

**AMHARA NATIONAL REGIONAL STATE
WATER ,IRRIGATION AND ENERGY BUREAU
(BWIE)**



**FEASIBILITY STUDY & DETAIL DESIGN
OF
MAYESE TWO DIVERSION WEIR SMALL SCALE
IRRIGATION PROJECT
VOLUME V: SOCIO ECONOMY STUDY
FINAL REPORT**

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Amhara National Regional State
Water Irrigation and Energy Development Bureau
(BoWIED)
Feasibility Study and Detail Design
Of
Mayese two Diversion weir small scale Irrigation
Project
Volume V Socio Economy
Final Report
October, 2018
Dessie

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FEASIBILITY STUDY & DETAIL DESIGN REPORT STRUCTURE

- ≡ Volume I: Watershed Management
- ≡ Volume II: Engineering Geology
- ≡ Volume III: Irrigation Agronomy
- ≡ Volume IV: Engineering Design
- ≡ Volume V: Socio Economy
- ≡ Volume VI: Environmental Impact Assessment
- ≡ Volume VII : Financial and Economic Analysis

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ABBREVIATIONS AND ACRONYMS

ACSI	Amhara Savings and Credit Institution
ANRS	Amhara National Regional State
BoWRD	Bureau of Water Irrigation and Energy Development
EA	Environmental Assessment
ENIDP	Ethiopian Nile Irrigation and Drainage Project
ESIA	Environmental and Social Impact Assessment
FGD	Focus Group Discussion
GIS	Geographic Information System
GPS	Global Positioning System
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
HTP	Harmful Traditional Practice
IWUA	Irrigated Water Users Association
M and E	Monitoring and Evaluation
MoWE	Ministry of Water and Energy
NGO	Non-Governmental Organization
PCA	Project Command Area
ToR	Terms of Reference
UTM	Universal Transverse Mercator
WoARD	Woreda Office of Agriculture and Rural Development
WoFED	Woreda Office of Finance and Economic Development
WoWRD	Woreda Office of Water Resources Development
WPIT	Woreda Project Implementation Team

EXECUTIVE SUMMARY

The State of Amhara Region (ANRS) Water Irrigation and Energy Development Bureau has prepared mayese two Diversion Weir irrigation Project (MTDWIP) that will finance up to 72.5 ha of new irrigated agriculture and complete detailed feasibility studies. However, the ADSWE, approved that mayese river can irrigate only 72.5 ha of land. The total Project cost is about Ethiopian Birr 21,599,327 million. Also the total project area will be 82 ha of land. The development objective of the project is to sustainably increase agricultural output and productivity in the Project Area. Thus, this objective will be achieved by developing 72.5 ha of irrigation and appurtenant infrastructure, and providing support to the Government and the project beneficiaries for agricultural and market development and for sustainable irrigation management. MTDWIP comprises four components: (i) Irrigation Development; (ii) Agriculture and Market Development; and (iii) Irrigation Management and iv) Project Management.

The proposed mayese weir irrigation in this river one headwork& main, secondary & tertiary canal works the Projects straddles the mayese River on the south Fringe of mehal- Saint 034,035 kebeles. The project lies South wollo zone of the Dessie-Mehal Saint highway, and begins at a point about 138 kms Dessie town to Abu-aria in the main Asphalt and 56 kms in all-weather gravel road from Abuaria to Densa. 7 km URRAP up to project site.The Project impacts 2 kebeles, namely 035,034 kebeles (lenguat & Alegeta) Respectively.The size of Project Command area is estimated to be 82 ha of which 72.5 ha is classified as command area. There are about 655 population are benefited from the project in 131 households.

The main objective of the project is to introduce modern irrigation system in the area there by to change the subsistence and food in deficient to surplus and making them self-sufficient in food production and to produce surplus for sale in the long run.

The ESIA study carried out for the project identified many positive benefits and characterized the type and nature of adverse impacts likely to arise due to the project. It also proposed indicative mitigation measures and monitoring mechanisms.

Based on the socio economy survey food demand for the project area per year is obtained for current and projected population (655 and 1027 respectively) would be 1473.75 and 2310. qt/ year. In conclusion, there will be surplus marketable production by the intended project

intervention. And the socio economy sample result shows the poverty status of the project area is critically low.

The Qualitative and quantitative methods were deployed to collect information for Socio-Economic study. These included: desk-based review of studies carried out earlier in the area and other secondary data. Site visits for interactions with government authorities at woreda/Keble level were carried out. Data from primary sources collected by means of conducting of a socio-economic survey, and community meetings and focus group discussions.

. A stakeholder workshop, key informant interviews with interested parties, and community consultation meetings and focus group discussions. Outcomes of the consultations can be summarized as follows:-

- Appreciation for the Irrigation Scheme: expected benefits such as improved agriculture in the long term, and employment opportunities in the short term during construction period; and also contribute 10% of investment cost.
- Management of the Irrigation Scheme: local-level structures to be established; how and by whom the Scheme is to be managed, and involvement of Woreda and Keble government bodies; involvement of WUAs; payment of water charges.
- Capacity building of implementing agents: requirements for training and resources
- Involvement of women and youth in the Irrigation Scheme: employment opportunities, position of women and youth around landholding tenure and farming

1. INTRODUCTION

Agricultural production in the country is carryout largely under rain fed condition where the productivity has remained low. Attainment of food self-sufficiency under such condition remains to be the most challenging task in the agrarian economy of the country to bridge the gap between the local supply and requirement/demand/, huge amount of food had imported from abroad annually. Moreover, the repeated severe droughts have affected the food production adversely, and made the food supply situation worse.

The level of poverty and under nutrition is severing in Amhara region, especially in drought prone lower agricultural potential parts of the region. The area under the study is one of the food insecure woreda. Also, Recurring drought, destruction of the ecosystem, low level of application of improved technology and traditional farming system in crop and animal production and implementation of non-conducive socio-economic condition have been the major factors contributing to the poor state of the agricultural sector and the resultant food insecurity of the region in general and the study area in particular.

In order to alleviate the situation of food insecurity, countries like Ethiopia have no choice but to aggressively switch development endeavours towards effective and efficient use of the existing natural and human resources. A development strategy that could help is the use of the country's water and land resource endowments. As a result, development of different irrigation schemes (small- to large-scale) can play a major part not only in solving the current food insecurity, but also in enhancing the economic development of the country through the earning of more foreign currency and the creation of employment opportunities. It is known that this particular initiative of the project which covers net irrigable area of 72.5 ha in the Woreda and expected to benefit directly about 131 household heads is one of many similar projects initiated by BoWIERD in Amhara National Regional State. As a result, the project will build upon and complement all previous and current efforts undertaken by the government and other development actors to alleviate the food insecurity and subsistent farming situation of the region and the country as a whole. Similarly, the performance of the socioeconomic survey will also support proper implementation of the project by providing basic data and information on current situation of the Woreda in general, and potentials and Impacts of the irrigation PCA in particular. This activity is essential to guide the project in designing irrigation systems that are compatible with the

socially acceptable mode of production in the area. To this end, Mayese two diversion irrigation development project is expected to contribute its part for the people in the study area in particular and to the region in general.

The present report is prepared based on household survey, community group discussions & Community meeting, as well as information obtained from key government officials and experts working at different levels. Documents compiled from previous studies were also used. .

It is known that this particular initiative of the project – which covers an area of some 72.5ha in 2 kebeles and directly benefits some 131 smallholders – is one of many similar projects initiated in Amhara National Regional State. As a result, the project will build upon and complement all previous and current efforts undertaken by the government and other development actors to alleviate the food insecurity situation of the region and the country as a whole. A socio-economic survey was carried out on sample size of approximately 17.6 % of the total beneficiary (131 households) that were selected based on the size and homogeneity of the population.

Similarly, the performance of the socioeconomic survey will also support proper implementation of the project by providing basic data and information on current situation of the woredas in general, and the irrigation PCA in particular. This activity is essential to guide the project in designing irrigation systems that are compatible with the socially acceptable mode of production in the area.

1.1 OBJECTIVE OF THE STUDY

The main objective of this irrigation development project is to introduce modern irrigation system in the area there by to change the subsistence and food in deficient to surplus and making them self-sufficient in food production and to produce surplus for sale in the long run. This project will benefit about 131 households directly (enumerated those households who have land to be covered by the intended project in Keble of at full development stages on about 72.5 hectares of cultivated land).

As indicated in Irrigation agronomy study result of this project; wheat, Potato and Garlic are proposed for the dry season. Teff, Wheat and lentil are also to be grown in the wet season based on the agronomic, pedagogical and economic factors.

This project is expected to improve the living standards of the society, and increase know how or outlooks of the society, reduce migration and unemployment level, and encourage farmers to have standard way of life.

The specific objectives of the socioeconomic survey are to:-

- Estimate the magnitude and identify the profile of the target households in the Keble;
- Describe the prevailing demographic features in the PCA;
- Assess existing socioeconomic settings and deliveries of social services and economic supports in the PCA and their impact on proper implementation of the project.
- Create employment opportunities for the local youths/people through intensification of the farming system in the project site;
- Identify existing social and economic organizations that will have a direct influences on the project implementation;
- Assess existing traditional WUAs and propose the most fitting organization for future irrigation water use.
- Investigate related problems and constraints and suggest actions and solutions for the smooth implementation and sustainable use of the project.
- Assess potential and Impacts of the project area.
- Assess the project area of the household's characteristics (social services, Infrastructure, cultural & demography) condition.

- Assess Gender issue about the project area.

1.2 APPROACHES AND METHODS OF DATA COLLECTION

The scope of the project, as indicated in the TOR, goes beyond development of irrigation infrastructure and services and tries to identify the monitor able indicators that can show the real and measurable impact of the project in the future. According to the TOR of the client the consultancy service should evaluate the social, cultural, financial and economic viability of the project and other essential measureable impact indicators. Therefore, this study should cover the issues of social acceptance, profitability and the viability of the project at poor farmers' level. Thus the objective entrusted to this consultancy service and scope and nature of the irrigation project dictates the methodologies and approaches used in this socio-economic survey. Due to the need for test of viability of the project quantitative approaches were selected to identify and explore the most important indicators and information substantiated by rigorous secondary and qualitative information.

Since the project is also intended to improve the agricultural productivity, and sustainability of livelihood of the small scale farmers resided on 72.5 ha of command area, the ultimate focus (data collection units) should be on individual households who will be the beneficiaries of the project. Therefore, the approach to this socio-economic survey undertakings and the data collection methods are and should be purely quantitative and measure outcomes and impacts in any cycle of the intended project.

2.3.1 1.2.1Data Collection Methods

Two types of data collection methods (qualitative and quantitative methods) have been used in this socio-economic survey.

1.2.1.1Quantitative Data Collection Methods

The major objective of this method is to capture data and information which are figurative and enable to draw quantitative indicators and measure financial viability principles of the project. The quantitative methods such as sampling of individuals and group of households are important

to collect data that can be measured for their changes over time, and capture peculiar individual and household behaviors, characteristics and welfare positions. The approach is important in all forms of projects and monitoring and evaluation systems. The method is taken as a major data collection method, to look into inter-household variations in access to resources and to measure variations in their capabilities. This will enable also to propose more targeted project intervention. Above all, the core of socio-economic analysis is test of viability which requires a rigorous analysis of quantitative data and information. These data could also be used for measuring the outcome and impact of the project on latter stage. The qualitative information (such as focus group discussion) is also used to substantiate the findings of primary information and to capture vital community level socio-economic characteristics. The most important survey and data collection methods in this category are sample household survey and secondary data collection methods.

Household Sample Survey

The household sample survey covered the group of individuals from Alegeta & Lenguat kebeles of Mehal Saint Woreda which supposed to fall within the 72.5 ha project area designated by the consulting firm based on the capacity of the designed Diversion. In this report they are often referred as the sample HHS target from direct beneficiaries (131 hhs) of the project Area. Therefore, full census of target group is the sample design and method in this survey.

The project area falls within two agro-ecological zone (degas & weynadegas) depending on the settlement pattern of the population.

Secondary Data Collection

The secondary data covers all social, economic and physical characteristics and attributes at woreda and Keble level. A comprehensive secondary data collection sheet has been prepared for both woreda and the target Keble to collect socio-economic information and data. Other sources of secondary data were annual reports of the sector offices at woreda and Keble level, various documents of the Agricultural offices previous baseline surveys of the project area. These secondary data were used to substantiate the sample survey out puts and to analyze woreda and Keble level variables and socio-economic characteristics wherever necessary.

1.2.1.2 Qualitative Data collection methods

The qualitative data collection methods include focus group discussion with communities, woreda level relevant sector offices (agriculture, health, education and others) etc. The community focus group discussion includes discussions with communities. The focus group discussants are represented from the community and include members of the Kebele councils, elders, women, landless households, irrigation users and non-users. In each focus group discussions a total of 5-7 representatives were participated. Also there was a consultation meeting which undertake the whole community of project beneficiaries.

2.3.2 1.2.2 Sample Design and Sample Size

Two stages random sampling method was used to collect data and to conduct socio-economic studies of the project areas. As indicated above the sample design considered the target groups of the project area. The target groups are the direct beneficiaries from the future intervention and at the same time fall within the 82 ha project irrigation area (of which 72.5 ha is net command area, the second stage includes the selection of the sample households from the project beneficiaries. The procedure, as indicated above is to use the sample frame from the project area. Recent list of all resident households in the project area have been used to select sample households randomly.

The sample size depends on the total population in the project area, the diversity of the farming systems and agro-ecological characteristics, the social and cultural setting of the communities and the purpose of the study. It is believed that the project area is more or less homogeneous in terms of social and economic setting, and farming system. All of the population is the Amhara and followers of two religion (orthodox Christianity and Muslims) but share common culture and languages. Economically, they are traditional small scale sedentary agriculturalists, with high level of poverty incidence sharing common livelihood constraints and potentials. Also the agro-ecology of the area is degas and Weina-Degas.

In general the calculated sample size for the project area is about 17.6 percent of the total household beneficiaries in the project area. Of the total selected samples 78.3 percent were males and the rest 21.7 percent were female heads.

2.3.3 1.2.3 Survey Instruments

A number of survey instruments have been used to collect information for the socio-economic study consistent with the nature of the livelihoods and the design of the project.

1..3.1 Household Sample survey Questionnaires

This instrument is prepared to collect data at household level. It consists a number of components: The demographic characteristics of sample households, agricultural production (livestock and crop production), off-farm and nonfarm activities, income and expenditure, household assets, land tenure, livelihoods & food security, agricultural marketing, social and economic infrastructure and services (health, education, water supply, housing and sanitation, energy, communication, road and transport) and institutions. This instrument is intended to collect data from sample household heads. The instrument further substantiated by a detail descriptions and explanations (a guideline) to ease the understanding of each questions and the speed and accuracy of collecting primary information from the sample. This description is prepared separately and provided to each enumerator to be used during enumeration and in class training.

1.3.2 Secondary Data Collection Sheet

This instrument was used to collect secondary data at woreda and Keble level and comprises demography, physical characteristics, production systems, employment and markets, social and economic infrastructures and agricultural and non-agricultural support services.

1.3.3 Qualitative Data Collection Check Lists

This includes checklist to collect qualitative information from key informants and focus group discussants. The checklist comprises a number of issues including agriculture (rain fed and traditional irrigated agriculture), programs and projects, linkages between institutions, potentials and constraints, private sector investments and enabling environments, communication and marketing systems, regional and local development policies and strategies and other relevant issues related to the intended project. The checklist was prepared for each focus group discussion and institutions and includes check lists for beneficiary communities, community

based organizations, office of agriculture and rural development, health, education, Woreda Administration and other relevant Institutions.

1.3.4 Field Organization and Training of Enumerators

To ensure the reliability of the data proper care was taken in selecting the enumerators and training in basic principles and actual practices of data collection methods both in class and at field level. The enumerators were selected from 12 grade students currently serving their internship period. A total of 2 enumerators were selected for household survey. The selected enumerators are well versed in data collection, local language, culture and social setting and above all they are from the local community previously live in the same localities. Therefore, there is no knowledge and cultural barriers in collecting the required information.

1.3.5 Data Processing and Analysis

Though data editing at field level was made during this survey more of the data editing, cleaning and entry was made at the firm's office. Each and every questionnaire was edited by the socio-economist and the economist assigned for this purpose and the questionnaire were coded for easy entry and processing. After data editing is completed, data entry using SPSS. Finally the data entered in the spread sheet program was converted into more suitable SPSS program by the socio economist.

The major data analysis methods used for the preparation of the survey was simple descriptive statistics (mean, frequencies, ranges and others), and other more appropriate tools. In general tables are used for analysis and presentation of the data.

1.3 LIMITATION OF THE STUDY

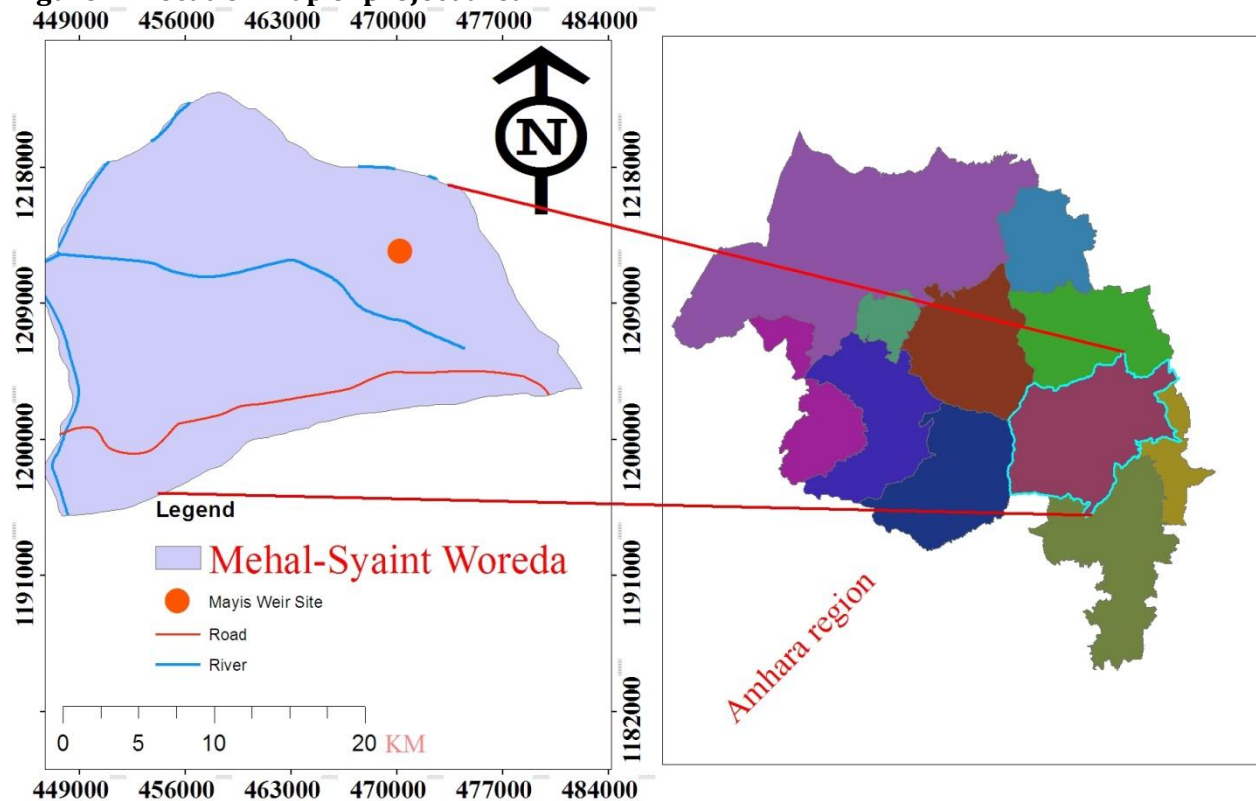
Household farmers do not keep records and the data they supplied might not be accurate. This limitation had also shown at the level of woreda experts, Keble administrative offices and development agents mainly of keeping records for many successive years' data.

1.4 BRIEF BACKGROUND TO THE PROJECT AREA

1.4.1 LOCATION AND PHYSICAL FEATURES

The study area located in Amhara Region, south wollo Administrative Zone in the mehal saint woreda at 7 Km distance from Densa Town to project site (mayese) in north directions. The diversion weir site is accessible in the main highway linking the Capital of south wollo Zone, capital city of (Dessie) to Abauria which is 138 kms in the main asphalt and 56kms Abuaria to densa and 7 km URAP up to project site(mayese two) all weather road. The weir axis is located in between the geographic UTM **E470210.76, N12122321.475** in the right and left at an altitude of **2605m**. the project area is accessible.

Figure 1 Location map of project area



The project area is located in degas & weynadegas agro-ecological zone. The elevation of the proposed command area ranges from 2598 up to meters 2572 above sea levels. This agro-ecology enjoys average rainfall 740 mm per annum. The project areas are Uni- modal rain fall pattern.

Most of the project area is undulating. The basic characteristics of the agro-ecological zone are relatively high population density, intensively cultivated land with a variety of crops including almost highland cereals, pulses. The project area and surrounding lands are considered to be one of the major wheat producing areas of the country. Other important crops grown in the project area includes cereals (wheat, teff); pulses (haricot bean, fababean , fieldpean, chick pea, Lenten and fenugreek, vegetables (potato, onion, tomato and garlic).

1.5 LAND USE PATTERN

Land is the property of the State and Ethiopian nation and nationalities. The farmers have a use right for their land and may rent out their land for not more than 25 years. The holding right to farm land is unlimited. The Federal Land Use Right Proclamation prohibits the cultivation of annual crops on land with greater than 60% slope, however, the user can use steeper land if appropriate conservation measures are applied and/or perennial crops and forest trees are planted.

There is no reliable information on the land use pattern of the project area. Cultivated land is dynamic land use types under rapid transformation, since the project area is characterized by high population dynamics.

However, rudimentary information from 2 Kebeles' Offices of Agriculture, which are fully and partially included in the project area, shows that the cultivated land use accounts for about 28.2% of the total area of the kebeles. The rest 71.8% of the kebeles' land is covered with grazing land, forest and bushes, construction of houses & roads and degraded land.

At present almost the whole command area is under intensive cultivation of cereal crops. The main agro-economic base of the area is mixed farming of field crops and rearing of livestock. The land use of the Keble including the project site has presented in Table 1.

Table 1: Land Use Patterns 035&034 Kebeles

Name of Kebeles in the project area	units	Gross area of kebeles	Estimated land use pattern (ha)					
			Cultivate d land	Grazin g land	Forest land	House s & roads	Waste land	Others
I. Lenguat	ha	4061	1132	1081	1231.5	556	-	61
	%	100	27.8	26.6	30.3	13.7	-	1.5
2 Alegeta	ha	2450	701	475	414.5	201	-	658.5
	%	100	28.6	19.4	16.9	8.2	-	26.8
Grand total	ha	6511	1833	1556	1646	757	-	719.5
% of G.Total	%	100	28.2	24	25.3	11.6	-	11

Source: Data Collected from Kebeles' Agriculture Development Offices.

Land use pattern

Figure 2 Land use pattern



Source socio economy survey partial view of command area.

2. SURVEY RESULTS

2.1 DEMOGRAPHIC CHARACTERISTICS OF THE PROJECT AREA

High fertility and rapidly declining mortality rates are main determinants of demographic growth patterns of the project areas. Over the last many decades fertility rates are increasing by significant level while mortality rate is declining with improvement of household access to basic health services, education and other services. Low awareness to and use of family planning services, the role of children in the rural family and society, increasing poverty and destitutions and other socio-cultural factors also contributed to increasing fertility rates and to population growth. Migration is the second major determinant though net out migration is currently declining compared to the last 25 years. As a result, rapid population growth is mainly the consequence of high fertility rates in almost all project areas. Increasing population from time to time has created a serious burden on the environment particularly manifested in increasing number of land deficit households, high population density, low per capita agricultural production, increasing demands for land based resources and environmental degradation. Relatively low access to basic services (health, education, sanitation and water supply) and food security further compounded the problem of population growth.

2.3.4 2.1.1 Population Number and Growth

The study area is one woreda in South wollo Zone, Mehal saint Woreda in Lenguat and Alegeta kebeles.

The total population of the project area and each Keble is estimated about 8270 and 5104 by the year of 2016, respectively. And about 50.3 percent are male and the remaining 49.6 percent are female population.

This sample survey covered approximately 17.6 percent of the total households (131 household heads) in the project area of the Keble. Of the total sample heads of households 78.3 percent are males and 21.7 percent are females. The total population of the sample households on the other hand is estimated at 115, with an average family size of 5 persons. It seems that high rate of

female out migration particularly to major urban centers and out of the country will be the major causes of such sex imbalance.

Table 2: Population summary of the project

Kebeles	Area of Keble (ha)	Population in the project area			Households			Average Family size
		Male	female	Total	Male	female	total	
Lenguat(035)	4061	345	115	460	69	23	92	5
Alegeta(034)	2450	135	60	195	27	12	39	
Total	6511	480	175	655	96	35	131	

The agricultural density of the study area is estimated to be about 9 persons per hectare(total population divided by the total cultivated land) which shows the area is densely populated that the agricultural land possession is small and fragmented difficult to increase its production and productivity through mechanization or other means of mechanism.

Other things being constant with the current population growth rates the population is expected to double after 25 years and by the end of 2042 the total rural population of the project area will be almost 1027 people. It is obvious that such population growth trends have serious economic and social consequences on the well-being and the environment particularly in terms of access to education and health services, income and employment, access to land and other basic infrastructure and services. Current land shortage, out migration, food insecurity and poverty situation will worsen with every additional number of households in the project area unless sufficient population growth control measures and adequate provision of productive assets and basic services are in place.

Projected Population of project beneficiaries

Hence, projection made with exponentially where annual growth rate is 1.8%.

$$P_t = P_0 e^{rt} \quad \text{Where: } P_t = \text{Number of population at time } t \text{ (year)}$$

r = Annual growth rate

e = geometric rate

t = Time (year)

Therefore, the project population is projected for 25 years and it is expected to be 1124 at the end of the design period.

2.3.5 2.1.2 Age Distribution of the Population

The sample household survey indicated that of the total population about 32.6 percent are children under the age fourteen, 54 percent are population in economically active population age groups (which is the age between 15 and 64) and the rest 13.4 percent are above the age of 65.

Table 3: Age and sex distributions of the population

Age group	Project area					
	Male		Female		total	
	No.	%	No.	%	No.	%
0 to 14	101	15.5	112	17.1	213	32.6
15 to 64	161	24.5	193	29.5	354	54
>64	38	5.8	50	7.6	88	13.4
Total	314	48	341	51	655	100

Source: Mayese two weir Irrigation Project: Socio-Economic Survey.

Of the total age population (below the age of 15 years) 17.1% is female population. Also in the economically active population there are more females than males. Economically active male (between the ages of 15-64 years) constitutes about 24.5 percent of the male population.

2.3.6 2.1.3 Marital Status

The sample survey shows that of the total population about 73.9 percent are currently married and the remaining 26 percent are either single or divorced. Of the total married population about 65 % are males.

Table 4 Marital Status of Sample Population

Marital status of the household head					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single	1	4.3	4.3	4.3
	Married	17	73.9	73.9	78.2
	Divorced	5	21.7	21.7	100.0
	Total	23	100.0	100.0	
Missing	System	0	0	0	
Total		23	100.0	100.0	

Source: Mayese two weir Irrigation Project: Socio-Economic Survey.

2.3.7 2.1.4 Ethnic and Religious and Language Compositions

The sample household survey indicated that 100% of the sample population in the project areas is of Amhara ethnic group. Orthodox Christianity is the dominant religion in the project area. Amharic is a widely spoken language and a mother tongue for all of the population in the project area.

Table 5 Distribution of Sample Population by Ethnicity, Religion and Language (%)

		Ethnic group of the household head	
		Amhara 100%	total
Religion of the household head	Orthodox	23	23
	Muslim	0	0
Total		23	23

Source, Mayese two weir Irrigation Project: Socio-Economic Survey

2.3.8 2.1.5 Settlement Pattern

The settlements are established by a group of households who have usually close blood ties and In general, almost all of the total population of both categories of project area resided in and around the area. Settlement pattern of the project area is scattered.

2.3.9 2.1.6 Population Migration

With increasing population, deterioration of livelihoods, increasing vulnerability to shocks (particularly drought and famine), lack of alternative employment opportunities and income,

seasonal and permanent migration of the population became common coping and adaptive strategies particularly since the early 1980s.

Current migration on the other hand is an effect of Shortage of land, declining crop and animal yields, increasing population and lack of access to alternative economic opportunities in the project area. Especially saint woreda and project area population are very common migration constantly increasing year to year. The early 1980s and 1990s are localized and has rural orientation, current migration is trans-boundary and mostly rural urban. The major causes are now permanent lack of opportunities and vulnerability to natural shocks and risks. In-migration on the other hand is limited due to lack of better opportunities within the project area. Thus net population out migration (both permanent and temporary) might be a check to population growth in the future.

As discussed above two types of migrations are common in the project areas. Seasonal migration, with the major objective of search for jobs, education and other temporary reasons are very common type of migration practiced by the majority of the surveyed households. Seasonal migration is mostly localized and season bound with return period of less than one year. This type of migration is very common recently particularly among the females and young age males who lack access to land and other opportunities. Poverty related factors are major reasons for such type of migration. Thus the poor and the marginal groups are most likely to experience seasonal migration compared to the relatively better off households, most of the time go to Dessie, kombolcha & Addis Abeba in the month of January up to April. Permanent out migration is either localized or trans-boundary and mainly related to chronic poverty and vulnerability of livelihoods, marriage, dislocations, epidemics, and other reasons that force population to permanent dislocations. Like temporary migrations, the poor is more likely to permanently migrate than the better off.

2.2 LIVELIHOOD SYSTEMS

Traditional agriculture (crop and animal rearing) dependent on rainfall is the dominant livelihood strategy of the majority of the population. A livelihood strategy in the project area is usually vulnerable to various shocks and low yielding the ever increasing population. Low income, food insecurity, and incidence of poverty are peculiar characteristics of the livelihood systems

reinforced by excessive environmental degradation due to over cultivation, population densities, deforestation, and soil erosion. Unemployment due to lack of arable land and low income due to low yield of crops and animals in general are very common exacerbated by growth of agrarian population from year to year.

Low access to inputs, rural credit and other support services, low level of technology adoption, poor access to alternative income and employment opportunities reinforced vulnerability of livelihoods. Combined with environmental degradation, low land and human productivity and vulnerability to drought, irrigation and high yielding technologies were not developed to support and change livelihood systems from worse to the better. Alternative employment opportunities to support crop farming and household income are not sufficiently developed due to lack of experience in small businesses, adequate rural credit and technical support, as well as inadequate attention given to this important sector.

Yet three major livelihood strategies support the overall livelihoods of the majority of the population in the project area. Crop production, animal husbandry and off and non-farm activities, all of them traditional, subsistent and low yielding. The nature of these livelihood systems and strategies and the proportion of population subsisting on them are discussed in detail in this section.

The existing population pressure and fragmentation of land will be further aggravated unless solutions have been devised ahead of time. The projection also made for food requirement or demand in parallel with population projection over the life of the project.

There are differences in opinions on the minimum amount of food required to live an active and healthy life, per person per annum and it should be noted that, food requirements of a population also increase with increasing in income and demographic changes. There are three proposal scenario on minimum food requirement (wheat equivalent of 1.8, 2.04 and 2.25 Qt/per capita per head proposed by DPPC, FAO and UNICEF respectively). So, for this study the minimum food requirement set by UNICEF i.e. 2.25 qt/per capita/head applied for food demand estimation.

As it is already known that Saint is one of the foods in secured Woredas in Amhara region. From the total population of 655 people living in the Keble (Lenguat, Alegeta), 4231 (89%)

people are food aid dependent. The household survey result also confirmed that 54 percent of annual income was from food aid. Even though unavailability of data on infant mortality and child death rates to this specific project area, it is predictable that in food deficient areas infant and child mortality rate will be high compared to food secured areas due to malnutrition.

Total production (food supply) by the intended project at full development is calculated from cultivated area of 72.5 ha both in dry and wet season for the next 25 years by hoping that the supply of inputs and extension supports for the planned irrigation farming will be sufficient and the reliability & sufficiency of irrigation water supply doubtless.

So, food production will rise from current 790 to 9,417 per annum due to irrigation intervention in the project area. To know the current and future food requirement, wheat equivalent of 2.25 Qt per capita times the population under consideration gives food demand.

Based on these assumptions food demand for the project area per year is obtained for current and projected population (655 and 1027 respectively) would be 1473.75 and 2310. qt/year. In conclusion, there will be surplus marketable production by the intended project intervention.

2.2.1 Crop Production

Crop production is the main economic activities supporting the lives of the majority of the population for a number of centuries. Traditional crop production systems highly integrated with animal production are common. Crop production is highly dependent on rainfall. Yields are very low due to high degree of soil fertility decline, crop pests and diseases, fluctuating rainfall, low adoption level of extension support services and inputs, poor farm practices and declining land holding sizes. Mixed farming system is common mainly supported by oxen-plow system. Cropping system is cereal-pulse complex common to the northern highlands of Ethiopia. Yet crop production engaged the largest proportion of the rural labor force and supports livelihoods of almost all rural population.

2.2.1.1 Production Seasons

Rain fed crop production is the dominant cropping system in the project area. Crop production is undertaken, twice a year reliant on the rains extending from May to the end of September each year. Small rainy season production is not significant as rain fall in this season is unreliable or

small to produce crops. Rain fed crop production is a risky business as a result, due to the combined effect of fluctuation of rainfall, environmental degradation, soil fertility decline, low adoption of inputs and other support services.

Highland cereals, pulses, and vegetables are the common field crops grown under rain fed agriculture. The project area and surrounding lands are considered to be one of the major wheat producing areas of the country. Smallholder farmers are producing significant tonnages of wheat seeds both for market and home consumptions. Other important crops grown in the project area includes cereals (teff & wheat) pulses (fababean, field pea, haricot pea and chick pea) vegetables (potato, onion, garlic & tomato).

Cropping patterns represent the level of cropland utilization and its allocation to crops, and reflect the agronomic, climatic and socio-economic conditions in a given cropping season. Smallholders have diversified cropping pattern to mitigate risk of pests and diseases, (partially) fulfil household food requirements and allow increased opportunities for sale. The cropping pattern of smallholders also depends on the availability of agricultural inputs, soil type, holding size, length of growing period of the constituent crops, rainfall duration, and market opportunity.

Cropping patterns in the project area do not differ significantly among the kebeles in the project area. For smallholder farmers the edaphic factor is the main, but the other factors such as possibility of crop pest infestations and diseases are, supplementary factors in designing the cropping patterns, there are no small or large-scale enterprises in the area and kebeles.

As shown in (Table 6) and (Table 7) the cropping patterns in different landholding sizes vary due to the access to cultivated land. Those farmers that have larger landholdings cultivate a more diversified range of crops than others. The same pattern is true for irrigated farming, for instance large landholders cultivate many crops. The results show that availability of cultivated land is a major factor determining the cropping pattern at household level.

Table 6 Cropping Pattern of (Rain fed):

Crop	Cropping Pattern			
	Geret (Lenguat)		Alegeta	
	Area(HA)	Area (%)	Area(HA)	Area (%)
Teff	114	10	133.4	19
Wheat	804	71	104	14.8
Barley	91	8	29	4.1
Field pea	42	3.66	21	3
Faba bean	67	5.92	21	3
Lentil	14	1.2	5.6	0.8
Maize		-	38	5.4
Sorghum		-	252.4	36
Chick pea		-	25.2	3.6
Haricot bean		-	29.4	4.2
Grass pea		-	42	6
Total	<u>1132</u>	<u>100</u>	<u>701</u>	<u>100</u>

Source: kebeles agronomy report

2.2.2 Existing Irrigated Agriculture and Practices

The existing low productivity and production capacity of rain-fed crops, due to uneven distribution of rainfall and heavy hail damage, has enforced farmers to develop traditional irrigation practices. Therefore, irrigated agriculture has been gradually developing following rainfall abnormalities and scarcity of land. In the project area irrigated crop production has been not practiced using water from mayese river by constructing traditional intake structures. So that The project area is used only one seasons' crop productions. The rain-fed crop production which is the main income base and constitutes more than 100% of the annual cultivated land.

According to the 2015 (E.C) annual irrigated crops area & yield estimation data, obtained from mayese Keble Agricultural Development Office a total of more than 102.7 hectares of land was covered by irrigated crops and more than 3100 quintals was produced in the Keble. However, the existing traditional irrigation is not diversified because of different technical and social reasons. In addition, the productivity of crops is comparatively low due to traditional management practice and low input use (see Table 7). In the project area no Traditional Irrigation.

Table 7 Cropping Pattern of (Irrigated) in the Keble

Crop	Cropping Patterns	
	Geret lenguat (035)	Alegeta (034)
	Area (%)	Area (%)
Maize	10.9	-
Barely	32.6	-
Potato	15.9	-
Onion	11.2	55.7
Cabbage	3.1	0.9
Carrot	-	-
Chat	-	0.7
Beet root	-	1.5
Coffee	5	0.9
Green pepper	0.8	14
Tomato	1.8	7.3
Lentil	18	-
Banana	-	7
Suger-kene	-	8.2
*Others	3.4	4
Total	100	100

Source: kebeles agronomy report

Under rain fed agriculture, soil type was found to be an important factor for the selection of crops, especially for smallholders. Vertisols are more difficult to work and may present problems of timeliness when they are too dry or too wet. Such problems can be overcome if only draught power is available. As a result, the planting time of teff is significantly late due to difficulties of land preparation. Another important factor is price trends. Due to price increases following the increased national demand for quality teff, teff has become one of the main crops of the farming system.

Smallholder farmers favour the brown-red soils (Nit- sols) which are easier to cultivate and less prone to water-logging than the black Vertisols. On these red soils, cultivated crops are mainly cereals (barley and wheat) with limited coverage of horticultural crops. Land preparation is by traditional oxen-drawn ploughs. Smallholder farmers stick to the less favoured Vertisols areas.

The diversified cropping patterns suggest that the project area has a reasonably good potential for producing a good range of crops and contributing to the supply of regional and even export

demand. In the highland farming systems with more fragmented land, higher population density and more amenable and fertile soils, which have a comparative advantage in higher value crops?

However, the demand for higher value crops from local markets in the project area should not be under-estimated. As shown in the above table, vegetables (potato, onion, garlic, etc.), pulses (fenugreek) and cereals (lent-in, wheat, teff) are already important in irrigation agriculture. Demand for higher-value crops will increase both with population and wealth. With more disposable income, a greater proportion of higher value crops are consumed.

2.2.3 Agricultural Input Utilization

Over cultivation, soil erosion and fertility decline and poor cultural practices have affected crop productivity. Traditional cultural practices which have been used by the farm households for centuries have failed with increasing number of population and declining of crop land holding. Fallowing is used by insignificant number of households. Inter cropping and crop rotation is rare as most of the households have inadequate land to spare. Organic manure and composting of the farm land is also limited with declining number of livestock and the use of residues for fuel and animal feed. Thus for the majority of the households in the project areas, commercial fertilizer and seeds are the major available options to improve both land productivity and household income.

Yet the majority of the households have inadequate access to commercial inputs mainly due to escalating prices from year to year. Improved seeds are available to few households either due to shortage of adequate and most needed crop seeds or high prices whenever available.

The household survey revealed that almost 100 percent of the households used commercial fertilizers such as DAP and urea. The proportion of land under commercial fertilizer is few mainly attributed to high costs of fertilizer; lack of access to improved seeds and in most of the lowland areas the perception of the households that their land is fertile. For these households logging of crops is the main reason for not using fertilizers. Erratic nature of rain and vulnerability of the crop sector to shocks also limited the application of commercial fertilizer.

Table 7: Number of Households Using Commercial fertilizer (%)

Do you use chemical fertilizer?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	23	100.0	100.0	100.0
	No	0	0	0	0
	Total	23	100.0	100.0	
Missing	System	0	0	0	
Total		23	100.0	100.0	

Source: Mayese two weir Irrigation Project: Socio-Economic Survey

In general increasing prices of fertilizer seems the major limiting factor for low level of application, diversity of crops under fertilizer and proportion of households using fertilizer. Thus the volume of production is significantly related to application rates of fertilizer in all agro-ecologies.

The major suppliers of chemical fertilizers in the project areas are cooperatives, Government and individual retailers. Those who purchase from individual retailers are mainly farmers who have very small plots of land and unable to buy the available size of fertilizer (25-50 kg).

2.2.4 Livestock Production and productivity

Livestock production is the second major livelihoods of the households. It is mainly for production of oxen power, milk and milk products both for household consumption and for markets. Currently except in few areas livestock production as a major livelihoods has been declined to the extent that a household rear only few animals mainly cattle and sheep. Productivity of one cow per day 1Litres, productivity of one local species variety hen per year 260 eggs, modern varieties hen per year 330eggs, traditional beehives per year 15-25kgs and modern 25-30kgs honey per year.

2.2.4.1 Livestock Population

Indigenous animal breeds are the dominant livestock species reared in the project area. Exotic and hybrid cattle population are reared and mainly concentrated around few urban centers and towns of the project areas mainly kept by urban dwellers for milk production.

Cattle in general are kept for production of milk and milk products and for traction power. However due to shortage of grazing land and expansion of crop land in almost all areas, the primary purpose of cattle rearing is now for traction power to supplement crop production.

Sheep on the other hand is kept for subsistence mutton production and cash income particularly during urgent cash needs and stress periods. With declining availability of forage the number of sheep particularly shoats have increased over the past years. The main characteristics of the sheep breeds are fast growing, high fecundity but low production of mutton compared to exotic breeds and some local breeds of Ethiopia. Goats are also dominant in the project area and mainly produced by the households for meat and cash income.

Equines are other dominant animal breeds with increasing importance with marginality of the population from major economic and social infrastructure. Donkeys and horses are mainly used for transportation of good and humans. Mules are totally used for transporting goods and humans.

They also generate substantial income for the households through renting. Milk production is however rare as the major purpose of production of camels is for transportation of goods and humans unlike in other pastoral and agro-pastoral areas of Ethiopia.

According to this survey, there are 512 cattle population, 424 heads of shoats (88.6% of sheep) and 152 equines population are in the project area. Based on this information there are 992.4 tropical livestock units of livestock population in the project area. The average holding is about 5.4 TLU per household. Of the total TLU cattle comprises about 51.6 percent, shoats 38.5 percent and equines 10 percent of the total livestock population.

Table 8: Number of Livestock Population owned by the Households

Type of Animal	Beneficiaries category						Remark
	Project area beneficiaries			2 Project area Kebeles			
	Number	TLU	%	Number	TLU	%	
Oxen	216	216	18.4	2363	2363	11	
Cows	112	112	9.5	1884	1884	8.8	
Calf	80	80	6.8	1067	1067	5	
Heifer	48	48	4	1146	1146	5.4	

Bull	56	56	5	1205	1205	5.6	
Sheep	376	338.4	32	9630	8667	40.6	
Goat	48	43.2	4	1050	945	4.9	
Donkey	120	78	10.2	922	599.3	4.3	
Horse	8	5.2	0.68	479	311.35	2.24	
Mule	24	15.6	2	193	125.45	0.9	
BEE HIVES	88	0	7.5	1408	0	6.6	
Total	1176	992.4	100	21347	18313.1	100	
CATTLE	512	512	43.5	7665	7665	35.9	
SHOATS	424	381.9	36	10680	9612	50	
EQUINES	152	98.8	12.9	1594	1036.1	7.5	
BEEHAVES	88	0	0	1408	0	6.6	

Source: mayese two weir Irrigation Project: Socio-Economic Survey

2.2.5 OFF-FARM AND NON-FARM ACTIVITIES

The population density in the project areas is high. Annual growth rate is also significant with subsequent effect on land use types and environmental changes. The direct consequences of population growth and density are shortage of arable land and expansion of crop production on unsuitable land forms and terrains. Deforestation and shrinking of grazing lands became common further restricting alternative livelihood systems and improvement of well-being. Land shortage is the major socio-economic problem for the majority of the households. As revealed in previous chapter the majority of the sample households has either no or less than half a hectare of land. Not only declining size of land holding but also fertility decline due to over cultivation and erosion, the yield of crops is progressively deteriorating over years. In most of the areas, agriculture particularly crop production is no more a reliable source of income and livelihoods. Food production per capita is very low and the majority of the households cannot subsist themselves. Over 80.6 percent of the cash income of the households is generated from the agricultural activities, yet with deteriorating agricultural productivity particularly crops, cash income also declines progressively from year to year. Crop production is highly vulnerable to various shocks and as a result cash income of the households is also fluctuating with annual rainfall pattern in the project areas.

2.2.5.1 Off Farm Activities

Despite significant change in land use pattern, crop yield and cash income, the majority of the households continue to subsist on crop production. This is mainly due to lack of access to alternative employment opportunities, affordable rural credit, lack of entrepreneurship and expertise, experience and knowledge in other economic activities, lack of technical and financial supports.

However, with deepening of the poverty level, shrinking of land holding sizes, and deterioration of livelihood assets, currently significant number of households started to engage in other off-farm and non-farm activities. The major types of off-farm activities are seasonal migratory jobs mainly in peak seasons. Trans-boundary migrations to other zones and states of Ethiopia are also substantial and most of the households generate significant income from such type of migrations. The major off-farm activities of this nature are weeding and harvesting and mainly related to the availability of these activities in destination areas. Another most dangerous and widely distributed type of migration is trans-boundary migration to out of Ethiopia especially to Arab states. In general about a quarter of the households reported to have engaged in off-farm activities about 1.8 percent in the project area.

Off-farm activities are poverty driven income and employment. The declining land holding sizes, increasing land deficit and landless households, increasing family size, lack of access to other employment opportunities, declining crop and animal yields, and basic assets of the households are the major reason for the majority of the households to engage in off-farm and non-farm activities.

2.2.5.2 Non-farm Activities

Non-farm activities are activities that are not directly related to crop and animal production. Non-farm activities in this context, includes small scale business (petty trade of animals, crops, manufactured goods), handicrafts (pottery, blacksmithing, carpentry, embroidery, weaving etc), animal fattening, charcoal making, salaried jobs (guarding, house servants, and others) and other activities (traditional healing, religious services, birth attendants, etc).

Unlike off-farm activities, nonfarm activities require substantial initial capital, experience and knowledge of enterprise development, market for goods and services, adequate training and financial support. As a result the availability of non-farm activities is at stake for the majority of the households. Besides for those who engaged in non-farm activities the income generated from each activity is so low to improve their livelihoods. Most of the non-farm activities suffer from competition, lack of capital and credit services and low demand. However for the poor households they are alternative sources of income and employment.

The most common non-farm activities are small scale trades of animals and crops, various hand-crafts and traditional activities (religious services, traditional healing and birth attendance) etc. Generally off farm and non-farm activities are increasing from time to time with declining size of land holding, agricultural production, and income and generally with the deepening of poverty in the area. Engagement in these activities however is constrained by lack of affordable credit, experience, lack of technical support and promotion activities and capital. Despite significant constraints to the development of off-farm and non-farm activities, they remain valuable options for areas suffering from land shortage, declining agricultural productivity and rapidly growing rural population.

2.2.6 Agricultural Labor:-

2.2.6.1 The Supply of Labor

The agricultural labor (population in the age group of 15-64 years) accounted for 54 percent of the total population. In addition, of the total labor force above the age of 14, about 65.2 percent are literate.

However, in the rural community and traditional farming systems it is common that children below the age of 10 and the old aged above 64 years actively working in farm fields. Considering the age group above 14 years (children) and those above the age of 64, the total potential available labor force in the project areas accounted for almost 54 percent of the population.

In general, the available labor force is estimated 354 times 216 Days which is Equal to 76,464 Man Day per Annual. Most of the women are engaged in household chores and other reproductive activities. Their participation in agricultural activities mainly limited to weeding, harvesting and transporting.

The other source of agricultural labor is children and other family members. They provide substantial labor for both agricultural activities and non-farm activities. The female children and other family members are usually part time agricultural workers mainly occupied by reproductive and other routine household activities such as cooking, child care, fetching water and processing food, etc. Substantial number of girls is also students who spare much of their time in the schools. Thus the female children, most of the time is part time workers like mothers and adult female members. The second group is boys and other adult male family members. This group provides substantial proportion of the labor force but mainly occupied either by education or other sideline activities. The majority of children are therefore part time agricultural workers. However, in peak agricultural seasons, particularly during weeding and planting most of them are full time agricultural workers. In this period most of the male children dropped out from the schools to support their families in various agricultural activities.

2.2.6.2 Holydays and the Agricultural Labor

The major causes of shortage of farm labor in most of the areas and among the majority of the households is the practice of celebrating too many holidays a year. All of the households responded that they did not work some days in a week and a year. These holydays include weekly, monthly and annual festivals and holydays.

In general about 11.5 percent of the households celebrate sixteen day in a month, 28.5 percent fifteen days, 27.9 percent fourteen days and the remaining 32.1 percent celebrate four to thirteen days per month. The mean monthly days celebrated by the households are however 13.05 days. Saturday and Sunday are celebrated by the majority of orthodox Christians. Other holydays in which most of the households are not working are monthly celebrations which mostly related to saints days. These holydays are very common among the orthodox Christians. The number of working days spared for this celebrations ranges from 1 to 12 days a month.

2.2.7 Land Holding and Tenure:

Population growth and increasing agrarian population and family size as well as due to other social and economic factors, per capita land holding is deteriorating in the last few decades. Expansion of crop lands at progressive rate, environmental degradation and frequent drought in the areas exacerbated the problem. Relatively adequate production is possible through expansion of crop land. Average productivity of major crops is also very low due to the dominance of local crop varieties, low input use, unyielding farm practices and lack of adequate technical support.

Land redistribution and re-allocations have been undertaken in the early 1991 in the project area. Registration was completed and currently most of the households have got user right certificates. Most of the households who have got land use rights are those who have also land use rights prior to the land redistribution with minor adjustments to accommodate the needs of the land less households. yet most of the households, particularly those who have no user right prior to the period, the newly formed households, the young agricultural generation have either have very small plots or have none at all.

2.2.7.1 Land Holding Size and Distribution

In general the majority of the households have very small plots of land. The household survey revealed that slightly 21.6 percent of the population in the project areas has less than one hectare of land. 69.5 percent have up to one ha and 8.6 percent have more than one hectare. On the other hand the average land holding for male headed households is 0.5 ha.

Table 9: Number of Sample Households by Size of Land Holding (%)

LAND SIZE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<0.5 Ha of land size	5	21.6	21.6	21.6
	0.5-1 Ha of land size	16	69.5	69.5	91.1
	>1 Ha of land size	2	8.6	8.6	100.0
	Total	23	100.0	100.0	

Source: Mayese two weir Irrigation Project: Socio-Economic Survey

2.2.7.2 Security of Land Tenure

The registration and certification of land use right have been seen as a guarantee for more investment, land resources conservation and sustainable production and improvement of livelihood systems. Thus about 98 percent of the households have land use certificate and they have been reported to feel secure with regard to their current holding.

Need for renting or share cropping an additional land to support livelihoods and solve critical shortage of current holding is also substantial. About 21.6 percent of the households in general, responded that their current holding is not adequate.

Due to critical shortage of land there are a number of land tenure arrangements in the project area including renting, sharecropping and contracting. Furthermore, renting or share cropping an additional land is more likely among the poor households who have small or no plot of land. Of those who have only less than half a hectare of land 21.6 percent are engaged in sharecropping and renting of additional land. Variation in access to farm resources and level of poverty are the strong determinants of engagements in additional land renting or share cropping.

2.3 HOUSEHOLD INCOME AND EXPENDITURE

2.3.10 Household Income

Consistent with the low level of agricultural production and the low diversity of off-farm and non-farm activities, the volume and sources of farm cash income is also low. Household cash income determined by the size of farm land, the yield of crops, the agro-ecological setting, the number and type of animals owned and the value and level of productive assets owned by the households. Market and price conditions, infrastructure situation, distance from the urban and market areas, the presence of cash crops, accessibility to extension services and inputs also determine the level of household cash income. The declining size of land holding from time to time has an impact on the level of production available to the farm households for both consumption and sale. With declining land holding in traditional small scale agriculture cash income generated from subsistence production and non-farm activities also declines proportionally. Furthermore the vulnerability of crop production to shocks and environmental

degradation also limited the potential for surplus production and improved cash income. Shortage of grazing land also constrains livestock production and as a result farmers tend to produce very few animals mainly for production of traction power.

2.3.1 Sources of Cash Income

Two types of cash income are common for the majority of the households. Agriculture is the major sources of income includes:- sales of annual cash and staple crops, live animal sales and animal products, a picture, forest production like(Eucalyptuse) . The non-agricultural income on the other hand includes off farm & non-farm activities and transfers.

The survey shows that almost all of the households obtain cash income from sales of crops. The main marketable crops are cereals and pulses. Income from crop sales in general increases with increasing volume of production and therefore the volume of income is highly linked with the availability of land, adequate rainfall in a particular planting season. The higher the size of land owned in general the better will be the income from crop sales. For the land deficit and food insecure households on the other hand the proportion of crop sales and income generated from this source is slightly less than the better off households.

Other source of agricultural cash income is sales of animal products including milk, skin and hides, milk products, eggs and honey. Lack of adequate feed, poor extension support services, animal diseases and low productivity of local breed contributed also to low cash income obtained from this source. Yet livestock products generate income for all of the households in the project area.

Off-farm and non-farm activities are other sources of annual cash income for significant number of households. The declining agricultural productivity, mainly due to shortage of land and fluctuating rainfall regime, a number of households are currently engaged in different types of off-farm activities. In general off and non-farm activities are source of cash income for 4.3 percent of the households. There are a number of off and non-farm activities in the project areas though limited in scope and ability to generate more income. Most of these activities are constrained by shortage of initial capital, marketing problems, technical support and business

experiences of the households. Yet they are increasing over time with the declining cash income from other sources. Other off-farm jobs including working on other fields during peak seasons, fuel wood and charcoal making and sales of other wood products generate income for the households.

Remittances and other traditional jobs such as religious services, traditional birth attendances (delivery services), and traditional healing practices are sources of income to slightly less than 16.6 percent of the households.

Table 10: Percent of Households Earning Income from Different Sources

		Statistics						
		Annual income of the household head	Income from crop production	Income from sale of animal products	Income from sale of fruits and vegetables	Income from off farm activities	Income from Aid	Income from others
N	Valid	23	19	17	21	22	18	20
	Missing	0	4	6	2	1	5	3

Source: Mayese two weir Irrigation Project: Socio-Economic Survey

2.3.1.1 Level of Cash Income

As indicated above the main sources of annual cash income of the farm households are agricultural activities. Agricultural activities such as crop and animal production generate income for all of the households whereas, non-agricultural activities for 34.8 percent of the households. The subsistence nature of the agricultural sector also makes the level of income more volatile from year to year and unsustainable with changing rainfall regime, pest occurrences, shortage of inputs and poor farm practices.

In general, about 34.4 percent of the households earn less than 6200 birr from all sources. The highest income category (above 15000 birr) accounted for only 12 percent of the households.

Table 11: Percentage Distributions of Households by Income Category

INCOME SIZE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-6200 birr income	8	34.4	34.4	34.4
	60201-15000 birr income	12	51.7	51.7	86.6
	>15000 birr income	3	12.0	12.0	100.0
	Total	23	100.0	100.0	
Missing	System	0	0		
Total		23	100.0		

Source Mayese two weir Irrigation Project: Socio-Economic Survey.

Poverty status of project area:-

The result of the hh survey reveals that instead of estimate annual income in income approach expenditure is nearly factual figure. Therefore the annual income of the household is 16716.6 birr per household.

The global poverty line in 2017 is 2.07 US dollars per day which is equivalent 1.9 us dollars per day in 2011. The current us/ birr exchange rate is 27.65 birr for 1 us dollar .therefore poverty line in Ethiopian birr is 57.2355. According these poverty line 86.1% of surveyed population are under global absolute poverty line. Automatically the population segment above poverty line is 13.9% of the total. The results indicate poverty in the project area is severe. However, the computation has its limitation since it does not use purchasing party price method.

Table 14.1 poverty statues based on global poverty line as guideline

Poverty Status	Daily income in birr	No hhs	Percentage
Under Poverty	16.9	8	34.4
	17.2-41	12	51.7
Sub Total		20	86.1
Poverty line	57.2355		
	60-67	3	13.9
Sub Total		3	13.9
Total		23	100

Source: computation based on hh survey

2.3.2 Household Cash Expenditure

Household cash expenditure is a function of income and asset holding. Household cash expenditure in most of the rural marginal societies is characterized by high consumption, low investment and excessively high expenditures on basic necessities. As poverty determines the level of household expenditure, the poorer the household is the higher the proportion of expenditure compared to income. Expenditures on education, health, agricultural inputs, and construction are by far lower than the relatively better off households. The level of production, the size of land owned by the household, the number of animals they owned and other factors that affect household cash income also determine the amount of cash expenditure.

2.3.2.1 Amount of Cash Expenditure

The average household cash expenditure is about 8850.13 birr per household. The higher the income of the households, as indicated above, the lower the cash expenditure.

Table 12: Percentage Distribution of Households by Category of Total Cash Expenditure

EXPENDITURE SIZE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-6200 birr income	8	34.4	34.4	34.4
	62001-15000 birr income	13	55.9	55.9	90.3
	>15000 birr income	2	8.6	8.6	100.0
	Total	23	100.0	100.0	
Missing	System	0	0		
Total		23	100.0		

Source: mayese two weir Irrigation Project: Socio-Economic Survey

2.3.2.2 Types of Household Cash Expenditure

Of the total expenditure, about 48.5 percent is expenditure on food. Most of the poor households expended less money on basic manufactured consumption goods and services such as sugar and expended more on staple food crops. For the relatively better off households expenditures on manufactured consumption goods is relatively high, and expended low on basic staple foods as they are more or less self-sufficient from own production. Other expenditures include expenditure on health and education. Expenditure on health treatment, education fee, ceremony etc. comprises about 5.14 percent of the total cash expenditure of the households. This expenditure also varies with the wealth status of the households and the number of children sent to schools by the households.

Table 13: Amount of cash expenditure by category

Descriptive Statistics						
	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Annual expenditure of the household	23	780	23200	193954	8432.78	4807.919
Expenditure for food consumption	13	600	5000	30600	2553.85	1219.027
Expenditure for clothing	21	500	7000	51100	2433.33	1427.702
Expenditure for fuel, salt sugar, oil etc.	23	100	5000	38900	1838.73	1345.982
Expenditure for treatment, education	22	84	2000	20934	951.55	510.830
Expenditure for farm inputs	23	1042	5200	56369	2450.83	1227.604
Valid N (list wise)	10					

Source: mayese two weir Irrigation Project: Socio-Economic Survey.

2.3.3 Rural Credit

Among the many problems attributed to low agricultural productivity, and poverty of the majority of the rural poor is lack of access to affordable and sufficient credit. The overwhelming majority of the cash income of the household is generated from crop and livestock sector. The development of the sector and the cash income obtained therefore depends on the amount and type of investment made by smallholder farmers. Due to low level of agricultural productivity and cash income the amount of investment made on the improvement of livestock and crop production is very small and mainly dependent on few agricultural inputs (fertilizer and improved seeds) The quantity of these inputs purchased is small either due to lack of money or

they are expensive.. Investment in land improvement, off farm and non-farm, activities, breeding stock and improved seed varieties, construction and irrigation structures and services are rare and unaffordable to the majority of the poor. Thus for many years, the agricultural sector performance in the project area has been deteriorating or remains stagnant. The main reason mainly attributed to lack of investible affordable credit to the farmers on timely and need basis.

Increasing population from year to year has resulted in shrinking of land holding per capita. The majority of the households have now less than half a hectare of land. For those who have some plots of land, land degradation seriously affected the fertility of their farmland and crop production. For the majority of the households, lack of food is now the major livelihood problem. With current population growth, the eco-system and the carrying capacity of the land will rapidly decline to the extent that it will not feed more than the current number of population. Yield improvement through heavy investment will solve the problem in the short run. However, sustainable livelihood improvement will probably possible through creating non-farm jobs at least for the land less and land deficit households through availing affordable credits.

In the project area, formal credit schemes were not available to the majority of the households. Informal sources are however, common including loans from friends and relatives, village moneylenders etc. These sources though they are the most accessible and mostly free of stringent conditionality they are often available at greater costs. High interest rate is the major problem of informal institutional credit. However, they are hard money available during stress periods and save the assets of the poor households. Such form of credit is short term, repayment period is short, and most of them are using for consumption purposes.

Formal credits are limited to animal fattening and agricultural inputs (fertilizer, and improved seeds) mainly distributed through service cooperatives. A number of households benefited from this type of institutional credit. However, for most of the households the increasing prices of these inputs in face of declining crop yields become unaffordable and difficult to repay. Other formal credit institution is the Amhara Credit and Saving Institute. This Institution provides short-term multipurpose credit for the destitute households who have no or small plots of land.

The aim of the institution is mainly to increase productivity and expand micro-enterprises and non-farm activity that support the livelihood of the poor.

The survey result showed that, of the total sample households about 34.8 percent are benefited from credit services provided by formal credit institutions in the area.

Interest rates as perceived by the majority of the households in all areas from all sources are very high. The average interest rate for credits from saving and credit association is about 18 percent per annum. For credits from cooperative society's average interest rate is about 11 percent. Loan from informal sector on the other hand found to be in the acceptable range compared to interest rates of the formal credit institutions. In general, however the survey result showed that interest rates are very high for the majority of the poor and are not consistent with the purpose of loan, inflation, prices of commodities and purpose of loan, repayment period and profit from the loan. As a result, most of the rural households tend to limit themselves to agricultural input loans.

Though there are a number of problems affecting rural credit in the project area four major problems are outstanding for utilization of and access to rural credit. High interest rate, though varies by sources of credit, over 47.8% of the households responded that high interest rate is the major constraints to utilization of rural credit. Interest rate ranges between 11-18 % for all credit sources on average. In view of increasing prices of inputs and manufactured commodities as well as the pauperization of the majority of the rural poor these rates seem high. In addition, high interest rates and the risky environment in which rural households operate are other causes of low utilization of available credit including that of agricultural inputs.

Most of the credit available to the rural poor is supply based, i.e., bound to the amount of money available for lending and conditionality's of the lending institutions than the need of the client. Input credits are available during planting season. Other credits are also available when funds are ready and lending institutions need to avail them. Emergency, consumption and other credit facilities are not available to the farmers when needed. Besides, for many of the households the main reason for low cash income is poor market performance mainly attributed to the seasonality of agricultural production and repayment period of credits available to the farmers. To settle their debts, repay their loans and cover their immediate family expenditure most of the farmers

tend to sell their crops right after harvesting at cheaper prices. Availability of short-term credits to cushion family cash needs in this period will improve not only cash income but also the credit worthiness of the poor farmers.

2.3.4 Gender Issues

Gender is a social construct and refers to the role of men and women in the society. This social construct, on the other hand shapes the position of men and women in the day-to-day life of the household, individuals and community and also affected by the role the two sexes play. Directly or indirectly, inequalities between genders have impact on the growth and development of the society, household and family, community and the nation. The roles women play both in traditional and modern societies have special bearings on resource use and efficiency, human development, productivity and decision-making.

In agrarian societies the role of women is mainly limited to reproductive activities, i.e., maintaining the generation and caring for the families including child care, collecting fuel wood and water, washing clothes and cleaning houses and barns and other domestic tasks. On the other hand, the role of men is productive mainly on the generation and development of productive assets that sustain livelihoods and the families as well as all activities that can be undertaken outside the domestic tasks. Women's workload is also considered more than that of male. While the main role of women is reproductive, in agrarian society women also expected to assist their husbands in various tasks particularly agricultural activities during peak agricultural seasons. Due to the disparities in their role, women have also poor access to basic services particularly literacy programs, education, health and other services. The gender inequality also limits women to have an equal access to sufficient foods, legal and judiciary services, and participation in various activities. Similarly, due to the role destined to each gender women mostly suffer from voiceless and devoid of decision-making power. The lack of voice and decision making power on the other hand exacerbated the subordination of female to males.

Usually most of the durable and valuable assets are considered as the property of males/husbands in the past. However, with awareness creation and legalization of women's rights in recent years both sexes have equal right to possess the assets and equally share during separation. They have also equal rights to inherit and transfer these assets to the second party including their

children and relatives with common consensus of the wife and husband. Land registration and certification have also given equal rights for wife and husbands. Discrimination between daughters and sons in terms of inheritance of the property of their parents is also improved. Daughters can have equal share with the sons in times of death or voluntary transfer of assets from their parents. Other assets including animals, household utensils, jeweler, farm tools and others are also the property of both husband and wife.

Table 14: Decision making of asset

Decision maker on household asset					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	husband only	4	17.4	17.4	17.4
	Wife	3	13.0	13.0	30.4
	Both	16	69.6	69.6	100.0
	Total	23	100.0	100.0	
Missing	System	0			
Total		23	100.0		

Source: Mayese two weir Irrigation Project: Socio-Economic Survey

In general, gender inequality is improving to some extent in the area. Participation in the community affairs, access to education and health services as well as access to control and decision making on productive assets owned by the households are improving and encouraging. However, due to the cumulative and long-term nature of gender issues as well as due to influence of religion and culture these problems are still deep rooted and need commitment and concerted efforts of all institutions.

Table 15: most pressing needs of women in the project area

Most pressing needs of the women					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	grinding mill	5	21.7	21.7	21.7
	safe water supply	7	30.4	30.4	52.2
	Others	11	47.8	47.8	100.0
	Total	23	100.0	100.0	
Missing	System	0			
Total		23	100.0		

Source: Mayese two weir Irrigation Project: Socio-Economic Survey

The survey revealed that others and safe water supply (constitutes 47.8% & 30.4%) respectively is the most pressing needs of the women in the project area followed by grinding mills (21.7%). In general The Empowerment of women in the project area the survey result shows weak.

2.3.5 Tradition and Culture

In general the population of Amhara has diversified tradition and culture. Specific to the study area farmer celebrate many religious based ceremonies. As indicated in the demography part of this document, almost all the population (95%) followers of Ethiopian Orthodox Church. As the data obtained from survey result, on average 12 days in a month or 144 days in a year are holidays, when the work on the farm is prohibited according to orthodox religion. Other cultural practices that mainly promote consumption for instance, numerous festivals and extravagant and wedding ceremonies should be curtailed through on going social mobilization and community agitation, and replaced with a culture of saving and investment promotion.

As to food habit, households prepare their food from cereal crops they already produced like wheat and teff mainly in the form of “Injera” (100%) and stating that they do not use fruits and vegetables in their daily meals due to lack of vegetables and fruits.

2.4 ACCESS TO BASIC SOCIAL SERVICES:-

2.4.1 Health Services

Health service coverage is one of the major indicators of the level of living standard of the community. Besides health care infrastructure, provision of adequate clean water and sanitation, malnutrition and primary education are crucial to improve the health status. Likewise, the productivity and sustainability of any development program is determined by the supply of healthy workforce. Much focus has been given to improve access to preventive and curative care for those who have inadequate access as well as to improve effectiveness of health services, staffing and adequate flow of drugs. In line with this, in the past ten years, efforts have been made to improve access to preventive and curative health services to the majority of the population, communities and kebeles.

There is a health post in all target kebeles. The trained health personnel comprises of 2 extension agents in each kebeles. Thus, majority of the project area is supported by health extension workers. Also, there are two health centers (Lenguat and Alegeta) in the project area. In addition, the district capital is close and accessible; there is relatively good health service in the target Keble.

As the survey, data shows that, almost all the respondent house hold farmers gave their own response that they received health education and they know mode of transmission of HIV/AIDS, what they should do to protect themselves and their family. Due to lack of cleaned water, most people attacked by water born disease like diarrhea.

Acute febrile illness , Dyspepsia , helminthiasis , infections of the skin and subcutaneous tissue , Pneumonia , diseases of musculoskeletal system and connective tissue , acute upper respiratory infection , Trauma , urinary tract infection and others accounts are top ten disease of the area.

The conclusion to be drawn from secondary data, baseline survey and focus group discussion is that vigorous steps have been taken to maintain endemic and communicable diseases by the project area for the last ten years and improvement has been appreciated. Despite this, the health service of the area is inadequate to meet the demand of the community mainly due to lack of sufficient health facilities and trained manpower. Limitation of health institutions with preventive health service has also an adverse impact on the change of public health status. An interactive linkage of health with other sector like clean and adequate water, sanitation and hygiene education, nutrition, education status (at least primary education) etc. has demanded the health program to be follow an integrated approach. Thus, so as to enhance the health status of the population in general and mitigate the problem that affects the intended project community in particular the following outstanding issues shall be appropriately and timely address.

- ✓ Change attitude and perception of the community in general and women in particular
Strengthen and expand training of health personnel in collaboration with relevant institutions.
- ✓ Improve the knowledge of nutritional requirements and dietary habits, which sometimes act as a barrier to adequate nutrition.

- ✓ Improve access to safe and adequate water and improve sanitation (toilet facility, liquid and solid waste management) and hygiene education are the key determinate factors to mitigate water-borne (e.g. Internal parasite, thaifoid).
- ✓ Follow an integrated approach in the health program to ensure its sustainability.

2.4.2 Education

Education is very essential for development as it is an instrument in fostering progress towards other goals, such as reducing extreme poverty and hunger by building up poor people’s producing potential, creativity and improving child health via the beneficial effects of maternal education. Thus, it is one of the vital sectors which emphasis has given by the government to improve the quality as well as to expand access especially for rural and underserved areas.

The data shows that education coverage of the project area is about 99 percent in the project area kebeles. There are about 4 schools in the intended project area. The gender-disaggregated data indicated that, of the total students, about 47 percent are females. The survey findings indicated that about 34.8 percent of the household are illiterate. The survey findings about 63.2% are literate population. The majority are completed up to grade four it was observed during survey, there are 4 schools (1-4=2 & 5-8=2) in the project Keble.

Table 16. Number of students attaining to the project Keble

Grade	Schools Name	Keble	Average Distance from the project site	Attaining Students			Teachers						Dropped Students		
				Male	Female	Total	M	F	T	M	F	T			
1-4	Alegta	034&035	2kms up to 3kms	139	117	256	5	7	12	1	1	2			
5-8	Alegta and lenuat	034&035	1.5KMs up to 4km	831	637	1468	23	19	42	3	1	4			

	Total			970	754	1724	28	26	54	4	2	6
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2.4.3 Source:- socio economy survey result

2.4.3.1 Access to Potable Water Supply:-

Providing access to safe and adequate water is one of the key factors for socio-economic transformation. Water has an interactive linkage with health and education. Good health is crucial to enhance the productive capacity of the community and improve attendance and performance of students, especially for girls by reducing water fetching burden. Thus, availability of clean and sufficient water plays a vital role for sustainability of any development project. Considering this, the study team has thoroughly assessed and identified outstanding issues related to water supply condition of the project area.

The sources of potable water in the project area are piped water and unprotected spring. As per the survey the main source of drinking water is Piped water followed by un protected spring. About 65.2 percent of the project area use piped water for drinking and cooking. Here, accessibility of clean water is relatively very good, up to 2.5kms distance. even if there are still some water Borne diseases in the project area.

2.4.4 Housing characteristics

There are 37 housing units in the total household survey. On average one family compound comprises 1.6 houses of all types. Out of the total housing units in the project area around 65.2 it is corrugated iron roof with wood and mud wall and both are 34.8 percent.

Among other factors, one of the indicators of the well-being of the households is the availability and quality of toilet facility.

Figure 3 .Land use pattern



Source partial view of command area.

2.4.5 Road and Transport Net work

Availability of adequate road network and transport facilities is the major factors to make the development program effective and sustainable. Considering the level of importance and relevance the consultant assessed the status of road access and transportation facility of the project area is very good.

The Dessie –Mehal-Saint highway (Asphalt &Gravel road) runs along the South fringe of the project area. The highway provides all year round access for the project. The weir site is accessible in the main highway linking the Capital of South Wollo Zone Dessie, to Abuarria which is 138 kms far from Dessie Town in the main asphalt and and 56kms Abuarria to Densa (capital of mehal-Saint woreda) the main gravel road and also 7kms URRAP far from Densa town to project site (mayese two) in all-weather road.

2.4.6 Access to other social services

The study assesses the availability of social and institutional services to recognize the status of socio-economic development of the project area. The assessment includes the percentage and the frequency of population using the services and the distance of the service from their homestead.

Market, mill, water supply, telephone, transportation are easy available in the project area. But there is no I.C.T Center and electric power. Subordinates that every dweller can be served at reasonable distance. The information obtained from survey data has indicated that all most all people in the study area has got water supply from Piped water and rivers.

Densa (the town of Mehal-Saint Woreda) are the main market places for the study population which is about 7 km in average from the study area give the marketing service 1days a week and every day.

Table 17. Main social services with average distance from farmer’s home

S. No.	Type of services	Average distance from the project area
1	Mills	1-3.5 kilometers
2	Market	7 kilometers
3	Telephone	0 kilometer
4	Postal	195 kilometers
5	Water supply	0.2-2.5 kilometers
6	Health service	2.5 kilometers
7	Education service	1.5-.4 kilometers
7.1	From 1 to 8 grade	1.5-3 kilometers
7.2	From 5-8 grade	2-4 kilometers
7.2	From 9 to 10 grades	7 kilometers

Source: Mayese two weir Irrigation Project: Socio-Economic Survey

2.5 PERCEPTION OF HOUSEHOLDS TO IRRIGATION

Irrigation agriculture is not a recent introduction around the project area, particularly in adjacent woreda and Keble. Expansion of small-scale irrigation, however, has been common after the 1995s with further expansion in the last 2000s and 2005s. Currently there is no a number of small-scale traditional and modern irrigation schemes around the project areas and Keble’s.

This survey doesn’t meet obstacles and knowledge of households on small scale irrigation are very high interested, their perception and need in case the expansion of irrigation will be materialized in the future and the consequences of irrigation on the social and economic settings of the households as perceived by the future beneficiaries. These are important for the sustainability of future projects particularly in case the expansion of irrigation.

The importance of small-scale irrigation in crop production is currently increasing with increasing land degradation, declining crop yield, fluctuation of rainfall and above all declining land holding. As a result, most of the households need to intensify their current holding to improve their livelihoods and ensure sustainable food production.

Almost all households need to practice, improve and expand their current production and area under irrigation. There is a great need to improve and expand irrigation among the majority of the households. Poverty driven and shocks seem the major reasons for the majority to practice irrigation development. In addition, an improvement of wellbeing in households who use irrigation around the project area is another driving force for the development.

Public Consultation meeting was undertaken in the project Keble On may 26/09/08 EC. The attitude of the community was assessed during public consultation. It was very helpful to obtain basic information on socio-economic, socio-cultural and biophysical impacts of the project, and the associated measures to be taken. The discussion was participatory in which the participants have expressed their views, concerns and suggestions without any reservation on the proposed irrigation project. The Minute of Public Consultation is annexed at the end of the main report section of this document.

The main areas of discussion were including the following points: (i) attitude of the community towards the upcoming project; (ii) responsibilities of the local community; (iii) dedication of the beneficiaries to form irrigation water user's association; (iv) opinion of the community to produce market oriented crops; (v) contribution & participation of the community on the project; (vi) views and fears of the community on the project;

During the discussion held with the communities, the participants were reflect their fear, views & suggestions and forwarded some questions on the issues as follows:-

- They mentioned that they are willing to participate, contribute by labor, at least 10% of investment cost by money in the project activities and provision of construction materials during construction period and to facilitate line of canal, land of camp and etc.
- They reflect their willingness to cultivate market oriented crops and to establish irrigation water users' associations and to set by-laws that govern the members.

- The community believes that the project will increase their agricultural yield by cultivating twice a year.
- The inhabitants suggested that the implementation of the proposed irrigation project should not create any adverse impact on religious properties (Holy water) of the area.
- The community also added their fear about the scarcity of water at the downstream for both crop cultivation and livestock as well as on the timely starting of the project implementation. Since the area has large number of livestock resources they strongly suggested that sufficient amount of water should be released for the downstream users.
- The head of Keble agricultural office accepted and suggested that soil and water conservation activities would be implemented in the area so as to minimize the risk of weir.

The community explained that the proposed project should try to consider the downstream users of the river. They also suggested that irrigation users should be aware about proper utilization of Agro chemicals so as to avoid water pollution.



Figure 4. Public consultation of mayese two project

2.6 SOCIOECONOMIC POTENTIALS AND CONSTRAINTS

2.6.1 Potentials for Irrigation Development

A. Water Resources Potential

Ethiopia is endowed with high water resources potential encompassing many river basins. These basins have their own surface and ground water potentials. Abay basin is one of the country's rich potential in ground water. There are different efforts to utilize these potential for the livelihood development of the people. For this project, there is a well around mayese River.

B. Agro-Climatic Conditions

The project area have suitable (weyna-dega and degas) agro-climatic condition. The farmers of the area are producing a diversity of crops, including cereals, pulses and vegetables as well as some spices. The communities of the Project command area have no exposure to irrigation in crop production but very high interested.

C. Community Attitudes towards Irrigation Development

Most of the community members who participated in the group discussions and household survey, expressed their positive attitudes towards the project and willingness to contribute (labour, local materials and in cash) to its implementation. They are ready to mobilize and join

IWUA to facilitate smooth implementation and operation of the project. In general all beneficiaries are happy to come this project.

2.6.2 Main Socioeconomic Constraints:-

A. Environmental Problems

The project will change the statuesque of the area through construction of different irrigation structures, flooding, use of different chemicals (fertilizers and pesticides) and introduction of varieties of crops. The concentration of the population in the limited area and the attraction of different groups (traders, transporters and other business people) will have certain impact in terms of the fragile environmental conditions. Thus, all kinds of cautionary measures should be taken to minimize these effects.

B. Recurrent Flooding

Most parts of the project area suffer from recurrent flooding caused by rivers, Thus, unless some solutions, such as construction of dykes on the riverbanks are considered and implemented, flooding will remain one of the major threats to achieve the expected benefits from the project and will also increase the burdens and costs for rehabilitating the irrigation structures.

C. Socio-Cultural Constraints

Cultural practices that mainly promote consumption – numerous festivals and extravagant wedding ceremonies, to cite two examples – should be curtailed through on going social mobilization and community agitation, and replaced with a culture of saving and investment promotion. Since operation of irrigation systems does not go hand-in-hand with such hindering conditions, the community must be able to moderate cultural traditions prevailing in the area. Thus, strict behaviour-changing campaigns should be undertaken by the concerned government bodies to improve the situation.

D. Level of Skill to Adopt New Technologies

It is known that most of the target population has a low level of education. This will require a two-pronged approach: on the one hand, the project must be tailored to suit the capacity of the target community and, on the other hand, rigorous efforts will have to be made to train and educate the community. As to the former, all the complexities in the irrigation systems should be reduce if not fully avoided. In the case of the latter, wide-sweeping extension and demonstration works and pilot trials should be carried out before embarking on implementation of the entire work.

E. Infrastructures and Marketing Problems

Development of infrastructure, such as roads, health facilities, safe drinking water supply, schools and Telephone are good condition in the project area. But Electric power and I.C.T.center are at low level in PCA. The community will lack the capacity to adopt new technologies of the kind proposed in the irrigation scheme. Sick people who are able to get health treatment within their locality can be expected to participate wholeheartedly in the implementation of development-oriented projects. The same is true of education.

As regards the road infrastructure Transportation and marketing facilities, the community has already identified these as critical challenges to their well-being and livelihood. Most of the target PCA is accessible by vehicles during the rainy season. There is no problem of marketing because no lack of roads and transportation vehicles both for human and freight, reflected in both farm inputs and outputs demand and supply situations as well as the capacity to adopt new input technologies and output price fluctuations. The community members reported that they are constrained with respect to the use of new technologies due to their unavailability and high prices, while they face critical low levels of demand and high price fluctuations for the existing traditionally produced cereals (low surplus from family consumption). This calls for more serious attention as future agricultural development within the project is planned.

F. Community Mobilization and Participation

The beneficiary communities should be considered as the centre for every development. In principle, unless a development is “for the people, by the people and with the people” it is not fruitful. Community participation should be a meaningful tool that provides guidance and advices, and serves as a platform for decisions making, accommodating concerns of all stakeholders. The target communities should be consulted and their opinions should be heard and implemented, otherwise they can create more constraints and obstructions to the development efforts, ending up with reduced participation of the farmers and can even lead to complete abandoning and failure of the project. Furthermore, unless there is a sense of the ownership of the community, the project cannot be sustainable.

2.7 POTENTIAL IMPACTS OF THE PROPOSED PROJECT

2.7.1 Potential Positive Impacts

There are various benefits expected from the proposed weir project. Some of the major ones include flood control and the provision of a more reliable and higher water supply for irrigation, domestic and other related uses. It can intensify agriculture through irrigation on marginal land. Generally, the positive impacts of mayese two Diversions weir irrigation project are summarized as the following:-

1. One of the most significant positive impacts of this project is increasing agricultural yields or production. The farmers can be able to produce crops more than twice a year.
2. There will be sustainable and diversified food supply throughout the year
3. It increases opportunities to produce market oriented or high value crops.
4. It enhances revenues of crop growers due to practicing complementary activities. Ultimately, the life of the communities will be improved.
5. It provides employment opportunities for the local youths. Unskilled labour which can benefit the surrounding communities.
6. Possibility of transferring (development) knowledge and skills in utilizing best irrigation agricultural practices. Here, the irrigation users will be organized in irrigation users association (cooperative) which can help to disseminate information effectively and efficiently. The association will lower the cost of individual activities.
7. It will increase the land value as a result of implementing improved irrigation scheme in

the area.

2.7.2 Negative Impacts of Mays river weir

2.7.2.1 Impacts on reducing water quality:

The farmers in the project area have a trend of utilizing agricultural inputs like herbicides and fertilizers to enhance crop productivity. Such chemical inputs may be more utilized with the intensification of agriculture using the proposed irrigation scheme. Excessive level of nitrogen and phosphorus from fertilizers addition may lead to eutrophication which can diminish water quality. The active ingredients of the chemicals will either be adsorbed onto soil particles, or break down at various rates maintaining their toxicity. When this transported through run-off to nearby watercourses, can cause contamination of surface and ground water if not well managed. Viability of clean and sufficient water plays a vital role for sustainability of any development projects. There are spring and hand dug wells developed in the project area so it is necessary to construct sufficient water supply based on the number of the community.

But based on the information obtained from the community, kebele 035 administration office, Keble 035 land use and environmental protection expert and woreda water resource development office, there are three kebeles (032, 033 and 043 kebeles) to the downstream of this irrigation project diversion site which are dependent on Mays river and have no alternative sources around them. These communities use this river water for drinking, livestock and for irrigation purposes and this irrigation project may reduce the amount of the river water following to them.

Mitigation options

- Removing weeds at the proper growing period (prior to seed maturity), using environmentally friendly systems like manual weeding
- In case, if chemicals are used, the application of herbicide will be to treat only in designated areas and the chemicals used must be approved for use. Spraying shall be conducted during favourable environmental conditions (should not be in windy and rainy condition etc.). Besides, it should be conducted by trained personnel.

- Apply Integrated Pest Management than relying on the use of chemicals.
- Encourage the irrigation users to utilize more of organic fertilizers(compost, manure, etc.)
- Advice the farmers to apply fertilizers based on research findings or recommendations.
- Construction of water supply to the nearby and to the downstream three Keble community is a must before the start of the project. According to the woreda water office, the downstream area is desert and there are no sufficient sources to develop, therefore other alternatives like rural pipe system and deep well from other accessible Keble must be considered and it is crucial to develop sufficient water supplies before the start of the irrigation scheme operation to avoid conflicts between up and downstream communities.
- In addition to constructing water supply scheme, the other alternatives for the downstream community Mays river water beneficiary is that ensuring that the design has adequate design provisions to allow some water flow to the downstream even in times of dry months, apply standard river diversion operational rules and observe water right permit regulations and requirements for the sake of downstream water right holders.

2.7.2.2 Ineffective organization/Scheme Management:

The success of the irrigation development project can be limited by effective and harmonized management of water and the irrigation infrastructures as a whole. Operation and maintenance activities of the scheme (canals, weirs, culverts, etc) shall be the responsibility of organized body at the farm level, irrigation water user associations (IWUAs). This organizational unit must be established using beneficiary farmers within the proposed scheme. It is supposed that the IWUA collect fees from the members and will budgeted for operation and maintenance to sustain the function of the project. On the other hand, others stakeholders/institutions support (such as Wereda water offices, woreda cooperatives promotion and Woreda Agricultural offices with their respective Bureaus) needs to contribute more for better achievement and function of IWUA.

Here; organizing legally registered water users association will be the responsibility of cooperatives promotion office, and woreda water resource office and providing basic agricultural extension service like supplying agricultural inputs (fertilizers, improved seeds, etc) will mainly be the duty of office of Agriculture.

The failure or weakness of the operation of the IWUAs on the irrigation management will result in inefficient use of water, which can lead to user conflict; poorly handled scheme (poor maintenance), lower crop yields and ultimately the project's benefits will be reduced.

Mitigation Measures

- Organizing IWUA with full participation of the irrigation users or members.
- Strengthening the IWUA through providing basic extension services(Awareness creation, training, facilities and equipment's)

2.7.2.3 Cumulative Impacts and mitigation Measures:-

Conflict between and among the Users:

Changing the direction of the flow of the river regime due to constructing the diversion weir may have negative impacts on downstream users for irrigation purpose and livestock. There may be competing demand between upstream and downstream users. Disputes will be usually high or arise when shortage of water happen either due to the reduction in the flow of water during the dry period or inefficient utilization of irrigation water by users.

Mitigation measures:

- Ensure that the design has adequate design provisions to allow some water flow to the downstream even in times of dry months, apply standard river diversion operational rules and observe water right permit regulations and requirements for the sake of downstream water right holders.
- The projection of the proposed command area shall be based on the available water potential (assuming the water that needs to follow to the downstream community). Hence, avoid extra interest that will be beyond the capacity of the existing water potential.

- Implementing irrigation water use efficiency enhancing mechanisms can minimize water loss and then conflicts among users. For example, avoid over flooding in the irrigable site, removing silt inside the canals regularly, timely maintenances of damage sections of the scheme and developing lined canals can be the strategies to enhance the available water use efficiency. Though, lined canals are more expensive, they have potential advantages of conserving water through the reduction of seepage loss. Besides, irrigation users in the project site should manage this scarce resource (water) through elected members of the committee. The farmers should also cooperate in selecting suitable crops especially during unfavourable seasons (e.g. planting short time growing crops than long season crops).

2.8 PROPOSED IRRIGATION USERS ASSOCIATION OF MAYESE TWO SMALL SCALE WEIR IRRIGATION PROJECT

Traditional water use association is familiar to the area. They established this association since the beginning of traditional irrigation.

Every existing legal entity established to collectively operate and maintain an irrigation and drainage system, wholly or in part, including ‘Irrigation Cooperatives’ and other cooperatives established pursuant to the Cooperative Societies Proclamation No.239/2016 shall within [two years] of the entry into force of this Proclamation:(a). Re-register as an Associations pursuant to this Proclamation and shall thereafter cease functioning as a cooperative; or (b). Support the establishment of Associations to take responsibility for the relevant irrigation and drainage system.

But the existing irrigation cooperative is a good base for the envisaged project to establish IWUA. The proposed project will need formal and best organization and management. Water user association should be established and need other supportive governmental and non-governmental organizations. The excepted roles of WUA are: maintenance and overall management of the scheme system; developing cropping pattern and watering schedule in collaboration with the concerned technical support provider organizations; collecting and managing water fees and maintenance fees from beneficiaries; facilitating and paving the way

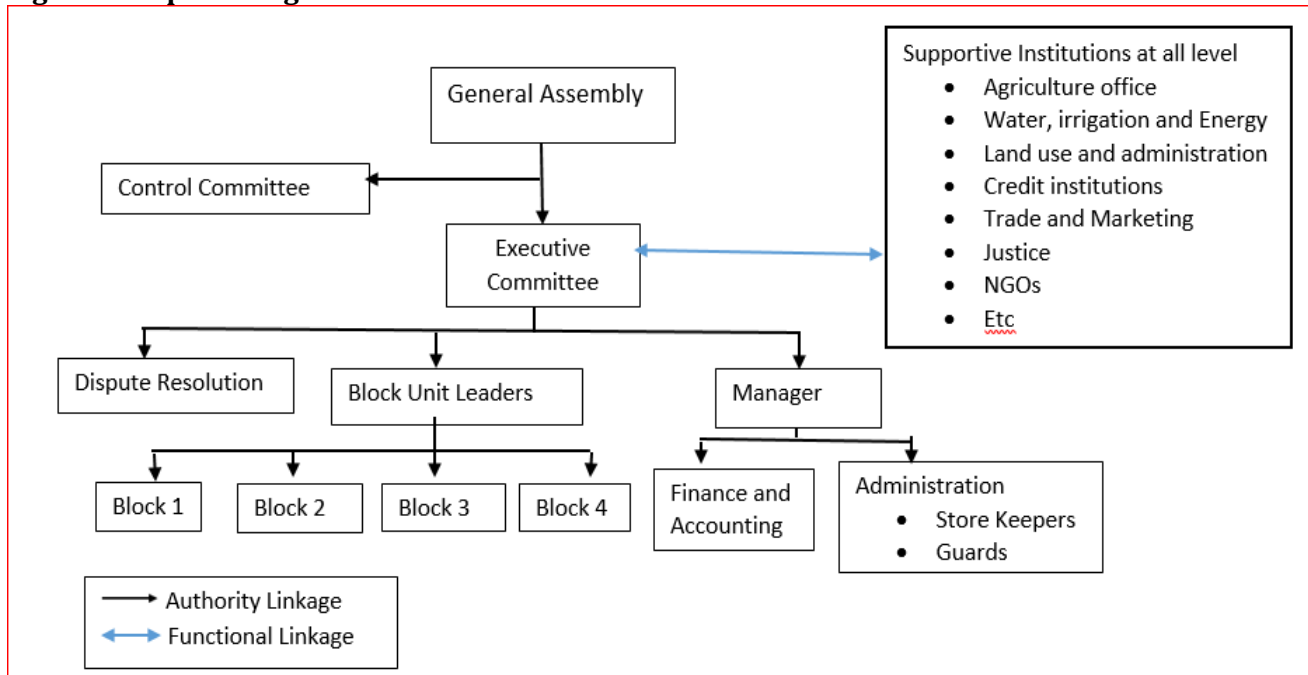
the access to inputs, credit, marketing, and training service; and manage and solve any administrative issues that are related to the irrigation scheme and water related conflicts. Supportive institutions like governmental organizations in different level from the region to the Keble/Gotes and NGOs working for the improvement of the community should work in organizing, operating and awareness creation to the new water user association/WUA. Figure 2 shows the detail hierarchy.

Tasks of an Association

- To manage and operate the irrigation and drainage system within its service Area in order to supply irrigation water and drainage services to its members;
- To maintain, rehabilitate and improve the irrigation and drainage system;
- To establish internal regulations for irrigation water consumption and to collect fees from its members for the services provided;

To train its members in irrigation techniques, aspects of irrigated agriculture, water saving methods and new technology.

Figure 5 Proposed organizational structure



2.8.1 Roles and Responsibilities

General Assembly:

The General Assembly is the supreme body of an Association. The exclusive functions of the General Assembly are:

- Approve the annual budget and financial plan and the operation and maintenance plan for the irrigation and drainage system;
- Elect the members of the Management Committee and the Control committee
- Approve the internal regulations of the Association
- Approve the annual, income and expenditure statement and balance sheet as well as the Management Committee's annual report;
- Take decisions on the reorganisation or liquidation of the Association;

Executive Committee

- Ensuring the implementation of the decisions of the General Assembly;
- Ensuring the implementation of the budget and work plan;
- Monitoring the performance of the Association;
- Electing their Chairman and Deputy Chairman from among its members
- Preparing the agenda for, and convening the meetings of, the General Assembly
- Preparing the draft budget, work plan, annual report, internal regulations and other documents for approval by the General Assembly;
- Ensuring that the Association's financial and accounting procedures are followed.

Control Committee

- Shall supervise the financial management of an Association.
- The Management Committee and any employees of an Association shall provide documents on the economic and financial activity of Association upon the request of the Control Committee.
- Shall be responsible to the General Assembly to which it shall submit an annual report on the economic and financial management of the Association

Dispute Resolution Committee

- The dispute resolution committee shall determine disputes concerning water use and distribution between members of the association.
- An association member who alleges that another member has violated the association's by-laws, an internal regulation or the watering plan may lodge a written and/or verbal complaint with the chairman of the dispute resolution committee.
- The chairman or another member of the dispute resolution committee shall promptly inspect the source of the problem and the chairman shall forthwith call a hearing of the dispute resolution

- Both parties to the dispute shall attend the hearing which shall be held in public and which shall be chaired by the chairman of the dispute resolution committee.
- If the dispute resolution committee is satisfied that the complaint is true it may take a decision to impose sanctions, in accordance with the by-laws, against the unsuccessful party.
- A decision of the dispute resolution committee shall be appealable to the court of appropriate jurisdiction.

Block unit leader

- Supervise the distribution of water from secondary channel to tertiary canals.
- Mobilize people during maintenance of channels and associated structures.
- Control application of recommended cropping pattern.
- Follow up day-to-day activities and submit report to the executive committee.

Association members

- Has the right to a fair share of the irrigation water distributed by the Association;
- Has the right to benefit from other services provided by, or through, the Association;
- Has the right to stand for election to the bodies of the Association providing no outstanding fees are due to the Association;
- Has the right to propose agenda items for discussion at General Assembly meetings;
- Has the right to nominate and to vote for candidates in elections to the bodies of the Association;
- Promptly pay any fees levied in accordance with the by-laws;
- Use irrigation water only in accordance with the Association's watering schedule;
- Participate in all activities related to cleaning and repairing the irrigation and drainage system;

Supportive institutions

- The Bureau of Agriculture will be the main implementing body in searching fund and implementing the project work as per its plan.
- Woreda and kebele Administration offices, multipurpose and saving and Credit Cooperatives are some of the stakeholders to be involved in the project work.
- Other such as NGOs and local associations are expected to provide technical and administrative support to the proposed organization and management body of the project.

- Assesses potential markets for the production and formulate marketing procedures and system conducive for the group.
- Undertake the scheme construction
- Give initial training on how to operate the scheme.
- Assistance on major maintenance.
- Coordinates Woreda level line offices relevant to the work to insure full participation.
- Woreda and Kebele administrative offices shall provide such material and other support as is reasonably practicable to the establishment and operation of Associations that operate within their jurisdiction while at the same time strictly observing their independent and non-political nature.
- To that end local government and Woreda and Kebele level officials shall not interfere in their establishment or functioning of an Association otherwise than pursuant to the written request of the Management Committees of such Associations.

3 Agricultural marketing

The term agricultural marketing is composed of two words-agriculture and marketing. Agriculture, in the broadest sense, means activities aimed at the use of natural resources for human welfare, i.e., it includes all the primary activities of production. But, generally, it is used to mean growing and/or raising crops and livestock. Marketing connotes a series of activities involved in moving the goods from the point of production to the point of consumption. It includes all the activities involved in the creation of time, place, form and possession utility. According to Thomsen, the study of agricultural marketing, comprises all the operations, and the agencies conducting them, involved in the movement of farm-produced foods, raw materials and their derivatives. This includes product marketing as well as input marketing.

3.1. INPUT MARKETING

3.1.1. Agricultural Input Utilization Experience and Demand in the Area

Long history of habitation and cultivation of land, without adequate fertilization and fallow system, has been the major reason for low agricultural productivity that results poverty and food insecurity in the project area. Traditional cultural practices which have been used by the farm households for centuries have failed with increasing number of population and declining of crop land holding. Due to land size fallowing is not practiced in the area. While in some extent crop rotation, crop residue and compost is used traditionally to improve soil fertility. Now days' the majority of the households in the project area used commercial fertilizer and seeds to improve their productivity and household income.

The opinions of farmers who participated in the focus group discussions the majority of the households have inadequate access to commercial inputs mainly due to rising prices from year to year. Even improved seeds are not sufficiently available to all households either due to shortage in supply and/or high prices and quality of seed available. Even if the farmers tolerate the high cost and be ready to use, inputs were not available on time. In the other way as the data from key informants shown increasing prices of fertilizers are also the limiting factor for low level of application of fertilizers.

Lenguat-multipurpose cooperative is the one who supply agricultural inputs accordingly in the project area.

Input demand forecasting enables assessment of domestic supply of inputs from different sources and identifying gaps for timely and adequate supply of the necessary inputs. Despite the policy and strategy provisions and efforts made, the price forecasting capacity is at low level. Input demand forecasting mechanism has been tried to put in place for fertilizer and seeds at woreda and Keble level but it is too much conventional type.

3.2. AGRICULTURAL OUTPUT/PRODUCT MARKET

For smallholders' farmers in the area, the most accessible markets are informal markets. They are termed informal because they exist beyond the tax system and are off-record. Informal markets include all transactions at the farm gate, roadside sales, village markets, rural assembly markets, and sales in the main urban wholesale and retail markets. Typically, these markets have no formal grades, no traceability, they rarely use standard measures, and prices are set through arbitrary combinations of supply and demand, trader lobbies, and local customer loyalties to specific sellers.

There is local market called Densa 7 Kms from the project area is a weekly market on Saturday of every week. While Work Mawcha nearby next market with a weekly market on Saturday is 8Kms from the project area and Robit 3 Kms from the project site a weekly market on Wednesday of every week are alternative inlet and outlet markets to the area and If the envisaged project become in to authenticity, marketing can be extended to Dessie, mekelle and Adis-Abeba as a potential Markets via distributor, wholesalers or user associations and cooperatives.

Table 18. Major markets, marketing day and distance from the Project area

Name of the market	Marketing Day	Average distance in Kms
Local Inlet and Outlet Markets		
Densa	Saturday	7
Work Mawcha	Saturday	8
Robit	Wednesday	3
Potential Markets		
Dessie	All day	195
Adis Ababa	All day	380
Mekelle	All day	565

Source: Field Survey (January, 2016)

Notice that bulkiness of products, perishability, seasonality, irregular supply, variation in product quality, weather and nature dependent, small size of holding and scattered production, difficulty

in standardization and need of further processing are basic characteristics of agricultural marketing that differentiates from manufacturing products.

According to FGD result 75 % of the produce is for home consumption. While wheat, Teff, and Bean are produce for sale. Almost all irrigated crops are also for market. Rain fed agriculture products such wheat, teff, Bean, Barely, and pepper, potato, onion & potato are main irrigated agricultural products supplied by/outflow from the Keble/ project area; while according to the household survey onion, Tomato, Wheat, Teff and Bea are the most profitable crops for the last three years in the area.

Major crops such as Teff, Wheat onion and Tomato are consumed locally and the rout extends to Mekelle and Dessie.

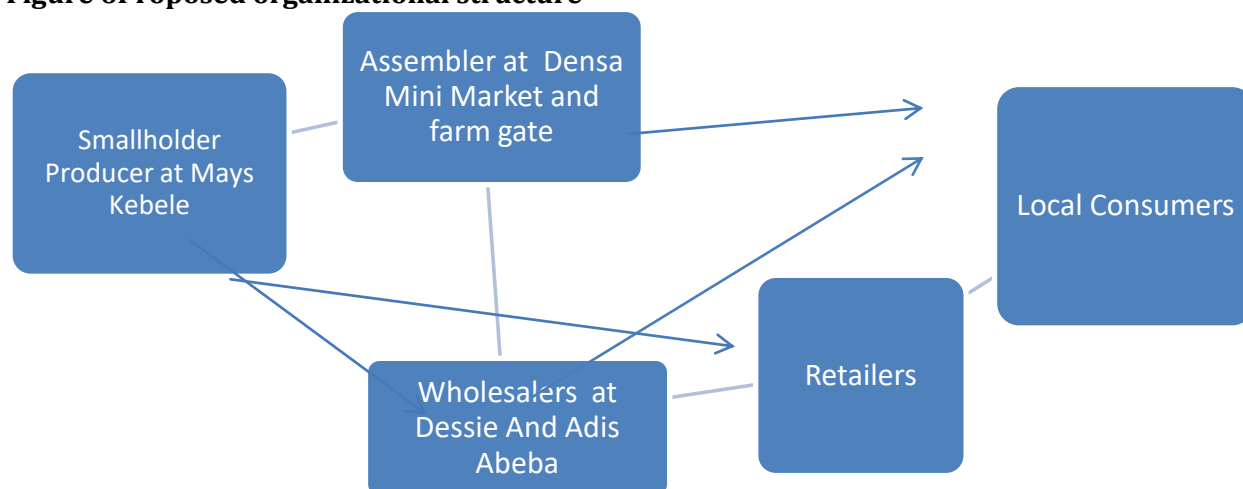
Processed and manufactured products like edible oil, sugar, and salt and cloths inflow to the area through inlet markets.

To improve and to attract producers making marketing linkage and information with potential markets like Dessie, Mekelle & Adis Abeba will be advantageous.

Marketing Chanel and Actors: In the area conventional marketing channels were observed as a typical structure for the transactions. The marketing chain starts from the production where farmers choose alternative channels to sell their products. The survey result shows that 60% of the producers sell to consumers directly. They also sell to traders who could be wholesalers or retailers, or to collectors and assemblers who buy grain at farm gate and sell to wholesalers at margins. Producers sell to consumers when they handle smaller quantities.

Wholesalers also sell the supply from Densa and Work-Mawecha market. The market survey revealed that wholesalers play key roles in the trading of Teff, Wheat, Onion, Tomato and Bean at Dessie, Mekelle and Adis Abeba market. While at Densa village-market transaction is between farmers and petty traders. Typical marketing channel of major commodities in Densa and Work Mawcha related markets is shown below:

Figure 6 Proposed organizational structure



3.3. PRICING

In order to assess changes in crop prices during the recent two years, price of marketed inputs and outputs were collected from key informants and participants of the focus group discussion (FGD). The price information was gathered from farmers and cross checked with traders and consumers to ensure reliability. Teff, Wheat and onion showed a high price change in product market, while fertilizer price change is high in the case of input market (see table below). The result of market assessment shows that there is high seasonal price variation between the harvest time, which is a peak supply period, and slack period. During the harvest and post-harvest seasons of October to December, relatively sizable quantity of grain flows into the markets.

The focus group discussions revealed that most farmers sell their produces in less than two months (major selling months of December and January). During the remaining months of a year, the supply falls and the price of the products increase.

Table 19. Farm gate price of major crops and inputs (during 2015/16)

Inputs	Input Price			Out put Price		
	Unit	Fin.price	Econ. price	Unit	Fin.price	Econ.price
Wheat	Qt	900.00	1,284.30	Qt	850.00	1,212.95
Teff	Qt	2,300.00	2,300.00	Qt	2,300.00	2,300.00
Lentil	Qt	3,700.00	4,458.50	Qt	3,700.00	4,458.50
Potato	Qt	800.00	800.00	Qt	700.00	700.00
Garlic	Qt	7,260.00	8,748.30	Qt	6,500.00	7,832.50

UREA	Qt	1,242.00	1,359.99			
DAP	Qt	1,422.00	1,557.09			
Agro-Chem.	Qt	-	-			
Agro-Chem.	Lit	400.00	352.00			
Lime	Qt	-	-			
Labor	man-day	80.00	96.00			
Oxen	oxen day	160.00	160.00			
Land tax	ha	90.00	-			
Sack	Pcs	12.00	12.00			

Source FGD and Local Market survey

In the local markets, local collectors and traders determine prices of all crops traded and farmers are forced to accept low price in the market. Since the peak supply period is short, the traders store the grain purchased at lower price and make a large profit by reselling the grain to the farmers/consumers. Lentil price is also determined by the trader and the local Broker too.

3.4. MARKET INFORMATION

Lack of market information is one of the major constraints in the proposed project area. As discussed with different potential stakeholders including the beneficiaries' and the survey result show that 69.8% of producers receive most of their information about the market through their interactions with neighboring and traders. They are unaware of prices in other markets, even those that are in close proximity. Traders often lack information on domestic production, marketable surpluses, stock, etc. at all level. They usually get most of their information from brokers and transporters, who know about prices. Besides, the price information available from secondary materials is not available in timely, accurately, and comprehensively. Thus, it is very crucial to conduct a detail study to establish a well-organized market information dissemination network and make the development program sustainable.

Stakeholders including the beneficiaries are seriously point out during the discussion about the market issues. Besides, the cooperative are not strong to bargain the price as they have no adequate knowledge, awareness and information to actively follow up the market condition. There is no any cooperative participate on purchasing and selling of irrigated fruits and vegetables from the farmer to the consumer yet. The market has also monopolized with a limited number of traders that influence and fix the price by themselves. While marketing information should be improved so that cost of brokers and intermediaries will be reduced. They used mobile phones and personal contacts to disseminate information.

3.5. HANDLING STORAGE AND TRANSPORTING

3.5.1. Storage

Storage facilities in the area are at low standard used traditional Barn/storages called *Gotera made from wood & mud* for grains while no more storage facilities to fruits and vegetables. Lenguat multipurpose cooperative have store made up wood and mud and cemented floor, while have ventilation problem, mix use of fertilizer and seed with grain and exposed to ruminant and humidity. Individual farmers didn't have modern store. There for production lost because of storage is a serious problem to the area. The agriculture office estimated 15% of the production lost is because of storage and post-harvest handling. So capacity building on storage and how to handle agriculture products should an agenda to this project.

4.5.2. Transport/Distribution

It is clear that transport or distribution gives place utility. Availability of adequate road network and transport facilities is the major factors to make the development program effective and sustainable. Considering the level of importance and relevance, the study assessed the status of road access and transportation facility of the project area.

There is highway Gravel, asphalt & urap road provides all year round access for the project area that runs across the Densa town adjacent to the project area and joins with Dessie. But, specific to the project area is not accessible for vehicles it should be upgrade as a feeder road to village markets. Farmers mostly use Donkey and car It Is dry Weather transport system in the project area.

3.6. CREDIT AND FINANCIAL SERVICES

ACSI (Amhara Credit and Saving Institute) is credit dealer institute in the area by coupon method through Lenguat Multipurpose cooperative.

As the respondent farmers stated the main purposes of borrowed money were to purchase fertilizer, seed, chemicals, irrigation technologies and cattle fattening. In the year 2007/08E.c the purposes of credit in terms of the percentage of borrowers' rating was 80% for purchase of farm inputs and 20% for purchase of animals. Hence the improvement of credit facility in the study area will be expected so as to improve the production and productivity of agriculture. Therefore, due consideration should be taken to improve the provision of credit facilities.

Their habit of saving and capacity to save are at the infant stage. They show some improvement to use wisely but still it needs more improvement and awareness creation to avoid extravagancy. The potential farmers in the area save in kind than in cash. Farmers having surplus agriculture products tried to change it to asset by purchasing of house in the nearby towns.

3.7. COOPERATIVE

Cooperative societies established to pursuant collectively overcome, withstand, and solve economic and social problems like market and credit which members cannot individually achieve. While the number and performance of cooperatives in the area is very limited. There are two types of legal cooperatives in the area, multipurpose cooperative and saving & credit cooperative:

- Lenguat multi-purpose cooperative is forefront cooperative in the area for provision of input and credit to the Keble. It is established before 6 years and re-organized by proclamation number 239/2016.

These cooperatives have major problems like financial problems, store and office problems especially to rural saving and credit cooperative (RuSACCO), and 1043 members.

3.8. CONTRACT FARMING

There is no any contract farming and contractual agreement experience in the area (bad and good). While it will have future potential fenu -Greek exporting and seed multiplication as a business for lentil and onion.

3.9. MARKET OPPORTUNITIES AND PROBLEMS

Opportunities

The area has abundant natural resources to further develop irrigated agriculture in several means of irrigation technologies and irrigation sources. Irrigation development is strongly supported by financial institutions, Small holder farmers with better access to markets are expected to be much more likely to participate in the market than farmers without access to such infrastructure.

It is already known that the area is food insecure area at least 6 months/year, ‘sale and produce’ will be difficult computing with food self-sufficiency. But market oriented production will be possible so that the farmer would purchase his basic needs (food) from the market in turn. This called agribusiness. November and June are highest production for Irrigation & July and October for rainy season. The other opportunity is Mekelle, Dessie and Adis-Abeba Towns are potentials because of traders may come up to densa the road is accessible.

Problems

Like any other areas of the region, farmers of the proposed project area store grain in traditional storage facilities made of wood and mud is called Got- era. In general as different information confirmed that such type of storage system has a high risk of moisture and pest damage which significantly decrease the quality of products as well their selling prices. The traditional packaging system use plastic jerkin, sack & basket.

Development of infrastructure, such as road, health facilities, safe drinking water supply, schools, power supply and communication facilities are critically at low level in PCA. As these basic needs are not meet, the community will lack the capacity to adopt new technologies of the kind proposed in the irrigation scheme. Sick people who are not able to get health treatment with in their locality cannot be expected to participate whole heartedly in the implementation of development-oriented projects. The same is true for education.

The community has already identified these as critical challenges to their well-being and livelihood. There is no marketing problem because of there is access road and transportation vehicles and Donkey freight (for farm inputs and outputs). The community members reported that they are constrained with respect to the use of new technologies due to their unavailability and high prices, low levels of demand due to high price and price fluctuations for their products. This calls for more serious attention for the future agricultural development within the project area.

The prevailing problems of all the surveyed markets from perspectives of both traders and farmers are assessed through field observation and FGD. The major marketing problems in the area are:

- Inadequate market infrastructures and facilities in the market places(market shade);
- Inadequacy of storage facilities and product handing practices ;
- Lack of market information on prices
- Influence of local brokers in the market negatively affecting the prices the producers receive;

- Lack of standardizations and fraudulence by merchants in weighing products(crops);
- Lack of credit service and financial support
- Delay of Inputs requirements
- transport cost is high
- Lack of Infrastructure

3.10. INTERVENTIONS NEEDED

Access to roads and transport facilities, market information, packaging and handling system, method of storage mechanism and input supply network are vital to raise the competitiveness and growth in agricultural sector. A well develop infrastructure and physical market access condition influence the tendency of producers to produce more and increase their income. Besides, improvement in market infrastructure is crucial to ensure the sustainability of any development program.

Rural commercialization and value addition strongly can be enhanced through adaptation and promotion of best practices like reducing post-harvest losses, develop and conduct training of farmers and extension workers on best practices; Demonstrate best practices with active participation of smallholder farmers; Facilitate linkage with producers and processors and marketing agents; Enterprise and sustainable agribusiness development, value addition, and market integration initiatives of rural communities supported, Organize training for extension workers and cooperative leaders on marketing extension, business plan and agribusiness management; Conduct value chain studies on selected products of smallholders farmers; Establish resource centers to improve access to business advisory service, etc. Basically needs:

- Improve accessibility to market through maintenance of the existing poor road and construction of community feeder roads that link village and Keble administration to local markets
- Promote warehouse and storage facilities to irrigated wet season crops
- Promoting the wider availability of information and market inelegancy
- Maintaining appropriate quality standards
- Establish and promote the legal system to ensure contract farming
- Research and Training in technical and managerial aspects of marketing, processing and storage generally agribusiness and marketing principle is necessary.
- Establish marketing cooperatives for both farmers and consumers and link them with potential markets by availing marketing facilities such as sales outlets or distribution posts, storage facilities, And credits.

- Mechanisms of legalizing the functioning of brokers and unlicensed traders complemented with regulatory system would increase competitiveness and improve marketing efficiency.
- Create continuous and sustainable access to credit facilities through promoting and expanding cooperatives, saving and credit cooperatives, government or NGOs special fund schemes to support various means of livelihoods.

4 CONCLUSION AND RECOMMENDATION

4.1 CONCLUSION

The socio-economic condition of the project area is characterized by high population growth and pressure, subsistence agricultural economy, low diversification of income and employment, high degree of poverty incidence and food insecurity, degradation and deteriorating livelihoods. In recent years, though many efforts are made to improve livelihoods, significant number of the rural population still suffers from multiple socio-economic problems.

Besides, erratic and unpredictable rainfall pattern is the most important cause of vulnerability for the majority of the population. Increasing number of rural population has also resulted in land fragmentation and shortage. As a result, the majority of the households owned very small plot of land. The agricultural sector suffers from critical shortage of arable land, degradation and soil fertility decline, unrewarding traditional farm practices, and low level of input utilization. Over 98 percent of the agricultural production depends of rainfall, only one less than eight percent of the agricultural land is under fertilizer. Irrigation, though currently increasing, it benefited only small proportion of the households. Furthermore, crop pests, weeds and various diseases devastated significant volume of production each year. Lack of diversification of cropping pattern also makes the cropping system more vulnerable to risks.

Livestock production is also subsistence and mainly for traction power and very small scale milk and meat production. Rapidly declining individual and communal grazing land, animal diseases and pests, poor animal husbandry practices are some of the problems affecting the livestock sector. Non-farm activities are also not well developed to support the livelihood of the poor. However in recent years, with increasing poverty and destitutions, a number of households started to engage in various non-agricultural activities. Yet, income from this sector is low due to lack of competitive power, access to credit, lack of technical support, and weak entrepreneurship. Due to vulnerability of the agricultural sector, farm income is also low and predominantly depended on the volume of annual production. Lack of affordable rural credit further crippled income and employment opportunities and diversification of livelihoods.

Access to basic services in most of the project areas is rapidly improving in recent years. Still most of the basic service facilities suffer from critical capacity gaps, unequal distribution of benefits, weak infrastructure, and poor quality facilities and underfunded service provisions. As a result, prevalence of diseases particularly those related to water borne diseases as well as poor environmental and personal hygiene are common causes of diseases affecting significant number of population. Opportunities to education are better yet poverty related problems still forced significant number of children to stay away from the education system. Other infrastructures such as water supply, access roads, marketing, communications, veterinary and extension services need further modification and capacity building for effective and sustainable livelihood improvement. This proposed irrigation project development is a master key for at least minimizing those mentioned agricultural related problems. That may also be the reason why the farmers are eager to see the project functioning in the very near future. During the community consultation all peoples are very happy and highly promising to implement this project.

4.2 RECOMMENDATION

The improvement of livelihoods of the population in the project areas depends on the sustainability and effectiveness of all development interventions. These interventions should be integrated and their impact must be multidimensional to solve old aged and deep rooted socio-economic problems. The agricultural sector must be improved in order to improve livelihoods. The sector often suffers from shortage of moisture, land degradation, fragmentation and lack of diversification. Without adequate moisture, sustainable crop production is nearly impossible. It needs vital transformation from rain fed to irrigated agriculture. Such transformation believed to solve deep rooted agricultural problems such as lack of diversification, vulnerability to shocks, low input, low yield and lack of sustainability.

The irrigation systems should also integrate with modern intensive livestock production (breeds, markets, and forage production), nonfarm activities (small scale processing, marketing and distribution, trade, etc.), infrastructure development and appropriate rural institutions, rural credit and extension systems. Irrigation will trigger demand for various goods and services which on the other hand leads to diversification of livelihoods, employment and income and in general the

transformation of traditional agriculture into modern monetized sector with high productivity and resilience. Thus,

- ≡ All the extension services (such as provision of inputs on time, technical support, provision of training and strengthening project organization (WUA)) will have to be undertaken as per the plan to achieve the predicted benefits of the project.
- ≡ Restless efforts of the Keble development agents will also highly require for successfully coordinating and implementing the whole plan. And also downstream beneficiaries depend on this Mayese River for livestock drinking it must be reduce some amount of water river.

ANNEXES

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