Irrigation Policies, Strategies and Institutional Support
Conditions in Ethiopia

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1. Background

1.1. Water Resources of Ethiopia
Ethiopia is endowed with abundant water resources. A large number of rivers flowing on either side of the rift valley form a drainage network that covers most of the country. Most of the rivers that carry the water resources, however, end up in neighboring countries hence making them international or Trans boundary Rivers.

The total surface water resources of Ethiopia, coming from the country’s twelve river basins, are estimated to be in the order of 122 billion cubic meters per year. With regard to ground water resources, the true potential of the Country is not yet known, however it is widely reported that Ethiopia possesses a ground water potential of approximately 2.61 billion cubic meters. Around 60% of the water resources flow into the Nile River system. However, the amount may be decreasing gradually because Ethiopia, in common with neighboring countries, has experienced apparent long-term changes in climate with an overall decrease in annual rainfall and a higher frequency of droughts since about 1970, accelerating a longer-term downward trend in average rainfall by 5% since 1912.

1.2. Agriculture sector
Agriculture is the dominant sector of the Ethiopian economy and its performance is the major determinant of overall GDP growth rate. On the average, the sector contributed about 48% of Ethiopia's GDP between 1995 and 1999. It equally accounted for 90% of export earnings, which consists mainly of coffee, hides and skins, pulses and oilseeds and 70% of raw material inflow into agro-based industries during the period. The agricultural sector is also the major employer, accounting for 85% of total employment. The crop sub-sector accounts 60% of the sector output, livestock and forestry constitutes 30% & 10% respectively. Peasant farms at household level are the backbone of the sector, cultivating about 96% of the cropped area and producing 90% to 94% of all cereals, pulses and oilseeds.

Rain fed agriculture provides the largest proportion of the total production. However, over the past few decades, irrigated agriculture has become more important. At present some 197,000 ha of land is under irrigation, the majority being in the Awash Valley. Around 68,8001 ha were established, initially by private entrepreneurs and then by the government as State farms, principally growing cotton, citrus fruits and vegetable.

1.3. Irrigation sub sector
Irrigated agriculture started in Ethiopia in the 1960 with the objective of producing industrial crops (sugar and cotton) on large-scale basis. Local farmers however, had already been practicing irrigation by diverting water from rivers in the dry season for the production of subsistence food crops. Productivity of rain-fed farming has dropped, and the agricultural sector is now unable to provide the basic requirement to the farming people. Traditional farming practices, environmental degradation, lack of external agro-inputs, effect to recurrent drought, and high population pressure have aggravated

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1Ethiopian Water Sector Development program, 2001
the present food insecurity in Ethiopia. This implies the need of launching irrigation projects development based on acute objectives of increasing crop yield, improving the living standard of the people and to provide impact on the environment.

Currently government gives emphasis to develop the sub-sector to fully tap its potentials by assisting and supporting farmers to improve irrigation management practices and the promotion of modern irrigation systems. Currently, irrigated agriculture produces less than 3 percent of the total food production of the Country. Ethiopia's experience in large-scale irrigation development and management is in state enterprises, mainly growing industrial crops like cotton and sugar cane. The experience in modern small-scale irrigation (SSI) development and management started in the 1970s by the Ministry of Agriculture (MoA), in response to major droughts, which caused wide spread crop failures and consequent starvation. The sector could be used to reduce family risks that are associated with crop failures resulting from droughts.

Traditional small-scale irrigation schemes (SSIs) have also existed for perhaps several hundred years, mostly developed by feudal landlords, notably in Hararge, Shewa and Gojam. These developments were usually no more than a few hectares in area and diverted water from streams, often only to provide supplementary irrigation. (Supplementary irrigation consists of irrigation during dry spells in the wet seasons; this is in contrary to normal irrigation, which is concentrate in the dry season). Over the past few decades many of these schemes have expanded as skills developed, irrigating areas of fifty or more hectares. The diversion structures are constructed of wood, stones, and grass sods. They are often washed away during high river flows and have to be remade each year. It is estimated that there are approximately 72,000 ha of land being irrigated by traditional means; the majority situated in Oromiya (41,500 ha), 12,500 ha in the Amhara NRS, 8,900 in the SNNPRS and the remainder in the other regional state.

Based up on the various river basin master plans and land and water resources survey, the aggregate maximum irrigation potential of Ethiopia (small, medium and large scale) have been estimated 3.7 million hectares. Out of this estimate only 197,000 hectares of land under irrigation.

2. Institutional framework

2.1. Ministry of Water Resources

Ministry of Water Resources is charged with aspects of water sector policy, planning, water resources regulation, development and use, and implementation of medium and large-scale irrigation. It also has the responsibility of building the capacity of regions regarding water resource development, and preparation of plans for the proper utilization of water resources. It coordinates projects that involve more than one region, or those that involve international procurement. The MoWR will render the implementation of the project by establishing a project coordination office (PCU).

Under the economic policy of the Government, the private sector can play a pivotal role in the development of irrigated agriculture. The International and Local None Governmental Organizations also play a significant role in study, design and development of small-scale irrigation schemes in different regions.

2.2. Local Government Administration

Administratively, the Ethiopian Federation is divided into eight self-governing regional states. The regions are further divided into zones, woredas (districts) and kebeles. The regional self-governments have legislative, executive and judicial powers in respect of all matters within their geographical boundaries, except for such matters as defense, foreign policy, economic policy etc. The Regional Council (RC) is the legislative organ of the regional state and is constituted by members elected in accordance with electoral law. It is the repository of overall political power

1 Ethiopian Water Sector Development program, 2001
regarding the internal affairs of the region. The President heads the Regional Council. Regional Bureaus in each region are established, which are responsible directly to the regional executive authorities. These Bureaus are almost replicas of the Federal Ministries. Thus there are Bureaus in charge of agriculture, health, water, social affairs, planning and economic development, mines and energy, transport and communication, works and urban development, trade and industry, tourism. Each bureau is responsible in relation to its area of activity mainly for: (i) the preparation, and upon approval, implementation of plans and budget; (ii) ensuring the implementation of laws, regulations and directives; (iii) undertaking studies and research, collecting and compiling statistical data, and transmitting it to the concerned federal organ.

2.3. Water Resources Management Policy
In 1998, the MoWR issued the Ethiopian Water Resources Management Policy (WRMP), which sets guidelines for water resources planning, development and management. The Fundamental principles pertaining to the formulation of the policy are:

- Water is the natural endowment commonly owned by all the people of Ethiopia.
- As far as conditions permit, every Ethiopian citizen shall have access to sufficient water of acceptable quality to satisfy human needs.
- In order to significantly contribute to development, water will be recognized both as an economic and social good.
- Water resources development shall be underpinned on rural-centered, decentralized management, participatory as well as integrated framework.
- Management of water resources shall ensure social equity, economic efficiency, systems' reliability and sustainability norms.
- Promotion of the participation and community management of all stakeholders and user communities, particularly women's participation in the relevant aspects of water resources management.
- The policy deals with water supply and sanitation, irrigation, hydropower, inland water transport, aquatic resources, water for tourism and recreation sub sectors. The overall goal of the policy is: to enhance and promote all national efforts towards the efficient, equitable and optimum utilization of the available water resources of the country for significant socio-economic development on sustainable basis. The specific objectives of the policy are to: Promote the development of the water resources of the country for economic and social benefits of the people, on equitable and sustainable basis;
- Allocate and apportion the water, based on comprehensive and integrated plans and optimum allocation principles that incorporate efficiency of use, equity of access, and sustainability of resources;
- Manage and combat drought as well as other drought associated impacts, and disasters through efficient allocation, redistribution, transfer, storage and efficient use of water resources; and
- Conserve, protect and enhance water resources and the overall aquatic environment on sustainable basis. The WRMP recognizes and adopts the hydrologic boundary or “basin” is the fundamental planning unit and water resource domain.
- To develop and enhance small and large scale irrigated agriculture and grazing lands for food self-sufficiency at the household level and for food export.

2.4. Irrigation Policy
Irrigation is one of the sub sectors included in the Ethiopian water resources Management Policy (EWRMP). The overall objective of the irrigation policy is to develop the huge irrigated potential for the production of food crops and raw materials needed for agro-industries, on efficient and sustainable basis and without degrading the fertility of the production fields and water resources base. The policy sets the following detailed objectives:

- Development and enhancement of small scale irrigated agriculture and grazing lands for food self-sufficiency at household level
- Development and enhancement of small, medium and large-scale irrigated agriculture for food security and food self-sufficiency at national level including export earnings and to satisfy local agro-industrial demand.
• Promotion of irrigation study, planning and implementation on economically viable, socially equitable, technically efficient, environmentally sounds basis as well as development of sustainable, productive and affordable irrigation farms.

• Promotion of water use efficiency, control wastage, protection of irrigation structures and appropriate drainage systems.

• Ensuring that small-scale, medium-scale and large-scale irrigation potential projects are studied and designed to stage ready for immediate implementation by private and/or the government at any time.

The above objectives are consistent with the objectives of Ethiopian Agricultural Development–Led Industrialization (ADLI) economic development strategy. The ADLI strategy is essentially based on initially fostering the rapid development of small holder’s agriculture, including irrigated agriculture with a view to creating demands for industrial goods and thereby fuelling the growth of industry. Thus ADLI meant to create the foundation for a virtuous cycle of mutual and parallel growth of the agricultural and industrial sectors.

2.5. Water Sector Strategy

To translate the national water management policy into action the Ministry of Water Resources has issued Ethiopian Water Sector Strategy (EWSS) in 2001. The strategy sets the road map as how to make meaningful contribution towards:

• Improving the living standard and general socio-economic well being of the Ethiopian people

• Realizing food self-sufficiency and food security in the country

• Extending water supply and sanitation coverage to large segment of the society, thus achieving improved environmental health conditions

• Generating additional hydropower

• Enhancing the contribution of water resources in attaining national development priorities

• Promoting the principles of integrated water resources management

By doing so, the strategy will be able to make meaningful contributions towards achieving a broader national development objectives of poverty alleviation and sustainable human resources development.

2.6. Irrigation development strategy

The irrigation development strategy is one of the sub-sectors dealt in the water sector strategy. The principal objective of the irrigation development strategy is to exploit the agricultural production potential of the country to achieve food self sufficiency at the national level, including export earnings, and to satisfy the raw material demand of local industries, but without degrading the fertility and productivity of country’s land and water resources base. More specific objectives of the strategy are:

• Expand irrigated agriculture

• Improve irrigation water-use efficiency and thus the agricultural production efficiency

• Develop irrigation systems that are technically and financially sustainable

• Address water logging problems in irrigated area

2.7. Main Elements of the Irrigation Strategy

Technical and Engineering aspects

1. Initiate the planning and implementation of a comprehensive, well coordinated and targeted-irrigation development program

2. Design appropriate irrigation schemes by taking into account the physical conditions, hydraulic characteristics, irrigation engineering, management capacity of users, and detailed agronomic and agricultural considerations.

3. Implement measures to secure long-term viability and sustainability of irrigation schemes.

4. Adopt improved and affordable systems and tools for water harvesting and pumping, for reducing seepage losses in canals, for water control, storage and retention systems and measurement structures.
5. Undertake measures to improve water conveyance efficiency, especially the irrigation water use efficiency by implementing agronomic, engineering, demand management, and economic measures based on detailed studies and analysis of these measures.

6. Develop standards, guidelines, manuals and procedures for the sustainable operation and maintenance of irrigated schemes and systems, while ensuring their successful application, monitoring and improvement.

7. Develop and promote simple designs and standards for construction and operation and maintenance of irrigated schemes.

8. Establish water allocation and priority setting criteria, as well as fair and transparent management system.

9. Pursue integrated planning approach in the development and implementation of irrigation projects.

10. Consider development of groundwater resources as supplementary means of irrigation in drought-prone areas, where rainfall duration is less than the length of growing season, as it is the only insurance against crop failure.

11. Develop necessary technical guidelines and standards for mechanisms, systems, materials and technologies to be used for improving water use efficiency in small, medium and large scale agriculture, so as to avoid both shortage (stress) and excesses (loss).

12. Give emphasis to water harvesting methods for small-scale irrigation development in areas where wet season runoff can be stored and used for crop production.

13. Create conditions conducive to the implementation/construction of medium and large-scale irrigation schemes.

14. Give appropriate consideration to past performance and technical capacity while selecting contractors and consultants for implementation/construction of irrigation projects because, in general the list bidder principle had not proven successful in construction works.

15. Implement a sequential framework for project authorization for the planning (studies and design), implementation and management phases. Analyze and outline the operation and maintenance as well as management requirements with respect to the beneficiary skills, and availability of materials, budgets and technical capacities.

**Financial and Economic Aspects**

1. Make higher budgetary allocations from the government sources for the implementation of short, medium and long-term irrigation development plan.

2. Share irrigation development costs with other sectors like power, road, health, education and agriculture, etc.

3. Establish and implement norms and procedures for financial sustainability and viability of irrigation schemes. For this purpose, implement a stage-by-stage cost recovery transition procedure (initial grace period; operation and maintenance costs borne by the beneficiaries from the beginning; cover cost of minor structures beyond the primary off takes; finally total cost of the scheme are to be recovered). Medium and large-scale irrigation development schemes are generally considered to operate on full cost recovery principles, although a transition procedure may be justified to stimulate development of the region.

4. Establish users' fee according to the related level of cropping patterns and farm level profits, scheme efficiency, and in simple and clear cost recovery system. Ensure that the water charges and fees are timely collected for efficient operation of the service rendering institution. Sustain the functioning of the irrigation systems through their regular operation and maintenance and gradual upgrading of the operation and maintenance capacities of the local beneficiaries.

5. Implement a price stabilization mechanism to protect the producers against market risks. Facilitate producers in rationalizing their production choice by providing updated production and marketing information. Discourage import of agricultural products to protect local producers through strict enforcement of standards, quality control and high import taxation. Increasing agricultural production efficiency will be the key to bring local production costs comparable to the international prices.

6. Extend credit facilities and bank loans for development of irrigation projects, especially small-scale irrigation schemes to be executed by local community groups. Provide incentives to encourage private sector investment in the irrigation schemes.
7. Mobilize financial resources from external sources for undertaking the development of medium and large-scale irrigation schemes.

**Institution Aspects**

1. Strengthen institutional and regulatory frameworks at the federal and regional levels by undertaking assessment of the existing institutional capacities with respect to the regulatory and implementation roles and responsibilities so as to develop the appropriate institutional structures for the implementation and management of irrigated agriculture. Make efforts to avoid overlap of duties and responsibilities among the institutions within the sector.

2. Reactivate and reinforce the role of federal government and regional states in the development of small, medium and large-scale irrigation schemes. This involves, inter alia, undertaking of activities related to rehabilitation and upgrading of existing schemes, upgrading of previous studies and designs, and implementation of the new schemes.

3. Enhance greater participation of the regional states and federal government in the development of large-scale irrigated schemes and farms in high water potential basins where there is low population density. Since large and medium scale irrigation areas are more in the low lands, the conflict arising from resettlement and loss of grazing land will be of prime concern. In such cases, compensation measures such as provision of irrigated pasture and livestock watering facilities may be considered.

4. Ensure operational sustainability of small-scale irrigation schemes by establishing operation and maintenance departments within the regional bureaus; description of operation and maintenance requirements for these schemes; identification of means to meet these requirements; preparation of operation and maintenance manuals; and strengthening the capacities of beneficiaries before handing over the schemes to them. In this regard, ensure transitional period during which the capacity of the beneficiaries is to be ascertained with an objective to identify and remedy difficulties and problems. Provide training to farmers using pilot level demonstration schemes, experience sharing programs, and research and study tours to improve water use efficiency and product quality.

5. Establish self-financing autonomous public institutions to undertake operation and maintenance activities of large-scale irrigation schemes. Involve major stakeholders in the board of directors of these institutions. Make these institutions responsible for all aspects related to irrigation water management in the area.

6. Encourage the participation of private sector, especially for the operation and maintenance and management phases of medium and large-scale irrigation schemes. Towards this aim:

   a) Device and implement incentive systems such as tax holidays, longer grace periods of repayment, duty free import of construction and farm equipment, and provision of main infrastructure, etc.
   b) Launch business promotion campaigns and forums
   c) Facilitate co-operative or joint venture arrangements with the potential investors
   d) Make approval procedures simple and easy, such as the ’one stop shop’ principle, and
   e) Distribute up to date information regarding investment possibilities in the irrigation sub-sector to local as well as foreign investors.

**Capacity Building Aspect**

1. Equip the institutions involved in project implementation with the available modern know-how in the fields of project study, design, construction and operation and management. Facilitate the transfer and adaptation of modern technology in irrigation development and secure basis to sustain technological base.

2. Strengthen technical capacities of national/regional/zonal/woreda level offices in: project planning, design, implementation, operation and maintenance, information management, monitoring and evaluation, and other aspects related to irrigation management. Towards this aim:

   a) Expose the national staff to higher level training
   b) Implement targeted training programs
   c) Encourage research and development activities
   d) Execute skill transfer programs through on the job training, and
   e) Link national institutions to regional and international network

3. Strengthen contract administration and management capacity of the clients and
national consultants to improve and upgrade the operational efficiency of existing and planned schemes.

4. Develop and strengthen information management capacities. In this regard, improve the adequacy, reliability and accessibility of existing databases at the national and regional levels (especially with regard to data on potential irrigable land, water resources availability, water use patterns, crop water requirements, farming systems, and irrigation efficiency) to carry out water management analysis and to determine potential to increase agricultural production.

5. Strengthen the existing technological base to improve the productivity and efficiency of irrigated agriculture. Take appropriate measures to sustain this technological base and to ensure that its expansion (either through local production or imports from external sources) complements the existing base and confers with the development needs of the sector.

Social Aspects

1. Integrate irrigation development activities within country’s socio-economic development plans, particularly within the Agricultural Development Led Industrialization (ADLI) Strategy, based on the two pronged approach of (a) strategic planning for achieving socio-economic development goals, namely through feasibility studies and designs for potential projects, and (b) Participatory driven approach for promoting efficiency and sustainability.

2. Institute decentralized and grassroots user based management of irrigation systems, taking into account the special needs of rural women in particular, during the planning, implementation/construction, operation, management and monitoring phases. Enable the local community to benefit from the irrigation schemes in terms of provision of social services, job opportunities and prevention of adverse social effects.

3. Assign priority to those irrigation projects, which are of multiple-purpose in nature and would contribute towards ensuring food security, provision of irrigated pasture in areas where cattle grazing and watering is a problem, increasing household incomes, and enhancing regional development.

4. Establish and strengthen the Water Users Associations or Irrigation Co-operation in each scheme on a voluntary basis. Encourage and promote the role of women in these community-based structures. Provide training to the women to assume greater role in the functioning of these community-based structures. Make these structures focal point for development and management of irrigation schemes.

5. Promote partnership building between relevant government institutions, NGOs and local communities at different levels for the provision of bulk water storage, flood control and transfer schemes in particular;

a) Mobilize local community groups and assign them greater role in the planning, construction, and operation and maintenance of small scale irrigation schemes;

b) Involve local people in the project cycle of irrigation schemes, as well as settlers in the decision-making process; and

c) Institute conflict resolution mechanisms based on traditional approaches and cultural practices.

6. Make use, to a maximum extent possible, of local materials and resources in the construction of small-scale irrigation schemes since these lead to reduction in construction costs and help in avoiding delays in procurement.

Environmental Aspects

1. Conduct appropriate Environmental Impact assessment (EIA) studies for the irrigation schemes, including the implementation of remedial measures, based on the National Conservation Strategy and Environmental Guidelines;

2. Establish guidelines for maintaining irrigation water quality;

3. Establish drainage parameters/requirements, and integrate appropriate drainage facilities in all irrigated agricultural development schemes;

4. Consider technical and technological options, which avoid the prevalence of breeding ground for vectors; minimize loss of forests; reduce seepage; and protect erosion, siltation, salinisation and pollution.

2.8. Irrigation Development Program

The irrigation sub-sector program is one of the sub-sector programs incorporated in water sector development program. The overall objectives of the program are:
1. To improve the food security and food self-sufficiency status of the country, both at national and household levels;

2. To improve the nutritional status and general welfare of the population;

3. To contribute to the supply of adequate raw material inputs for industries;

4. To build national and regional capacities for planning, implementation and operation of irrigation projects;

5. To exploit untapped land and water resources for sustainable irrigated agriculture;

6. To reduce dependence on rain-fed agriculture and attendant vagaries of the Ethiopian climate;

7. To improve rural employment through increased cropping intensity; and

8. To improve land productivity through double cropping

Within a period of 15 years, the Irrigation Programs aims to develop a total area of 274,612 ha of land, bringing the total area under irrigation to 471,862 ha by the end of the Program period in 2016.

ON GOING IRRIGATION PROJECTS IN THE MOWR

The ministry of water resources is undertaking a number of irrigation projects located in different regions. They constitute approximately a total area of 510603 ha. Most of these projects are envisaged to be completed and ready for production before the end of the irrigation program-planning period in 2016. This about twofold the area planned to be developed in the irrigation development program.

Table 2. List of On-Going Irrigation Projects

<table>
<thead>
<tr>
<th>Name of the projects</th>
<th>Irrigable area (ha)</th>
<th>Type of work</th>
<th>Status</th>
<th>Detail description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kessem Tendaho</td>
<td>50000</td>
<td>C</td>
<td>Under construction</td>
<td>Wegech = 31821ha, Ribde = 199225 ha, Anger = 22563, Negasso = 23000ha, Upper Beles = 237000ha, Lower Beles = 23000ha</td>
</tr>
<tr>
<td>Koga irrigation and watershed</td>
<td>5200</td>
<td>C</td>
<td>Under construction</td>
<td></td>
</tr>
<tr>
<td>World Bank financed irrigation</td>
<td>177998</td>
<td>IS</td>
<td>Under study</td>
<td></td>
</tr>
<tr>
<td>Awash river flood and watershed Irrigation</td>
<td>-</td>
<td>FS</td>
<td>Under study</td>
<td></td>
</tr>
<tr>
<td>IFAD-SCP IAIPD</td>
<td>3340</td>
<td>SC</td>
<td>Under study and construction</td>
<td>IFAD/French Govt. Financial</td>
</tr>
<tr>
<td>Gunma Irrigation</td>
<td>20000</td>
<td>FSD</td>
<td>Under study</td>
<td>Gilgel Abay, North-west, South-west, North-east</td>
</tr>
<tr>
<td>Lake Tana shore Irrigation</td>
<td>37000</td>
<td>FSD</td>
<td>Expecting financial and technical proposal from WACSE</td>
<td></td>
</tr>
<tr>
<td>Arjua Dedessa</td>
<td>14280</td>
<td>FS</td>
<td>Under study</td>
<td></td>
</tr>
<tr>
<td>Humera</td>
<td>42865</td>
<td>FS</td>
<td>Under study</td>
<td></td>
</tr>
<tr>
<td>Wabbi Shebele basin irrigation dev.</td>
<td>11920</td>
<td>FS</td>
<td>Expecting financial and technical proposal from WACSE</td>
<td></td>
</tr>
<tr>
<td>- Erer &amp; Golocho</td>
<td>20000</td>
<td>FS</td>
<td>Under signing of the contract agreement with WACSE</td>
<td></td>
</tr>
<tr>
<td>- Illua &amp; Budduro</td>
<td>20000</td>
<td>FS</td>
<td>Under contract negotiation</td>
<td>(Gelifa, Gilaha and Bilate)</td>
</tr>
<tr>
<td>Lake Abay basin irrigation</td>
<td>21900</td>
<td>FS</td>
<td>Under contract negotiation</td>
<td></td>
</tr>
<tr>
<td>Raya valley pressurized irrigation</td>
<td>18000</td>
<td>FSD</td>
<td>Expecting financial and technical proposal from WACSE</td>
<td></td>
</tr>
<tr>
<td>Koba-Shirea pressurized irrigation</td>
<td>17000</td>
<td>FSD</td>
<td>Preparation of RFP has been finalized. Discussion with regional government has been started to decide upon the continuation of the project</td>
<td></td>
</tr>
<tr>
<td>Z WAY Irrigation</td>
<td>15000</td>
<td>FSD</td>
<td>Expecting financial and technical proposal from WACSE</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>510603</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C= Construction, IS= Identification study, FS= Feasibility study, SC=Study and construction; FSD= Feasibility study and detail design