

# **OROMIA WATER, MINERAL AND ENERGY BUREAU**

## **FEASIBILITY STUDY AND DETAIL DESIGN OF HARGETI TIRTIRO SMALL SCALE IRRIGATION PROJECT**

### ***Final FEASIBILITY REPORT***

#### **List of Reports**

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**ACRONYM**

ADO	Agricultural Development Office
BoARD	Bureau of Agriculture and Rural Development
BoEPLAU	Bureau of Environmental Protection, Land Administration and Use
BoH	Bureau of Health
BoWME	Bureau of Water, Mines and Energy
DAs	Development agents
WCO	Woreda cooperative office;
WDC	Water distributor committee/Team leader
WMC	Water management committee;
WMEO	Woreda mines and energy office;
WOA	Woreda agriculture office;
WWMEO	Woreda Water, Mines and Energy Office
WWYCAO	Woreda Women, Youth and Children Affairs Office
HABP	Household Asset Building Program
OWME	Oromia Water, Mines and Energy





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## **PART I: SOCIO ECONOMY**



# 1 INTRODUCTION AND BACKGROUND

## 1.1 INTRODUCTION

This socio-economic study report is a component of the feasibility study to identify basic socio-economic features of the project area. The socio-economic report was prepared based on field assessment, data collected at project sites and different stakeholder consultations to depict general socio-economic overview of the intended project area.

## 1.2 RATIONALE OF THE PROJECT

Agriculture is the dominant sector of the Ethiopian economy that contributes over 40% of GDP, 90% of export earning and 85% of employment. However, the sector characterized largely rain fed dependent and severe failures due to shortage of rainfall, climate change and drought as recurrent phenomenon in the country.

There are many interrelated factors to influence crop production and agricultural activities in general. One of the determinant factors is access and availability of water and suitable land that enables crop production. In Ethiopia, despite the availability of potential water and land resource, irrigation development still remained at slow pace and crop production largely rain fall dependent which is determined by climate condition that blamed as major cause and for large number of the population exposure to food shortage.

To overcome the effects of climate change and rainfall shortage, water centered development in agriculture given prime importance more than ever in current agricultural development program with aims to improve the problem with food shortage/food insecurity, growing interest of government and other stakeholders towards promotion of water centered agricultural development among which small scale irrigation is one of the interventions options as stated in government policy directions and AGP.

Irrigation development believed to transform the rainfall dependent traditional subsistence agricultural society into modern and sustainable irrigated agricultural production system. The adoption of sustainable water management and irrigation development with strong linkage to market and other necessary institutions could provide ample opportunity in terms of maintaining sustainable livelihood basis and diversified income source and adding value to the households and coping strategy against climate change and rainfall shortage.

However, from experience in the country, some of the small scale irrigation projects implemented unable to meet intended objective and remained abandoned for various reasons that includes technical, institutional, operation and maintenance, financial management and cost recovery issues and above all lack of community participation from planning through execution and institutional problems in management and operation of the project.

Therefore, assessment of existing socio economic situation and identifying development priority problem is vital important for sustainability of the project.

This report deals socio economic, organization and management aspect of H-Tiritiro irrigation project feasibility study that aims to provide relevant baseline socio economic situation of the project area.

## 1.3 REVIEW OF POLICIES AND STRATEGIES

### 1.3.1 *Plan for Accelerated and Sustained Development to End Poverty (PASDEP)*

The government of Ethiopia adopts development policies and strategies every five years. The Plan for Accelerated and Sustained Development to End Poverty (PASDEP) was adopted for the period 2005/6-2009/10 with aims for accelerated, sustained, and people-centered economic development as well as to pave the groundwork for the attainment of the MDGs by 2015.

As available document reveals, during the PASDEP period, the growth made in agriculture played the key role and the country achieved 11% economic growth and based on the success result of PASDEP, Growth and Transformation Plan (GTP) adopted for the period 2010/11-2014/15.

### 1.3.2 *Growth and Transformation Plan (GTP)*

The Growth and Transformation Plan (GTP) is directed towards achieving an economy which has a modern and productive agricultural sector with enhanced technology and an industrial sector that plays a leading role in the economy; to sustain economic development and secure social justice; and, increase per capita income of citizens so that it reaches at the level of those in middle-income countries.”

In policy direction of GTP, smallholder farming will continue to be the major source of agricultural growth with shift into commercialization. To complement this development objective, concerted policy support also given for private investment in large commercial farms.

Fundamentals of the strategy include the shift to produce high value crops, a special focus on high-potential areas, facilitating the commercialization of agriculture, supporting the development of small and large-scale commercial agriculture where it is feasible. In general, agricultural will direct on placing major effort to support the intensification of marketable farm products by small and large farmers for domestic and export market.

During the GTP period, it is planned to transform agriculture sector to high growth path in order to ensure the food security challenge of the country and to curb inflationary pressure as well as broadening the export base of the country. The sector also serves as a spring board to bring about structural transformation in the long run through contribution to industrial growth. To promote multiple cropping and better cope with climate variability and insure food security, the Growth and Transformation Plan (GTP) has adopted agricultural development strategies that summarized as follows. Fundamental policy directions and agriculture development strategies and focuses include;

- Scaling up production and productivity of land, labor and available natural resource; use based on agro ecological suitability.
- Focus on specialization, diversification and strengthening agricultural production and marketing system.
- Strengthen extension service for majorities of smallholders
- Provide support for the private large scale commercial farms.
- Promotes appropriate use of rain water and other water source,
- Improve water use efficiency through expanding irrigation schemes with special attention to small scale irrigation schemes development.

- Enhance the use improved technologies in water, land and natural resources utilization and conservations
- Strengthen public participation in the planning and implementation and take affirmative actions to enhance women participation at woreda and kebele level; engaging and mobilizing the public in the construction of local infrastructure development activities (road, schools, health stations, irrigation and others).

The shift to a higher growth path, agricultural diversification and commercialization of subsistence agriculture also requires effective marketing system. Modern agricultural marketing systems like the marketing practiced through Ethiopian Commodity Exchanges (ECX) continue with strength through further market research. Investment in marketing infrastructure will also be made with transparent and efficient agricultural marketing systems.

In general, the Agricultural Transformation Plan has adopted range of interventions and public investments directed to basic infrastructure development mainly road, market infrastructures and others to support and scale up the success in economic growth of the country.

In line with the general development policy and strategic framework, several attempts underway in study and design of small scale irrigation project initiated by respective regions with vision towards water centered irrigated agriculture development for small holder benefit through efficient utilization of the existing water resource.

#### **1.4 OBJECTIVES OF THE SOCIO ECONOMIC STUDY**

The main objectives of the socio economic study is to collect, process, analyze and depict baseline socio economic situation of the project area. The study aims to reveal socio economic overview of existing situations mainly beneficiaries socio economic characteristic, identify basic economic and social problems/constraints, development potentials and opportunities, and project impacts in alleviating the social and economic problems of the project area.

#### **1.5 SCOPE OF THE STUDY**

The study deals all about demographic features of the project area, examining the existing economic activities, economic and livelihood basis existing basic social infrastructure and social services, and identifying major economic and social problems, development priorities of the project area. Further, the study attempts to investigate positive and adverse social impacts of the project and stipulate recommendations to intensify the positive aspect and mitigate the possible adverse social impacts due to the project.

In general, the report tried to verify the underlying situations, population and demographic features, economic and social conditions, potentials, problems priorities, opportunities and challenges and assessed farmers perceptions and likely response to the project opportunities, demand and attitude toward implementation of the project. Generally, the scope of task includes, but limited to;

- Asses and identify existing socio economic problems, constraints and social mitigation measures
- Asses gender relations and gender disaggregated data with respect to land access, control over resource, capital and income.
- Assess household economy
- Asses conflicting and or competing demand if any
- Asses unlikely social impacts of the projects

- Asses and evaluate farmers attitude toward the project and
- Asses existing social structures and recommended social structure under which sustainable use and operation of the irrigation system.
- Extent of farmers interest in the project and its implications for project planning

## 1.6 METHODOLOGY

The socioeconomic study report was prepared based on field assessment, site visits as well as primary and secondary data collected at zone, woreda and kebele levels.

### a) Review of available data and report

Relevant primary and secondary data and information required for the study was collected at zone, woreda and kebele level. Pertinent documents on policy issues and development strategic policy direction were reviewed within the framework of the project objective. Primary data required for this study was generated through field assessment and site visits during which discussion were held with different stakeholders and focal groups including interview with individual households.

### b) Discussion with stakeholder institutions

Relevant stockholder institutions and sectoral office contacted at zone, woreda and kebele levels.

### c) Key informant and group Interview

Consultation and communication made with District officials, PA officials, farmers in the project area both individually as well as in group as appropriate and discussed on specific issues related to the proposed irrigation development, existing socio-economic constraints and future plan of the project.

### d) Public Consultation and Focal Group Discussion

Public Consultation and focus group discussion was used in order to know the attitudes, opinions and reactions of the community to the proposed project; group discussion was also made with Kebele leader & command area farmers individually as well as in group.



**Figure 1: Consultation meeting with target communities**

Public consultation was held with community representatives and different segments of the society. The public consultation was facilitated by woreda experts to coordinate the assessment. The participants were drawn from different groups of the society (leaders & elders, Women, Youth, beneficiary Farmers and Kebele executives).

During the discussion, consultation was made with the community openly shared views on irrigation project development plan, explained clearly the duties & responsibilities of the community, government and other stakeholders and have come to consensus to strengthen the existing traditional water user committee in to strong water user association and mobilize labour, material and financial contribution from community and discussed on the strategies that ensure active participation in planning, implementation and sustainable operation of the irrigation system.

### **1.7 LIMITATION OF THE STUDY**

- a) There was shortage of required data at project woreda and kebele.
- b) The consultant tried to assess available or related study documents, but limited available report of preliminary initial assessment which is a kind of desk review with scant information and no other previous study document for the project.

### **1.8 STRUCTURE OF THE REPORT**

The report used descriptive and quantitative analysis approach and tried to give general overview of the woreda and project area specific features. The report is organized in two parts. In Part I presented socio economic report and part II organization and management aspect of the project.





## 2 SOCIO ECONOMIC CHARACTERISTICS

### 2.1 LOCATION AND PHYSICAL FEATURES

Hargeti –Tirtiro irrigation project is located in East Hararghe zone, Gola-Oda woreda about 41 km from Burka Woreda town. The irrigation water source is diversion from Modjo river that flow in between two adjacent kebele (Hargetti and Tirtiro). The project is expected to serve communities in the two kebele

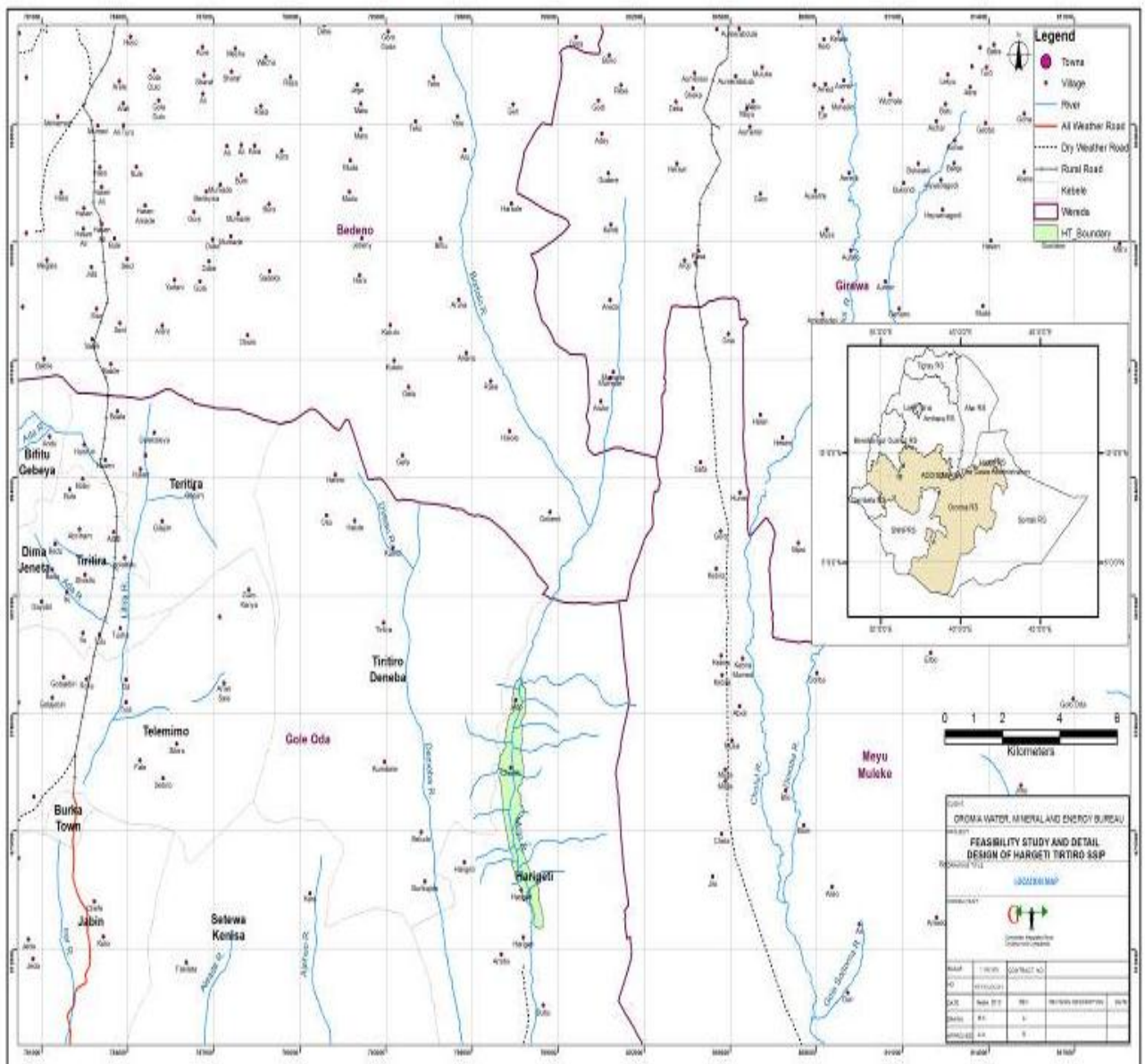


Figure 2: Location map Hargeti-Tirtiro SSIP

## 2.2 POPULATION AND DEMOGRAPHIC FEATURES

### 2.2.1 General

Development intervention project intended to contribute human and general socioeconomic improvement of the target people and understanding population and demographic dynamics is paramount important in development project planning. Population and demographic structures is highly interrelated to agricultural production and planning, food security and market potentials, food supply and demand and it was found important to look the population dynamics widely. Accordingly, population features at zone, woreda and project area presented in section that follows with supporting data as appropriate.

### 2.2.2 East Hararghe Zone

East Hararghe zone is divided in to 19 woredas and the total population is projected to be 3,059,637 (CSA, statistical abstract, 2011).Gola-oda woreda constitutes 3.8% of the total East Hararghe zone as shown in Table 1 below. Based on the CSA population projection (2011), East Hararghe zone population by Woreda indicated in table below.

**Table 2-1: East Hararghe zone –Total population, 2011**

Zone/Woreda	Male	Female	Total	Area (KM2/M2)	Population Density (Person/Km2)	%
East Hararghe zone-Total	1,553,937	1,505,700	3,059,637	17,935	171	100
KombolchaWoreda	79,785	77,659	157,444	304.52	517.00	5.1
Jarsoo "	66,216	64,449	130,665	515.07	253.70	4.3
Gursum "	86,625	84,032	170,657	598.50	285.10	5.6
Babile "	53,323	52,607	105,930	595.64	177.80	3.5
Fedis "	64,164	62,598	126,762	720.79	175.90	4.1
Haromaya	156,282	150,006	306,288	553.99	552.90	10.0
KurfaChalle	33,377	32,631	66,008	243.44	271.10	2.1
Kersa	96,690	95,039	191,729	461.04	415.90	6.3
Meta	142,941	140,108	283,049	753.18	375.80	9.3
Goro-Gutu	82,566	79,017	161,583	546.93	295.40	5.3
Dedar	138,294	133,887	272,181	646.99	420.70	8.9
Melka-Bello	101,644	97,330	198,974	1,391.75	143.00	6.5
Beddenno	135,071	132,705	267,776	821.73	325.90	8.8
Midhega-Tola	43,525	40,997	84,522	1,732.53	48.80	2.8
Chnakisin	50,648	47,496	98,144	778.87	126.00	3.2
Girawa	136,350	132,566	268,916	1,109.41	242.40	8.8
Gola-oda	60,163	56,972	117,135	5,051.60	23.20	3.8
Meyu	26,273	25,601	51,874	1,413.95	36.70	1.7

Source: CSA, Statistical Abstract, 2011

### 2.2.3 Gola-Oda Woreda

Land use and land cover of the woreda assessed for general overview, as the data provided from the woreda finance and agriculture shows about 54% of land covered under bush and used as grazing land.

**Table 2-2: Land use and land cover -Gola-Oda woreda**

Land use	Area (Ha)	%
Cultivated	31743	15
Cultivable	39987	19
Bush forest and grazing land	11,968	54
Others/community use	22140	11
Total	205838	100

Source; Woreda finance and economic development office, 2012

According to woreda finance and economic development data source, 98% of the woreda is characterized as Kolla agro ecology and the other 2% mid high land. Annual rainfall is about 450-550mm. As indicated in the preceding section, the woreda is the largest with respect to land size (5, 51.6km<sup>2</sup>), but the lowest population density which is 23.2 person/km<sup>2</sup>. The low population density of the woreda could be due to various reason mainly agro climate that characterized as low rainfall and less agricultural activities, limited development in basic rural infrastructure like roads, market, limited urbanization and township and others.

The woreda is divided into 17 rural and 1 urban kebeles of which Hargetti and Tirtiro Danaba kebele accounts 5.5% and 3.9% of the woreda population in respective order as depicted in Table 2 that follows.

**Table 2-3: Oda-Gola woreda population size by kebele**

No	Kebele	Male	Female	Total	%
1	Hargeti and Tirtiro kebele	4,448	4,396	8,844	7.4
2	Tirtiro 02	2,826	2,507	5,333	4.5
3	Tirtiro 03	3,271	2,571	5,842	4.9
4	Biftu Nagaya	2,670	2,209	4,829	4.1
5	Tullu Mino	3,652	2,402	6,054	5.1
6	Jaben	2,863	2,271	5,134	4.3
7	Satawa	2915	2316	5231	4.4
8	JiddoMisira	4360	4782	9192	7.7
9	TirtiraDanaba	3570	2983	6553	5.5
10	ModjoHHargeti	2308	2312	4620	3.9
11	DimaMissira	3683	2822	6505	5.5
12	Dimajannata	3157	2734	5891	5.0
13	Gola Nagaya	2511	2375	4836	4.1
14	GorroAbbuu	3459	2709	6168	5.2
15	ChopiDagaga	4804	3608	8412	7.1
16	CophiMi'awa	4514	3496	8010	6.7
17	GaaraGaafa	5346	4368	9714	8.2
	Burka town	4345	3224	7569	6.4
	Total	64,702	54,035	118,737	100.0

Source: CSA, Gola-Oda woreda Finance and economic development, 2011

## 2.3 DESCRIPTION OF THE PROJECT

### 2.3.1 Command area and beneficiaries

The project has diversion irrigation system and the irrigation command area serve two rural Kebeles (Hargetti and Tirtiro).The proposed irrigation project is expected to develop net command area of 307 hectare and expected beneficiaries of about 495 households.

## 2.4 POPULATION AND DEMOGRAPHIC STRUCTURES

### 2.4.1 Population and sex composition

According to woreda Finance and economic development data source, the total population of project kebeles population is 4622 and 6552 in respective order. With regards to sex composition female accounts about 50.5 % and 45.5% of the kebele population in respectively.

### 2.4.2 Population growth

Population growth projection computed for both Mojo Hargeti and Tirtiro Deneba kebeles and for the total population. Based on the average annual growth rate for Oromia region, population

growth projection in the two kebele expected to increase from the current 11,174 to about 19,235 in year 2030. The food demand expected to increase from the current 26,817 quintal to 46,164 quintal during the same period.

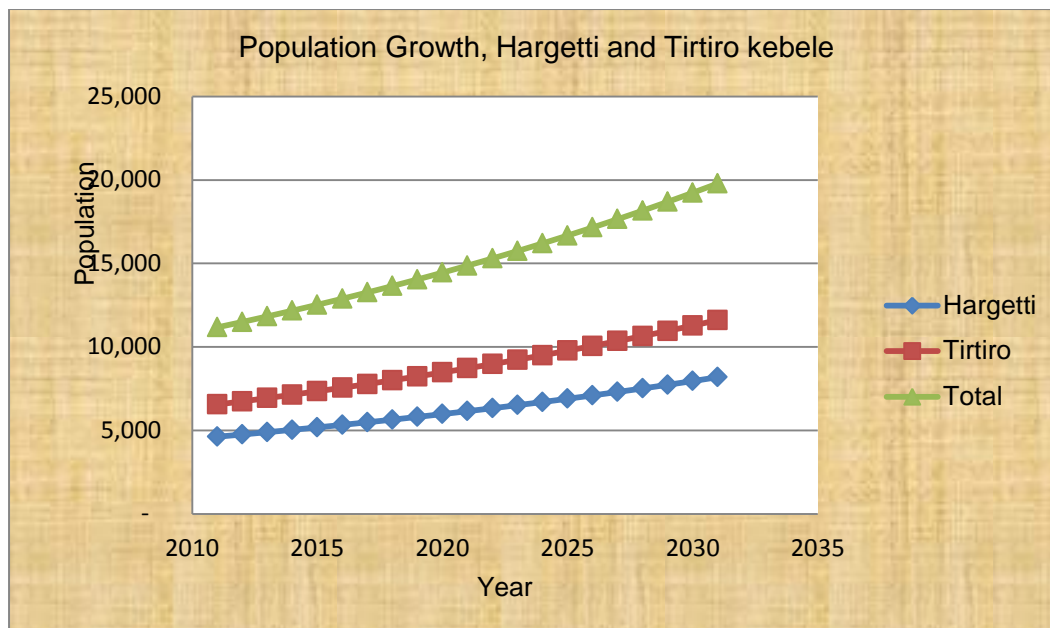


Figure 3: Population growth trend, Hargetti and Tirtiro kebele

#### 2.4.3 Age structure and labour availability

Age structure is one important variable in determining working age population availability of active labour force at the project area. One important implication of the age structure is the concept of dependency and nonproductive labor. Conventionally, those aged between 15-64 years are considered the productive age and the other two extreme below 14 year and above 64 years nonproductive labor.

Accordingly, based on the central statistics agency (CSA) basic data, age structure at project kebele estimated, and age below 14 years; age between 15-64 years, and above 65 years accounts 45%, 51.9% and 3.1% in respective order.

Table 2-4: Age structure Hargetti and Tirtiro kebele

Age group	Hargetti	Tirtiro	Total
Below 14 years	2,079	2949	5,028
15-64 years	2,398	3401	5,799
Above 65 years	143	203	346
Total	4,620	6553	11,173

Source: Estimated based on CSA age structure

It is assumed that age between 15-64 years are productive age group and the other two extreme age groups below 14 years and above 65 years are dependent age group and accordingly 51.9% are in active and productive age group.

With regards to labour availability, a total of about 57999 active age population and there is no competing project for labor at the area and available productive labor force is adequate to mobilize for implementation of the project.

#### 2.4.4 *Family size*

Many factors determine a given community family size and demographic structures. Among these includes religion, marriage structure, household economic status, educational level as well as economic and social importance for children. Household's family size is large in most rural Ethiopia in general and same is at proposed irrigation project area.

In terms of religion all the community at project kebele and command area belongs to Muslim religion affairs. With regards to marriage structures, polygamy marriage structures widely practiced where one male couple with more than one female as family counterpart. As a result, observed high number of children per household head.

Based on the assessment study minimum and maximum family size ranges from 5 to 13 number of family size and six average family size. This indicates high family size compared to the national average of five family sizes that mainly attributed due to cultural, religious, low education level and low awareness in family planning.

The high average household size of the study population appears to be partly indicative of the fact that, they are still characterized by the traditional extended and nuclear family system, whereby women were more exposed to early marriage at their young age and the community's perception to have more children.

#### 2.4.5 *Family Planning Awareness and Practice*

Although, one health extension worker assigned at project kebele and family planning is not yet practically defused and community attitude not yet changed mainly due to religion view and lack of health education. As observed during discussion, male groups strongly resist family planning in the context of religion and importance attached to have more number of children as economic asset. However, majority of women well understood the burden and problem with having more children and changed their attitude. Despite the resistant from male as husband counterpart, there are some women that started and using birth control and in relative terms women have good awareness to practice family planning.

#### 2.4.6 *Population Density and land holding*

Population density and land holding are important factors in determining economic activities and looked to it from different perspectives. According to central statistical abstract (2011), average population density in Oromia region is 106.8 person/km<sup>2</sup> and the average population density for east Hararghe zone is 170.6 person/km<sup>2</sup> and 23.2 person/km<sup>2</sup> in Gola-Oda woreda that clearly shows, project woreda is less populated compared to the national and Oromia regional average .

#### 2.4.7 *Settlement, housing and township*

Acquaintance of settlement pattern of a community is very important in project identification and planning processes. The population density and settlement pattern also has significant implication on the socioeconomic impacts of Irrigation project particularly with activities related to displacement effects and mitigation measures.

Generally, Mojo Hargeti and Tirtiro Deneba Kebeles is characterized as low rainfall and majority of the land area is used for open and communal grazing land. The vast land area surrounding the irrigation command area is bounded by hills mountain bush and forest land that accommodates variety of wildlife like lion, leopard, hyena and others. Some key informants indicate these wild life cause damage and loss of their livestock.

The settlement pattern of Hargeti-Tirtiro SSI command area has quite different nature. The settlement is observed scattered over the command land area of the irrigation project that engaged in crop agriculture. The settlement pattern formed small villages based on extended family and kinship system. Hargeti kebele is divided into about 5 sub kebele and Tirtiro kebele has 11 sub villages and “Gares”.



**Figure 4: Settlement and housing view at project area**

As is the case for most rural areas, the types of housing unit vary in their style associated with purpose, types of construction materials and type of community (Urban or Rural). In view of this, mix of the housing units observed that cover roof constructed from corrugated iron sheet and local thatched roof.

However, majority of the dwelling units have houses made from local materials including wood, mud and thatched roof. Housing units made from wood and corrugated iron sheets are rarely observed in the project area, where as majority of houses have roof made of thatch and wood that have a single room that are shared their room with domestic animals.

#### *2.4.8 Ethnic composition*

The communities in project area are belong to Oromo ethnic group and population migration to the project area is less observed that shows the project area has the low ethnic diffusion and intact with other socio cultural practice. Generally, ethnic composition is characterized as homogeneous tied to family kinship.

#### *2.4.9 Religion*

Consistent with the religious pattern, almost all of the households residing in and around the project area are belong to followers of the Muslim religion and existing religion is intact with others religion outlook.

#### *2.4.10 Social and Cultural Features*

With regards to food intake, chat is widely used as stimulant. Their staple food is sort of porridge usually prepared from the flour of sorghum or maize, which are the major crops produced within and around the project area. Livestock product also serves as supplementary food source.

In terms of religion and social values of the community, a man can marry more than one wives (Polygamy) depending on his economic status mainly livestock possession, ox and land for crop production. Wealth and economic status, mainly livestock is one of the determinant factors to engage where an old aged man couple with teenager girl as far as he own and provides the

required wealth as a prestige. Girls sold in exchange of livestock and disregarding age and other criteria for their male counterpart who is against women's right.

In terms of ethnicity characterized as homogeneous belongs to Oromo ethnic group and no ethnic tensions observed in the project area. However, it is bordered with Somali in south east and their livestock use grazing land and water from the proposed Modjo river, but allowed on mutual understanding and less likely incidence of conflict. Except such circumstance, the community at project area is sedentary agriculturalists and no significant conflict to be mentioned as a problem.

Socio cultural change expected with implementation of the irrigation project and construction of the road that underway to connect with woreda town is expected to contribute market access, skill and knowledge transfer mainly in agriculture and irrigation development.

## **2.5 ECONOMIC ACTIVITIES AND LIVELIHOOD BASIS**

### *2.5.1 Economic and livelihood base*

In general, agriculture is the economic and livelihood bases of the community and crop production contributes the major share and mainstay of the household economy at project area.

### *2.5.2 Estimated income and income source*

As estimated about 70% of the household economy depends on crop and farm activities and the remaining 30% derived from livestock as supplementary economic activities. Other income from off farm activities and/or like apiculture, fishery or other economic activities contributing income and food source is limited and insignificant to be mentioned.

## **2.6 AGRICULTURE AND CROP PRODUCTION**

### *2.6.1 Land use*

The Constitution of the Federal Democratic Republic of Ethiopia (1995) on article 40.3 states the public ownership of both rural and urban land as well as all natural resources. It further states that land is common property of the Ethiopian people and cannot be subject to sale or to other means of exchange.

Nonetheless, in Mojo Hargeti and Tirtiro Deneba Kebeles communal ownership of grazing land is a dominant land use. However, owing to available water from Modjo River at proposed project area, the irrigable land is intensively cultivated by individual farmer and land holding entitlement is inherited from family. Availability of Modjo water source with moderately suitable land topography in dry moisture area is major deriving factors envisaged irrigation project to be feasible owing to attaining the objectives of food security and rural development.

### *2.6.2 Land holding size and beneficiaries*

Land holding size determines production and productivity in agriculture and land access and important to give overview of land access and land holding size at project area. According to the assessment result, land holding size ranges minimum of 0.25 hectare to maximum of 1 hectare and the average land holding size is expected below one hectare and the average is 0.62hecatre per household taken for the project.

Majority of the household (58%) land holding size is below one hectare and about 42% of household land holding size ranges 1-1.5hecatre and the average 0.75hecatre. Moreover, except the irrigable command area, adjoining land topography is covered mountain bush and

forest and is not suitable for rainfed agriculture and livelihood and crop production largely depend on intensive cultivation of the river side. As a result, land access for the youth limited and some youth have no access to farming plots on the irrigable area.

Farm access and possession of land is mainly through family inheritance and there was no land redistribution. However, key informants indicate sharecropping and cash rentals are optional sources to access land for cultivation. Destitute households those unable to cultivate their land goes for out sources their land for others

The project area is surrounded by hills, rugged mountains and bush forest at left and right side which is difficult for cultivation. The only suitable topography for cultivation is the proposed project area of Modjo river side. This land is fragmented through inheritance. This may have an increasing trend in due course due to increasing family size, limited irrigable land area and combined with scarcity of farmland.

The woreda has relatively low population density, but the project area and site specific feature is somewhat different. The project area has limited agriculture expansion due to difficult topography, hills and mountain and survival of the people depend on intensive cultivation at the side of Modjo River and high population density. Coupled with the limited opportunities for agricultural expansion and off-farm job opportunities as well as high family size significantly diminished irrigable farmland per households.

Climate factors (Kolla agro ecology), high family size, increasing population growth, limited farm land and fragmentation of the land coupled with limited application of agricultural input and other factor are some of the causes for low production and food insecurity at the project area. Considering food shortage and vulnerability of the people in the project area, the government and concerned bodies should duly act on through appropriate measures, which are directed towards improving efficient utilization of water and land resource in the area to improve food security situation.

### *2.6.3 Rain fed crop production*

Major economic base of the project area derived from crop production (70%) and livestock (30%). As farmers indicates, among other crops that can adopt to grow includes maize, sweet potatoes, peas, sesame, pepper, tomato, onion, sugarcane, banana and chat. Maize and sweet potatoes are widely grown. Maize and sweet potatoes are used mainly for food consumption whereas chat and banana generate income source to meet family financial needs.

In general, at existing condition, maize and sweet potato are the most important crops to meet the family food demand and the intended cropping patterns with development of the irrigation project require giving priority for local food crops as well as high market value crops that meet local market demand to generate household income.

### *2.6.4 Irrigated crops*

Existing irrigation practice was assessed at woreda and project area specific situation. There are also considerable numbers of farmers who are practicing irrigation farming at the area.

As key informants witness, traditional irrigation exists since long years of time immemorial and probably five to six generation as explained by the community group. Irrigation is not a new practice to the area and large land area is under cultivation by traditional irrigation from Modjo river water source. Mixed cropping is practiced in which farmers maximize their production and minimize risk through planting of different crops on their holding. Irrigated crop production in Mojo Hargeti and Tirtiro Deneba Kebeles is shown below.



**Table 2-5: Irrigated crop production in Hargeti and Tirtiro kebele, 2011/12**

Crop	Mojo Hargeti		Tirtiro Deneba	
	Area	Production (Qt)	Area	Production
Maize	447	8940	71	1420
Sweet Potato	5	475	4	380
Banana	3	300	3	300
Chat	25	450	8	144

Source; Woreda pastoralist and agricultural development office,

### 2.6.5 Traditional irrigation practice and beneficiaries

As to available data source and observed at project area both side of Modjo river used under traditional irrigation a total of over 480 hectare with about 512 and 240 households beneficiaries in Mojo Hargeti and Tirtiro Deneba Kebeles and total 752 households practicing irrigation in Modjo river catchment as part of their livelihood. In addition to Modjo, there are also some spring source from swamp area at downstream and used for traditional irrigation. Crops like maize, sweet potato, chat and fruits mainly banana are dominantly produced crops using irrigation from Modjo river water source that intended for irrigation development. Existing traditional irrigation schemes are managed by local Water Users Committee.

**Table 2-6: Traditional irrigation and beneficiaries**

Project sites/kebele	Male	Female	Total
Hargeti	430	82	512
Tirtiro	234	6	240
Total	664	88	752

Source: Woreda and kebele data given by assigned Irrigation expert and study coordinator

There exist 10 and 3 traditional irrigation canals in Mojo Hrgetti and Tirtiro Deneba kebele respectively. The irrigation schemes are built by local people knowledge and labour contribution without government or NGOs involvement in the past long years and passing from generation to generation on sustainable basis.

With regards to attitudes of direct and indirect beneficiaries of the proposed project towards its implementation, community expressed high interest and desire. The positive attitude towards the project implementation is highly related to long years traditional irrigation experience and understanding of benefit and contribution from irrigation and expectation to achieve improved irrigation system. Traditional weir site are constructed from local materials mainly wood, banana leaves and stone band.

As indicated by farmers group, these traditional structures frequently damage and taken away by flood during rainy season and exploiting their labor and time, causing loss of energy and labor productivity as well as misuse/inefficient utilization of water and agricultural land.

### 2.6.6 Agricultural input supply and accessibility

#### Input supply and utilisation

Modern input mainly fertilizer use is almost nonexistent in the project area; the main reason attributed to their low commercial input use was rainfall shortage, limited knowledge due to inadequate extension service, input supply access at near the project area and increasing price of agricultural input and farmers fear of risk and avert.

According to the information obtained during field survey, the main reason for limited use of inorganic fertilizers (DAP and Urea) was moisture stress due to erratic pattern of rainfall, supply shortage, higher price and limited extension on improved input use.

Despite the limitation in commercial fertilizer, the plain land fertility is maintained by silt accumulation from river overflow and flooding. Some farmers are using animal dung for fertilizing their plots. This traditional land management practice associated with its plain topography helps the land to maintain its relative fertility. The use of organic fertilizer such as compost, animal dung is comparatively increasing for its easily availability, traditionally accepted and adopted with less risk. Farmers at the project area do not use improved seed and use low yielding local crop varieties. In general, agricultural inputs are not yet widely used due to different reasons like weak extension support, fear of natural hazards, high price of inputs, lack of input supplier near the area, lack of training and experience sharing... etc. In a nutshell, crop production is influenced by wide range of constraints poor cultural practices, low input use, and moisture stress...etc.

Generally, agricultural inputs and improved techniques is still rudimentary and needs more emphasis with introduction of the irrigation project to attain project objectives.

### 2.6.7 Input price trend

Increasing price of fertilizer and agricultural input indicated as major problems as to majority of the farmers view. Main challenge in input use includes increasing price of agricultural input, knowledge and skills in fertilizer application.

**Table 2-7: Agricultural input price trend (Birr/Qt)**

Year	Fertilizer		Improved seeds			
	DAP	UREA	Maize	Sorghum	Onion	wheat
2001	-	-	-	-	-	-
2002	874	699	-	1200	630	650
2003	1058	920	-	1800	850	650
2004	1586.8	1274.14	-	1600	1200	1008

Source: Gola-Oda woreda agriculture office

### 2.6.8 Agricultural extension

Agricultural extension service in Gola-Oda woreda is currently low, but with improvement. According to the woreda Finance and economic development data source, from year 2002 to 2003 E.C farmers training centers increased from 12 to 15, development agents increased from 32 to 47 and number of farmers covered in extension service increased from 17,558 to 17,997 during same period.

**Table 2-8: Extension service coverage, Gola-Odaworeda,2012**

Gola-Oda Woreda	unit	2002	2003
Land area	KM2	298,817	298,812
No of kebele	No	17	17
No of DAs	No	32	47
No of farmers covered in extension service	No	17558	17997
No FTC	No	12	15

Source: Gola-oda woreda agriculture and pastoralist development office

Farmers training center/FTC constructed very recently (2004 E.C) and two DA's also assigned for project kebele, but farmer training not actually undertaken and needs to strengthen the extension service in the future irrigated agriculture improvement to the area.

Training and extension in most case considered as an integral parts of irrigation projects. Currently, there is no training given in agricultural extension, irrigation development in particular. Therefore, training and extension should be considered as a strategy to introduce skills and knowledge and other appropriate technologies to achieve intended development to

objectives of the project. Technical training needs to be given for both women and men groups as well as implementing partner staffs, i.e. development agents and other technical experts at woreda office. Both women and men need to be included in extension and training particularly irrigation management (water management, Operation and management...etc)

## 2.7 LIVESTOCK DEVELOPMENT

Livestock play a significant role that contributes the second major livelihood source next to crop production. The sector is major sources of farm power, milk and other products as supplementary food and income source.

Livestock rearing is commonly practiced at home stead as well as on open grazing bush land mountain areas. Cattle and Goats are the dominant livestock in the area. As to the current assessment, on the average household owns average of 20 cattle and about 20-25 goats. Equines and poultry is also high, but livestock like sheep, other pack animals are less available and insignificant to be mentioned. As key informants indicate camels are getting expensive and less likely available by few household and considered as wealth prestige.

The situation at woreda level is quite different and available data reveals that camel accounts the lion share followed by cattle. This indicates the important role of camel and cattle play in the woreda.

### Grazing land and animal feed

The project kebeles (Mojo Hargeti and Tirtiro Deneba) are surrounded by hill mountain bush forest land that used as grazing land. However, animal fodder is not available as required and stiff competition on natural bush land with livestock from neighbor woreda pastoralist areas. There is no improved fodder type and animal feed use natural forest and crop residue at home stead.



Figure 5: A livestock feeding on crop residue at herd

In general, Hararghe and surrounding is known for potential livestock, but constraints in livestock feed and low yielding livestock breed and livestock disease like foot and mouth disease. There is no animal health clinic as observed during undertaking this study, and farmer indicates as it is on construction at Tirtiro Deneba kebele center, but it takes about 2hours distance from the project sites and less likely to contribute livestock health improvement. With regards to livestock feeding households were reported that, they are willing to conserve livestock feeds if they are provided with necessary trainings and materials and willingness to receive improved breeds, if there is an opportunity to do so.

## 2.8 OFF-FARM ACTIVITIES

In some rural area, off-farm income generation activity contributes supplementary income and employment for the rural household. However, it depends on various factors mainly resource availability, urban-rural linkage...etc. Apiculture is found to be one of the best options to support households' economy. However, beekeeping is not common activity in the area and mainly due to less extension work to encourage farmers to engage in this sector.

The opportunities for off-farm activities such as, handcrafting, petty trading of agricultural and industrial products, promotion of services, and development of wage employment...etc is not observed to be mentioned.

In any case, it could be recognized that off-farm activities could potentially contribute towards rural disguised unemployment, supplement households' income, even reduce the pressure on land through creating support service like artisans, blacksmiths for agricultural mechanizations, thereby improving the farming practice. In general, participation of community in off-farm income generating activities has been observed very low.

Therefore, off-farm income generating sector appears to be an area of concern to be focused for the generation of productive employment through the devised rural development strategy. Thus, intervention programs planned by development partners like NGOs should be geared highly towards introducing skills/cottage industries through strategic linkage and integrating it with agricultural technologies of at least producing farm tools and others at local area.

Other off farm activities like at least sale of firewood/forest products as supplementary livelihood and income source not observed as elsewhere since urban/township is far from the area and characterized low urban population and less to influence market demand for such product.

## 2.9 FOOD SECURITY SITUATION

Small scale irrigation primarily aims to meet family and local food demand and food security situation assessed within zone, woreda and project area specific situation. East Haraghe zone has 19 woredas and indicated that all woredas are food deficits. According to zone disaster prevention and preparedness commission, of the total of 541 kebeles in the zone, and 366 kebele are in food deficits that covered and served under safety net. The safety net program is designed for poor of the poorest and critical food supply shortage. During undertaking this study, a total of 422,043 or about 15.4% of zone population in food deficit and under safety net food support.

In Gola-Odaworeda a total of about 17,000 people are in food deficits and covered under safety net food support and a total of 10,200 quintals provided every month as food support for the current year 2004 E.C.



**Figure 6: Hargeti and Tirtiro farmers at food distribution center.**

In addition to safety net, school feeding and nutritional food and haricot bean also provided to supplement food shortage gaps. As information obtained from Woreda Pastoralist, Rural and Agriculture Development Office, there has been no year without the provision of relief assistance to the Woreda people since year 1997 E.C

**Table 2-9: Safety net beneficiaries, Gola-Oda woreda by kebele, 2004 E.C**

	Kebele	Beneficiaries
1	Hargeti and Tirtiro kebele	600
2	Tirtiro 02	1200
3	Tirtiro 03	1400
4	Biftu Nagaya	1125
5	Tullu Mino	1400
6	Jaben	1500
7	Satawa	900
8	JiddoMisira	900
9	TirtiraDanaba	975
10	Modjo Hargeti	500
11	DimaMissira	1200
12	Dimajannata	1100
13	Gola Nagaya	900
14	GorroAbbuu	900
15	Chopi Dagaga	800
16	CophiMi'awa	800
17	GaaraGaafa	800
	Burka town	
	Total	17,000

Source: Gola-Oda woreda, pastoralist and agriculture development office, food security Division, 2004

With regards to the project area, 975 and 500 household beneficiaries and key informants indicates that, relatively, people around the river and water source area are in better economic and food supply status and during critical food shortage neighbor people share available food from the project area. However, since few past years, climate change and decreasing rain fall causing low production of agricultural output. Major food shortage period is from April-June. Food crops are met from aid source confronting with long distance loading due to the very inaccessible transportation problems after disposing Burka woreda town.

In general, less effort made for improving irrigation as food shortage coping mechanism and rather existing coping practice give focus on safety net, school feeding which of course tends to impose dependency syndrome in the short or long time period. As zone disaster prevention

and preparedness office explained, East Hararghe zone is generally one of the food deficit areas of Oromia region, in the worst case resettlement undertaken within the pocket area of the zone and other zones of Oromia region.

Household asset building program (HABP) also initiated with aims to develop household asset on self-support and sustainable basis which is encouraging, but for long lasting solution small scale irrigation needs to develop and existing traditional irrigation recommended for improvement to enhance increased crop production at household level there by for local consumption.

The causes of food shortage and thereby food insecurity are multifaceted and varying from place to place. With regards to East Hararghe zone and Gola-oda woreda in particular erratic rainfall, population pressure and fragmented farmland, land degradation and cultural cropping and farm practice, poor working culture were reported to be the major causes of food shortage.

Among all suggestions, introducing modern agricultural methods and improving working culture are the first two priority measures to reduce food shortage problem. Households have shown interest to use various agricultural technologies, i.e., crop, livestock, natural resource and irrigation packages to improve their livelihood options. In addition, the majority of the respondents consume chat and poor balanced and nutritious diet that directly or indirectly contributes low labor productivity.

Rural households in the surveyed areas have developed various alternative measures in response to the problem of food shortage. Among all types of coping mechanisms, public work and direct food support program under safety net and selling of animals are the major options taken as coping mechanism. Other off farm activities like at least sale of forest products as supplementary livelihood and income source not observed as elsewhere since urban/township is far from the area and characterized low urban population and less to influence market demand of such product.

## **2.10 MARKET**

### *2.10.1 Urban- rural market linkage*

Market is very essential for local producers to sell their products and buy other food items and consumable commodities needed for family consumptions. Markets provide facilities for trade, sale and purchase of goods and opportunity to access market information.

As to the case of the project area, market accessibility is difficult and long distance about 2-3 hours on foot walks to arrive the primary market place. According to data obtained from local informants, product is transported by human labour or pack to woreda market which is also characterized as less urbanization and low market population.

Urban and town development is at very low stage in the woreda and project area in particular. There are no industries in the area and no significant employment opportunities and other off-farm activities. Burka as woreda town is the only township in the woreda with urban population of about 6,575 that accounts only 5.3% of the total population, and the rural population nearly accounts 95% of the population. Poor urban -rural linkage and other off farm activities is less likely observed and less prospect to develop in short and medium term period.

Market place (Burka) is small and growing woreda town characterized in less urban population and on top of that located in long distance from the project area and neighbor woreda town is also in far distance, but used as alternative market place. Products like chat and sugar cane loaded on pack animals or human labor to the long distance market place to meet immediate cash needs of the people.

### 2.10.2 Market place and market access

The project area is found in long distance from the only market place of Burka, woreda town. Under some circumstance mainly when high flooding from Modjo River and crossing problem, Neighbor woreda (Melyu) town used as market place.

**Table 2-10: Market place and distance**

No	Market place	Woreda	Distance (Hour on foot walk)
1	Burka	Gola-oda	3
2	Huse	Meliyu-Muluke	6
3	Chulul	Meliyu-Muluke	5
4	Adada	Girawa	10

Source: Key informants

Market place and market day is limited in the project area and neighbor woreda market is in far distance. There is no locally assembled market place found closer to the project and no access to attend at least village markets as primary or second market. Thus, farmers attended only one market place as primary and secondary markets. Generally, market access is limited and households were also asked to identify main market related problems in the study area and consequently, Market distance, road inaccessibility, transportation and communication, product wastage, low demand of the products and cheap price of perishable product were reported as some of the marketing related problems in the area.

### 2.10.3 Agricultural output Marketing

The area is suitable for production of onion, currently; onion is not produced at the area due to market problem related to perishable nature of the product as well as low extension service in selecting high market value crops. Despite all these market constraints, the good news is that, road access to the project sites (41km) is under construction and expected to complete in short time period and will be good opportunity for the market access of irrigated crop production. Price of the agricultural product at project kebele shows increasing trend as data collected at project area indicates;

**Table 2-11: Market price trend at project area (Birr/Qt)**

Crop	2004
Maize	570
Sorghum	550
Ground nut	1250
chat	4500
Onion	750
Potato	670
Tomato	400

Source: Gola-Oda woreda pastoralist and agriculture development office

Crop like onion, potato and tomato less produced and less adopted as food or/and less to generate income source. Market roots and destination is very limited at current time, but road access is on construction that link the project area with woreda town. However, still the woreda market and people purchasing power is low at woreda town and needs to create market arrangement with traders for product marketing to Harer, Diredowa and other domestic market.

Market infrastructure and market system is very traditional in that unit measurement made in estimates and sometimes use local unit called 'Koba' a king of cup and there are also other engaged in barter trade type of marketing where maize exchanged for milk with neighbor Somali community pastoralist grazing their livestock at the project area catchment.

#### 2.10.4 Road, Transport and Communication

The project area is not accessible to road transport not only for market, but also for pregnant women to visit health center. The major transportation problems reported in the study Kebele during the fieldwork are lack of road and transportation and inaccessibility of the available road among others. There is no road link with other neighbor woredas except the woreda town.

Transport and communication services are fundamental factors in determining development endeavors being undertaken in a given locality. Since they provide services to other sectors of the economy, it would be impossible to conceive of social and economic development in the absences of adequate transport and communication infrastructure and services.

In addition, telephone service/ICT/Internet service, electricity are not accessible at project area and even some of these services not accessible at woreda town. Thus, there is urgent need for the improvement and extension of basic infrastructures in the sphere of road, transport and communication.

### 2.11 AGRICULTURE SUPPORT SERVICE

#### 2.11.1 Agricultural Extension Service

There are three development agents and one health extension agents assigned to provide technical support to the farmers. Existing development agents are natural resource, general agriculture and animal development education background and lacks irrigation agronomist required at project area. Moreover, the existing development agents are not provided training and educational support on irrigation and observed gaps to meet required extension service and skill transfer in irrigation to farmers.

This gap is also confirmed by farmers during discussion and with implementation of the project required to assign development agents with irrigation development background. The visit to project area by woreda agriculture and pastoralist development office is also limited and rare as witnessed by farmers may be due to the poor road condition and lack of vehicles and transport service that needs due consideration with implementation of the project.

In general, the existing extension service requires improvement to support the modern irrigation development in irrigation system and canal maintenance, farm operation, agricultural input utilization, irrigation water distribution and efficient water allocation and utilization and others.

#### 2.11.2 Water Users Associations

Irrigation water users cooperatives/associations primarily important for efficient management of irrigation schemes and sustainable operation of the system. In project kebele, traditional irrigation has long years experience and there is traditional water management system and possible to organize functional water user associations (WUA).

The existing traditional irrigation system is guided by elected leaders on each canal. Existing institution and irrigation water management is through local leaders locally called "Malaka Bishani" that distributes water in schedule. Existing Water management is traditional where one or two people manage water distribution. Organizing Water users associations (WUA) is on



progress and the community have the consensus to establish functioning water user association.

### 2.11.3 Agricultural Cooperatives

Agricultural cooperatives primarily important to meet farmers priority agricultural needs of input supply and market arrangement of their agricultural product output. In Gola-Oda woreda there are 18 agricultural developments cooperative and others.

**Table 2-12: Agricultural cooperatives and membership in Gola-Oda woreda**

Type of cooperatives	No of cooperatives	No members
Agricultural Development Cooperatives	18	1006
Credit and saving	8	1175
Multi-purpose	1	14
Non agricultural Cooperatives	2	48
Consumer cooperatives	2	40

Source: woreda agriculture and pastoralist development office

Irrigation usually tends to increase farm product output and in the absence cooperative associations and/or water users association less likely to achieve intended objective of input and output marketing and increased incentives for increased production and income and wellbeing improvement. Woreda agriculture and pastoralist office needs to work hard in developing institutions required to support the irrigation system and agriculture development in general.

In Mojo Hargeti and Tirtiro Deneba Kebeles there is one farmers' cooperative and one credit and saving, but at low operation and not in a position to provide the required service for farmers. As deduced from farmers' group discussion, membership in any of existing cooperative remained low, mainly due to lack of initiatives and committed cooperatives that meet farmers interest. However, farmers' view of the future also assessed and all indicated interest to be a member in the future irrigation cooperatives and existing observed gaps needs to be covered in order to bring meaningful economic benefit to the people.

### 2.11.4 Agricultural credit and saving

One main constraint in many rural areas is the limited access to credit and agricultural input. Expected result of increased agriculture production will realize only with sufficient access for credit and agricultural input for both men and women.

A project called household asset building program (HABP) is operating in the Woreda and providing credit for vulnerable people to build their asset through business activities. The project area is also part of the target area of the program where the vulnerable households are benefiting from the credit facility. The purpose and use of the credit service should be for various agricultural activities and input purchase like ox, improved seeds, grain trading, and animal husbandry and needs to introduce and create accessibility for credit service. In general, access to agricultural credit and saving for both men and female is low and needs to be promoted for effective and efficient benefit from the irrigation project.

### 2.11.5 Non-Government Organization And Institutions

There is no other Non-Government Organization or Institution operating at the project kebele and even at woreda level. As available information, Haro Maya university sometimes make oversee visit for research work in the woreda, but has not arrived to the project area may be due to road access problem and recommend to link with such institutions so that farmers get technical advice and knowledge from outside source. Moreover, all development activities

should not left for government and community alone, and effort should be made by woreda administration and others to involve non-government organization for intervention to curb some socio economic problem of the area.

## **2.12 BASIC SOCIAL SERVICE AND INFRASTRUCTURE**

The development of education, health and water supply interventions are important investment sectors for the attainment of social service development in a given district/area. Nonetheless, owing to kola agro climate and others factors, the project area remained marginal for several years from the development of social services and basic social service development is low.

### *2.12.1 Education and school infrastructures*

Education plays a crucial role in the process of social and economic transformation. In its broader social objectives of increasing the stock of knowledge and outlook of the population, raising output and productivity, education stands out as a key factor for poverty reduction. It is also argued that, when farmers are able to acquire basic education, it becomes easy for them to adopt new technology. Cognizant of this fact, education service at project area assessed.

Tirtiro and Argeti kebele being located adjacent to each other bur Modjo River dividing the two kebele and share some basic social service. Although, there exist two schools in Tirtiro kebele, it is far from Tirtiro project sites beneficiaries and use from the school in Hargeti kebele. However, Modjo river sometimes get high flood and difficult for crossing the river mainly children and girls and indicated as problem in education. The school service is lower primary (grade 1-4) and there is no alternative after 4th grade and cause for school dropout for both male and females. As the data from woreda education office indicates school dropout is 21.3%.

Like in most parts of pastoral Ethiopia girls and children education constraints and buriers includes attributed to kola agro climate and migration, water shortage and school dropout and wrong attitude for girls education, i.e. Marriage is through family arrangement with wealth as priority to engage girls for male counterpart. As s result, family prefers girls to stay at home and arrange for marriage and high girls school dropout.

### *2.12.2 Health and health related disease*

#### **Health infrastructures**

Status of health has a direct relationship with development in that it can negatively affect the human element or labor productivity. Project kebele health infrastructure is not adequate and existing health service located long distance from project area. There is no health post near the project. The only health infrastructure is one health center that located in Galo sub kebele in a distance of about 2-3 hours on foot walk. The health center was established recently (2004) with finance from health care financing by Federal Ministry of health. It serves five kebeles (Modjo Hargeti, Setawa, Gido, Tirtiro-Daneba and Bareda Lencha). It takes a minimum of 1-2 hours to access health post at Tirtiro and Hargeti and recommended to establish at least health post service in project areas. With regards to health workers, there are 13 health experts working in the health center and 10 health extension workers under the supervision of the health center assigned in each. As indicated two extension workers assigned in each kebele, but in actual only one exist during the study and due high turnover.

**Table 2-13: Number of health professionals at Hargeti and Tirtiro health center**

Health infrastructure	Male	Female
Clinical	11	-
Public	1	-
Druggist	1	-
Health extension workers	-	10

Source; Hargeti-Tirtiro health center

### Human disease

Malaria and water related problems are the major health related disease as to the communities at project area. High malaria infection and outbreak exist for 3-4 month beginning from July-October. As indicated by the key informants at the health center, irrigation could aggravate the situation and needs prevention intervention to avoid the related health risk from malaria infection. Existing ten top diseases at the project kebele indicated in table 13

**Table 2-14: Ten top disease at project kebele (Hargeti and Tirtiro kebele)**

No	Disease	No of cases	%
1	Fighting case	224	5.8
2	Intestinal parasites	475	12.4
3	Gastritis	345	9.0
4	UTI-Urinary tract infections	342	8.9
5	STI-Sexual transmitted infections	113	2.9
6	Accident case	278	7.2
7	Nemonia	665	17.3
8	Malaria	560	14.6
9	Dehariea	700	18.2
10	Malnutrition	142	3.7
	Total	3844	100.0

Source: Hargeti health center

As can be concluded from the ten top disease of the project area, malaria and other water related health observed among the ten top diseases and needs proper prevention options. Currently, prevention and malaria control is through ITN, DDT, Quartem treatment, and draining of swampy area by community mobilization. Major problem related with human health includes lack of incinerators and environmental pollution, health expert turn over, medical supplies...etc.

#### 2.12.3 Water supply

The majority of the people use water for drinking from unprotected sources mainly Modjo rivers and Modjo river. Water is scarce at the project area and existing water resource needs to be planned, harmonized and prioritized for efficient allocation of available water source. Water supply coverage in the woreda is 46.8%. At Hargeti kebele, there is one deep well and there is no any water supply schemes in Tirtiro kebele and majority use traditional river.



**Figure 7: A women fetching Modjo river for domestic water consumption**

Animal and human use from the same river source and the proposed irrigation is also from this source and needs adequate allocation of water for human, livestock and irrigation use. It is also recommended to improve the water supply for human consumption and cattle trough for livestock.

#### 2.12.4 Source of Energy

Regarding sources of energy, majority of households are in use of wood, cow dung and crop residue as source of fuel for cooking and less access for using kerosene or other source of energy. Crop residue is also used as animal feed and no longer available as organic fertilizer for improving soil fertility. In general, energy and livelihood depend on natural resource with increasing agricultural expansion at the expense of wood and shrubs, deforestation and less practice for forestation; the direct consequence of this in the long run inevitably to impact and ends up negative agro ecology of the area and influence food security situation unless proper water, land and natural resource management is in place.

### 2.13 GENDER ISSUES

Gender is seen as a social construct that determines the way in which social relations are structured between men and women and it is central to how society assigns roles. It focuses not only on women but also looks at ways in which men and women interact with each other, the gendered nature of economic and social activities role, relations and control over resources.

With regards to gender relation, women involve in all household chores water fetching, firewood collecting, cooking, marketing and also other farm activities as required. In addition, biologically are to give birth and have no saying in family planning and involve in giving child care rearing and child care besides the house chores and most vulnerable to work overload. Women give backup support in farm activities and required to visit farm place. The following picture was taken at neighbour kebele with a women carrying child on her back, dish for husband at farm area on her head and coffee and water in both hand which is complete reality on the ground at the project area.



**Figure 8: Women life situation at project area**

In marriage structure girls and women considered as commodities and sold for male counterpart without their willingness. Wealth status is the only criteria and an old aged man can marry a teenager girl with consents of their family. As a result, girl drop out is high. The economic and social status of women is as miserable as ever. Women are still subordinate to men in all spheres of life, and traditional practices that violate the legal and human rights of women are still practiced. Among the harmful traditional practices prevalent in the area, early marriage, female genital mutilation is still practiced.

Despite the legally acknowledged entitlement of women to own land equally with men since the land reform proclamation, traditionally, they are neither entitled to inherit the wealth of their father, nor to take their share during divorce. It was also observed that, married women have little or no say in decision-making at household and community levels. Concerning gender division of labor, women's share of productive and reproductive activities, burdens of household chores are cumbersome as is the case in most societies. Although considerable improvement is observed regarding school enrollment of girls during the last decade or so, undoubtedly parents still prefer to send their boys to school than their daughters. Even when girls are sent to school, it is very likely that the majority among the dropouts is girls owing to early marriage and also to the distance of schools from homes, which makes difficult the travel of girls by themselves.

Women have also no say in family planning, be it birth spacing or limiting the number of children. There are no micro- finance institutions, which would have contributed to the economic improvement of women. It should be noted that, poverty and economic dependence of women on men is one obstacle in the realization of women's empowerment. Thus, women's economic liberation could be seen as a step towards other social and cultural liberations and their ultimate empowerment.

In a nutshell, the situation of women in the study area is precarious and calls for a concerted effort of all stakeholders and development actors to avert the situation. Although, there is women's affairs office at *woreda* level, the realities in the ground reveal that, not much has been achieved so far in this respect.

Therefore, is a need to rectify the existing inequalities or the unequal spread of benefits among its community members? The project can impact lives positively if properly planned and

engendered with favorable impact on the lives/livelihood strategies of the project-affected persons depending on the way they are implemented.

## **2.14 COMMUNITY PARTICIPATION**

Community participation in planning, implementation and management is believed to ensure sustainable development. Accordingly, participatory discussion made with community embracing the marginalized populations and discussed people attitude about the project and how to play a central role in implementation and management of the project. As noted on the discussion community participation has been high in a forestation, soil and water conservation, construction of social infrastructures such as schools, health facilities, access road constriction and high labor mobilization in traditional irrigation canal development and clearing as witnessed by community on the discussion meeting.

Regarding the proposed irrigation project, communities are willing to contribute their share in the form of free labor contribution and local material supply.

The importance and contribution of irrigation provided lesson from the existing traditional irrigation and communities have strong desire in the development of the irrigation project. As viewed during discussion, communities have willingness to contribute labour for operation and maintenance cost during operation. Moreover, communities have been asked about land loss or relocation if any arise and expressed their full willingness to accept land loss due to canal or other if any arises due to the project and agreed to solve at community level.

### 3 POTENTIAL, OPPORTUNITIES, CONSTRAINTS AND TREATS

#### 3.1 POTENTIALS

Generally, Mojo Hargeti and Tirtiro Deneba Kebelesand surrounding project site is characterised in shortage of rainfall and limited water potential, and the availability Modjo river source and Modjo river considered as potential resource base and the life and livelihood base of the people in contributing human and animal drinking water as well as crop production with suitable land topography.

#### 3.2 OPPORTUNITIES

In the current growth and transformation plan (GTP) agricultural still continued to be the major focus and efficient utilization of land and water resource is the pillars for development in agriculture. Among some opportunity at the project area includes;

- Traditional irrigation has long years experience at the area is valuable opportunity for organizing water user association and sustainable operation of the system.
- The area has suitable irrigable land with fertile soil that would be good opportunity to increase production and productive.
- The project area is also endowed with various sorts of forest natural potential resources by virtue of its endowment of nature and livestock can be promoted as supplementary livelihood source.
- Although, existing basic infrastructures is low and underdeveloped, there are efforts in establishing some of the basic service education, health, road...etc.
- Although, degraded standard, there exist access road to the project that is under construction and can be considered as opportunity for project implementation as well as solving one of the critical road and transportation problem

#### 3.3 CHALLENGES

Some of the multidimensional issues recognized to be the major challenges to the project area includes:

- Recurrent drought and erratic rainfall, and limited water resource
- High flooding from the Modjo river on the vast command areas and cause crop damage every other year.
- Lack of experience in application of agricultural input, mainly fertilizer and improved seeds.
- Low application of agricultural inputs, low yield varieties, traditional cropping pattern
- Inefficient utilization of water resource, land and labour and economic loss/wastage due to limited knowledge and skills without disregarding the long years traditional practice.
- High family size and the resulting pressure on limited irrigable land
- Livestock loss due to wild animals lion, hyena and leopard
- Livestock disease and lack of animal health service
- Poor market infrastructure
- Lack of road and transportation

- Lack of agro-Industry and underdeveloped market and market system. Sales and marketing is based on estimates and no unit of measure like kilogram or quintal and in some circumstance mutual understanding and barter trade practiced.
- Human health problem and distance from health center
- Lacks of nursery sites and on the other side continued over grazing, soil degradation and deforestation
- Lack of banks and financial institutions near the project area
- Poor Infrastructure mainly road access, water supply, school and health post.

### 3.4 PROJECT SOCIAL IMPACTS AND THREATS

#### 3.4.1 *Human Displacement*

The proposed irrigation use diversion system from Modjo River and potential adverse impact assessed if any that expected to arises. Expected displacement due to the project was analyzed at irrigation command area, upper and downstream users. As to the assessment study, proposed irrigation command area is fully used under traditional irrigation and there is no anticipated, displacement or submerged land (settlement, grazing land, crop and forest land area as well as other social values holy place, recreational or aesthetic values). As to the field observation and consultation with local communities, the proposed irrigation water source have been under traditional irrigation since long years and less to anticipate people displacement due to the project.

##### **a) Command area**

The irrigable command area is both side of the river, and the command area serve for Mojo Hargeti and Tirtiro Deneba Kebelesin the left and right side. Majority of the command area is under traditional irrigation and social impacts not expected due to the project.

##### **b) Upper stream users**

In the upper stream there is one sub village/Tura with about 70 household and highly to be included to be served from the project and informed the irrigation design to consider the issue. However, due technical matter some of these groups in the upper stream might not be included and can continue with existing traditional irrigation and no social impacts expected to arise due to the project.

##### **c) Downstream users**

At downstream there is one sub kebele of Hargeti that some of the household group expected to be served from the proposed irrigation system and for the other groups there is water source called "Madda Chaffe" at down side. The project is expected to serve communities in two kebeles and project design considered required amount of water for the downstream animal and human use. Moreover, livestock water trough is proposed in the irrigation design at required place.

#### 3.4.2 *Health impacts*

Irrigation projects in most case tend to accompanied by health related disease mainly malaria and adverse impacts, on health status of communities. The principal causes and level of adverse impacts depend on agro ecology and water management system. In swamp and water logged area creating conditions for the breeding and transmission of vector borne diseases, and drinking water supply and sanitation conditions leading to gastro-intestinal



conditions. Many vector-borne disease problems in irrigated areas is due to absent or inadequate drainage and surface irrigation type impose increased vector-borne disease.

In order to mitigate such health impacts, it needs to consider properly designed irrigation system, improved preventive water management plan at community level, and supply of drugs and other materials as preventive and curative measure.

### 3.4.3 *Competing Demand for Water and Shortage of Water*

The proposed water source from Modjo River has multiple uses for the community including irrigation, drinking water, livestock and considered as source of life to the area in dry agro ecology.

At current condition, over 480 hectare traditional irrigation within the Modjo catchment and a total of about 752 households practicing irrigation as part of their livelihood in both side of the river. The proposed irrigation is planned for land area of 307 hectare and expected to support 495 households. The proposed project should consider equitable water allocation for the proposed command area and other outside the command areas as traditional users.

Therefore, proper consideration should be given to maintain water balance and life in the eco system and planning of the available water is the key issues and proposed for design consideration to take into consideration with proper mitigation measures.

In addition to r planning the water and proper schedule in water distribution requires concerted efforts of water management committee, water distributor and above all conflict resolution committee expected to play the lead role in settlement of conflict within command area, upper or lower side of the river, if any to arises.



## 4 PROJECT BENEFIT & IMPACT

### 4.1 DIRECT BENEFIT/IMPACT

#### a) Food Security and increased income at household level

Currently about 20% of the households at project area are in food shortage/deficits. The introduction of irrigation farming in the area will enable farmers to produce adequate crops with small farmland and thereby ensure sustainable food supply in the area and maximize household income.

#### b) Promotes diversified crops and Income Generating Schemes

Like in many rural areas of Ethiopia, women in project area lack source of income generating scheme which is one of the major problems for women in the project area. Hence, provided women work culture changed, the development of irrigation scheme will enable women to participate in irrigated farming and garden vegetable production and generate income from development of the irrigation schemes.

#### c) Job Opportunity

The project is expected to generate temporary employment during construction and irrigation operation requires additional family labor and reduces the prevailing disguised unemployment labor and increase labour productivity.

### 4.2 OTHER INDIRECT BENEFIT

- Skill, knowledge and Socio- cultural Improvement: The skill- knowledge and cultural diffusion created and farming system and work culture of the households will greatly improve gradually through social interactions and skill transfer.
- Directly or indirectly contributes social infrastructure development like road access and other basic social infrastructure like water supply could improve with the implementation of the project.
- Promotes social Welfare: The proposed project will have greater contribution for increasing social welfare through increasing productivity and enhancing income level of the household.



## 5 CONCLUSION AND RECOMMENDATION

The proposed irrigation project is located in kola agro ecology and about 15- 20% of the population at project area are in food shortage/deficits. The proposed irrigation project serves communities in two adjacent kebeles (Mojo Hargeti and Tirtiro Deneba). The irrigation project net irrigable command area estimated 307 hectare and expected beneficiaries of about 495 households. The economic and livelihood source is derived from crop production and livestock and generally considered as agro-pastoralist. Crop production, although, considered major economic activities, still subsistence level.

Traditional irrigation exist since long years, but inefficient utilization of water resource, land and labour and economic loss/wastage observed due to limited knowledge and skills without disregarding the long years traditional practice knowledge.

The challenges facing the Hargeti-Tirtiro irrigation project area in particular includes climate change, shortage of rainfall, limited water availability coupled with ever increasing and unprecedented family size and population growth...etc.

The socio-economic problem of the study area is multidimensional and calls for a concerted efforts involving all development actors. Based on the discussions made and the outstanding issues discussed in this report, some plausible solutions are forwarded with regard to major socio-economic challenges facing the project area.

- Mojo River cause high flooding from the rugged surface of the mountain edge result high damage on the command area which indicated as priority problem of the community. In proposed irrigation project the issue is addressed the required protection mechanism is proposed. and taken into consideration.
- Traditional irrigation system constructed by local knowledge which is to be appreciated and local materials that damage by flooding every other year requiring high labor and time for maintenance every year. The project is expected to minimize such problems and highly recommended for implementation for efficient allocation of farmers' labor and productivity improvement as well as efficient utilization land and water potentials at the project area.
- Traditional irrigation has long years experience at the project area with traditional community organization and recommends strengthening the existing organizational setup to water users cooperatives and/or water users association for effective management of schemes on sustainable basis.
- The project area is located long distance to the woreda town channelling and enhancing products market at local market facilitating transportation access is paramount important. Strengthening development of rural village and primary market to establish to serve the rural areas and market expansion. In this regard requires to work market linkage to enhance product marketing.
- Like in many other areas of Ethiopia, access to resource primarily depends on gender (women/men), and a lot to be worked to bring attitudinal change to bring women in development activities and benefit from the development ventures.
- Traditional irrigation has proved sustainability from time immemorial and good institutional set up to organize strong water users associations. However, in the organization process women should involve into he labor force and scheme management.

- Strengthening proper implementation of family planning activities. This has greater implications and meaning both to relieve pressures on natural resources, especially farmland and more importantly, to balance population and economic growth,
- Community group at upper stream of the diversion weir highly interested to be covered and benefit from this project. However, technically the weir site selected by considering topographic features and other issues.
- Adverse social impacts of the project assessed at command area, upper and down stream users and no significant social impact due to the project.

In general, social impacts of the project at upper and downstream are insignificant and alternative option indicated for upper and down stream human or animal water use. Proposed projects is planned in drought prone characterized erratic rainfall areas and demand driven, good traditional practice, strong local responsiveness, land and water resource available, etc and socially feasible for implementation.

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## **PART II: ORGANIZATION AND MANAGEMENT**





## 6 INSTITUTIONAL ARRANGEMENT

### 6.1 NEED FOR INSTITUTIONAL ASSESSMENT

The command area for Hargeti and Tirtiro irrigation Project is anticipated to adopt gravity irrigation system, whereby the water flows divided into main canals, secondary canals and within tertiary as well as farm components in both side of the river. The net irrigable land in the command area is envisaged to be about 307 ha and this irrigable land is to be developed for farmers in Mojo Hargeti and Tirtiro Deneba kebeles.

After construction of the irrigation project, formal handing over of the system shall be made to the intended beneficiary community that further demands operation and management of the scheme. Hence, the scheme requires the formal community organization that will take full responsibility of managing the irrigation project.

In order to propose workable organization that ensures sustainable operation of the system, it is required to review existing institutional setup, community organizations, available technical support in training and other capacity building and obtain views and experiences in the project area mainly with respect to irrigated agriculture.

The organization and management aims to identify the institutions at the local and or community level that will be established and formally organized to take over the responsibilities of managing and operation of the proposed Hargeti-Tirtiro irrigation Project. It further aims to enhance the local implementation and management capacities that are expected to result from implementation of the proposed irrigation system towards ensuring the sustainable management of the project.

Accordingly, the future community organizations, the legal framework, promotion & institutional options, irrigation water use and setups of envisaged schemes, as well as by-laws, the extent of required technical support from concerned sector offices or involved organizations and existing practices of irrigation management and related institutional issues are described in section that follows.

### 6.2 EXISTING ORGANIZATION AND MANAGEMENT

#### 6.2.1 *Traditional irrigation practice*

Generally, the project area is characterized low land area and low rainfall and crop production requires high demand for supplementary water source. As a result, traditionally irrigation widely practiced on command area. Land topography adjoining the command area is surrounded by Hill Mountain that used for livestock grazing and crop production limited to plain land area at Modjo river side.

As to available data source and observed at project area both side of Modjo river used under traditional irrigation a total of over 480 hectare with about 512 and 240 households beneficiaries in Mojo Hargeti and Tirtiro Deneba Kebeles and total 752 households practicing irrigation in Modjo river catchment as part of their livelihood. Crops like maize, sweet potato, chat and fruits like banana are produced following the Modjo river side.

In addition to Modjo, at the end side of the command area, there exist other water source called "Madda chaffe" that used as water source for irrigation for downstream users at the end side of the command area.

Traditional weir site are constructed from local materials mainly wood, banana leaves and stone band. As indicated by farmers group, these traditional structures frequently damage and taken away by flood during rainy season and exploiting their labor and time, causing loss of energy and labor productivity as well as misuse/inefficient utilization of water and agricultural land.

### 6.2.2 Existing Irrigation Schemes Organization and Management

The irrigation schemes started since long years that built by local people knowledge and labour and passing from generation to generation on sustainable basis. There exist 10 and 3 traditional irrigation canals in Hargetti and Tirtiro kebele respectively. Existing traditional irrigation schemes are managed by local Water Users Committee.

The institutional assessment and observation at project area reveals that the beneficiaries in the proposed command area have long years traditional and informal community organization for irrigation management. It is traditionally and conventionally managed by traditional institutional management system whereby two people appointed by the community on each canal to distribute water. Each season community provides free labour contribution for canal clearing and other work related with irrigation system and have traditional bylaws tied with penalty, i.e. if one failed to be available for work charged 10birr/day; if one found breaking the canal charged 100 birr as penalty and major action against their irrigation system will be taken up to local court and higher level as required. Hence, based on the existing traditional organization possible to establish strong irrigation management structure to operate & maintain irrigation system on sustainable basis.

### 6.2.3 Community Consultation and Participation

As the organization and management assessment prevails, the farmers in the project area have good attitude for implementation of the envisaged irrigation project. As the results of community consultation in the project area, they have committed and promised the following issues;

- They are fully aware of the importance of irrigated agriculture and willing to use all irrigable land in the command area on equitable basis and mutual benefit to meet food security and local development.
- The beneficiaries are willing to fully participate in construction through labor contribution and to take responsibility of O & M of the scheme then after.
- They are willingly agreed to establish the required Water Users Association to properly utilize the water and for sustainable operation and management of their irrigation scheme.
- Moreover, they decided to carry out required maintenance of irrigation structures, main & secondary canals and any in-farm structures by themselves and cooperatively manage the scheme through their community organization or Association.

### 6.2.4 Local Administration Support to the Scheme

The local administration including Kebele and Woreda authorities were consulted regarding implementation and management of the project. Consultation was made with Woreda administrative as well as community at command area, including community leaders were participated on the consultation meeting and discussion was made as regards to importance of the project in relation with their roles & responsibility during and after construction of the development scheme. Accordingly, it was realized that the local decision makers and concerned stakeholders have positive attitude towards implementation of the project.

Finally, the local authorities are agreed to organize community and resolve any problems that will arise on land use, water distribution and management of command area throughout study,

construction, operation and implementation of the project and planning for efficient and equitable land and water allocation.

### **6.3 PROPOSED PROJECT AND ORGANIZATIONAL STRUCTURES**

#### *6.3.1 General*

The target in institutional arrangement is that, the envisaged irrigation project essentially is intended to be farmer-managed and the command area farmers are expected to be fully involved in the planning, design and construction of the scheme, after which they are to own and manage as well as operate and maintain the systems on sustainable manner. With this objective, the organizational structure for irrigation schemes proposed based on water source, settlement pattern and irrigation system structures, explicitly to function for the user farmers community management level.

#### *6.3.2 Project command area and beneficiaries*

The project scheme is anticipated to serve Mojo Hargeti and Tirtiro Deneba Kebelesfound in the proposed command area and irrigation infrastructure is planned to be diversion irrigation system for the people living in the aforementioned command area. The intended proposed irrigation project is planned for net irrigable area of 307 hectare and estimated beneficiaries of about 495 households.

#### *6.3.3 Proposed Organizational Arrangements*

An organizational setup for irrigation scheme management expresses the way the roles, responsibilities and ownership is organized among the various institutions and involved stakeholders, whereby their respective duties and extent of involvement is materialized through suitable institutional arrangements.

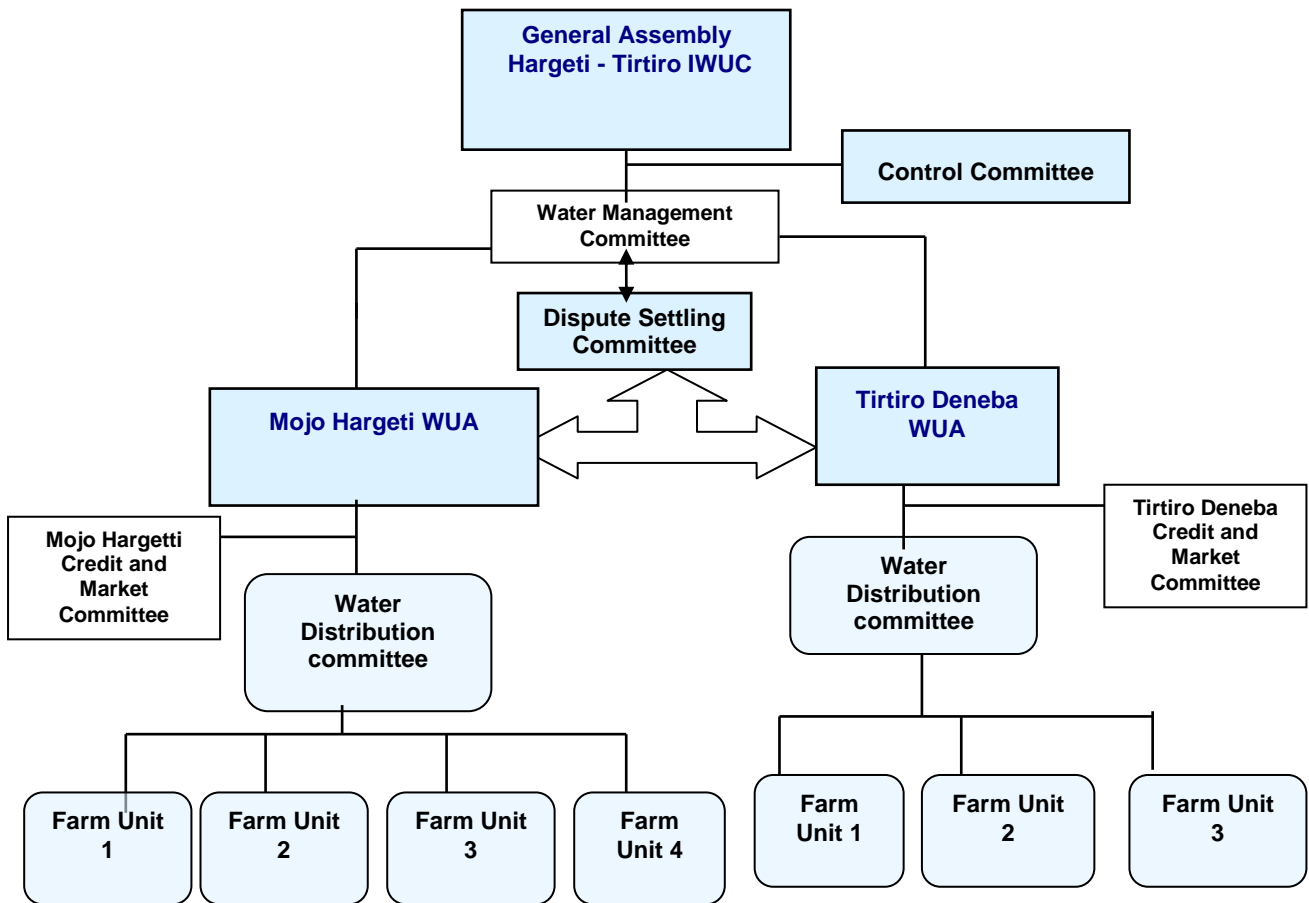
As the existing experience in the country shows, regardless of the traditional arrangements, the farmer organizations can be established either in Water Users Association (WUA) or in Irrigation Water Users' Cooperatives (IWUC). The prevalent practice indicates that water user association operate as local community based organization and sustained for long; whereas cooperatives are the higher stages of the farmers' organizations below the unions. Currently the roles and mandates of both WUAs and IWUCs are varied. These two organizational setups are addressed in this study as option for appropriate implementation purpose.

#### *6.3.4 Irrigation Water Users Cooperatives (IWUC)*

The anticipated user communities from the Irrigation scheme are communities in two kebeles (Hargeti and Tirtiro kebeles) and therefore, both kebele will have one higher Irrigation water users cooperatives and each to establish their own water users associations.

The fact that beneficiaries are in two Kebeles of Hargeti and Tirtiro kebele, needs to organize one users own management umbrella and two water users associations for the sustainability of schemes towards achievement of overall agricultural sector objectives.

Therefore, the general organization structure for Hargeti-Tirtiro irrigation system established in the form of irrigation water users cooperative (IWUC) that will have a higher water management board and two water users associations with General Assembly and sub committees as water distribution committee as follows.



**Figure 9: Proposed Organizational Setup for Hargeti-Tirtiro - IWUC's**

The farm unit represents the beneficiaries using from each secondary canal. These four farm unit level water users' committees are represented in water distribution committee.

In order to create for fair & equitable distribution of water, irrigation scheduling and in case of water charging mechanisms and/or water fee collection etc... functions shall be devised by the management committee and must get the approval of the General Assembly before implementation.

The primary responsibility for implementation, management and operation of irrigation schemes will rest upon Woreda agriculture office (WOA), woreda cooperative development office and the user communities. The proposed farmers' associations need to have their own strong internal organizational structures and management modalities to be successful. During organization and establishment of proposed irrigation water users cooperatives' the support from WOA, Kebele Administration and development agents (DAs) as well as community leaders is crucially important as front line stakeholders in the process of organizing management committees' and members.

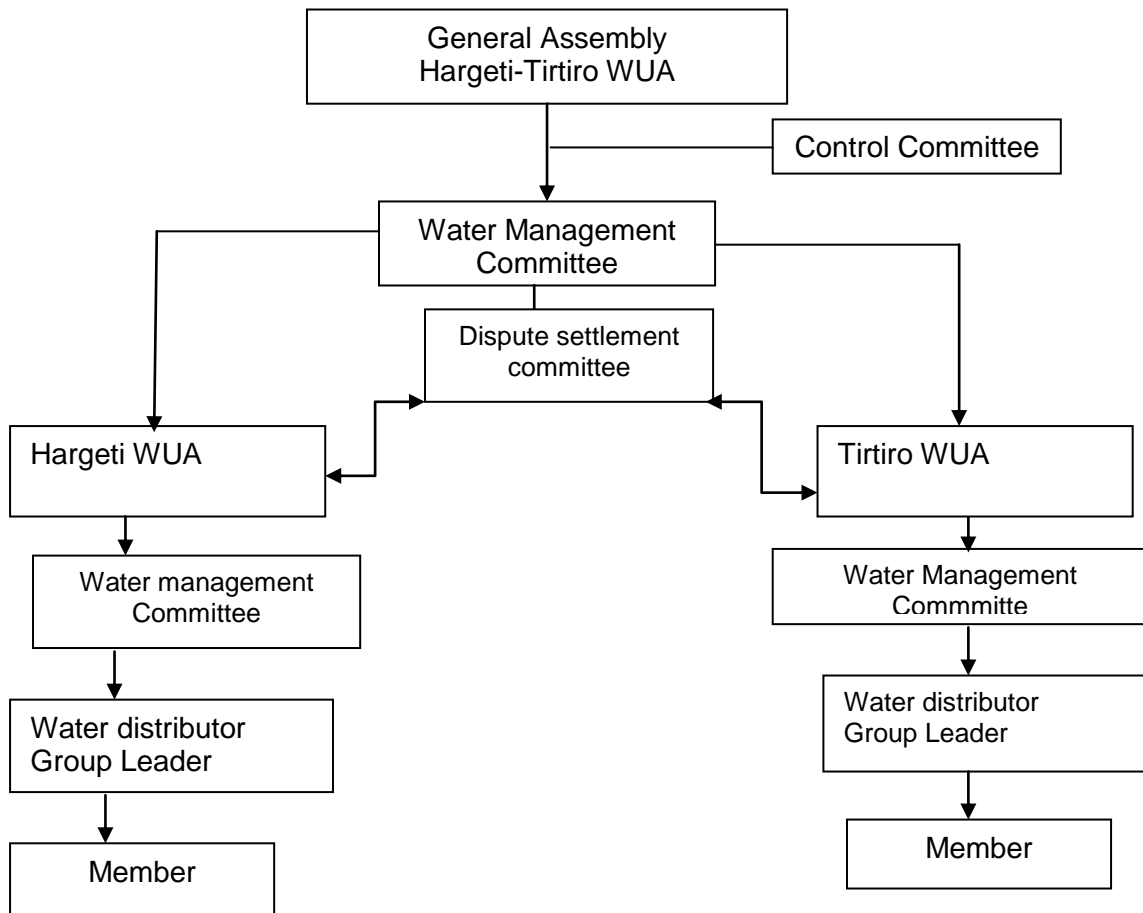
**6.3.5 Water User Association (WUA)**

Water Users Associations (WUA) have roles in management of small scale irrigation that proved sustainability for long and draft proclamation underway to provide legal support to WUA and proposed as organization and management option in this report.

Therefore, this study assessed the possibility of establishing WUAs for the management and administration of irrigation schemes as an organizational option.

The expected project beneficiaries include smallholder farmers with long years of traditional experience to manage the irrigation water so that Water Users Associations (WUAs) can be easily established in the area. The WUA is limited for the distribution of irrigation Water among the beneficiaries, cleaning of canals, collection of water fees and support in minor maintenance of the irrigation scheme and less legal mandates to involve credit and market until legal recognition to operate as legal entity.

The organization setup of irrigation water users associations and (IWUA) are similar except the credit and market committee under IWUC. The creation of blocks containing groups is essential for smooth flow of information and management of group activities. Each block may have at least three groups and members should come under every group. The control committees of WUAs are accountable to the General Assembly. The proposed institutional set-up of WUAs presented as organizational structure proposed as follows.



**Figure 10: Proposed Organizational Structure of Hargeti-Tirtiro WUA**

The two kebele will have one general Assembly that will be the highest decision making body. The water management board as executive committee drawn from sub-committee and to be elected by the general Assembly will guide the major activities of the Association. Duties and responsibilities of sub-committee for WUA and IWUC is similar that stated as follows.

### 6.3.6 Duties and Responsibilities

**General Assembly: As stated in cooperative** society proclamation, the General Assembly is the supreme organ and highest governing and decision making body of the Association. Although, powers & mandates of the General Assembly should be specified in the association by-laws, its role and function shall include but not limited to the following;

- Democratically elect and nominate respective members of the Water Management Committee,
- Select members of the water management committee as well as control committee, Conflict settling committee, and Credit & Marketing committee and others as necessary.
- Approves the annual budget and work programs of the cooperative,
- Approves and amend the association by-laws and internal regulations,
- Determine share payment and the annual profit sharing and reserve amount,
- Examines and approve audit reports of the association,
- Discuss on issues submitted by the management committee and give decision regarding the association and related works.

**Water Management Committee: The** water management committee is accountable to the general assembly and number of members and manner of election to be determined in the bylaws. However, if there are women group members in the association, at least one woman included in the management committee. The duties and responsibilities of the management committee includes, but not limited to;

- Direct day to day activities of the associations
- Organize meeting and maintain minutes and undertake follow-up for implementation
- Maintain association documents and records
- Prepare annual work plan and mobilize resource , labour and others as required
- Prepare draft internal regulation for approval to the general assembly
- Promote membership and examine application for approval general assembly
- Execute other activities given by the general assembly

**Control Committee: The** control committee is nominated by and accountable to the General Assembly, and the number to be stated in by law. The main duties of the control committee shall be specified in the by-laws; however the following are major duties;

- Supervise and follow-up effective performance of management committee,
- Evaluate effective and efficient utilization of fund and property of the associations
- Monitor and control financial and material resources of the association,
- Oversees integration and application of by-laws and internal regulations,
- Perform other activities assigned by the general assembly as the situation required.

**Conflict Resolutions Committee:** The Conflict Resolutions Committee, having the accountability to water management committee and will consist of 3 members elected by the General Assembly. The committee members are expected to have social acceptability and norms and are responsible to:

- Resolve any disputes and/or conflicts arises among the association members, in and around the upper, middle or lower stream users,
- Examine and create smooth and friendly relationships among irrigation user farmers,
- Involve in community sensitization and labor mobilization
- Perform any other related tasks as required by the general assembly.

**Credit & Marketing Promotion Committee:** The Credit and Marketing Committee is proposed and much more function with irrigation water users cooperatives (IWUC) which has legal backup support for credit and market arrangement. Its function being accountable to the Management Committee has role to play mainly in credit and market arrangement in the following areas;

- Develop modalities on how members get access to agriculture input supplies such as selected seeds, fertilizers and pesticides, etc...
- Links the scheme management committee with third parties as regards to credit, marketing and input supplies,
- Assess the demand of each member and compile data for further action to provide services according to the average demand,
- Find the way for members to get access to market to sell their products,
- Facilitates credits in case members initiate demand to get money for agricultural development,
- Facilitates and performs the supply of agricultural inputs, credits and provide commercial services for the cooperative members as may be directed by the WMC,
- Perform other functions in accordance with the by-laws and as instructed by the management committee.

**Water Distribution Committee:** Water Distribution Committee is generally accountable to the Water management committee. The numbers of committee members and its terms of service as well as mandates shall be specified in the by-laws. However, for ease of management, the Ketena committee members shall be at least 3 as the structure requires. The major duties include;

- Nominates members of Water Distribution Groups upon fixing their numbers depending on the size and lay out of canal structures in their service area,
- Assist & coordinate in preparing of the standing instructions on the water distribution, utilization, O&M requirements and management of water to ensure equitable distribution among its members, etc...

**Group Leader:** Farmers will be organized in group with group leaders elected democratically by the irrigation users to operate along specific canal structures in the command areas. They are accountable to the water distribution committee. The Groups will have individual water

distributors selected from farmers along the canals in each distributions main or secondary canal.

The farmer group will have a group leader, a vice and secretary, who are elected by a group of beneficiary farmers of a specific water distribution area. The duties and responsibilities of the team leader and their terms and number of members in the committee shall be determined and clearly specified in the by-laws. However, key duties of group leader include;

- Coordinate and maintain equitable water distribution in their vicinity,
- Coordinate collection of bills and cash efforts as required,
- Link the lowest end users of the farmers group and that of the cooperatives management,
- Reports on the occurrence of conflicts among the members on their respective vicinity or coordination unit and inform to Conflict Resolutions Committees to sort out early solutions,
- Undertakes the maintenance of canals and access roads available under their respective command areas,
- Coordinate all activities related to the water distributors as regards to input supplies, credit facilities, water distribution, marketing and similar services,
- Mobilize human and financial resource and ensure active participation of the end user group in their vicinity.
- Perform other related water distribution, utilization and O&M activities of their respective service areas,

## 6.4 COST RECOVERY

### 6.4.1 *Local experience*

As stated in water resource development policy and strategies, medium and large scale irrigation development schemes are to operate on full cost recovery principle; whereas small scale irrigation project to be implemented on cost sharing and towards stage by stage cost recovery transition.

The implementation of a stage-by-stage cost recovery transition procedure (initial grace period; O&M costs by the beneficiaries; cover costs of minor structures beyond the primary off takes; finally, total costs of scheme are to be recovered).

Medium and large-scale irrigation development schemes are generally considered to operate on full cost recovery principle; while the cost recovery of small scale irrigation is to cover full O&M costs plus some cost of investment.

Literature review indicates as there are two direct purposes of water charging. The first purpose is a payment to the government for the right to use a national resources and the second purpose is to cover the operation, maintenance and replacement costs of the water supply or irrigation projects, as well as to recover the initial capital cost of the investment. Other study indicates the conceptual and purpose of cost recovery is to provide sustainable irrigation services that improve irrigation performance through:

- More efficient O & M of irrigation facilities,



- Promoting more efficient use of water by framers,
- Promoting government objectives by leading to better investment decisions, easing government's financial burdens and resulting in a more equitable distribution of income among the rural farming communities.

Some studies undertaken in cost recovery studies indicates low local experience in application, complex water pricing modalities and water fee collection, low organization and management setup at exiting condition of farmers organizational setup.

#### 6.4.2 Approach and strategies

Cost recovery is a wide and complex issue beyond the scope of this study, but required to give highlight on institutional setup and arrangement required with the context of the project area and give future direction.

The experience and achievement in cost recovery is generally low at country level as literature and various study report indicates. The concept cost recovery and water charging is complex process and depends on the awareness level of farmers, proposed crop type and return, location, price and market accessibility, access to credit and saving schemes, irrigation technology, mode of water charging and many others.

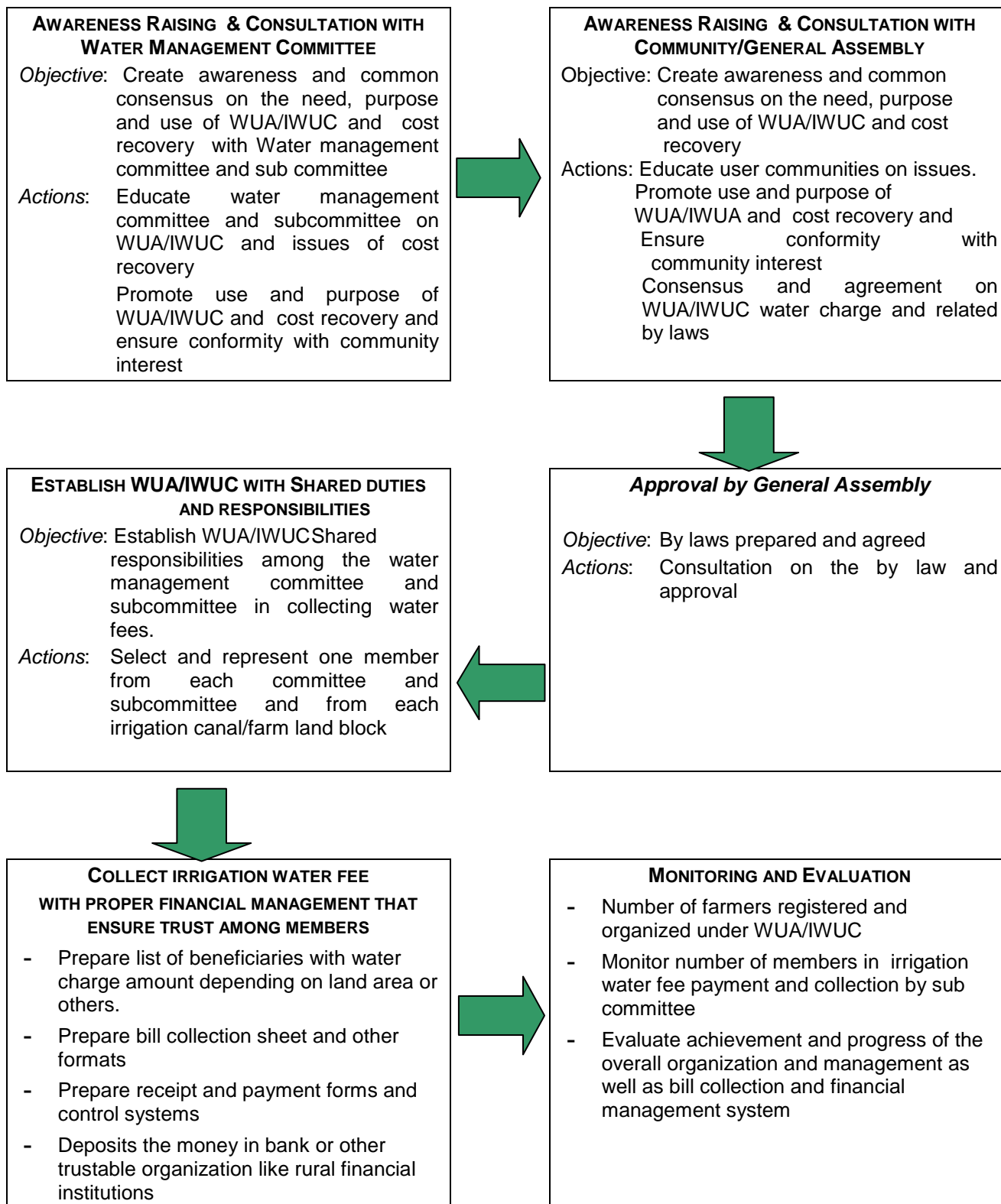
Although, there exist traditional irrigation under the local community management system, the concept of cost recovery and water charge is not yet and awareness level at very low stage.

The management of the irrigation cooperatives/association expected to work not only to maintain fair & equitable water distribution and scheduling, but also creates awareness of cost recovery, plan and implement water charging mechanisms with consensus of the general assembly. Awareness raising should be made to water management committee and sub committee members and each user group should be clear on the purpose and use of water charge and approved by the general assembly.

The following major tasks are proposed to be undertaken as a preparation to implement organization and management and there by to achieve cost recovery on proposed irrigation schemes;

- Conduct wide coverage awareness creation on irrigation cost recovery for the sector offices at all level, irrigation water users and other stakeholders;
- Strengthen the management capacity of the community organization / irrigation users cooperatives to enable them to implement the cost recovery.
- Promote Woreda and Kebele level support to irrigation water users on irrigation agronomy, water management and marketing of perishable products.
- Prepare cost recovery plan
- 

The general approach/strategic framework for establishing community based organization and management of farmers managed small scale irrigation schemes as well as effective implementation of cost recovery requires community participation and general consensus of stakeholders and implementing partners as per the sequence and steps proposed as follows.



**Figure 11: Organization & Management Logical Framework**

After consensus and general agreement on the idea strategies devised on how to effectively collect and manage the water fee. It needs distributing functions by the management committee and subcommittee.

The support of Cooperative promotion and development office, woreda agriculture office and development agents working in the kebele is crucially important to take the lead role in organization and management of cost recovery and the whole irrigation schemes..

#### 6.4.3 *Irrigation water charge options*

Water charge is termed as an actual payment made by the water users to access water for irrigated crop production. The issue of cost recovery and water charging method is wide issues to exhaustively discuss in this report. However, based on local experience and review of other reports, the most commonly used charging methods described that include:

- Flat charging,
- Area-based method,
- Crop-area based charge,
- Volumetric charge,
- Volumetric block tariffs,

All charging methods have their own advantage and disadvantages and its application requires a sort of education/awareness and management level of farmers and many other considerations. Within the context of proposed project area, farmers awareness and management level is at low stage and difficult to realize water charge & cost recovery in short time period. However, in the medium to long term period, flat or Crop-area based charging method is recommended as strategic direction which are relatively simple and easy to administer, and also implemented and tested with local context in Ethiopia mainly from the experience in Amhara region of Fetem small scale irrigation project adopt area crop based cost recovery system.

### **6.5 TRAINING AND CAPACITY BUILDING**

It is highly important to facilitate the transfer and adaptation of modern institutional arrangement and management of small scale irrigation schemes to attain sustainable operation of the system. In this regards training and capacity building required at different level including woreda staffs, development agents and farmers group that aims to

- Conduct public consultation and awareness raising for the community
- Special training on leadership and organization for water management committee and sub committees, team leaders
- Strengthen technical and management capacity of the woreda and DAs to improve and upgrade organization and management efficiency of the project
- In order to meet cost recovery, special attention needs to be given to understanding water charging methods, collection system, and cash spending and management, record keeping and reporting.

### **6.6 MONITORING AND EVALUATION**

#### 6.6.1 *Monitoring*

Monitoring is a system/tool to look whether activities are undergoing as schedule and in due consideration of procedure and work plan. It is used to alert management to any problems that arise during implementation.

Monitoring within the context of the proposed Hargeti-Tirtiro irrigation project requires for the overall implementation process organization and management setup as well as system that administer and manage cost recovery issues.

To this end requires process monitoring from initial and the training and capacity building process undertaken up to the establishment of intended farmers managed organizational system. Therefore, it requires identifying problems and any unexpected results and recommending corrective action at each stage of the work process.

In addition to process monitoring, Impact monitoring is also important that focus on monitoring of the project progress towards achieving intended purpose/objectives, and impact of the project on different groups of the people.

Responsibility: Stakeholders and community representative and involvement of all direct or indirect stakeholders required from the earlier stages of community organization and should participate and responsible in the evaluation process. In the process develop community skills in analyzing situations and identifying solutions, strengthen their accountability and commitment to a project, and act as bridge for flow of communication to the general user groups to the extent that ensure public trust..

### 6.6.2 Evaluation

In the context of proposed irrigation project, evaluations adopts and focus on progress towards realizing system that ensure sustainable operation and management of the schemes which is the prime objective and goal. Therefore, periodical evaluation should be undertaken by relevant stakeholders and responsible sectoral office mainly woreda cooperatives promotion office and woreda agriculture office and others as required. Evaluation team should be organized from these offices and undertake ongoing evaluation/Midterm evaluation, terminal and ex post evaluation of the irrigation schemes management. Implementation of cost recovery as liquidity/cash management requires special follow up and control and periodical evaluation and auditing the cash collected and expense and this should be made transparent for the community to maintain trust of the community. Evaluation system should be drawn based on existing level of farmers awareness, education and organizational status, and the evaluation system should be made as simple as possible and concentrate on key indicators to meet specific objectives.

In general, water centered agricultural development approach is government policy direction and responsible stakeholders should have in their annual plan, not only for the irrigation physical infrastructure, but also equally for organization and management of schemes.

The development agents and woreda sector office should have organization and management issues in their annual plan and monitored and evaluated in accordance of the set indicators by their report. Reports will be compiled and analyzed monthly, quarterly and yearly in the planning period to indicate the effectiveness of the performance and draw lesson for corrective measures and the future plan of action.

## 6.7 CONCLUSION AND RECOMMENDATION

The proposed Hargetti-Tirtiro irrigation project is planned to use diversion irrigation system and net irrigable command area of 307hecatre and expected beneficiaries of about 495 households. Traditional irrigation experience sustained for long and opportunity to organize workable irrigation water management system based on the long years local management experience.

Based on the experience in other areas and taking the proclamation on cooperative society organization, simple and farmers' level organization and management system proposed to establish water user association (WUA) or Irrigation water users Cooperatives (IWUC).

In general, water centered agricultural development approach is government policy direction and responsible stakeholders should have in their annual plan, not only for the irrigation physical infrastructure development, but also equally for organization and management of the scheme.

The development agents and woreda sector office should have organization and management issues in their annual plan and monitored and evaluated in accordance of the set indicators by their report. Reports will be compiled and analyzed monthly, quarterly and yearly in the planning period to indicate the effectiveness of the performance and draw lesson for corrective measures and the future plan of action.

In general, proposed projects is planned in drought prone characterized erratic rain fall areas and demand driven, good traditional practice, strong local responsiveness, land and water resource available... etc and socially feasible for implementation.

Considering food shortage and vulnerability of the people in the project area, the government and concerned bodies should duly act on through appropriate measures, which are directed towards improving efficient utilization of water and land resource in the area to improve food security situation.



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## APPENDIX



### List of participants in focus group discussion sessions

Ser.	Participant's name	Sex	Occupation
1.	Jamal Ahimed	M	Farmer
2.	Abdurahim Mohammed	M	Farmer
3.	Adem Sali	M	Farmer
4.	Yaya Sheh Umar	M	Farmer
5.	Abdulahi Iberahim	M	Farmer
6.	Abdi Mohammed	M	Farmer
7.	Tofik Adem	M	Farmer
8.	Annuwar Umar	M	Farmer
9.	Jemal Abduljalil	M	Farmer
10.	Abdurehaman Adem	M	Farmer
11.	Abdulatif Awel	M	Farmer
12.	Osman Ahimed	M	Farmer
13.	Mohammed Kelifa	M	Farmer
14.	Ibrahim Reshid	M	Farmer
15.	Umer Ahimed	M	Farmer
16.	Musahid Haji	M	Farmer
17.	Kasim Sheka	M	Farmer
18.	Jemal Abdela	M	Farmer
19.	Kelifa Bushira	M	Farmer
20.	Shuksir Osman	M	Farmer
21.	Mohamed Tofik	M	Farmer
22.	Jamal Shore	M	Farmer
23.	Megersa Ahimed	M	Farmer
24.	Ibrahim Mohamed Ali	M	Farmer
25.	Mohamed Jemal Ame	M	Farmer
26.	Abdi Ahimed	M	Farmer
27.	Hassen Mohamed Beka	M	Farmer
28.	Ahimed Zeyinu	M	Farmer
29.	Kemal Tofik	M	Farmer
30.	Ararso Shafi	M	Farmer
31.	Kelifa Ahimed	M	Farmer
32.	Kelifa Tofik	M	Farmer
33.	Olkeba Mohamed	M	Farmer
34.	Najo Shore	M	Farmer