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Irrigation Based Valleys Development Program

1. Background
Since its foundation, the regional government of Oromia has been undertaking various development activities at all levels to enhance the development of the region, pursuing a strategy focused on rural development. Remarkable achievements have been recorded in economic, social and political undertakings from the ongoing development endeavors. At present, the regional government of Oromia is implementing its Five Year Development Plan (1998 -2002 EFY). With this plan the regional government is committed to address the development needs of various groups of the society depending upon the potentialities of geographic areas. To this end “Geographically differentiated development strategy” is one of the pillars of the strategies of the Five Year Development plan of Oromia National Regional State designed to realize development goals and objectives of the region.

Implementation of this strategy has a tremendous effect for the fulfillment of the country’s vision to be among the medium income countries by 2020. It is understandable that with its growth potential, its geographical location and the population it has, the role of Oromia is imperative to attain this national vision and objective.

To this end the development corridor approach, which enabled to exercise area based development interventions, was chosen as strategy by Oromia regional government to meet set development objectives. The path followed may not follow known standards rather they are problem driven and are aimed in socioeconomic transformation of certain affected areas in a sustainable manner. To attain this objective water was taken as an entry point and dramatic achievements have been done so far. The lowland parts of Oromia, which are hit by recurrent drought, and that were marginalized are addressed in this program. Access road and other infrastructure developments were also part of the program that gave encouraging outcomes in an attempt to transform these areas to development centres as they have good development potential if solutions to some very limiting factors were given.

Parallel with these huge activities the regional government decided to undertake intensive studies to understand the resources and dynamics of these distant lowlands. Accordingly, land use planning studies and water resources assessment studies are being undertaken as the two decisive surveys that are building confidence in attaining set objectives. Results of the water resources survey in Borena and the two Hararge zones have revealed the presences of enough water for human and livestock consumption and the study is continuing to make overall assessment to utilize the subsurface water resources for irrigation. In the same manner the semi detailed land use planning studies has characterised each land unit and indicated the best use.
These efforts made in the last three years are elevated to their present stage and initiated valley development program which is a focus of this program concept paper. The program relies on findings of the past three years’ experience, interest of the public and the government, land use plan and water resource studies. Guided by the land use plan areas delineated as agricultural lands but have limitations to be transformed to higher suitability levels will addressed in this program. Types of interventions are designed mainly following the hydro geological set up of localities, the degree of severity of existing drought problem.

Parallel with this valley development program, major problems in the highlands of Oromia, which is linked with population pressure on limited resources, improper utilization, and management of the natural resources will be addressed in accordance to the recommended land use plan.

In general, the starting points for the intent to introduce and scale up valleys development program, which can also be considered as “area based development intervention”, is to bring about ever lasting solutions to the areas/valleys with food security problem and bring about fast economic growth in areas/valleys with high irrigation potentials through integrated intervention than applying the sectoral approach interventions.

Besides contributing to the achievement of regional development goals and objectives, this program will lays a foundation for further development of the area based development approach.

2. Brief Description of the Program Areas

Oromia, as can be understood from Fig. 1, is divided in to three development corridors and several sub-corridors based on similarities in agro-ecological setups and socioeconomic similarities of the areas.

These development corridors include: (1) South Eastern Oromia Development Corridor, (2) Central Oromia Development Corridor consisting The Oromia Rift valley and Central Oromia Highlands, and (3) Western Oromia Development Corridors. However, for the purpose of the issue under consideration (valleys development program), the realities in the two development corridors: South Eastern Oromia Development Corridor and Western Oromia Development Corridors are described under briefly. As a background for the issue under consideration, South Eastern Oromia Development Corridor and Western Oromia Development corridors are briefly addressed as follows.
2.1. South Eastern Oromia Development Corridor

i) Location and physical features

The South eastern Oromia development corridor is comprised of all districts in east and west Hararge zones, the districts of Sawena, Laga Hida, Gololcha, Rayitu, Goro, Ginir, Dawe Sarar and Dawe Qachan from Bale zone and the districts of Seru, Aseko, Gololcha and Aminya from the Arsi zone. The total land area of the South eastern Oromia development corridor is 80,217 km² and this constitutes 40.3% of the land area of all development corridors.

South East Oromia Development Corridor is the first corridor to be designed with main objective of reversing food security problems in a sustainable way and transform the food insecure and pastoral areas of this corridor to centers of development. Based on its agro climatic and socioeconomic set up, this corridor is sub divided in to four sub corridors including: Hararge; Borena; South Bale and Guji; and Southern Highlands of Oormia. From the four sub-corridors Harerge Sub corridor is the largest sub corridor including all anas in the East & West Harerge zones, some anas in Arsi and Bale zones.

Based on data available during the preparation of the first plan of development corridor, i.e. 1998, from the, 1,474,956 or 14.4% of the population of these development corridors are living in a deep rooted food insecure situation. Out of
the total food insecure population existing in the region, 67% are found in this corridor (mainly in East and West Hararge zones), followed by Borana (13%). Generally, the south eastern Oromia development corridor can be categorized using the traditional agro-ecological zoning as 62% low land, 29% mid-altitude and 9% high land. The rainfall distribution and the length of growing period (LGP) are indicated on maps 1 and 2 respectively, shows rain fed agriculture is less promising to ensure food security, mainly in the Hararge sub corridor.

Map 1: Rainfall Distribution
According to the rainfall distribution data, only a small portion of the area receives less than 500 mm per annum. In general the area that is not suitable for cropping is very small in terms of the total amount of rainfall received. The rainfall situation, however, is erratic, unpredictable and unreliable and hence water harvesting during abundant showers for later use and the use of surface and ground water potential can be the options to make the people in the area food secured.

Map 1: Length of growing period

As it can be clearly understood from the length of growing period map of this corridor, the largest portion of the area has short growing period. As a result crop failure due to short growing period attributed to the short duration and the erratic
nature of the rainfall in the area. Consequently agro-pastoralism is the dominant livelihood in the low lands, the largest portion of the area.

**ii) Population and means of livelihoods in the SE Devt. Corridor**

The largest proportion (about 67%) of the food insecure population of the Oromia NRS is found in the South Eastern Development Corridor. Out of the total population in the DC, in 1998 EC it was found that 19% are food insecure. Therefore, in solving the food security problems, it is considered that this development corridor deserves a major attention. The livelihood of the people is dependant on mixed farming (farming and livestock rearing), pastoralism, labor work and petty trading.

In the highland and mid-altitude districts the livelihood depends predominantly on cereal farming. However, the largest part of the area is carrying out agro-pastoralism.

**iii) DEVELOPMENT CONSTRAINTS/CHALLENGES**

Several problems and constraints could be raised to explain the prevalence of poverty and food insecurity in SE Development corridor in general and Harerge zones in particular. Considering the available capacity and budget, it is not possible to give solutions to all the prevailing social and economic problems. Therefore, it seems necessary to address the major bottlenecks to the overall transformation of the area for long period of time.

(a) **Recurrent drought** – Rainfall distribution data of the area shows only a small portion of the area receives less than 500 mm per annum which indicates large portion of the area receive sufficient moisture for crop production. The rainfall situation, however, is erratic, unpredictable and unreliable and hence most parts of the South Eastern Oromia is subjected to recurrent drought that causes crop failure and ultimately subjected the population to food aid. This explains water harvesting during abundant showers for later use and the use of surface and ground water potential can be the options to make the people in the area food secured.

(b) **Inadequate water supply** - The major cause of food insecurity in the Southeastern Oromia development corridor, mainly in the Harerge sub-corridor, according to various information sources, is primarily attributed to shortage of rain and changes in weather condition. Shortage of drinking water for humans and livestock is the major source of problem. Drinking water supply coverage is only about 15% in east and west Hararge in late 1990s. On the other hand, the shortage of drinking water has caused high concentrations of livestock at some water points causing further land degradation on grazing lands.

Consideration of the available grazing areas is crucial in the provision of water
supply to solve water problems. This could help prevent further degradation through proper utilization of grasslands.

The erratic nature of the rainfall in most parts of the area usually ends up with serious recurrent crop failures subjecting the population to food aid and further deepening the root of poverty in the area.

Therefore, increasing the productivity of crop and livestock and solving the water problems through improving the water supply situation for humans and livestock and beyond that using the available water sources to improve agricultural productivity highly contributes to solving the food insecurity problems.

(c) Land degradation and poor agricultural productivity – The other major reasons for food insecurity in this area include population pressure, changes in climatic conditions (shortage of rains), land degradation, poor agricultural practices, etc.

The undulating topography of the high lands and mid-altitude areas coupled with the current poor farming systems and shortage of rain are causing decreasing fertility, increasing run off and soil erosion leading to decreasing productivity year after year. This has led to inability of the land to sustain the users. All the steep slopes are cultivated without proper soil and water conservation structures leading to degradation and further contributing to the food insecurity situation. Forests are cleared from mountains and hills exposing these areas to erosion. There is no chance for the rain water to replenish streams and springs as percolation is hindered by run off leading to drying up of many water sources. All the steep slopes are cultivated without proper soil and water conservation structures leading to degradation and further contributing to the food insecurity situation. All these indicate for the need to implement proper and intensive watershed management.

The change in climatic conditions is very serious challenge. This means that rains are sporadic, untimely, falls in insufficient amounts or sometimes non-occurring. This comes about repeatedly and the practiced rain-fed agriculture is being exposed to the catastrophe of droughts.

Therefore, the farming system in this development corridor has to be based on moisture conservation and irrigation accompanied by proper watershed management and has to be supported by improved agricultural practices.

(d) Poor level of infrastructure development – Attributed to the interventions of development corridors program during the last three years several areas of the corridor were opened to access roads. Some of the access roads developed during the past years got the chances to be upgraded under the development
corridors program. However, the efforts made so far in improving the road network of the area is far from being enough. The road network is still very poor, especially in the valleys with the big potentials for agricultural development, which contributed to the underdevelopment of the livelihood of the population in the area. Thus, infrastructure development (including road, power supply, communication, etc.) seems the other packages to promote the valley development interventions in the corridor.

2.2. Western Oromia Development Corridor

i) Location and physical features
The corridor is comprises of 8 administrative zones of west Oromiya. These are West Wallaga, Kelam Wallaga, Eest Wallaga, Horo-Guduru Wallaga, West Shewa, Southern West Shewa, Jimma and Ilubabor. The total area is 102,763.6 km², which is about 30% of Oromiya’s total land cover. See figure 26 below.

Certainly, there are variations in landform features between the zones, but generally range from plain fields, valleys and gorges to dissected plateaus, hills and mountains. Based on the traditional agro-climatic zonation, the west Oromiya zones have kola, woina dega and dega agro-climates (Fig. 27). Woina dega comprises about 60%, while kola and dega take 22% and 18% of the share, respectively.

West Oromiya zones are relatively endowed with a variety of natural vegetations. Data available indicates roughly 53% of the region’s and 32.3% of the nation’s forest resources are located in these zones. There is an enormous opportunity to promote forestry based development, that already started by Oromia Forest development agency, and huge potential for nature based ecotourism activities linked to the high forests. Such interventions will create local employment in addition to their economical and environmental benefits.

Minerals and construction materials are other natural resources with which west Oromia is gifted. Information obtained from Oromia Bureau of Planning and Economic Development indicates that several precious minerals and construction materials are located in these zones. Except the limited extraction of some minerals such as marble, gold, copper and iron in West Wallaga; mineral water and building materials in West Shewa; and only coal (very recently) in Ilubabor, mining of the other available minerals is not carried out yet.

ii) Farming Systems

Three broad farming systems are recognized in the area: mixed crop-livestock, perennial based and shifting cultivation systems. More specifically, however, the area can be categorized into more detailed farming systems as follows:
(a) Mixed Cereal-Livestock system – in parts of West Shewa zone
(b) Cereal-Enset- Livestock system – in parts of Jimma, West Shewa, Ilubabor and West Wallaga – is occurring in terrains comprising of hills and rolling plateaus, with deep nitosols of good fertility.
(c) Food crops-Forest coffee-Livestock – in Ilubabor, parts of Jimma and West Wallaga. Food crops such as cereals, enset and root crops are grown though at varying degrees between localities. Coffee is tended under the shade of natural forest trees for cash crop, at altitudes below 2000 masl.
(d) Shifting cultivation system – is occurring in the river valleys of Abay, Gojeb, Gibe and Didessa rivers, below 1700 masl. Sorghum, maize and finger millet are planted and under-sown with beans, pumpkin, gourds and cabbage. Growing sesame, cotton and ginger has great potentials under this system.

Livestock is important components of all the farming systems, except in the tsetse-infested lowlands, providing draught power for working on farms, food (meat, milk eggs) and many products for sale.

iii) Land Use and Vegetation

The area, when categorized into major land uses constitutes 45% arable land, 16% forest/bush land, and 14% pasturelands. The remaining 25% falls under settlement, degraded areas and other land use units. The west Oromiya zones have ample potentials for development. Only portion of the available cultivable lands are utilized under the current situation. The lowlands in the kola zone are particularly sparsely populated.

The lowland areas remain the last extensive areas for agricultural expansion for a rapidly growing human population mainly comprises lowlands in the Abay-Didessa basin and the extreme western lowlands in Kellam and West Wellega which extends upto the sudan border. However, there is no access to majority of these areas due to lack of access roads.

iv) Development Constraints/Challenges

Data available indicates that several issues can be raised as the major impediment to development of this area. The following, however, are the major ones:

(a) Socio-economic Factors
- Low level or less developed agro-techniques,
- Less commercialized agriculture or “Food crop syndrome” - most of the farm households tend to grow food crops though their farm plots are suitable for highly economical cash crops.
- Poor saving culture - In the other extreme, even if some money is obtained due to sale of a farm produce (e.g. coffee) a saving tradition is not well developed.
(b) In appropriate land use and agricultural practice, and Land Degradation

It is apparent that the agro-climate of the sub-region is quite favorable for agricultural production and plant growth with suitable management practices. Not only food crops, but also export crops such as coffee, tea, sesame, cotton, spices, fruits and vegetables have greater potentials in the area, for both abroad and domestic markets.

Due to inappropriate land use and poor agricultural practices it is observed that deforestation and land degradation is going on at an alarming rate resulting in decreasing agricultural production. The undulating nature of the terrain coupled with high rainfall and termite problem has exacerbated the soil erosion problems in some localized areas. This area include Ayera Gulliso, Lalo-Qile, Lalo-Asabi, Boji Birmaji, Nejo, Menesibu districts of W/Wellega, which are with high population density and severe soil acidity. Land degradation and decreasing productivity is also severe in Haro, Limu, Gida Kiremu, Ibantu districts of E/Wellega.

Most of the areas in this part of the region are ideal to promote Coffee and associated perennial tree crops. It is not difficult to understand that the problem of the area is putting the land for a purpose for which it is not meant for. Moreover, there are no traditional or modern mitigation measures taken to reverse the problem. If this situation is allowed to continue, it is evident that areas like this will expect a food aid.

(c) Inadequate Infrastructural Development

Even though a considerable focus was given to construction of main and rural roads in the last ten years, there is still poor access to the vast lowlands and valleys. The existing roads are mainly distributed in the highland areas leaving the lowlands poorly connected that have contributed to under development of the area.

(d) Livestock Health Problems

Zones with the least livestock population in the region are found in this part of Oromiya. This is mainly attributed to livestock diseases, and especially large proportion of the land is infested with tsetse fly. Tsetse fly is a vector insect for the livestock deadly disease, trypanosomiasis and the human disease known as sleeping sickness.
3. Rationale for the Valley Development Program

The economy of the country in general and of Oromia in particular is largely dependent upon the agricultural sector. Growth and improvement in this sector lay the foundation for enhanced and sustained growth in all respects. The agricultural sector besides providing employment and contributing to enhanced regional revenue, it plays decisive roles in the supply of raw materials to the industrial sector. As a mainstay of the regional economy, agriculture accounted for 65.3% of the Regional Gross Domestic Product and provided employment opportunity to about 89% of the population in 1998/99.

The region has large expanse of land resources, endowed with diverse soil and climatic condition highly favorable for cultivation of various types of crops and livestock rearing. Despite availability of abundant resources and persistent efforts made to maximize productivity of the agricultural sector, returns from the sector remained below expectation. The regional government has been pursuing various strategies to make the people self-sufficient in food crops production. In the Five-Year Development Plan, therefore, priority is given to production of high value crops, enhancement of production and productivity to free the region from reliance on food aid and improvement in the overall livelihood of the rural population.

Although commendable achievements were made by the ongoing development endeavors, production and productivity of the sector is still among the least. Dependence on rain-fed agriculture and poor orientation towards production of marketable and high value crops are among the challenges to improve productivity of the sector. Unwise and unscientific use of natural resources has exposed the region to excessive deforestation, soil erosion, migration of wild life, pollution ...etc; as a result of poor implementation of the policy framework also contributes to the poor performance of the sector.

As is evident from the achievements registered from the various development endeavors underway in the region, poverty reduction is feasible only through rapid and sustainable economic growth. The realization of such economic growth rests on encompassing the broad mass, particularly the rural poor, through agricultural and rural development strategy.

The agricultural development strategy emphasized maximization of production and productivity to bring about rapid economic growth. The productivity enhancement focuses not only on production of staple food crops, but also on production of raw materials for industrial sector development. The realization of such a far-reaching objective emphasizes cultivation of market oriented high value and exportable crops. In this regard, a great deal is expected largely from the
millions of smallholder farmers. In order to guide and direct the smallholder private producers along the intended development strategy, intervention areas designed in this regard include expansion of irrigated agriculture so that productivity of land and agricultural output increases beyond self-sufficiency both for domestic market and export.

It is a matter of fact that irrigation is the only strategy to exercise sustainable agriculture. Especially its importance is of paramount in areas where moisture constraint is critical for agricultural production. Water is one of the most critical resources for crop production in moisture deficit areas. Fortunately, Oromia is one of the few regions of the country adequately endowed with both surface and ground water resources. Water is key input to enhance irrigation development in the fight against food insecurity and ultimately ensure transformation of the sector in particular and the economy in general.

As indicated on Economic Study of Oromia, conducted in 1999, the region has about 1.7 million hectares of potentially irrigable land using surface water, with potential capacity of serving about 6.8 million households. However, up to the end of 2004/05 EFY, the extent of land under irrigated agriculture is estimated at 205,977 hectares, about 84% of which is owned by farming households. This irrigated area accounts for roughly 12% of the regional potential. However, the overwhelming majority of irrigated land owned by small holders, accounting for over 87.33% (152,515ha), was developed through traditional irrigation practices characterized by poor productivity and inefficient management.

In general, the above discussion clearly explains the regions’ over reliance on rain-fed agriculture, the effectiveness of which is declining year after year. This is manifested by low productivity and yield because of continuous decline in reliability and intensity of rainfall, becoming a bottleneck to meet food demand of the ever increasing population. Thus, augmenting rain-fed agriculture with modern irrigation practices is a necessity.

It is a matter of fact irrigation promotes sustainable economic growth and development through enhancing the productivity and profitability of the agricultural sector. Irrigation based agriculture is important to realize the country’s strategy and policy towards -Agricultural Development Led Industrialization (ADLI). Intensive agriculture using irrigation is one of the major strategies to transform the agricultural sector. Accordingly, making use of irrigation projects using surface water and/or under ground water is among the strategies identified in the five year development plan to increase the return from the agricultural sector.

Cognizant of the need for irrigated agriculture the regional government has launched large scale irrigation projects, Fentale I and II, in the rift valley of the region under development corridors program, the first fruit of which is being
tested by the beneficiaries. These projects are expected to develop about 26,000 ha and will augment the amount of irrigated land and the output from the sector that will enhance fast economic growth beyond ensuring food security in the project area. Moreover, detail study of underground water potential is going on in the South East Oromia development corridor and promising results are being observed, to use ground water potential both for drinking water supply and irrigation.

Encouraged by the achievements registered from the various development endeavors underway in the region, under development corridors program, further interventions are planned to be under taken in different parts of the region in the coming years. Accordingly, “Irrigation Based Integrated Valleys Development Program” is designed for the coming five years to develop irrigation potentials/endowment of the region. Implementation of this program will enable the regional government to ensure food security and ultimately transform the economy of the region in particular and that of the nation in general.

This valley development programme is part of the development corridor programme and following the completion of land use plan in a certain area it will pave the way for area base/spatial development programme, that is expected to address all aspects of development in a basin or water shade

4. DEVELOPMENT GOAL AND OBJECTIVES OF THE PROGRAM

i) Overall Development Goal
The overall development goal of this program is to bring overall societal transformation in the Region and make the region’s population a middle income society before 2020.

ii) Major Development Objectives
✓ To solve food security problems in the Region in a sustainable way and transform the food in-secured areas to centers of economic growth and development.
✓ To make a paradigm shift and bring overall economic and societal transformation in the Region through sustainable utilization of the Region’s human and natural resources.

iii) Specific Development Objectives
▪ Tackle the food security problem experiencing in the project area once and for all.
▪ Enable the local community to produce cash making or foreign marketable crops two or more times per year.
▪ Increase net income of farmers from agricultural activities using both surface & ground water sources.
5. EXISTING OPPORTUNITIES and Potentials: THE RESOURCE BASE

The program areas under discussion are endowed of immense natural resources (land, water sources, good climate, etc.), to some extent hard working people and several opportunities to achieve the above mentioned objectives with in short period of time, if due attentions are in place.

5.1. Land

The valley development concept to bring sustainable development particularly in drought prone parts of Oromia is triggered by the availability of dependable land and water resources potentials in these areas. The recently completed land use planning studies has indicated the potential of available land if intermediate level of management is employed. One of the known drought prone sub-basins of West Hararge is a good example for this. At existing level of low management above 64% of the sub-basin is only suitable for livestock production. Only by solving the moisture limitation of the basin about 50 % of this land could be transformed into best agricultural land (See table below).

Table ...: Indicated land for Arbakurkura sub-basin at low level of management

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<thead>
<tr>
<th>Proposed Land Use Plan</th>
<th>RS</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>Area (ha)</th>
<th>%</th>
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<td>491705.81</td>
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Table ...: Indicated land for Arbakurkura sub-basin at intermediate level of management (after improving only moisture)
The lowland valleys of Oromia hold fertile alluvial soil that is transported from washed highlands and most of its parts don’t need additional nutrients. The possibility of annual replenishment of nutrients by floods makes valley development for agricultural purpose a most viable economic activity. The broad and sandy loam containing valleys of Hararge (Fig....) are prime targets for this program. The major potential areas as enclosed in map below has a total area of about 366,000 hectares. Most of these areas are areas of chronic food shortage and repeated drought.
As can be seen from fig … these valleys are not used for their most beneficial uses due to moisture stress and limited know-how.

Fig. ...: Fertile valleys in Hararge that need water and The ‘bone’ growing valleys of West Oromia

Suitable areas in other parts of the region are many folds. The land potentials in different parts of the region have different nature depending on prevailing geological phenomenon. The high grade volcanic terrains of West Oromia, particularly West Wellega has a unique landscape that is suitable to be developed
using its almost flat bottomed valleys and adjacent low-lying hilly grounds (Fig.). As can be seen from figure below there are about 20 small and medium valleys with in 15 km distance along the indicated cross-section. This programme helps to solve problem of coffee abortion in Western Oromia and maximize the efficient use of hilly terrains that is affected by acidity. Depending on the nature of the various landscapes and suitability of land different valley development approaches will be followed in this programme.

**5.2. Water Resources**

One of the triggering factors for this programme is the availability of little utilized surface and subsurface water resources. The growth corridor development approach followed in the past three years has helped in understanding the subsurface potential and the extent to which it can be used to reverse existing poor development scenario. The main target water source for this programme is the groundwater source followed by surface water. The groundwater resource can be divided into two categories, shallow and deep sources, depending on its availability (fig...) and the abstraction technology required.
5.2.1. The shallow groundwater sources

In this programme shallow ground water is considered as part of the groundwater that can be abstracted by human labour or easy boring machines and may not exceed 50 meters. The availability of these waters depends on climatic, geomorphologic and lithologic factors. Most of these aquifers are unconfined and major target areas for shallow ground water areas are parts of the Cenozoic sedimentary units hosting:

- Alluvium-filled grabens
- Channel fills
- In areas where the Quaternary sediments are in contact with the basement, volcanic and massive Mesozoic rocks
- Areas of intense Weathering where exposed parts of hard rocks yield significant amount of useable water

Except the dry lowlands of Oromia that have little annual rainfall and lacking floods from the highlands, most parts of Oromia is endowed with shallow groundwater resources. Areas of high potentials are the metamorphic terrains of West and East Oromia. Unless fractures and deeply weathered the metamorphic rocks are aquicludes. In areas like the gently sloping valleys and plains of Hararge the thick alluvium deposits act as excellent shallow ground water storage (Fig..).
Areas of high annual precipitation and poor deep aquifers of West Oromia have great shallow ground water resources in weathered parts of bed rocks and the thick alluvial sediments overlying them.

Apart from these places areas close to the lakes and rivers within the rift valley and discharge zones like Ade’a and Becho plains provide large amount of shallow ground water. The highland plateaus of Oromia are mainly covered by Tertiary volcanics. These rocks also contain shallow groundwater in their weathered parts but the yield is not as large as the alluvium sediments of East and West Oromia. Due to the clayey nature of the developed soils over the dominant basalt covers, the shallow groundwater resources in these terrains are not high enough to stimulate large consumptive use. This source is the prime target of this valley development program.

Assessment of these resources shall be carried out before implementing large scale development projects. Hydrogeological methods and Vertical resistivity soundings shall be employed to delineate high potential areas, estimate safe yield and undertaking integrated groundwater management.

5.2.2. The deep groundwater sources

In this programme deep groundwater is considered as part of the groundwater that can not be abstracted by human labour and commonly exceeding 50 meters. Similar to shallow groundwater sources, the availability of these waters depends on lithologic, geomorphologic and climatic factors in recharge and discharge zones. The lithologic successions below the horizon of shallow aquifers hold the great groundwater reserves of the Region. Most parts of Oromia is a good recharge zone that receives more than a meter of annual precipitation and of which, according to various estimates, a minimum of 20% goes into the hydrologic system. The geological setting controls the groundwater flow system. Most parts of Oromia being situated in a hydrogeologically favourable location enjoys the availability of huge amount of groundwater in its aquifers (Fig...a & b). The bedding plans and the rifting systems have made the central parts of Oromia to benefit most.
Fig...: Groundwater flow directions east and west of the rift systems (a) from Northern Oromia Plateau towards the rift (b), Engda, 1999 and from Horo Plateau towards Southwest Oromia

The fractured Tertiary volcanics in the escarpment zones of Oromia, the Mesozoic deposits where the limestone is karstified limestone and the Upper Sandstone provide huge amount of groundwater at reasonable depth of less than 300 meters. Recent studies have shown that these aquifers contain enough amount of water to develop valleys. Some of the aquifers were confined aquifers and as exploration wells bore deeper finding artesian flows is becoming common (Fig....).

Fig...: Artesian wells located within the valleys of Hararge
Most high yielding springs, as high as 100 l/s, also emerge from these aquifers. Although there are unfortunate chances of losses due to infiltration into the karstic substrate, these aquifers are much more promising in terms of valley development from deeper groundwater sources. With large drilling diameter it is possible to locate wells yielding tens of liters in most valleys sought to be developed.

The deep aquifers within the central highland plateau also have substantial amount of groundwater. Abstracting large discharge wells for irrigation demands the penetration of longer depth than the previously mentioned areas. Due to the development of deeper penetrating fractures to let the groundwater to go deeper, the same is true in the rift valley floor areas situated away from surface water bodies.

Apart from the higher initial investment cost the deeper sources supply large amount of water in a relatively sustainable manner. These sources are preferable to develop large commercial farms than those fragmented small holder farmers to be developed around shallow wells.

5.2.3 Surface water

This source, as compared to the groundwater, is relatively known and easily accessible; but not efficiently utilized. Surface water can be taken as a prime source in the Western part of the Region where even small streams are perennial. Most streams in this region flow more than nine months. In most of the years the rainy season come before stream beds loss their moisture contents. This characteristic of the western Oromia streams make the valley floors’ alluvium best target for shallow groundwater abstraction to supplement for any gap in rainfall or stream flow.

Surface water use can also stand as prime sources of water for some parts of the highlands of Bale and Arsi and areas at the foot of the mountain chains in these zones.
5.2.4 Recommended sources for immediate development in various parts of Oromia

In general, available secondary data and preliminary assessments described above indicate that the areas under consideration are endowed with several opportunities and resource potentials for irrigation development. The following table indicates possible sources for selected immediate intervention areas.

Table: Major source of irrigation water for immediate intervention

<table>
<thead>
<tr>
<th>Zone</th>
<th>Major sources of Water</th>
<th>Method of Abstraction</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Hararge</td>
<td>Shallow well/deep well</td>
<td>HD/Machine</td>
<td></td>
</tr>
<tr>
<td>West Hararge</td>
<td>Deep well/Shallow well</td>
<td>Mainly Machine</td>
<td></td>
</tr>
<tr>
<td>Jimma</td>
<td>Shallow well/surface</td>
<td>HD/Machine/grav</td>
<td></td>
</tr>
<tr>
<td>Illu Ababor</td>
<td>Surface/Shallow well</td>
<td>Grav/HD/Machine</td>
<td></td>
</tr>
<tr>
<td>West Wellega</td>
<td>Surface/Shallow well</td>
<td>Grav/HD/Machine</td>
<td></td>
</tr>
<tr>
<td>East Wellega</td>
<td>Deep well/Shallow well</td>
<td>Mainly Machine</td>
<td></td>
</tr>
<tr>
<td>Horoguduru</td>
<td>Shallow/deep well/surface</td>
<td>Machine HD/Grav.</td>
<td></td>
</tr>
<tr>
<td>West Shewa</td>
<td>Deep well/Shallow well</td>
<td>Machine HD/Grav.</td>
<td></td>
</tr>
</tbody>
</table>

South Eastern Oromia DC

- Committed people with an entrepreneur and creative mentality striving to free themselves from relief assistance and improve their livelihoods are seen as a major development force. Therefore, in solving the problems of these areas and making them centres of development, the human power in these areas is considered as a huge resource,
- Extensive land resources that are suitable for different agricultural activities if problems related to water and moisture deficits are addressed,
- Forest resources that can directly or indirectly contribute to improved livelihood of the local population (such as gum, incense, myrrh, honey, etc),
- Perennial and seasonal rivers that can be utilized for irrigation development,
- Promising ground water potential for domestic and livestock water supply and for irrigation development, detail study of underground water is in progress, etc.
**Western Oromia DC**

- Ample rain with fair distribution, unlike the lowlands located in the south and eastern part of the region.
- Besides the food crops, the area is highly conducive for export crops such as coffee and sesame, industrial crops such as cotton, tea and tobacco have greater potentials in the area, for both abroad and domestic markets.
- There are a number of perennial rivers flowing through these zones and fertile extensive land, ample Irrigation potential.
- Though little has been studied yet, it is generally presumed that the area has ample ground water resources, in addition to rivers, for irrigation development.
- Forest resources that can directly or indirectly contribute to improved livelihood of the local population, etc.

Nevertheless, people living in these areas are suffering from food insecurity (in the eastern part of the region) and deep rooted poverty because the above-mentioned resources were not developed and utilized systematically. Therefore, by identifying and developing the available resources efficiently, it is believed that it is possible to change the ‘hand to mouth’ and/or aid dependent living situation of the people in the program areas and bring about a sustainable development.
6 Key Issues and MAJOR INTERVENTION AREAS IDENTIFIED

6.1. Key Issues
Considering the existing situations in the program areas the following are some of the issues need due considerations to meet the intended objectives.

- Transformation of agriculture from subsistence to commercialized system through specialization and diversification, efficient water use and management,
- Developing sustainable land use systems,
- Organization and supporting the youth based on site specific interventions,
- Infrastructural development (Road, water supply, drainage, etc).
- Strengthening rural-urban linkage;
- Increase productivity through the development of irrigation using all the possible water sources.
- Transformation of the traditional `Bone` irrigation system into highly intensive and commercial farming. This requires improving the drainage system.
- Undertaking infrastructural development focusing on high potential and key resource areas (access rods, water, health, etc)

6.2 Major Intervention Areas
Based on the issues deduced from the existing situation in the program areas, described above, and the envisaged objective or changes the following are the major areas of intervention to be addressed in the short and long run.

✓ Undertaking water resources assessment and water supply development,
✓ Introduce effective and sustainable land use and management system,
✓ Undertaking Infrastructural development (roads, power, communication, etc),
✓ Irrigation scheme development using surface/sub-surface/ground water,
✓ Provision of appropriate and to the standard extension services,
✓ Create access to market and improve the market infrastructures.
✓ Organizing and supporting the youth based on local realities so that they will be drivers of the envisaged changes.
7. Intervention Areas and Scope Of The Intervention Under This Program

The programme is expected to cover all potential valleys in the region. Limitation in implementation capacity and lack of proper knowledge about the valleys’ resources will lead us to prioritization. Depending on the objective of the programme, food insecure areas with known development potentials will be given priority. Other high potential valleys, although they are in food secure areas, will be targets for immediate development interventions. The completed and ongoing land use study areas are relatively well known. From these studies it is possible to pick possible intervention areas. In this regard, the two Hararge zones (see fig. ) and acidity problem areas of West Oromia zones (fig. ) are to be given priority for short and medium term interventions.

The two end approach, considering drought prone areas and high development potential areas simultaneously, will be followed throughout the programme life till all valleys are developed guided by results of land use plan.

Fig. Example of intervention areas – food insecure ‘Aredas’ in Babile & Fedis Anas with with underlying high shallow groundwater potentials zones (in light blue)

The scope of intervention of the program will be from a short term (immediate) on spot supply to long term multi-village distribution system water supply projects and family based irrigation to large scale irrigation projects in the long term. Of course, the intervention will be based on the potential of land & water resources and the availability of the capital budget to implement the program.
Accordingly, to decide the potential of the land and water resources the program should include the land use plan and water resources study side by side and/or prior to the implementation of the water supply and irrigation projects. Like that of the Development Corridor Projects as the water is found the on spot supply and small scale irrigation will commence at the points and then will be scaled up to multi-village water supply and large scale respectively in course of time.

7.1. Type or Components of intervention

The program will be integrated type that consists of Valley Irrigation Development and water supply for human and livestock. The interventions will base on the land use plan of the valleys i.e. to use the resources, (especially the land and water) according to their suitability and potential so as to utilize the resources to their maximum efficiency and optimum capacity.

The major works in this Valley Development Program are:

- Groundwater Investigations;
- Drilling Boreholes that serves both for irrigation and drinking water supply;
- Study, design and construction of Irrigation Systems;
- Study, Design and construction of Water Supply Systems;
- Study and design and construction of drainage system

7.1.1. Irrigation Component

The concept of “Blue Revolution in Agriculture” can be brought about a paradigm shift for sustainable development of agriculture which indicates the planning of irrigation development based on the principle of “MORE CROPS PER DROP”. This development leads not only for securing food shortage but also production of commercial commodity through irrigated agriculture.

In line with the national water resource polices, the regional efficient water use strategies need to be set towards irrigated agricultural development. This effective utilization of water resources for irrigation enhances the sustainable development of agriculture, on the other hand decreases its dependency of rainfall.

The existence of ample surface and ground water resource potentials in the Region pave the way in promising the intended development strategies. The development of these enormous resources can be possible through short, medium and long term development strategic plan of the region which can promote the income of the farmers through irrigated agriculture by producing high value crops two or three times a year.
The main target of this component is to avail water to the target area by conducting study, design, and supervision and construction irrigation infrastructure (see section ____).

7.1.2. Water Supply Component

Water supply problem for human and livestock is one of the major causes of food insecurity in our country. This fact is also true for Oromia National Regional State as the access to potable water supply in the rural is below 50% of the total rural population. On top of that the sanitation coverage in the region is below 20% that worsens the problem.

It is obvious that the problem of water supply results in low productivity due to the fact that the community will expend more of their time in fetching water and watering their livestock rather than participating in other economic and social affairs. In addition to losing their time, they also expend their money for health service against the water borne and water related diseases.

The livestock of community will also lose their weight and give low milk due to long distance traveling to the water points.

The low drinking water coverage (shortage of drinking water) on the other hand, brings high concentrations of livestock at some water points causing further land degradation on lands that in turn results in the low productivity of the land.

Though efforts done so far in the last 18 years especially in the past two years under the development corridors approach is encouraging and have greatly reduced the problem, still the problem of water supply is not solved as it needs long time intervention. The implementation of Gewgew, Hariro and Meyu Muluke in East Hararghe and the Teffe, Korke-Rimeti, Hallo Gobba- Eddo Gelma and Bososo water supply projects In West Hararghe and Borena Water Supply Projects are expected to contribute a lot in alleviating the water supply problems in their respective zones. The contribution of some of the above projects to fight the 2007/8 drought, specifically the Borena water supply projects are unforgettable.
Fig ____. Photos taken from some of the Hararghe valleys: indicating the severity of the water supply for human and livestock population.

However, to the contrary of the problem, the water resources potential of the Region, particularly in the valleys, is found to be promising as confirmed from the early results of the South East Oromia Ground Water Investigation Project and different intervention by Oromia Water Resources Bureau. The case of Oda Bultum, Homicho and Genda Ta’a artesian wells in West Hararghe and the yields of the two test boreholes drilled in Erer Valley in East Hararghe are good indicators of the groundwater potential that could support the need of the community in the area.

Therefore the Valley Development Program approach should address the prevailing problems and come up with the integrated development strategy so as to go in line with the land use plan of the respective valleys. This means consideration of the land potential is critically important in the provision of water supply to solve water problems, which is otherwise result in the misuse of resources and degradation of the land.

As the valley development program is mainly targeting the groundwater, potential entry point in the valleys, integrating the water supply for human, livestock and crops will be easier because of the reason that groundwater doesn’t need much treatment (in case needed at all) to supply it for these three demands.
This integration will avoid the duplication of efforts and minimize the capital costs of the individual costs of the projects in the Program.

The experience in Genda Ta’a (i.e. by farmers in small valley brought big change in their lives) Project in West Hararghe zone will be a good model.

Above: The paradise in Genda Ta’aa (Irrigation by groundwater from borehole drilled for drinking water supply).

Genda Ta’a before intervention  Genda Ta’a today

Above: Little intervention brought big difference at Genda Ta’a (in small valley). Who can deny the fact “Water is life”.

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The lesson learnt from Genda Ta’a, it is easy to integrate the irrigation and drinking water supply from single source. Bringing the water from drilled borehole to a common storage reservoir and supply it via water points, cattle troughs and canals or irrigation pipes to supply for human, livestock and crops respectively will improve the system efficiency and also reduce the capital costs of the projects.

7.1.3. Drainage Component

Drainage is affecting significant portion of potential agricultural areas in various parts of the Region. Apart from the well known drainage problem areas of Arsi and Bale wheat fields and North Shewa zone, the parts of the Western Zones of Jimma, Illuababura, and Wellega are also affected by drainage. Using the experiences gained from the ongoing drainage projects solving drainage problem of drainage affected areas will be one of the components of this programme.

Fig. Drainage affected area in Jimma zone

8. Implementation strategy

Implementation of this project will follow the approaches and strategies applied so far in implementing the projects already started with food security fund in food insecure parts of the region. This implementation strategy is different from the normal approaches in that detail study and design work, that has to be complete before approval of the project previously, is undertaken parallel with the implementation of the civil work under this approach. This approach has big advantage to reach the needy people with the required services or development intervention within short period of time while its disadvantage is the difficulty to clearly define the activities to be carried out, the total resource required to complete the project. Consequently it is barely possible to exercise proper
monitoring and evaluation on the status of the project while under implementation.

To ease this problem, even though study and design work is to be implemented simultaneously with civil works attention will be given to complete study and design work in short period of time, very early, as much as possible. Accordingly, detail study and design including supervision of the construction work is going to be handled by Oromia Water Works Design and Supervision Enterprise while drilling and construction works (activities under C and D described above) are to be handled by the sister enterprise, Oromia Water Works Construction Enterprise.

Under this implementation modality the following are some of the areas of attention, as implementation strategy, for the smooth implementation of the program.

**Cost recovery approach:** It is well known that, though its return is very encouraging, irrigation scheme development is highly expensive. Consequently is seems difficult to enhance irrigation based agriculture and meet the development objective of the region as per the existing urgency with limited financial resource. The amount of resource going to available to implement this program may not be relaxed and meet the planned intervention. Cost recovery approach, thus, is the appropriate strategy to develop the enormous potential of the region through revolving the resource available to this program. This strategy will be applied in areas with deep groundwater resources.

**Family based ground water development:** On the other hand experiences show that, as indicated under section ____, households can manage to develop and harvest sub-surface water sources. This is a good indication for the possibility to develop large area through scaling up such experiences to areas with shallow water tables. Here, assisting families to develop their own shallow groundwater resources through provision of technical assistance accompanied by appropriate irrigation extension service will enable to contribute the achievement of objectives set with minimum cost.

Necessary arrangements will be made to assist the households in provision of technical assistance and provision of pumps and necessary spare parts. With regard to provision of pumps/its spare parts, involving the private sector in providing spare parts for pumps could be one of the possible alternatives.

Finally, necessary institutional arrangement will be in place at different levels to implement the program with required efficiency.
9. Major Program Activities
Since developing, even some portions of the existing potential areas (more than 300,000 hectares in Harerge Valleys for instance) is very demanding both in terms of financial and technical capacity, implementation will take place using phase by phase or step by step approach. Accordingly, 20,000 hectares of the potentials in Harerge Valleys and 20,000 hectares of the potentials in Western Oromia are going to be developed during the first phase of the program.

10. Monitoring and Evaluation System
Monitoring and evaluation is an instrument for smooth implementation of the intended interventions of a given plan/program/project. It is imperative, thus, to establish a transparent evaluation system to make close follow up of the implementation of planned activities. In placing appropriate and transparent monitoring and evaluation system will help to monitor whether or not the planned activities are following the implementation schedule and the standards set, if the intended results are being obtained through attaining planned targets or not, including the encountered shortcomings. During evaluations, the achieved results of implemented activities are checked and analyzed against the baseline information and targets set.

To this end, it is necessary to separately prepare and attach points of evaluation for activities of the program to be evaluated. The results of these monitoring and evaluation are to be prepared in a separate report and approved by a higher level implementing body.

10.1. Monitoring and evaluation made by sectors
All sectors that are given duties are expected to separately compile the implementation of this program (different from their regular plans) and submit to the Coordination office of the development corridors of Oromia. As this work requires a special attention, there should be a focal person in implementing sectors to follow up the activities, compile achievements and problems and prepares monthly, quarterly and annual reports and submit these to the coordination office and other concerned bodies.

10.2. Development Corridors Board
Apart from the follow up carried out by the sectors, a committee that monitors the attainment of the targets set and provides the necessary leadership should be set up at region, zone and district levels.
A development corridor Board, chaired by the President of the regional state of Oromia, already in place and doing the proper leadership of the implementation of the ongoing interventions in development corridors will direct the plan and implementation of this program. After analyzing the action plan and implementation reports submitted from implementing sectors, it gives directives on issues that require improvements and decisions.

Besides reviewing reports from implementing sectors the Board members should make regular field visits for monitoring the implementation of the planned activities. A presence at the work site to see the status of the implementation certainly will enable the Board, sometimes, to give immediate decisions and directives on issues that need to be improved for smooth implementation of the program/plan. Therefore, the Board should have a visiting program of at least once every three months. By doing this, the Board will analyze the strengths and weaknesses on the implementation of the program/project and decide on urgent corrective measures for shortcomings identified.

### 10.3. Development Corridors Coordination Office

The coordination office already organized to undertake coordination of the ongoing interventions will undertake, also, coordination of the implementation of this program. The office will closely work with development corridors board and has the responsibility to coordinate and oversee the planning process of development projects, be secretary to the board, propose and indicate budget for the projects of the program, assist the board in deciding and prioritizing intervention areas on resource basis, coordinate stakeholders of the program and integrate their efforts for a common goal, and undertake periodic review and monitoring of the program and report to the Board. The coordination office will report the periodic review of the implementation of the program to the board on quarterly basis.

### 10.4. Zonal Coordination Committee/team

Even though the implementation of this program is largely handled by regional institutions, the role of the zone is also substantial. The zonal administration should take the duty of coordination to ensure the implementation of activities planned at district level without discontinuation. Facilitation of experience exchange for good practices is also one of the functions of the zone. Therefore, a coordination committee that is comprised of the relevant zonal sectors and district administrators should be set up by the zonal administration. Zonal level offices and sector branches should identify activities that are accomplished and those that need follow up and submit these to the coordination committee once every two months. The zonal coordination committee is expected to meet once every two months to analyze activity reports and to resolve any problems that might have been observed during implementation by being on the spot.
10.5. District Executive Committee
District is where this work is to be carried out. Therefore, facilitating all work to be done at district level and ensuring the participation of communities is the major function among the duties of the district executive committee. Therefore, to make communities contribute their labor in these development undertakings in a coordinated manner, it is necessary to increase the awareness of communities on the program. Moreover, it provides support to the district level technical offices that are implementing the program and carry out the necessary follow up on implementation. The district executive committee is expected to meet monthly to analyze the activity reports presented from the district level technical offices implementing the program and to resolve some of the problems identified that needs district level intervention.

10.6. Community Participation
It is a matter of fact; to be sustainable development interventions normally need community participation at all levels of the implementation. Community has to participate in implementation, monitoring and evaluation of projects to be implemented under the program starting from project identification and preparation. Since the community at the grass root is the primary beneficiaries of the program/projects they need to make their contributions to implementation of the projects in labour and/or in as per their current background, though the projects to be implemented are on the cost recovery basis. However, any contribution of the community to implementation of the program will, entirely, be on voluntary basis. To help coordinate this community participation, a Community Coordination Committee comprising of all social groups (elders, youth, women, village structures) should be established from the beneficiary groups.
11. Assumptions and Risks

11.1. Assumptions
This program is proposed to meet the intended objectives and all of the deliverables will be provided with the assumptions that there will be no terrible situation with the issues described under:

- The government provides full support to the program,
- Community’s commitment to contribute to the implementation of the program and readiness to benefit from the development interventions undertaken.
- Adequate budget availability from the possible sources and its continuous disbursement for smooth implementation of the program.
- Full participation of all stakeholders in implementation of the program.
- The above mentioned monitoring system is in place and efficient, subjected to necessary modification.

11.2. Risks
- Lack of adequate budget and discontinuous disbursement,
- Lack of full community participation,
- Conflict of interest on the proposed project areas.
- Weak implementation capacity.
- Lack of adequate attention by implementing agencies.
- Lack of support by stakeholders.

13. Indicators for impact Assessment/Evaluation

To measure the results and impacts of this program, it is imperative to conduct an initial socio-economic survey to know the current status of the beneficiaries in the project areas to be identified that can be used as a base to evaluate the changes occurred after implementation of the program. This can be done during the detail study and design work of the individual projects to be implemented under the program. Generally, this program will have an immense contribution in increasing the daily income of beneficiaries and solve food insecurity problem in areas where food security is a prevailing problem. In areas where the beneficiaries are food secured this intervention will increase the income they are earning from the sector.

Impact assessment will be made against the baseline data to ensure whether the intended objectives: tackling food security problems in project areas with food shortage once and for all; enabling the local community to produce cash making
or foreign marketable crops two or more times per year; increase in net income of farmers benefiting from the interventions etc.

The indicators for overcoming food insecurity (‘graduation’) can be measured using two methods: (1) Annual comprehensive method of measurement that considers income, expenditure and assets to calculate the per capita income, and (2) Annual limited method of measurement that measures the annual income and assets of a household. This measurement takes into consideration the realities of the districts.

To ease the work of impact assessment to be undertaken at end of the program implementation, baseline data has to be gathered conducting socio-economic survey, before the intervention takes place for the indicators described under. The impact indicators include:

1. **Income indicators**: increased income in cash and in kind, asset creation, increased education and health expenditures, increased expenditure on non-food items and physical resources (plough animals, farm implements and inputs)

2. **Consumption indicators**: Changes in food consumption patterns, expenditure and cost of food, meal frequencies and composition, calorie supply

3. **Social service improvement indicators**: Basic health service indicators, Potable water, adequate sanitation and personal hygiene

4. **Indicators of self reliance**: increased household saving and reduced debt obligation.

5. **Food Access indicators**: Purchasing power, farm and non-farm income level, Crop yield

6. **Asset building indicators/General indicators for ‘graduation’ (overcoming food insecurity)**: income obtained from sales of products, livestock assets (oxen, sheep, goat, camel, etc.), and income from sales of livestock and from non-farm works, and accrued cash saving.

Based on the base line data evaluation of changes occurred at household level will be undertaken on annual basis to confirm whether households have come out of food aid/ graduated, in food insecure project areas and see the overall improvement in areas do not have food security problem.
14. Program sustainability Issues

The core objective of this project is ensuring food security and bringing about sustainable economic development in the project areas. Materializing this objective needs giving a priority attention to sustainability of the project. If there is resource and capacity the scheme can be developed. However, its provision of service in a sustainable manner needs proper and well organized scheme management.

To in place efficient and effective project/scheme management so as to ensure project sustainability, attention will be given to the following issues:

- Identification of the immediate beneficiaries (those who are going to use the plots of irrigated land for cultivation). This will be handled while identification of the actual project sites takes place.
- Then attention has to be given to involve these beneficiaries in the process of project implementation starting from the early phase of project life. Accordingly, the community has to participate in project implementation through contributing labour or handle some of the intervention by its own. This will pave a ground to build sense of ownership and guaranty for sustainability of the program.
- Organizing the beneficiaries in to groups that will assist project implementation and will develop to water users association or else after project implementation is completed. In the mean time attention will be given to train the beneficiaries to operate and manage the scheme. In this regard, women and men above middle ages and among the direct beneficiaries of the program will be trained as technician (Indian experience) to do VLOM.
- Parallel to implementation of the project, efforts will be made to in place necessary arrangements for collection of cash from farmers in areas where intervention is made on cost recovery approach. In addition this arrangement will assist to handle financial contribution from farmers for maintenance and operation if the scheme is to be managed by the beneficiaries or to pay for the services provided by external body (eg: OWWCE) while providing service.

Moreover, watershed management is one the factors that determine sustainability of this project since the source of water, ground water or surface water, is highly affected by the management of land and soil in the catchments. Thus, water shed management will get due consideration in implementation of the project.