17 were 132,451 while in 2017/18 were 138,053 in general water supply coverage in % are 56.9 in 2016/17 and 58.6 in 2017/18 for the details(see tables 18 and 19). Concerning the project kebel, there is no any water supply scheme or activities so far. In the project kebele, extension services were being provided by respective line departments of the woreda, and some NGOs through

demonstrations and training. The most important source of information in the study area is government extension organizations through DAs residing to their respective kebeless.

Since most of the would beneficiaries are practicing traditional irrigation on within the commend area of the irrigation project. Therefore, land distribution among the beneficiaries immediately after the construction of the new scheme may not take place. This will be accomplished with the consent of the project beneficiaries and Kebele administration involvement
It is therefore, proposed that one farmer will own and cultivate existing ownership land after the implementation of the new scheme. Hence, there will be no threat of population displacement and conflict as far as the irrigation project is concerned.

The **Firi-Qabso** Small Scale Irrigation Project will have substantial predictable impacts on the socio-economic development of the area. Aspects of the socio-economic factors are, therefore, wide and multifaceted which cannot be easily measured but can be reflected in the increased production and services in the economy and resulting spillover effect in terms of lowering the cost of food for urban and rural poor, stimulating the non-farm economy and impact on women and the poor..

PART I- SOCIO-ECONMY

Chapter -1 INTRODUCTION

1.1. Background

Agriculture is the most important sector in Ethiopian economy and its development is important for general economic development of the country. The significance of agriculture to the Ethiopian economy arises from the fact that in which in the fiscal year of 2007/08 it contributed to about 45.9% of GDP, to more than 88% export and about 85% of employment (CSA, 2008).

Development of the agricultural sector in Ethiopia is therefore seen as central to combating hunger, reducing poverty, and generating economic growth (through the reduction of food imports and the boosting of exports). However, progress in the sector can only be achieved if the main constraints like variability in climate, limited access to technology, low levels of rural infrastructure and poor institutional structures are successfully addressed. Although there are various ways in which the above-mentioned issues can be tackled, one key strategy that could contribute to the alleviation of poverty and improvement in food insecurity in country is assisting poor farmers to increase the productivity of their farms.

In Ethiopia, 'Agricultural Development-Led Industrialization (ADLI), policy constitutes various components needed for agricultural growth including technology, finance, rural infrastructure, internal and external markets and the enhanced role of the private sector. Central to achieving the agricultural policy objective is the promotion of irrigated agriculture and integrated water resource management.

The ***Firi-Qabso*** **SSI** study project area is situated in East Harerghe zone Melka Bal'o Woreda of Oromia Regional State. It lies in the South-East tip of the Region. The major farming system of the project area is mixed crop-livestock (sedentary) mode of production. The project area population livelihood mainly depends on crop and livestock production. Agricultural production in the study area is constrained by declining soil fertility, unpredictable and erratic rainfall, pests. Farmers are further hampered by ineffective input supply and output marketing and have limited opportunities to earn off-farm incomes. Oromia Irrigation Development Authority (OIDA) the client or project owner - has awarded the study and design works of small-scale irrigation development projects to Oromia Water Works Design & Supervision Enterprise (OWWDSE)– the consultant. Following this, detail feasibility and design study was conducted to construct small scale irrigation that has about 105.5 hectare of irrigable land in order to reduce poverty and to increase productivity at household level. It is through irrigation and integrated crop

development that sustainable crop production can be ensured. In this view, the feasibility study of **Firi-Qabso** small scale irrigation development project was carried out in Melka Bal'o district of East Hararge Zone of Oromia National Regional State to develop 105.5 hectares of command area.

1.2. Project rationale

The development of irrigation and agricultural water management holds significant potential to improve productivity and reduce vulnerability to climactic volatility in any country. Although Ethiopia has abundant rainfall and water resources, its agricultural system does not yet fully benefit from the technologies of water management and irrigation.

Agricultural production in the study area is constrained by declining soil fertility, unpredictable and erratic rainfall pests, input supply and output marketing and have limited opportunities to earn from off-farm incomes. Other factors which affect agriculture are in-availability of credit scheme and cash for investment, inadequate extension services and poor infrastructure. Moreover, inhabitants of the area have low levels of social services in terms of education, health and water supply. These issues, combined with increasing degradation of the natural resource base, especially in the highlands, aggravate the incidence of poverty and food insecurity in rural areas.

Therefore, irrigation technology enable farmers to increase crop intensities through double cropping, supplementary watering during drought, thereby increase and stabilize yields to reduce vulnerability and improve productivity. It is with this logical and conceptual understanding that Oromia Irrigation Development Authority (OIDA) signed contractual agreement of ***Firi-Qabso*** Small scale Irrigation Development Project Feasibility Study and Design with the consultant, OWWDSE. Accordingly, this socio-economic study was conducted as a step towards the intended and requiring activities of the ***Firi-Qabso*** Small Scale Irrigation Development Project implementation.

1.3. Objective of the study

General objective

The general objective of the study is to conduct baseline survey regarding socio-economic situations of the beneficiaries and obtain data that can help for the development and implementation of ***Firi-Qabso*** small scale irrigation project.

Specific objectives

To describe salient aspects of socioeconomic conditions of the study area, the specific objectives are:

- to identify and describe the major socioeconomic aspects of the woreda inhabitants in general and beneficiaries of the project area in particular.

- to assess the community's willingness to contribute to the construction of the irrigation project and participation in scheme management.
- to forward the necessary recommendations that can help in formulating feasible development interventions in the project area.
- to conduct economic and financial analysis of the project

1.4. Study Methodology

1.4.1. Data types and source

For the purpose of socio-economic study, both quantitative and qualitative data were collected. And both primary and secondary data sources were used**.** The structured survey was conducted at the level of 30 randomly selected beneficiary households. Apart from the HH survey, community group members and key informants were used as primary sources of qualitative data.

Secondary data were also collected from woreda line departments such as office of agriculture, education, health etc, were included in the socio-economic investigation using structured questionnaires. Moreover, Central Statistical Authority (CSA) and different publications as well as available literature were also searched referred to consolidate the study.

1.4.2. Methods of data collection

The study methodologies adopted to assess the socio-economic aspects include household survey and participatory assessment by conducting group discussions with the beneficiaries and secondary data collection from various sources.

A. Formal survey

Formal household survey was conducted by employing structured questionnaire prepared to be compatible with the situation of irrigation beneficiaries and their farming system. Accordingly, enumerators who have knowledge of the culture, acquaintance with socio-economic concepts and proficiency of local language were recruited and trained before actual data collection commenced.

Sampling

Undertaking of the Sample household survey followed or employed purposive sampling approach in which 30 household heads respondents were selected randomly from the total population of the kebele.

B. Informal survey

Local peoples' perceptions, believes and attitudes, values as well as prevalent social and economic problems and potential for future development has been assessed.

Focus Group Discussion (FGD) and community consultation meeting meetings

Focus Group Discussion was conducted to obtain the necessary data on general issues and problems of the beneficiaries in the study area. Based on the prepared check list, reliable information was collected community representatives, including the youth and women.
Moreover, and awareness creation and community consultation meeting was held with beneficiaries in the presence of peasant association leaders. Finally, by employing checklists; key-informant interview was made to provide additional information. (See Appendix)

1.4.3. Data Analysis

Data collected for the objectives of this study were analyzed using appropriate statistical soft ware of Statistical Package for Social Sciences (SPSS) version 20. Household Survey results and other quantitative data from different sources were analyzed by using descriptive statistics like frequency, mean, percentage and standard deviation. Moreover, qualitative data were also organized in order to fill the gaps in the data.

Chapter 2- REVIEW OF LITRATURE

3.1. The Water Resources and Environmental Policies and Legal Frameworks

3.1.1. Water Resources Management Policy, Strategy,, Programs and Plans

The Ethiopian Water Resources Management Policy (WRMP) was issued in 1999. It deals with the overall water resources of the country, including both surface and groundwater. The Policy sets out how these water resources should be economically and sustainably used for different purposes, including water supply and sanitation, irrigation and hydropower.
The overall goal of the WRMP is 'to enhance and promote all national efforts towards the efficient, equitable and optimum utilization of the available Water Resources of Ethiopia for significant socioeconomic development on sustainable basis' (MoWR, 1999). It establishes several fundamental principles to guide the management of water resources, including statements that 'water is a natural endowment commonly owned by all the people of Ethiopia', and 'as far as conditions permit, every Ethiopian citizen shall have access to sufficient water of acceptable quality to satisfy their basic needs' (MoWR, 1999). The Policy recognizes the need for an integrated and comprehensive approach to management of water resources that is compatible with the goals of other sectors, including health. It also promotes the participation of all stakeholders, including user communities and particularly women. On water pricing and tariff setting, the Policy recognizes water as a natural resource with an economic value that should be paid for, but the price for water should not be so high that it discourages water use, nor too low, which could encourage over-use and wasting of water.

3.1.2. Environmental Policy

The Environmental Policy of Ethiopia (EPE), issued in 1997, goes beyond the statement of high-level policy to include implementation and regulatory aspects. Its overall goal (FDRE, 1997) is: to improve and enhance the health and quality of life of all Ethiopians and to promote sustainable

social and economic development through the sound management and use of natural, human-made and cultural resources and the environment as a whole so as to meet the needs of the present generation without compromising the ability of future generations to meet their own needs.

To support this goal, the EPE sets out 19 key principles, which include the following:

• Every person has the right to live in a healthy environment.

• The development, use and management of renewable resources shall be based on sustainability.

• The use of non-renewable resources shall be minimized and where possible their availability extended (e.g. through recycling).

• Appropriate and affordable technologies which use renewable and non-renewable resources efficiently shall be adopted, adapted, developed and disseminated.

3.1.3.Water Sector Strategy and Programme

Strategies are documents developed to operationalise policies, in other words to translate policies into action. Programmes consist of sets of related activities, projects or events that are intended to enact policies and strategies. While policies require the approval of the national parliament, strategies and programmes are endorsed by ministries.

a) Water Sector Strategy

The Ethiopian Water Sector Strategy developed in 2001 has been described as a road map to achieve the objectives stated in the Water Resources Management Policy (WRMP) (Tafesse, 2008). The guiding principles of the Water Sector Strategy (WSS) remain the same as those of the WRMP. These principles are:

- Water is a natural endowment commonly owned by all the people of Ethiopia.
- As far as conditions permit, every Ethiopian citizen shall have access to sufficient water of acceptable quality to satisfy basic human needs.
- In order to significantly contribute to development, water will be recognized both as an economic and social good.
- Water resources development shall be underpinned by rural-centred, decentralised management, a participatory approach, and an integrated framework.
- Management of water resources shall ensure social equity, economic efficiency, systems' reliability and sustainability norms.
- Promotion of the participation and community management of all stakeholders and user communities, particularly women's participation in the relevant aspects of water resources management (MoWR, 2001).

The WSS is divided into separate strategies for four sub-sectors: general water resources, hydropower, water supply and sanitation, and irrigation. The section on general water resources uses similar section headings to the WRMP but expands on each of them to give more information on how they should be implemented.

b) Water Sector Development Programme

The Water Sector Development Programme (WSDP) was issued in 2002 to further elaborate on the Policy and the Strategy. The WSDP is a large document in two volumes that proposes plans and projects throughout all regions of Ethiopia covering the period from 2002 to 2016. It identifies priority intervention areas and projects for this 15-year time period. It includes specific targets for improving water supply and sewerage coverage, and also for irrigation, hydropower, water resource development, and institution and capacity building.

The WSDP focuses particularly on actions to (MoWR, 2002):

- Make clean water available for drinking and improve sanitation
- Make water available for livestock in nomadic and other special areas
- Extend irrigation for agricultural development to the maximum possible
- Expand generation capacity to meet hydroelectric power needs
- Provide water for industrial development
- provide water for, among other uses, fisheries, tourism and transportation.

The WSDP therefore provides details for implementing the Water Resources Management Policy and the Water Sector Strategy. The Policy was the first to come followed by the Strategy and then the Development Programme. Changes in the Development Programme may lead to revisions to the Policy and Strategy as needed.

c) National development plans

Alongside these specific policies, strategies and programmes, the government of Ethiopia has also adopted several major plans for national improvement. The Growth and Transformation Plan (GTP) is a national development plan prepared by the Government of Ethiopia. It aims to improve the national economy and bring an end to poverty by increasing opportunities for commercial agriculture, large-scale industry and infrastructure development. All sector plans are aligned to the GTP. The first phase, GTP I, covered the period from 2010 to 2015. A follow-up plan, GTP II, will cover the next five years to 2020 and is expected to build on progress made so far and set further goals for economic development for Ethiopia.

In 2005, partly in response to the target in Goal 7 of the Millennium Development Goals),the Ethiopian government adopted the Universal Access Plan (UAP). The UAP is a national WASH plan that sets out the targets for WASH improvements. It initially covered the period from 2006 to 2010 and was revised to align it with GTP targets and strategies. This second iteration, UAP II, has been in place from 2011 to 2015.

3.3.5. Proclamation on Ethiopian Water Resources Management

Proclamation No. 197/2000 was issued in March 2000 and provides legal requirements for Ethiopian water resources management, protection and utilization. The aim of the Proclamation was to ensure that water resources of the country are protected and utilized for the highest social and economic benefits, to follow up and supervise that they are duly conserved, ensure that harmful effects of water use prevented, and that the management of water resources is carried out properly.

The Proclamation defines the ownership of water resources, powers and duties of the Supervising Body, inventory of water resources and registry of actions, permits and professional licenses, fees and water charges. According to the Proclamation, all water resources of the country are the common property of the Ethiopian people and the State. As provided in the Proclamation, the Supervising Body shall also have the necessary power for the execution of its duties under the provisions of this Proclamation.

According to Article 11 (1), no person shall perform the following activities without a permit from the Supervising Body without prejudice to the exceptions specified under Article 12:

- construct water works;
- supply water, whether for his own use or for others;
- transfer water which he/she abstracted from a water resource or received from another supplies; and
- Release or discharge waste into water resources unless otherwise provided for in the regulations to be issued for the implementation of this Proclamation.

As defined in Article 12, any person shall utilize water resources for the following purposes without requiring a permit from the Supervising Body:

- dig water wells by hand or use water from hand-dug wells;
- Use water for traditional irrigation, artisanal mining and for traditional animal rearing, as well as for water mills.

Chapter-3 RESULTS AND DISCUSSIONS (SOCIO-ECONOMY

Chapter 3 presents and discusses results pertaining to the specific objectives of the study. The chapter has been organized in major sections dealing with, respectively, settlement pattern and farming system, population and demographic and socio-economic characteristics, crop and livestock production, social services, institutions and gender.

3.1. Description of the Project Area

3.1.1. Location

Astronomically, MelkaBello district lies between $8^0$31’ and $9^0$08’N latitude, $41^0$10’ and $41^0$34’E longitude. It is bordered by Deder district (to the north and north east) , Bedeno district (to the northeast), Gola Oda district (to the south east) Mesala district(to the west) and in the East Hararge Administrative zone exist to the west.

Jaja Town the capital of Woreda is located at a distance of 163 kms from Harar town to the West direction 417 km from Addis Ababa. The total area of the Woreda is 1088.25 km^2 which is accounted 4.90% of the total area of East Harerge zone. The project site or Firi-Qabso kebele is

located at a distance of 28 km from the woreda capital and 425 from Addis Ababa. The site is accessible through Deder-Harawacha- Harew Town all weather road

3.1.2. Climate

The district has three major types of Agro-climatic zones namely kolla (tropical dry climate), woina-dega (tropical rainy climate) and Dega (temperate rainy climate), covering about 39%, 41% and 20% of the area of the district, respectively. Kolla agro-climatic zone (900-1500m.a.s.l.) characterized by 410-820mm main annual rainfall and 20-25^{0}c mean annual temperature. Similarly Woina-degas agro-climatic zone (1500-2300m.a.s.l.) experiences average annual rainfall and temperature ranging between 600 and 2007/08mm and 15^{0}c and 20^{0}c, while Dega agro-climatic zone (2300-2925ms) experiences average annual rainfall and temperature ranging between 1200 and 2007/08mm and 100c and 150c. The district has Meteorological station under the control of Ministry of Agriculture.

3.1.3. Farming System

Farming system of the woreda as well as the project area is Crop-Livestock integrated production in which livestock husbandry and cropping are practiced in association. The interactions are based on using animal tractions, manure (in cropping) and crop residues as animal feeds. Interactions are more frequent in the midland o the Woreda where cereals are the major crops grown. The farming system is cereal, root crops and cash crops (chat) are dominant, oxen cultivation where livestock production is undertaken complimentary with crop production. Therefore, the proposed irrigation project as a land use system supports the subsistence requirements of the small holders particularly, in providing animal feeds for fattening and milk production.

3.2. Population and Demography

3.2. 1. Population

According to (MoFED, 2005) development would be perceived as a complex process involving the economic, social- cultural and political betterment of people). High population growth which may create pressure on natural resource endowment, the environment, provision of public utilities and services as well as employment could be blamed. In this study, population and demographic issues data analysis will focus on household characteristics like: total population and the project growth, sex ratio, population density, age structure and ethnic composition etc.

Based on the 2007 population and housing census report of (CSA, 2007), the Population of the district is projected to **211,762** rural population and **20,770** urban population **in 2017 year**. From the total population of 214,790 and **20,970 is rural and urban population**, respectively **in 2018 year**. The rural and urban population estimate of the of Melka Bello woreda is detail in the following table:-

Table 1: Total population of study woreda and kebele

Year	Population Size

	Total Population			Rural Population			Urban Population		
	M	F	Total	M	F	Total	M	F	Total
2016/17	116,264	116,267	232,622	105,884	105,878	211,762	10380	10389	20,770
2017/18	117,968	117,792	235,760	107,488	107,302	214,790	10,480	10,490	20,970
Project Kebele level Population									
2017/18	5393	5283	10676						

Sources:- Melka Ba'lo finance and plan office

Population density is defined as population of a given year divided by the total area in km^2. Accordingly, population density of the project area districts was adapted from (CSA, 2007) data (see Table2).In this regard the woreda has the population density of 64 persons/km^2. Density of population and population growth in relation to total geographic area as well as productive land potential are good indicators to determine the aggregate demand for land both in quantity and composition.

3.2.2. . Household Size and by Age Group

The population age structure is an essential demographic data for different planning purposes especially for the development of service sectors like health, education water supply employment and other similar socioeconomic issues. The available population data for the project area revealed that the population by the broad age group found to be the figures shown in the table below.

Table 2: Household family members by age group

Age Group	**Population Size in:**	
	Number	**Percent (%)**
0 -- 14 years (Young age group)	28,193	49%
15 – 64 years (Adult age group)	17,261	30%
65 and above (Old age group)	12,082	21%
Total	**57,536**	**100%**

Source: Household survey result 2019

The younger population below the age of 15 years constitutes 44% while the economically active age group (15 – 64) holds 53.84% and old age group 65 and above yeas shares the remainin2.1% of the total population. in respect of the population burden on economically active population, the population data for the project area disclosed that every 100 economically active individuals are responsible to 44 individuals for their living. Based on the household survey results, the mean average household size among the area community population was found to be 5 6

persons/household with standard deviation of 2.10 with male and female compositions of 2.4 and 2.6 persons respectively.

3.2.3. Demand for labor

The availability of workforce is among the demographic and economic factor that influence irrigated crop development of the study area. The demand for labor in agricultural production, varies with the type of crop produced i.e. some crops like vegetable seeks large labor than cereal crops provided that the farm size is equal and other limiting factors are constant for both crops. Therefore, labour constraints may call for the modification of land utilization types, reduction of the area to the profitable but labour intensive crops, or modification of cropping pattern to ease peak seasonal labour requirements of the annual crops. At full development, the annual labour requirement of the envisaged production activities per hectare is 1679 man-days. It is assumed that average land holding size allotted per household is 0.25 hectare, and the labour requirement for 0.25 hectares man-days. Accordingly, as the demographic surveys results of this study indicate, HHs on average have sufficient active working force (women and children) estimated to be 8n which is 1040 man-days. Moreover, for the proposed irrigation, since most of family labor is free when irrigation farming is under taken, then the demand of labor during this period will be satisfied and some farmer hire during peak period.

Table 5: Family size and age structure of sample households

3.2.4. Marital Status, Education level, Ethnicity and religious affiliation

The survey results regarding the marital status of the respondents indicate that 90 percent are married while 6.7 per cent claimed to be single. Educational levels of the household respondents shows that 55.2, 3.2, 9.7 per cent of the respondents found to be in illiterate, read and write and those who attended 1-4 grade category. Household heads those who have primary level education (from grade5-8), 9-10 grades and grade 11-12 are 25.8, 3.2 and 3.2per cent while 3.2 per cent of the family heads claimed that they have college education.

The majority of the population in the project area belongs to the Oromo ethnic group. As far as religious affiliation is concerned, 93 per cent of the interviewed respondents replied that they are followers of Islam religion while 3.3 per cent are belonging to the Christian religion.

3.3. Livelihood and Major Economic Base of the Study Area

In this sub section, data on annual amount of income earned, major sources and annual expenditure by the sample households are presented and discussed.

3.3.1. Types of sources of income

According to the household survey result, farming mainly farming is the major source of income for about 100 % of the surveyed families while Trade , Farming and Daily Laborer as a sole source of income is for about 7%,13 and 13.3%of the families.

Table 1 Table 3: Income sources of the sample HHs

Source Of Income	Frequency	Per Cent
Primary		
Farmer	30	100.0
Total	30	100.0
Secondary		
Trade	21	70.0
Farming	4	13.3
Daily Laborer	4	13.3
Total	30	100

Source: Survey Data, 2013

3.3.2. Annual income of the Households

The result of HH survey regarding total average annual income result of HH respondents was Birr 21734 with minimum and maximums of4000 and 70,500, respectively. The results further indicate or confirm that most of the respondents (53.3%) earn in different ranges of Birr 17001-21000 while 13.3 % earn annual income in a range of birr 13001-17000 and 7001-10000 incomes see Table4. Livestock and crop products are also important for both consumption and sale. For all groups, the majority of food needs is met through their own production–crops, livestock and its products (milk).

Table 4 Total: Annual income of HH survey respondents (By income category)

N.o	**Annual income category**	Frequency	Percent
1	<5000	1	3.3
2	5001-7000	3	10
3	7001-10000	4	13.3
4	10001-13000	1	3.3
5	13001-17000	4	13.3
6	17001-21000	16	53.3
	Total	29	96.7
Missing	System	1	3.3
Total		30	100
Std. Error of Mean		2766.43444	
Mean		21734.4828	
Minimum		4000	

Maximum	70500	

Source: Household Survey, 2019

3.3.3. Annual Expenditure of the Households

As far as expenditure is concerned, most of the households of 33.3% and 30 % per cent the households found in the project area expend Birr 7001-10000 and 10001-13000respectively. The expenditure patterns of the sample households are dictated by the food and non-food needs of the family. Households in all wealth groups generally spend income on similar items but in different quantities.

Table 5: HH survey respondents by annual total expenditure category

No	**Expenditure category**	**Frequency**	**Percent**
1	<5000	4	13.3
2	5001-7000	9	30.0
3	7001-10000	10	33.3
4	10001-13000	3	10.0
5	13001-17000	2	6.7
6	17001-21000	2	6.7
	Total	30	100.0
	Minimum	4000.00	
	Maximum	70500.00	
	Mean	8366.6667	
	Std. Error of Mean	780.90933	

Source: Household Survey, 2019

3.4. Production and Economic Activities

3.4.1. Crop production

As the soil and climate is suitable for a wider variety of crop types, different crops and varieties are growing by farmers of the kebele in the project area. However, improved agricultural technologies are not fully and adequately utilized, mainly because of inadequate extension services rendered to the farmers, inaccessibility of the area, insufficient supply, poor distribution and unaffordable price of the improved technologies. According to the data obtained from the woreda Agriculture Office and the nearby DA Center, the information about the last cropping season has been compiled in the following table.

Table 6: Major Staple Food Crops of Melka Bal'oWoreda and the Project Kebele

S/N	Major crops (rain-fed)	Melka Bal'o Woreda			FiriQabso Kebele		
		Area Coverage		Yield, (qt/ha)	Area coverage		Yield, qt/ha
		ha	(%)		ha	(%)	
1	Maize	8984	21.20	10.94	344	37.43	28.79
2	Sorghum	11,262	12.94	7.95	226	32.63	20.0
3	Teff	1194	9.02	3.31	98	19.39	6.0
4	Wheat	2689	1.05	10.37	30	2.88	8.0
5	Sweet potato	150	0.90	80.0	10	2.88	85.0
6	Coffee	3690	54.88	2.06	197	4.80	6.67

Source: Melka Bal'o Woreda Office of Agriculture and Development Agents Office of the project kebele

From the above table, it can be understood that crops like sorghum, maize, wheat, and sweet potato are widely grown in the woreda and the project areas as well. The above condition is also confirmed by the Woreda Office of Agriculture and Development Agents Centers of the project kebele. As the information obtained from the Woreda indicated, almost all types of field crops are growing in the woreda.

3.4.2. Livestock Production

Livestock production is a major component of the farming system. It is also one of the economic activities for traction powers, provision of dairy products, transportation and for household income generation. Oxen are selected for speed and endurance in pulling traditional ploughs. Small ruminants and chickens are generating additional incomes for the community. Traditional beekeeping is also normally known in the area. Modern beekeeping is not as such significantly practiced, but small scale activities are there in few pocket areas. Equines serve as means of transport for human beings and agricultural products. The major type and quantities of livestock

in Melka Bal'o Woreda and the project Kebele (where the proposed irrigation project is located) are indicated in the table below.

Table 7: Livestock Types, Quantities and Common Diseases in M. Bal'o Woreda and the Project Kebeles

S/N	Melka Bal'o Woreda		FiriQabso Kebele	Diseases of the area
	Type of livestock	Qty	Qty	
1	Cattle	206,877	3018	Foot & Mouth disease (FMD), Anthrax, Lumpy Skin Disease, Black legs, Newcastle, fowl typhoid, Bovine and Ovine Pasturollosis, Senoryosis, Trypanosomiasis (Tryps), endo and ecto parasites (Faciolla), Coccidiosis, sheep pox, etc.
2	Sheep	33,924	260	
3	Goats	198,660	1650	
4	Horses	745	---	
5	Donkeys	15,628	420	
6	Mules	4950	2	
7	Camels	4900	28	
8	Poultry	255,870	3350	
9	Beehives			
	-Traditional	16,732	920	
	-Transitional	159	10	
	-Modern	527	7	

*****Source: Melka Bal'o Woreda Livestock Health Clinic and nearby Development Agents Office**.**

According to the information obtained from woreda livestock agency and health clinic, and the community, Anthrax, Blackleg, Tryps, FMD, Pasturollosis, Faciolla, Newcastle and Coccidiosis are the most prevalent diseases in the area. Vaccination and treatment is the major means of preventing these diseases and farmers use their traditional healing mechanisms practiced from generation. In the area natural grazing is the major sources of feed for livestock. In addition some improved forage grasses, multipurpose legume trees and few industrial byproducts are used for livestock feed in the area. Crop residues are largely consumed on the field and also collected, stored and fed during the season of feed shortage. Communal grazing land in some areas is the common means of grazing arrangements among the farmers of the area. Farmers allocate common grazing lands at the bottom of the hill, around river banks, wetland to feed their animals in common. Individually, farmers in the command area allocate and fallow some part of their crop land for animal grazing. Zero grazing is also practiced by few farmers exercising animal fattening around homesteads.

3.4. Land use

The land use pattern is mainly composed of an intensive grazing, subsistence type of agriculture and scattered settlement, situated within different landforms. The major land use types in the command area include cultivated land, grazing land, bushes & shrubs, and scattered settlement. Among the use types, cultivated land takes the largest proportion (75%) followed by bushes& shrubs land (15), settlement land (5%), and grazing land (5%). On the cultivated lands coffee is the dominant crop, and other crops such as sorghum, maize, sweet potato, H. bean, sugarcane, banana, and other lowland oil crops are cultivated under traditional way of farming practices. As the information obtained from the farmers and physical observation made in the field, about 50% of the command area is covered with coffee, chat and other horticultural crops such as onion, tomato, sweet potato, beetroots, sugarcane, and others take the remaining proportion with traditional irrigation system during the field assessment period. Average landholding size per household is 0.25ha in the project kebele. According to the information obtained from the woreda agriculture and DA offices, the following land use patterns for the woreda and the project areas are identified.

Table 8: Land Use Pattern of Melka Bal'oWoreda and FiriQabso kebele

S/N	Types of Land Use	Melka Bal'o Woreda		Firi Qabso Kebele	
		(ha)	(%)	(ha)	(%)
1	Arable land	48,748	42.49	984	13.49
2	Cultivated	39,586	81.2 of arable land	940	95.53of arable land
3	Grazing land	6087	5.3	121	1.65
4	Settlements	1048	0.91	152	2.08
5	Forest lands (including bushes & shrubs)	27,384	23.87	5,938	81.40
6	Rock land	16,195	14.12	40	0.55
7	Other land	15,260	13.3	60	0.82
	Total	**114,722**	**100**	**7,295**	**100**

Source: Melka Bal'o Woreda Agriculture Office, and FiriQabso kebele DAs office

3.5. Land Tenure and Land Holding

Land tenure refers to the type of ownership or use rights of land. These are private, communal or state ownership. At Woreda level, land holding per farm family ranges from less than 1 hectare t o4 hectares in which26,605 households possess <1 hectare 3,653 1-2hactare and 772 possess 2-3hactar hectares with an average holding size of 1.2 hectares..

Table 9: Land-holding sizes per household in hectare in the year 2017/2018

Average land-holding sizes	Number of households (holders

per household (ha)	<1 hectare	1-2hactare	2-3hactare	3-4hactare	4 hectare	>4 hectare
12.78	26,605	3,653	772	185	113	55

Sources:- Environmental protection & land administration Office(December,2018)

The size of population and distribution of land is not the same among the community or the beneficiaries of the project .i.e. due to increment of the population. According to the key informants, in the study area, there is no shortage of cultivable land. So, most of the farmers cultivate their own land.

3.6. Basic Social Services

Social services are the basic necessities means for the development of a nation. Basic social services discussed under this topic include: health, education and water supply services.

3.6.1. Education

Education is one of the factors which accelerate growth and development. Most of the problems of the rural people in one form or another are related to lack of education in general and shortage of skilled manpower that would have played determining role in development in particular. Therefore, educational level of all members of the family is important for the acquisition, comprehension and acceptance of information about improved farming as well as ways of living. According to the information obtained from office of education, total number of formal and non-formal educational institutions include: 88, 59 and 4 grade 1-4 , 5-8 and 9-10, schools respectively were found in the woreda while there are only2 ,11-12 sxhools (Table12).

Table10: Number of students attending schools in 2010 E.C in the Woreda)

Level and number of schools by grade		Number of Students			Class to student ratio	Teacher to student ratio
Level	Number	Male Male	Female Female	Total Total		
1--4	88	19217	16323		66.8	65.9
5 – 8	59	9557	6686	16243	64	24
.9-10	4	1568	710	2278	50	15
11-12	2	325	71	396	40	
TVT	**1**					
total		30662	23990	54452		

Source:- district education office,2013

Regarding educational services, formal schools are better in their educational services although still there is still a problem of teachers. According to the key informant, in non-formal schools, adult male5989 and female 3495 total 9484 are served during their slack time. In project kebele there are 5,4 and8 1-4, 5-8 and 1-8grades level schools, respectively with total number of 1736, 791 and 2527 male and female students, respectively.

Table11: Project kebele level and number of students and schools by grade

Project kebele level and number of students and schools by grade		Number of Students		
Level	Number of school	Male Male	Female Female	Total Total
1--4	5	943	793	1736
5 – 8	4	493	298	791
1-8	8	1436	1091	2527

Table13: Number of teachers by qualification and sex

Qualification	Male	Female	Total
Degree	151	27	178
Diploma	540	158	698
TTI	31	11	42
Total	-	-	-

Source:-Malka Balo district education office,2009/10 E.C

With regard to formal schools, there is less number of teachers and teacher vs subject ratio is also not in balanced. With regard to the number of school teachers by level of qualification, 178 degree holders, 698 diploma holders and 42 TTI graduated teachers are serving in schools found in the woreda.

3.6.2. Health services

In the study area woreda, the health institutions found to serve the population include: health posts, clinics and health centers. Almost all of the health facilities found in rural areas belong to public sector except some private clinics and rural drug venders found in towns and district capitals.

Table 14: Number and type of health institutions

Type of health institution	Total Number	Project Keble
Hospital	**0**	
Health centers	**7**	
Health stations		
Health posts	**31**	**2**
Private clinic	**5**	
Rural drug vender	**4**	

Source: - District health office, 2013

The main problems of health sector in the area were: shortage of health personnel; treatments; shortage of drugs and medicine, absence of and inaccessibility of health services to the villagers. On the other hand, the major causes of most prevalent diseases of the area are related to general socio-economic and environmental conditions.

Table15: Number and type of health personnel

District	Male	Female	Total Number	Project Keble
Physician	**0**	**0**	**0**	
Health Officer	**14**	**0**	**14**	
Nurse	**44**	**6**		
Lab Technician			**50**	
X-ray technician	**0**	**0**	**0**	
Sanitarian				
Pharmacist	**5**	**2**	**7**	
Health extension worker	**0**	**61**	**61**	**2**

Source: - malka Bal'o District health office,2018

The health institutions in the woreda constitute health center, health stations and heath posts with health professionals. The major means of transportation used by inhabitants to go to health institution is on foot, human shoulder, animals and vehicles. Among top ten diseases of the area, results of household survey and woreda information prioritize typhoid as is highly prevalent in the area following U.r.t infection, wound, helmenthiasis, etc see table 15.

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Table16: The top ten diseases of the woreda (in order of importance)

No	**Type of Disease**		**Rank**

1	Typhoid fever	**Pneumonia**	
2	U.r.t infection	**Violence injury**	
3	Wound	Trauma	
4	Helmenthiasis	Dyspepsia	
5	U.t infection	Urinary truck	
6	Disease of blood and blood forming	pasitic	
7	Diarrhea	Typhoid fever	
8	Conductivities	Acute feberian illness	
9	Disease of digestive system	Non blood	
10	Otitis media	**helmenthisis**	

Source: Malka Bal'o - District health office,2019

Toilet and bathing facilities are essential components of sanitation, personal and environmental hygiene for households and community members. The majority of households have no toilet facility within their compound/courtyard. There are very few households that are using pit latrine in their courtyards. Open field execration is very common disposal system of the well field

3.6.3. Water Supply

Most of the people found in the study woreda as well as project area, get water from unsafe sources**.** Currently, people of the area are using all available water sources such as rivers, unprotected springs, shallow wells and hand dug wells for livestock and sanitation purposes. The water supply schemes found in the woreda for the year 2017/18 are 12 Hand-dug wells and 4 spring development
dug wells and 6 spring development while in 2017/18 there were 1 deep well, 12 hand dug wells and 4 spring development

Table17: Number of water schemes giving services

Year	Deep well	Shallow wells	Hand-dug wells	Spring development
2016/17	1	4	9	6
2017/18	0	0	12	4

Table 18:Number of rural urban population supplied with potable water

Year	**Total population of wereda**			**Population of wereda supplied with potable water**			Coverage
	Rural	Urban	Total	Rural	Urban	Total	

2016/17	211,762	20,770	232532	115,883	16,568	132,451	
2017/18	214,782	20,976	235758	120213	17,840	138,053	

Sources:- **Melka belo water and mineral energy office**

According to the woreda office of water resource, energy and mining, total beneficiaries of potable water supply in the year 2017/18 120213rural and 17,840 urban totally 138, 053people were served The total potable water supply coverage of the woreda for the year of 2016/17 and 2017/18 was 56.9 and 58.6,respectively. The total population supplied with potable water supply in the wereda in 2016/17 were 132,451 while in 2017/18 were 138,053 in general water supply coverage in % are 56.9 in 2016/17 and 58.6 in 2017/18 for the details(see tables 18 and 19). Concerning the project kebel, there is no any water supply scheme or activities so far.
Major problems are in relation to water supply include budget, water contamination and shortage of water treatment chemicals.

3.7. Infrastructure and utilities

3.7.1 Transportation and Road network

Transport and communication are the most important elements for the economic development of any Werads of Zone. Transportation and Road networks facilitate economic and social interactions between Woreds/kebels and people. the transport situation in Melkabelo wera in the year 2017/18 from Melka bal'o werad to,Deder Werad & West Hararge zone only 503.7km of gravel road and 372.03km all weather dry and Weather road a total of 721.37Kms of all Weather road existed.

Table29: Melka Bal;o Woreda roads types and length

Year	Asphalt Road	All whether Gravel Road	All weather dry Road	All weather dry and wet road	Total all weather road
2016/17	0	160.6	152.8	190.3	503.7
2017/18	0	189	124	181.73	494.73

3.8. Institutions and institutional services

3.8.1 Extension services

In the study are woreda, there are many public and civil societies, development organizations supporting smallholder (livestock and crop development) through the provision of knowledge/information, finance, production inputs. The major institutional services available include: agriculture and health extension, credit services and input supply.

In the project kebele, extension services were being provided by respective line departments of the woreda, and some NGOs through demonstrations and training. The most important source of information in the study area is government extension organizations through DAs residing to their respective kebeless. The current government system of extension provision is based on Training of Trainers (ToT) method that participate woreda SMS, each DA s and Model Farmers. In the project area, currently three DAs are assigned to crop production animal husbandry, animal health and natural resource management professions, respectively. However, as regard to extension services and input supply for irrigation based crop production it seems less emphasis was given.

Table20: Number of kebeles, household and farmers received extension service for the year

Year	Number of kebele	Household			Farmers received extension service		
		Male	Female	Total	Male	Female	Total
2016/17	22	105,884	105,878	**211,762**	21,489	1,571	23,060
2017/18	22	107,488	107,302	**214,790**	25,689	1,781	27,470

Sources:-Malkabelo agricultural office, December,2018

In summary, extension service delivery to participating households needs to be strengthened through: training in irrigation water applications; setting up demonstration plots; use of compost manures; farmer exchange visits; improving access to better farming techniques (less laborious) and post-harvest technology. Moreover, strengthening irrigation extension capacity, by increasing the number of capable development agents and contact farmers is needed.

3.8.2. Credit Services

Credit service is also another component of institutional service which influence production and utilize agricultural technologies. Hence, access to finance and credit use can influence farmers' production in terms of input and technology utilization.

In the study woreda the financial institutions providing credit services are Oromia Saving and Credit Association and Busa Gonfa (Micro finance)found in the woreda capital town of Jaja and Harew Towns. Thus, there is a need for appropriate finical intuitions, as availability of finance supported with adequate training enables farmers to enhance productivity and diversify their means of livelihoods.

3.8.3. Input Supply and Use

Table21: Agricultural production Input distributed in the woreda

No	**Types of inputs**	**Unit**	**2016/17**	**2017/18**

1	Fertilizer	Quintal	2307.5	
1.1	DAP	"	1560.5	
1.2	UREA	"	2,649	3,456
2	Pesticides	KG		
2.1	Liquids	LI		
2.2	Powder	KG		
3	Sorghum	Quintal	168	
3.1	Barley	"		
4	Teff	"		2,085.5
4.1	Wheat	"	98	2,810
4.2	Maize	"	910.79	8,351.5

Source:- Malka bla'o agricultural office, December,2018

3. 9. Community Based Social Organizations

3. 9.1. Cooperatives

In the project study Woreda, there are 55 farmer's cooperatives &1 union with members of 19,982 and11, 114 in the year 2017&2018 respectively. The major activities on which the cooperatives engaged were general trading, saving & credit, irrigation and handcraft. At project kebele level there are 2 cooperative with members of male 649 and Female 229 Total 878 members.

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Table22: Number of producers cooperatives by hand, engaged workers and capital

No	Types of cooperatives	Total No. of cooperatives	Number of workers			Amount of capital	
			Male	Females	Total	Fixed capital	Running costs
1	Cooperative	57	14,709	5,273	19,982	17,669,412.37	
2	Unions	1	3,703	2,411	11,114	18,813,543	

Sources: Cooperative office of Melka Bel'o, 2018

Service Cooperatives by their Members ,Male **35,410** &Female **13,737** Total **49,147** .The major types of services delivered by the cooperatives for their members, are marketing services for Chat, Apple, Consumer goods Sugar cane, Oil& Etc),Saving & credit, Livestock production. Total capital of Service Cooperatives, that is fixed asset **65,325,901.74**, Operational **70,141,600**,

3.10. Gender Relation and General Situation of Women

Women`s participation equal responsibilities in the local political bodies and number of women elected at different level ( member of council ,cabinet members, etc) are now increases time to time in both the rural and urban of the woreda/districts. According to, Melka Balo woreda women`s affairs there were **231** in rural and **273** in urban women`s having equal responsibilities in local economic & political bodies. Besides the wrong perception regarding gender equality is improving from time to time and in addition women are been empowered due to improvement in the level of education of women

3.11. Problem and Potentialities of Woreda

3.11. Problems

1) Supply of agricultural inputs.
2) There is widely expansion of striga (alien weed) which can affect more cultivating land Business and marketing system /centers serves for peasant production sales are not found in w oreda.

13.2. Problems of the wereda concerning social facilities.

1) Shortage of colleges and technical teaching TVET centers in the wereda.
2) Lack of quality potable water supply coverage service in both rural and urban
3) Health institution problem like.hospital
4) 22 rural kebele and one urban kebele population are not getting electricity light services.
5) wereda have no sport stadium, libraries and halls.
6) There is no youth friendly program center and refreshment centers like sport stadium, libraries
7) Lack of people transportation services and road problem in woreda that connecting kebele with Town

13.3. Problems exist concerning with environmental conditions.

1) shortage of rainfall around lowland area
2) Problems of deforestations and loss of soil fertility in lowland and highlands area.
3) Disparity population of rural household of peasants.

3.11. Potentialities of the Woreda

1) Wereda are varies agro-climatic zones

2) There are several perennial rivers and land area that can serve for modern irrigational purposes
3) There is a land area that can serve for agricultural investments in wereda's such as Rare laga ramis ,Dire adam boru,jalloo and the like
4) There are more products of coffee production in wereda's for trading purposes.
5) The Wereda has potentials of mineral deposits such as gold, charcoal stone as well as Constructions stone, like sprite, gravel, limestone and the likes.
6) There is also places for tourist attraction such as Goda wanji, hot water

Chapter4- LAND DISTRIBUTION WITHIN THE CONTEXT OF THE NEW SCHEME AND EFFECT OF DISPLACEMENT

The beneficiaries of the intended project(Firi-Qabso) are practicing traditional irrigation (on owned land) within the commend area of the irrigation project. Therefore, land re-distribution among the beneficiaries immediately after the construction of the new scheme may not take place. However, any depute which may arise due to implementation of the project e.g.for farmers crops which could be destroyed due to irrigation canal construction consent of the project beneficiaries and Kebele administration involvement made consent to bring a solution. However, with reference to the existing land holding and production conditions the following factors are considered to under the context of the existing traditional irrigation scheme:

- Agricultural production will be possible at least two times in one year
- High value cash crops will be produced
- Forage crops will be introduced that will be used for livestock fattening
- Assuming that land suitability (of the command area) for the proposed cropping Pattern is nearly the same for the entire beneficiaries.

It is therefore, proposed that one farmer will own and cultivate existing ownership land after the implementation of the new scheme. Hence, there will be no threat of population displacement and conflict as far as the irrigation project is concerned. The expansion of the new irrigation scheme will not displace farmers who presently cultivate in the weir axis area.

Chapter5- SOCIO-ECONOMIC IMPACTS OF THE PROJECT

The Firi-Qabso Small Scale Irrigation Project will have substantial predictable impacts on the socio-economic development of the area. Aspects of the socio-economic factors are, therefore, wide and multifaceted which cannot be easily measured but can be reflected in the increased production and services in the economy and resulting spillover effect. Therefore, the following relevant socio-economic factors are used in the economic analysis.

1) **Employment and direct impact on income of rural population**

Irrigation can support crop intensification through which small plots of land can produce more *per capita*. The available household labor can also be engaged throughout the year, thereby improving labor productivity. Studies consistently show that agricultural productivity gains have raised rural incomes by directly increasing farmer income and, of Particular income to the poorest, by increasing employment opportunities and wage rate.

2) **Lowering the cost of food for urban and rural poor**

In the areas where food supplies are not kept Pace with population growth, increased production of food has often has a dramatic effect on food prices. Therefore, first, reduced market prices enable poor households to buy food that they couldn't otherwise afford thereby improving their nutrition intake. Secondly, poor households spend a high proportion of their household income buying food and free up their income for other needs like education, health etc. fees.

3) **Stimulating the non-farm economy**

Agriculture is the main root of economic growth in most developing countries by providing employment, generating domestic national income and export revenues. Therefore, the intended project will help agriculture to perform well in which, the impact is felt quickly, not just in the agriculture sector but also in wider non-farm economy through the forward and backward linkages between irrigation production and commodity value chains.

4) **Impact on women and the poor (equity)**

The overall irrigated land use system, will contribute to the increment of production and productivity of the HHs. This can provide equal opportunity for both men and women in terms of employment and access to and control over resources According to some studies, the switch from rain fed agriculture to irrigation usually places additional demand on woman's' workload.

Chapter6-- CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The investigations of the socio-economic impacts of Firi-Qabso Small Scale Irrigation Project, call for socially and economically more comprehensive and transparent decision making implementation procedure. Accordingly, major socio-economic, organizational and institutional issues are summarized as follows:

- The intended project will have the impacts of raising rural incomes by increasing employment opportunities and wage rate, lowering the cost of food for urban and rural poor and stimulate wider non-farm economy through the forward and backward linkages between irrigation production and commodity value chains.

- The community is aware of the benefit to be achieved from an irrigation project. They have showed their willingness to participate by means of labor as the project's cost sharing. Users would also contribute all naturally occurring materials required for construction. Moreover, the administration council of woreda as well as Kebele also considers the project as a sustainable development opportunity to reduce poverty among the rural communities. They have expressed their interest and willingness for the realization of the project by promising to contribute all needed.

- Women and the poor, can Participate in irrigated agriculture as farm laborer, land owner or decision makers. In addition, increased income resulted from the proposed scheme will address basic needs of women. This can provide equal opportunity for both men and women in terms of employment and access to and control over resources. However, in spite of the recognition of the roles of women can play in irrigation development and management, woman may not be the full beneficiaries of the enhanced farm productivity and increased income unless purposeful measures are taken by the concerned stakeholders.

  Finally, the socio-economic study of this irrigation project indicates that there are favorable conditions in aspect of farmers experience administration council of woreda as well as Kebele administration commitment and future market prospects are great and would demand the implementation of the project.

6.2. Recommendations

Sustainable farmers managed small scale irrigation development can be realized if only measures of core issues of irrigation development addressed properly. Therefore in order to make the project viable the following points are suggested.

1) In order to take in legal identity and assuming full responsibility for scheme operation and maintenance by WUAs, implementing appropriate institutional framework and providing comprehensive training (in areas of operation and maintenance, water distribution, management, simple accounting and aspects of monitoring) to water users committee is highly important.

2) Strengthen their capacity and coordinate institutions dealing with small scale irrigation to support smallholder farmers through the provision of knowledge/information, finance, production inputs and services. Moreover, the contact/model farmers system should be adopted to provide extension directly to farmers in the recommended ratio.

It is therefore, important that:

- Extension officer should equally be qualified in providing practical training and
- Model farmers attend periodical training programmes to train the beneficiaries.

3) Financial systems in the different schemes should be in place so as to solicit funds to support sustained development activity to meet cash requirement of target beneficiary which will PAve way to increase the expected benefits.

4) As irrigation involves large investment in capital and labour, farm produce is also need to be geared towards marketable commodity. Lack of dependable market, inadequacy of marketing infrastructure, storage, and transportation, flooding the market with similar crops and lack of information are issues of marketing in the project area. Therefore, for successful marketing and farm profitability identify:

- Good practices in terms of crop selection, good quality seed, and timeliness of produce, extension and marketing link are imperative.
- Upgrade farmers' and Development Agents' skills in irrigated agriculture extension, business case preparation and thereby increase productivity, impact and sustainability of irrigation sachems

5) Women Participate in irrigated agriculture both as farm labourer, land owner and decision makers. However, women may not benefit from the enhanced farm productivity and increased income unless purposeful measures could be taken farm and organization levels. Therefore in order to improve women's status:

- Ensure their Participation in WUA, decision making, land right and leadership and
- Use in gender inclusiveness (gender analysis) in planning and adapt gender performance indicators in monitoring and evaluation programmes to insure decisive roles of women in the socio-economic development.

PART II AGRICULTURAL BUSINESS ENTERPRISES AND MARKETING

Chapter -1 INTRODUCTION

1.1. General Background

Privately managed (small-scale) irrigation schemes in most of the SSA countries, show that there is business potential for private entrepreneur involvement in irrigation CTA, 2001). Irrespective of the level of profitability of a given technology, lack of marketing services and/ or the existence of a relatively small market size may hamper the widespread adoption of the technology in question. It is possible to generate the total impact of technological changes in terms of increment in production, additional marketable surplus, quantity which can be commercialized through the existing market outlet and possible variations in prices.

In any economic system beyond the subsistence leve(including Ethiopian small holders farmers), produce certain goods beyond and above their requirements. This gives rise to an exchange process and ultimately to specialization. The above explanations make it clear that in

non- subsistence economic systems, producers will have to take into account the above question. The reposes that the producers could give to these questions will depend on the availability, reliability and adequacy of relevant and precise of information. It is noteworthy that from the producers' point of view production is only half the job the other probably not the least important one is marketing. Therefore, producers must be cautious and vigilant in making their production decision.

1.2. Objective

- Review of concepts related to agricultural business, marketing systems, functions and actors;
- Assess existing situation of (constraints and potentials) of marketing of the project study area;
- Make recommendations towards the creation of an enabling business environment for intended small-scale irrigation project beneficiaries.

1.3. Approaches

Approaches used for the above objectives include:

- Review of marketing concepts in terms of marketing functions, principles, actors etc.
- Assessment on marketing situation of small-holder farmers and ;
- Key informant and discussion with farmers

Chapter2-AGRICULTURAL BUSINESSES AND MARKETING-AN OVERVIEW OF THE EXISTING SITUATION

2.1. Agricultural Business and Agricultural Marketing Systems

2.1.1. Criteria for Agricultural Business Enterprises

When establishing a new agricultural enterprise, it is important to consider the economic value it will contribute to the owner. Undertaking farm level economic analysis is the most realistic way of assessing the viability of the envisaged enterprise and its suitability to the farming system.

There is no single and correct way of analyzing the impact of a given technological innovation on farmers' livelihood. In fact, different farmers have well defined priorities and specific criteria for judging the viability of innovations. Consequently, on-farm data need to be analyzed with maximum care and conclusions should be drawn by taking into account farmers' decision making criteria. In what follows, attempts will be made to summarize the most important points which are commonly employed in evaluating the viability of new technologies/enterprises.

A) Promotion Criteria

This refer to exploring the feasibility of using the new technology within the existing farming system given the prevailing agro-ecological, technological, socio-economic and institutional factors and farmers' management capacity e.g. (Comparative economic analysis within the existing system).

The most commonly used tools include:-

- Gross Margin Analysis
- Net Margin Analysis
- Partial Budgeting
- Whole Farm Analysis

B) Sustainability Criteria-

These criteria help to evaluate the long-term viability of new technologies. Experience shows that technologies come and go. A technology which was popular at one time may fade out of public memory at another time. Therefore, it becomes necessary to gauge the sustainable nature of technologies by looking into the existence of:-

- Viable Product Markets;
- Sustainable Institutional Support;
- Accessible Inputs;
- Sharp Falls In Levels Of Outputs;
- Variations (Fluctuations) in input and output prices; etc.

2.1.2. The Dynamic Nature of the Evaluation Process

As agricultural development activities are aimed at bringing perceptible (detectible, Noticeable) changes in the sector, the potential impacts of improved technology transfer must be assessed on regular basis. This is mainly because the farmers operate in an ever changing production environment so much so that they need to take account of and adapt to changing conditions.

The environmental factors can be divided into two:

1) The micro - environment; and
2) The macro - environment.

The micro-environment has to do with the intra-farm production conditions over which producers have relatively high degree of maneuver. Examples include: allocation of available resources to alternative uses; what and how much to produce; when and how much to sell; which techniques of production to use; etc. It should be noted that decisions on some of the aforementioned points could be influenced by circumstances beyond the control of the producers. All the same, the latter are free to make whatever decision they find appropriate.

The macro-environment deals with factors which producers can hardly manipulate and is divided into two:-

a) The proximate macro-environment; and
b) The wider external environment.

The proximate macro-environment:--The proximate macro-environment which includes all aspects which have closer links with producers in that the latter cannot do without them. The proximate macro environment consists of input supplier', output distributors and competitors' environment. Changes in these elements will have substantial bearing on the producers' decision making.

The wider external environment:- encompasses all those factors which are completely beyond producers' control. More specifically, the producers are at the mercy of these factors. The wider external environment includes: the economic environment; the technological environment; the political and legal environment; the social and cultural environment; and the institutional patterns.

Given the fact that changes in the environmental variables will be passed on to the producers, the latter revise their decisions and make adjustments in resource use and requirements by taking the prevailing conditions into account. A technology which was found viable at a given point in time may become less important at another time. It is, therefore, imperative to evaluate the viability of technologies through time.

2.2. Agricultural Marketing Systems and Functions (Market Agents, Information)

2.2.1. Marketing agents/ market intermediaries/market middlemen

The performance of all business activities involved in the flow of food products and services from the point of initial agricultural production until they are in the hands of consumers (-Kohls & Uhl). These are market "participants" who perform different marketing functions in order to obtain economic benefits. In general, three groups of market intermediaries can be distinguished: **merchant middlemen, commission** agents/brokers and facilitative organizations. Merchant middlemen take title to the product, commission agents and brokers carry out marketing functions on commission, and facilitative organizations assist merchants in their marketing activities in the marketing system.

a)Merchant middlemen

Merchant middlemen take title to, and therefore own, the product they handle. They can be classified as follows:

***B) Assemblers*:** Sometimes also known as traders/transporters/country buyers, they are the first link between the farmer and other middlemen. They often carry out the initial task of assembling goods from dispersed farms or local rural markets. Assemblers may be farmers, shopkeepers, itinerant traders or some co-operative or government-buying agency.

***c) Wholesalers**:* The role of wholesalers is to transfer goods from producers or assemblers to retailers or other wholesalers. Thus, their role may overlap with that of assemblers, in that they may deal directly with producers. They often finance the movement of goods themselves and consequently bear the cost of marketing risks.

***d) Retailers**:* The main function of retailers is to buy wholesale agricultural produce and sell to consumers at convenient locations and times in various forms and quantities. In town, retailers often buy from wholesaler-distributors or their brokers and resell to the consumers. Retailers

may have a fixed base: a stall, a shop or a place on the ground, or they may be hawkers, who carry their products around.

e)Packers/Manufacturers/Food processing companies*:* Enterprises that use agricultural commodities as raw material. For instance, in the case of meat processing business, processors have a very important role in the marketing channel.

f) Exporters/State Owned Enterprises (SOEs): In general, these are companies that mostly buy and sell agricultural products in foreign markets. These products vary from those freshly harvested to those that have gone through various stages of processing.

g) Agent Middlemen (Commission agents – Brokers)

Agent middlemen can be distinguished from merchant middlemen in that they don't take title to goods. These agents work for a commission on behalf of other participants. They operate at all levels of the marketing channel. Typically, they work for either a flat rate or percentage (of the selling price) commission. Brokers bring buyers and sellers together and assist in negotiations on a more ad hoc basis. Some brokers may operate as auctioneers, auctioning products on behalf of collecting wholesalers.

h) Facilitative Organizations (Facilitators)

Facilitative organizations aid the various middlemen in performing their tasks. These organizations don't, as a general rule, directly participate in the marketing process either as merchants or agents. The majority of the literature in marketing refers to three types of facilitators: first, **physical distribution firms**, including warehousing firms and transportation firms;

second, marketing service companies, including standardization (grading and quality assurance) agencies, marketing research firms, market intelligence (advertising and promotion) agencies, trade associations, livestock auctions/grain exchanges, and market information service; and other firms that help **finance and/or insure risks** associated with the buying and selling of goods.

2.2.2. Marketing channels

A marketing channel describes the movement of a product from the site of production to the place of consumption. It may include transportation, handling and storage, ownership transfers, processing, and distribution. The marketing channels for agricultural products could be broadly divided into the following two categories:

- ☞ A 'short' or zero level channel (direct marketing where the producers sell to consumers without the use of middlemen); and
- ☞ A 'long' and multi-level channel (indirect marketing where producers sell their products to consumers through the use of middlemen). Available evidence shows that most producers do not sell direct to end users. There is normally at least one level of

intermediary, frequently a retailer. One reason for the use of intermediaries is that they specialize in particular activities.

There is no sole supplier or producer of different services and goods to dominate and satisfy the need of customers. Then, this nature of market makes it to be an interactive in which many stalk holders mainly consisting producer, purchaser, facilitator etc. take a part. Therefore, depending on nature of the product and consumers, many people take part in a chain from point of production to consumers.

I. Producers ➡ Consumers
II. Producers ➡ Retailers ➡ Consumers
III. Producers ➡ Wholesalers ➡ Consumers
IV. Producers ➡ Wholesalers ➡ Exporters
V Producers ➡ Wholesalers ➡ Retailers ➡ Consumers
VI Producer ➡ Broker ➡ Central wholesaler ➡ Retailer ➡ Consumer

2.2.3. Market Information

The availability of accurate and adequate market information is essential for producers, market intermediaries, and consumers, if market mechanisms are to work efficiently. Information helps the protagonists in the marketing system to balance supply and demand in particular markets and thus avoid gluts and surpluses with their corresponding fluctuations in prices.

Information concerning probable supply levels and corresponding prices will enable producers to make their decision on:

- What to produce?
- When to produce?
- How much to produce?
- How to produce? etc.

Market information helps to produce products which accurately reflect the needs & wants of customers. Market intermediaries could also operate more efficiently and avert business risks if they are provided with reliable information for this helps them to improve their knowledge of buyers demand and sellers supply levels as well as factors affecting prices. In order to aid decision- making market information must be:

- Relevant, i.e. its content must be related to the information needs of the target group;
- Meaningful i.e. precisely specified with regard to location, time and other features and formulated in a way which can easily be understood;
- Reliable i.e. accurately & regularly collected & transmitted;
- Promptly available , i.e. published within a few hours of being collected; and
- Easily accessible.

Some of the variables on which market information could be collated are:

▪ Prices obtainable through the various outlets open to the producers;	▪ Resource availability;
▪ Volume of trade;	▪ Competitors(type & number);
▪ Market potential(foreign domestic);	▪ Supplies & raw materials;
▪ Level of production ;	▪ retail prices;
▪ Conditions of sales;	▪ government actions & policies;
▪ Product problems;	▪ Costs of production;
▪ New processes & technologies;	

2.3. Major Problems and constraints of Marketing

Farmers face huge constraints when it comes to physically accessing markets. They also lack market information, business and negotiating practice, and a collective organization to give them the power they need to work together on equal terms with other market intermediaries. Concerning demand and supply gap in relation to irrigation produces, it is difficult to reconcile the extreme polarities since major supply is from produce that comes out of the district transported long distance in a difficult accessible road. To improve the market situation, infrastructure facilities such as road and product segregated market arrangement, shades and accessible route to collect and lodge product is very crucial.

Some of the common marketing constraints facing smallholder farmers, as discovered through different experience a discussion as follows.

2.3.1. Production Constraints

Commercialization of small holder farmers is constrained by various production factors and resource such land, labor force and capital. Poor access to these assets affects the way in which smallholder farmers can benefit for opportunities in agricultural markets..Production for market calls for production resources that include especially in terms of the volume of products traded and the quality of those products. Moreover, Small-holder farmers lack regularity producing for the markets due to insufficient access to production resources.. As a result, crop diversification is not practiced and one of the consequences is that there are often market gluts, which result in low prices.

2.3.2. Transaction costs and less bargain power

Transaction costs result from information inefficiencies and organizational problems such as the absence of formal market storage, transport etc. Transaction costs include the costs of information, negotiation, monitoring, co-ordination, and enforcement of contracts. Distance to the market, in addition to poor infrastructure and poor access to asset and information results high transaction costs. As a result poor farmers find it difficult to compete in profitable markets due to the high transaction costs. Therefore, traders with higher social capital are better able to enter more capital- intensive marketing activities such as wholesaling and long-distance transport, whereas traders with poor social networks face major barriers to entry into the more lucrative market segments.

2.3.3. Lack of on-farm Infrastructure

In the study area smallholder farmers do not have access to on-farm infrastructure such as store-rooms and cold-rooms to keep their products in good condition after harvest. Lack of access to facilities such as post-harvest constitutes a barrier to entry into agricultural markets, in terms of quality and quality. Hence, storage facilities increase would increase farmers flexibility in selling their products as well as their bargaining power.

2.3.4. Transportation Problems and Lack of Market in Rural Areas

Since road conditions of the project areas are poor, most small-scale farmers have no means of transport to carry their produce to markets. Problems transportation in general results in loose of quality and late delivery, which in turn lead to lower price. Most of the smallholder farmers are located in rural areas where there are no formal agricultural markets. They are compelled to market their produce to local communities in their areas, sometimes at lower prices, or to transport their products to towns at a higher cost in absence of well facilitated road and transport service. Poor roads and other facilities increase the price of final products and makes competing with imported commodities difficult

2.3.4. Problems of Vertical and Horizontal Integration

Lack of strong marketing organizations and supply chain facilitation limits market out lets of smallholder. Producers found in the project area are lacking link with bulk buyers due to problems of cooperatives are weak and farmers' marketing group is not organized. Group marketing enables to penetrate into big market or find new market alternatives which otherwise individuals can't perform being alone. Moreover, integration helps to understand each other and develop trust to fill market demand by scheduling and producing different crop based on contractual agreement. Lack of appropriate information source and limited access, reduces farmers awareness on market situation and the possibility to capture market opportunities.

2.3. Existing Marketing Situation of the Project Area

In the study project area, marketing is a big challenge for smallholder irrigators. Most of the farmers produce vegetables like tomatoes, onions, carrots and cabbages, however, because of the perishable nature of the crops, prices fluctuate frequently and farmers are often forced to sell at low prices. Although there are local markets to service the surrounding small towns, in the large town however, poor transport and lack of market linkages and information remain limiting factors. Further, the absence of organized markets has allowed tradesmen to take advantage of the situation.

2.3.2. Marketing Opportunities

In the study project area, marketing for small holder farmers although a challenge, opportunities also exist to be exploited. Because the project is near to big Towns and educational institutions which could be considered as reliable marketing outlet. In addition, vegetable produced by traditional irrigation is already linked to the regional foreign countries of Djibouti and Somali Land. Therefore, if the necessary marketing promotion and measures taken, farmers could be benefited from intended irrigation project.

Chapter 3: PRPOPOSED CROP BUSINESS ENTERPRISE AND MARKETING

3.1. Gross Margin Calculation for small-Holders Crop Enterprises

The gross margin for an individual farm enterprise is defined as the difference between the value of its output and the value of the variable costs incurred in producing that output. The gross margins per hectare of crops and per head of livestock are widely used for comparative analysis of activities on one farm, and between farms in similar environments. Valid comparisons can, of course, only be made in terms of a production unit common to all the farms of activities being compared. This unit can be the land area, if land used by each activity is equally suitable. The procedure is to select the highest gross margin per unit of the most common limiting resource (land, capital, man hour or man day) and expand it until some other restraint (self possession, Limit) is met.

One easy and quick way of looking into the potential effects of new technologies on the productivity and income of farmers is by comparing gross margins on per unit of the most common limiting resource. However, no generalization should be made on the basis of such results which, in fact, should be interpreted very carefully because of the following reasons:

- The results can be affected by variations in climatic factors (depending on whether we have a good or bad year);

- The soil type and method of seed bed preparation can affect the yield level; and
- Changes in input and output prices can affect the level of gross margin.

Suppose that a farmer has 2 hectares of land on which he plants wheat. On one hectare he used a local variety along with traditional methods whereas on the other he planted an improved variety and applied modern inputs. The following table summarizes the information on costs of production and output levels.

3.2. Facts and assumptions used in the analysis

a) Yield estimates/projection: The yield (production per hectare) of the crops proposed is presented in the agronomic study document. The yield level considered in the financial analysis is the maximum attainable yield level presented in the agronomic study document for _____

b) Estimated Production cost per hectare for the different crops: The production cost per hectares for each of the selected/proposed crops is estimated based on the input requirements and their market prices during the study period. The production inputs considered include: human labor, oxen labor, seed, fertilizers, insecticides, fungicides and herbicides. The summary of the estimated production cost per hectare for the different crops for the first year is provided in the following table. It is assumed that the production cost will increase by 5 percent every year over the 25 years of the project's life span

Table 23: Recommended crops total production cost

S/N	**Selected Crops**	**Fertilizers,(Birr/ha)**		**Pesticide Birr all types**			
		NPS	**Urea**	**Pesticide(all types) Birr**	**Labor cost**	Estimated costs of seed, material and equipments	**Total Cost**
1	Potato	1335	1269	600	**10,960**	3500	17664
2	Onion	1335	1269	4500	**17,120**	6500	30724
3	Cabbage	1335	630	600	**14,160**	1500	18225
4	Tomato	2002	1269	3200	**17,420**	4000	27891

Table 16: Recommended crops gross margin profit

S/N	**Selected Crops**	**Production Cost**	cost per quintal	**Yield (qt/ha**	Total product cost/Ha	Gross margin Profit	Remark
1	Potato	17664	600	65	39000	21,336	
2	Onion	30724	800	70	56000	25,276	

3	Cabbage	18225	500	120	60000	41,775	
4	Tomato	27891	800	150	120000	92,109	

The above table shows that production using modern inputs with irrigation is preferable because for an additional expense it resulted in an additional gross margin indicated in the above table. It is also important to note that the gross margin does not measure profit. It shows the contribution of each enterprise to fixed costs, interest and capital expenditure. Therefore, enterprises can be compared on the basis of their gross margins, provided fixed costs are the same.

3.2. Proposed Measures for Markets Improvement

3.2.1. Market facilitation and coordination

1) Small-scale communal irrigation schemes

- Synchronies production with marketing.
- Assess market demand before production.
- Market assessments and surveys carried out by the government and supporting
- Focus on the production of high-quality produce so as to be able to compete with other produce • Form/strengthen WUA/farmer cooperatives and marketing organizations.
- Plan as a group as this increases the bargaining power;.
- Farming should be approached as a business – there is a need to develop marketing skills.
- Diversify; explore the possibility of growing other crops that are high in demand.
- Contract growing with buyers, possibly for export – this provides an assured market.

2) Explore other markets.

- Access roads need to be upgraded and maintained; government and donors have a critical role to play here.
- Collection centres are needed within the communities. These centres can also be used as a meeting place for the community.
- Exchange visits for farmers should be arranged within the country and outside – so as to expose them to other practices and models.

3.2.2. Support system and services

1) Production systems

- Farmers need to adopt an agri-business approach to their operations and be prepared to practice crop rotation and diversification.
- Farmers' organizations should be involved in seed multiplication programmes to enable access to good seeds as well as reduce seed costs.

2) Support systems

General

- Extension service delivery to participating households needs to be improved and strengthened through:
  - Training in irrigation water applications; -
  - setting up demonstration plots; -
  - promoting organic farming and use of compost manures;
  - - farmer exchange visits;
  - Improving access to better farming techniques (less laborious) and
  - post-harvest technology.
  - The contact/model farmers system should be adopted to provide extension directly to farmers

3) Government support

The government has a critical role to play in supporting farmers to realize their potential. The points listed below all relate to what the government needs to do.

- Provide infrastructure support to cooperatives such as storage sheds, equipment, etc, and;
- Provide training in management and maintenance of the infrastructure as well as new extension requirements;
- Ensure that the extension service provides: - new, cost-effective techniques in the utilization of the irrigation equipment
  service to small-scale farmers involved in out-grower schemes; - business skills such as negotiating skills to the farmers' cooperatives;

4) Beneficiaries

- Farmer-based organizations, community-based organizations, WUA, etc., should be established
- Improve marketing linkages/infrastructure and involve private sector participation as a way of increasing support to the farmers;
- Gender issues – women should be encouraged to participate in the process and given leadership roles. Ways of doing this include promoting the formation of women's groups to carry out income generation projects involving processing, storage, postharvest technologies and marketing.

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Appendices

1Appendix Table 1: Household characteristic

No	Variables	Frequency	Percent
1	**sex of the respondent**		
	female	6	20.0
	male	24	80.0
	Total	30	100.0
2	**Marital status of the respondent**		
		1	3.3
	married	27	90.0
	single	2	6.7
	Total	30	100.0
3	**Ethnic of the respondent**		
		1	3.3
	Orthodox	1	3.3
	Muslim	28	93.3
	Total	30	100.0
4	**Educational status of the household head**		
Valid	Illiterate	10	33.3
	Read and write	13	43.3
	Attended grades 1-4	3	10.0
	Attended grades 5-8	2	6.7
	Attended grades 9-10	2	6.7
	Total	30	100.0

Appendix Table 2: Households profile on community participation

No	Participation in community development	Responses					
		Yes		No		Total	
		No	%	No	%	No	%
1	Soil & water	13	65	7	35	20	100
2	Social services	15	75	5	25	20	100
3	Afforestation	17	85	3	15	20	100
4	Road construction	15	75	5	25	20	100
5	Do you like to carry out fattening	16	80	4	20	20	100
6	Receive improved breed	12	60	8	40	20	100
7	Extension, training and credit for livestock	16	80	4	20	20	100
8	Traditional CBOs participation	17	85	3	15	20	100
9	Conservation of feed	16	80	4	20	20	100

Source: Survey data, 2013

Appendix Table3: Households profile on income, food security and constraints

Variables		
Source of income	**Frequency**	**Per cent**
Sale of Crop	7	35
Family members sale of labour	2	10
Sale of livestock	8	40
Borrowing	1	5
Sale of forest product	1	5
Sale of forest product	1	5
Total	20	100
Months HH rely on Yearly produced food		
3-6 **months**	2	5.4
6-9 **months**	4	10.8
9-12 **months**	5	13.5
Total	11	29.7
Main sources water for drinking		
River	7	35
Hand dug well	2	10
Protected spring	6	30
Piped water	5	25
Total	20	100

Source: Survey data, 2013

Appendix Table 4: profile on income, food security and constraints

Months HHs to rely on produced food	Frequency	Per cent
3-6	2	10
6-9	4	20
9-12	5	25
Total	11	55
Main sources of water for drinking and food cooking		
River	7	35
Hand dug well	2	10
Protected spring	6	30
Piped water	5	25
Total	20	100
Major constraints in health services		
No constraint	2	10
Absence of health service in the nearby	1	5
Shortage of medicine	13	65
High treatment and drug cost	4	20
Total	20	100
Second major constraints of health service		
No constraint	2	10
Shortage of medicine	6	30
Lack of health personnel	2	10
High treatment and drug cost	9	45
Lack of accessibility to reach to health centers	1	5
Total	**20**	**100**
What is women's' need ?		
Maternal and child health care	9	45
Credit and saving schemes	3	15
Credit and saving schemes	8	40
All of the above	20	100

Appendix III:- Socio-economic Study: Questionnaire for Household Survey for Small-scale Irrigation Projects

InterviewDate_____ProjectTitle:_____
_____Location_____
Region_____Zone_____Woreda_____Kebele Administration:_____

1. HOUSHOLD CHARACTERSTICS

1.1. Name of the household's head _____

1.2. Sex

1. Male
2. Female

1.3. Age _____

1.4. Religion _____

1.5. Marital Status

1. Single
2. Married
3. Divorced
4. Widowed

1.6.Family size

Male _____

Female _____

Total _____

1.7. Family member's age in number

1. Less than 15yrs ___
2. 15-64 yrs _____
3. Above 64 yrs
4. Total _____

1.8. Ethnic Group _____

1.9. Educational Level

1. Illiterate

2. Read & Write
3. Grade 1-8
4. Grade 9-12
5. Above Grade 12

1.10. What is the main source of income (means of livelihood) of the HH

1. Crop production
2. Livestock Production
3. Equally from crop & livestock Production
4. Forest production
5. Petty trade
6. Others

1.11. What is the secondary source of income (means of livelihood)

1. Crop production
2. Livestock products
3. Forest products
4. Petty trade
5. Off-farming employment
6. Others if any

1.12. Estimates of annual income of the HH from different sources

S.No	Income Sources	Annual income in Birr	Remark
1	Crop production		
2	Sale of livestock		
3	Sale of livestock products (Milk, butter, cheese, egg, skin, honey etc)		
4	Sale of vegetables and fruits		
5	Sale of forest products		
6	Off farm activities		
7	Remittance		
8	Others		
Total			

1.13. Estimates of annual expenditure of the HH for different purposes

S.No	Type of Expenditure	Annual Expenditure in Birr	Remark
1	Food		
2	Clothing		
3	Fuel		
4	Salt, sugar, oil etc		
5	Soap and other sanitation purposes		
6	Treatment		
7	Education		
8	Farm in puts		
9	Others		
Total			

1.14. Were you born here?

1. Yes
2. No

1.15. If no how long have you lived in this area?

1. Less than 10 Yrs,
2. 10 - 20 years,
3. More than 20 years

2. SOCIAL SERVICES

2.1 Education

2.1.1 What type of education do you prefer for your children?

1. Formal education
2. Non-formal education
3. Religious education

2.1.2 How far is the near by formal education institution for the household? In km.

1. 1st cycle, 1-4 _____
2. 2nd cycle 1-8 (5-8) _____
3. High School (9-10) _____
4. Preparatory 11-12 _____
5. Higher education _____

2.1.3 Number of family members attending formal education.

1. Male _____
2. Female _____
3. Total _____

2.1.4 What are the major problems of education in your community?

1. Absence of the school in the nearby
2. Unable to cover school expenses
3. HH demand of children labor

2.2 Health

2.2.1. What is the most common disease prevailing in your area?

1. Malaria
2. Diarrhea
3. TB
4. Intestinal parasite
5. Eye diseases
6. STD
7. Headache
8. Typhoid
9. Others (Specify)

2.2.2

What is the second most common disease prevailing in your area?	Rank
1. Malaria	
2. Diarrhea	
3. TB	
4. Intestinal parasite	
5. Eye diseases	
6. STD	
7. Headache	

8. Typhoid	
9. Others (Specify	

)

2.2.3 Where do you go for treatment when one of your family members gets sick? (More than one questions are possible)

1. Hospital,
2. Health center,
3. Private Clinic
4. Health post
5. Traditional healer
6. Self-treatment
7. Stay at home

2.2.4. What is the major constraint in health services? **More than one question are possible by ranking**

1. Absence of health service in the near by
2. Shortage of medicine
3. Lack of health personnel
4. High treatment and medicine cost
5. Reluctance of the health personnel
6. Lack of accessibility to reach the health services
7. Other

2.2.6. Have you ever received health education on diseases prevention and control?

1. Yes
2. No

2.2.7. Do you agree that immunization for children and women are useful?

1. Yes
2. No

2.2.8 Do you agree that family planning is useful?

1. Yes

2. No

2.2.9. Do you and/or your spouse use family planning service?

1. Yes

2. No

2.2.10 Do you favor to have many children?

1. Yes

2. No

2.2.11 Do you know the mode of transmission of HIV/AIDS from Person to person?

1. Yes

2. No

2.2.12 Do you know what you should do to protect yourself and your family from being infected with HIV/ AIDS?

1. Yes

2. No

2.3 Drinking Water Supply

Main sources of water used for drinking and food cooking? **More than one question are possible by ranking**

1. River
2. Pond
3. Lake
4. Hand Dug Well
5. Protected Spring
6. Not protected Spring
7. Piped Water
8. Others

2.3.1 How far do you travel to fetch water from the major Supply source?

Round trip distance: KM _____ OR _____Minute

2.3.2 Do you pay for water?

1. Yes

2. No

2.3.3 If Yes How much per month in birr _____

2.3.4 Who mainly collect water for the family?

1. Wife
2. Female children
3. Male children
4. Husband
5. All HH members

2.4. Sanitation Facilities

2.4.1. Do you have Toilet?

1. Yes
2. No

2.4.2. Where are you disposing your domestic dry waste?

1. Everywhere
2. In the nearby farming plots
3. In the pit
4. In the nearby natural depression
5. Burning in the fire
6. Open dumping
7. Other

2.5. Transports and Communication

2.5.1. Do you have transportation problems in this area?

1. Yes
2. No

2.5.2. If yes, what is the main problem?

1. There is no road at all
2. The fare is high
3. The road is not good
4. The road is too far
5. Other problem (Specify) _____

2.5.3. How far is the nearest postal service from you area? in KM _____

2.5.4. How far is the nearest telephone service from your area? in KM _____

2.5.5. How far is the nearest Bank service from your area? in KM _____

3. AGRICULTURE AND FOOD SUPPLY

3.1. Land Tenure

3.1.1 Do you have your own land?

1. Yes
2. No

3.1.2 If yes, how much in ha?

Grazing _____

Cultivated _____

Backyard _____

Forestland _____

Total _____

3.1.3 If yes, how much cultivated land in ha?

Rain fed _____

Irrigated _____

3.1.4 Do you have rented **Your own** land for others?

1. Yes
2. No

3.1.5 Do you have rented **Others** farm land?

1. Yes
2. No

3.2 Crop Production

3.2.1 How is the trend of your crop production for the last 5 years?

1. Increasing
2. Decreasing
3. No change

3.2.2 Do your last year's production is sufficient for your family?

1. Yes
2. No

3.2.3 If no, what is the reason?

1. Shortage of farmland
2. Shortage of inputs (seed, fertilizers, farm power etc.
3. Bad weather
4. Other reasons

3.2.4 If no, how do you manage to fill the gap?

1) Family members sale labor
2) sale livestock
3) get remittance
4) Aid from Govt. and or NGO
5) Borrowing
6) Sale of forest products

3.2.5 For how many months of the year your households rely only on the yearly produced crops without external support or buying from market?
1) < 3 months
2) 3-6 Months
3) 6-9 months
4) 9-12 Months

3.2.6 How many quintals of crops (all types) of food do your family requires for 12 Months? _____ _____qt

3.2.7 Do you use any labor from outside other than your family?
1. Yes
2. No

3.2.8 What is the share of crop production contribution of your annual income? Estimate the percentage _____ %

3.2.9 Do you want to change from rain fed to irrigate farming?
1. Yes
2. No

3.3 Livestock Production

3.3.1 Do you own livestock?
1. Yes
2. No

3.3.2 If yes, specify their type and number?

No	Type	Number
1	Cattle	
2	Oxen	
3	Equines (horses, donkeys, mule, camel)	
4	Shoats (goats & Sheep)	
5	Poultry	
6	Bee hives	

3.3.3 What are the main problems of livestock keeping?
1. Shortage of feed
2) Shortage of capital to buy animals
3) Livestock diseases

3.3.4 Do you have enough oxen for Ploughing?

1. Yes
2. No

3.3.5 What is the share of livestock contribution of your annual income?
Estimate the percentage _____ %

3.3.6 What is the source of feed for livestock?
1. Grazing
2. Crop residue
3. Grazing and Crop residue
4. Others (specify) _____

3.3.7 Source of water for livestock
1. River
2. Traditional well
3. Pond
4. Springs
5. Other

3.3.8 Did you provide your livestock any supplemental feed materials during the dry season or during the wet season?
1. Yes
2. No

3.3.9 Do you conserve feed for dry season and wet season (kiremt)?
1. Yes
2. No

3.3.10 If yes, state the type of feed you mostly conserve (only one)
1. Standing hay
2. Cut hay
3. Crop residues
4. Browse (pods, leaves, etc)
5. Other (Name)

3.3.11 was there shortage of animal feed in the recent years?
1. Yes
2. No

3.3.12 what is the first measure you take during feed shortage?
1. Increase sale of livestock
2. Buy feed from other places
3. Collect pods & leaves
4. Borrowing and sharing with others
5. Aid from government and NGOs

3.3.13 What is the second measure you take during feed shortage?
1. Increase sale of livestock
2. Buy feed from other places

3. Collect pods & leaves
4. Borrowing and sharing with others
5. Aid from government and NGOs
6. Off-farm employment
7. Others (specify)

3.3.14 Is the frequency of feed shortage increasing?
1. Yes
2. No

3.3.15 Do you practice apiculture?
1. Yes
2. No

3.3.16 If yes, what number of beehives do you have?
1. Modern _____
2. Traditional _____

3.3.17 who treat your animals?
1. Community Animal Health Workers
2. Local veterinary service
3. Private
4. Black Market
5. Traditional healer

3.3.18 Do you pay for their service?
1. Yes
2. No

3.3.19 How much did you pay in the last 1-year?
1. Below 20 Birr
2. 20-50Birr
3. 60-80Birr
4. 80-100Birr
5. above 100 Birr

3.3.20 You may be advised to reduce the number of livestock, but keep only productive ones under improved management and better feeding. Do you agree to destock (reduce) the number of your livestock?
1. Yes
2. No

3.3.21 Are you willing to conserve livestock feed? If you are provided with the necessary training and material.
1. Yes
2. No

3.3.22 Do you like to carry out fattening and or dairy programs?
1. Yes

2. No

3.3.23 If yes, which one do you like most?

1. Fattening & dairy
2. Fattening
3. Dairy programs

3.3.24 Do you like to receive improved breeds?

1. Yes
2. No

3.3.25 If yes, which types livestock do you like most?

1. Dairy Cattle
2. Beef Cattle
3. Goat
4. Sheep
5. Poultry

3.3.26 Have you ever received any extension service, credit, and training for livestock Production?

1. Yes
2. No

4. SOCIO CULTURAL ISSUES

4.1 In Formal Social organizations

4.1.1 How do people get together to discuss issues of community concerns?

1) Through formal community organization
2) Through Iddir and/or other related informal social organization
3) Through religious leaders
4) Through esteemed elders
5) Others ____

4.1.2 Do you organize or participate in the informal organizations such as Iddir, Debo, Wonfel, Mahber and other similar informal social organizations?

1. Yes
2. No

4.1.3 If yes, state the name of the most important one of the informal associations you organize or participate?

_____

4.2 Community Participation

4.2.1 Have you taken part in any of the following community development programs?

1. Afforestation
    1. Yes
    2. No
2. Soil and water conservation (terracing, soil bund, etc)

1. Yes
2. No

3. Social services (water supply, education, health etc.)
   1. Yes
   2. No
4. Road construction
   1. Yes
   2. No

4.2.2 In what form do you participate?

1. Labor contribution
2. Material provision
3. Money contribution
4. Idea generation

4.3 Community's attitude on the proposed irrigation development

4.3.1 Have you herd of the proposed irrigation development?

1. Yes
2. No

4.3.2 If yes, from whom? _____

4.3.3 Do you accept the proposed development plan?

1. Yes
2. No

4.3.4 If yes, what do you expected from it?

1. Sustainable production and then better income
2. Job opportunity will be created
3. Better infrastructure & social services
4. Other advantages

4.3.5 In what way do you like to contribute or participate for the project in the future?

1. Labor
2. Material
3. Money
4. Labor & material
5. Material & money
6. Idea provision
7. Other

4.3.6 If your perception is negative towards the project, specify your reason:

1. Fear of losing land
2. Fear of losing house
3. Fear of losing trees
4. Reduction of income from crop production

5. Reduction of income from livestock
6. Fear of social disruption

4.4 Gender Issues

4.4.1 Is there sex discrimination in this area?
1. Yes
2. No

4.4.2 Who is the decision maker on the household assets (land, livestock) in your house hold?
1. Husband only
2. Wife
3. Both husbanded and wife
4. All house hold members

4.4.3 Estimate the average working hours for men and women per day:

4.4.4 Do men/husbands participate in the house tasks?
1. Yes
2. No

4.4.5 Do women participate in the decision making of community affairs and development activities?

1. Yes
2. No

4.4.6 Is there Women association in your area?
1. Yes
2. No

4.4.7 What are the most pressing needs of women in this area?
1.Grinding mills
2. Safe water supply
3. Maternal and child health care services
4. Credit and saving schemes

5. Compensation claim: ----------

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6. Food security situation: ----------

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7. Conflict occurrence and resolution mechanism: ----------

Name of the Enumerator _____

Date _____

Address _____

Appendix IV: Focus Group Discussion (FGD) and Key Informant Checklist questions

1. Is there scarcity of water in your area?
2. If yes, what are the traditional coping mechanisms for scarcity of water in your area?
3. What are the types of livestock reared in your area? And your preferences
4. Are there problems in relation to rangeland such as overgrazing, bush encroachment, agricultural land expansion, grazing land use conflict? What should be done to solve these problems?
5. What are the main problems regarding livestock production in your area? What are the possible solutions? (Problem tree analysis)
6. Who plays decisive role in making decisions regarding land use your area?
7. What are the types of crops grow in your area? And your crop preference
8. What are the major problems regarding crop production in your area? What are the possible solutions?
9. What is the wealth category of your area?(Wealth ranking)
10. What are the major social problems (Education, health, water supply and sanitation etc.) in your area?
11. What are the major problems regarding access to infrastructure (road, market, grinding mill, telephone, electricity and other utilities)?
12. Have you heard of the proposed irrigation development?
13. Do you accept the proposed development plan?
14. In what way do you like to contribute or participate for the project in the future
15. Who is the decision maker on the household assets (land, livestock) in your house hold?
16. How do women participate in the decision making of community affairs and development activities?
17. Discuss gender division of labor in the household and in the community.
18. What are the most pressing needs of women in this area
19. Compensation claim in relation to the irrigation scheme establishment
20. Food security situation of your area

21. Is there land use conflict in your area? If yes, what are the main causes of the land use conflict?
22. Are there any conflict resolving mechanisms in for land use conflict in your area? And how do you apply these mechanisms?
23. What are the main development problems? What are the possible solutions? What are the general development opportunities in your area?