MALABO MONTPELLIER PANEL

Ethiopia

WATER-WISE

Smart Irrigation Strategies for Africa

Between 2002 and 2014, the area under irrigation in Ethiopia increased by almost 52 percent. In 2015, the estimated total area equipped for irrigation was 858,340 hectares (ha). In addition, around 1.1 million ha were estimated to be cultivated through farmer-led irrigation.[1] The 2018 Biennial Review Report by the African Union revealed that Ethiopia is on track to meet Malabo Commitment area #3.1, "Access to agriculture inputs and technologies," given its score of 6.03 out of 10, which vastly exceeds the 2017 minimum score of 5.53.[2] Nevertheless, the share of arable land equipped for irrigation currently accounts for only about 5 percent,[3] even though the economic potential for large- and small-scale irrigation development is very high. **The internal rate of return (IRR) for large-scale irrigation is over 7 percent, with an estimated expansion area of 0.75 million ha. The IRR for small-scale irrigation is even higher, at 12 percent, with an estimated area of 0.16 million ha.[4]**

INSTITUTIONAL INNOVATIONS

At federal level the Ministry of Water, Irrigation and Electricity (MoWIE) and its subsidiary organizations (including Water Works Design and Supervision Enterprise (WWDSE), Water Works Construction Enterprise (WWCE), and Water Resources Development Fund (WRDF)), the Ministry of Agriculture and Natural Resource Development (MoARD), the Ministry of Environment, Forest and Climate Change (MoEFCC), and the Ministry of Finance and Economic Cooperation (MoFEC) are all responsible for development of irrigation sector infrastructure in Ethiopia. The MoWIE leads the development and implementation of guidelines, strategies, polices, programs, and sectoral laws and regulations and is the main actor

to handle medium- and large-scale irrigation schemes. It is also responsible for regional and interregional water resource development and management, as well as for functions that involve international procurement.

The WWDSE conducts studies related to irrigation, basin development master plans, and other water projects. Moreover, it carries out surveys, designs, and specifications, delivers consultancy services on resource development, and builds national capacity in the field of water resource study, design, and construction supervision. The WWCE is in charge of the construction of dams pertaining to water resource development for irrigation and other related development purposes. The WRDF is part of the MoWIE, providing long-term loans and acting as a semi-autonomous body on behalf of the Ministry to expand sustainable irrigation development. Loans are issued for a period of 20 to 25 years at 3–5 percent fixed interest rates. Among others, the MoARD is responsible for developing community-managed small-scale irrigation schemes (up to 250 ha); while the MoEFCC is in charge of investigating the environmental impact of irrigation projects; and the MoFEC is responsible for allocating capital budget for the construction of such projects. Regional and local-level (district and subdistrict) irrigation sectors follow the same structure, even if the placement of the sector in terms of organizational structure differs across regions. Some regions such as Oromia recently reorganized a separate irrigation authority, while in other regions like SNNP and Beneshangul Gumuz, the responsibilities are with the Bureau of Agriculture. In addition, River Basin Authorities are responsible for the management and implementation of water-related activities in their respective basins. Irrigation Water Users Associations and Irrigation Cooperatives are local-level institutions engaged in mobilizing and coordinating communities' sustainable and efficient use of irrigation water. The beneficiary communities are also responsible for operating and managing irrigation schemes.[5]

In 2010, the Agricultural Transformation Agency (ATA) was established, chaired by the Prime Minister. In 2013, the ATA began mapping over 32,400 square kilometers (km²) to identify water resources, especially shallow groundwater, with potential for irrigation development. The final results of shallow groundwater mapping in 89 districts (woredas) indicate the presence of nearly 3 billion cubic meters (m^3) of water at a depth of less than 30 meters. This could allow approximately 100,000 ha of land to be brought under irrigation, benefitting 376,000 households.[6] At the regulatory level, the Ethiopian Water Resource Management Proclamation No. 197/2000, Council of Ministers Water Resource Regulation No. 115/2005, River Basin Councils and Authorities Proclamation No. 534/2007, Rural Land Administration and Land Use Proclamation No. 456/2005 and Irrigation Water Users Association (IWUA) Proclamation 2014 are the legal instruments that govern the operation and management of irrigation in Ethiopia.[7,8]

Policies and strategies

Agriculture and irrigation have been featured on the Ethiopian policy agenda since 1991, when the government implemented its strategy of Agricultural Development-Led Industrialisation (ADLI), which sees agriculture as the engine of growth. In 1999, the Government of Ethiopia issued the first Water Resources Management Policy (WRMP) of its kind. The WRMP set guidelines for water resources planning, development, and management. In particular, the policy sought to enhance the production of food crops and raw materials needed for agro-industries through irrigation on an efficient and sustainable basis. To translate the WRMP into action, the Ministry of Water Resources (MoWR) issued the Ethiopian Water Sector Strategy (EWSS) in 2001.[9] Within the strategy, the Water Sector Development Programme (WSDP) set out five different sub-components: Water Supply and Sewerage, Irrigation and Drainage, Hydropower Development, General Water Resources, and Institutions/Capacity Building. The principal objective of the Irrigation Development Programme is environmentally and financially sustainable expansion of agricultural land under irrigation, and improved water use efficiency toward achieving food self-sufficiency at the national level, and satisfying the raw material demand of local industries. To this end, the policy foresees to build micro dams on rivers/streams, consider cost-effective pumping stations using pressurized irrigation technologies, make higher budgetary allocations to irrigation, promote the use of shallow wells using hand and foot pumps; and promote the participation of the private sector in the management of water resources.[10]

In 2003, the Rural Development Policy and Strategies presented specific policies and strategies to guide agricultural and rural development, aimed at productive and sustainable utilization of agricultural land through irrigation, multicropping, and diversified production.[11] The recently completed Plan for Accelerated and Sustained Development to End Poverty (PASDEP) 2005/06–2009/10 and the Five Year Growth and Transformation Plan (GTP I) underpinned the objectives for the agriculture sector. Besides others,

PASDEP promoted irrigation development while GTP I further aimed to improve the management of natural resources with a focus on improving sustainable water utilization and the expansion of irrigation.[12,13] Irrigation is also captured in the Policy and Investment Framework (PIF) in Ethiopia's 2010–2020 National Agriculture Investment Plan (NAIP). The PIF calls for major investments in irrigation development, including both smallholder and larger-scale commercial schemes to exploit Ethiopia's abundant, yet underutilized, water resources. In particular, the plan seeks to increase the area under irrigation by 8 percent annually, and to improve water conservation and water use efficiency. Overall, the government aims to allocate over half of the total funding of US$15 billion until 2020 to irrigation development.[14] In addition to the goals set in the NAIP, the Growth and Transformation Plan (GTP II) 2015–2020 aims to increase irrigation-based agriculture to 4.1 million ha for small-scale and to 954,000 ha for medium- and large-scale schemes, including the use of alternative energy sources like solar and wind power.[15] Recognizing the close links between environmental and development concerns, the government is working to integrate climate considerations into its broader development planning processes. The Climate Resilient Green Economy (CRGE) initiative, under the leadership of the Prime Minister's Office, the EPA, and the Ethiopian Development Research Institute, was launched in late 2011. The initiative developed a strategy to build a green economy and laid the foundation for integrated planning for climate-resilient development. The Resilience Strategy for Agriculture acknowledges irrigation as a critical response to climate change for smallholder and industrial agriculture.[16]

PROGRAMMATIC INTERVENTIONS

In collaboration with development partners, the government set up different irrigation projects across the country. Between 2008 and 2015, the Participatory Small-Scale Irrigation Development Programme (PASIDP) aimed to develop a sustainable, farmer-owned and -managed system of small-scale irrigated agriculture. The US$58 million program was largely funded by the International Fund for Agricultural Development (IFAD) and coordinated by the Ministry of Agriculture and water users associations.[17,18] PASIDP sought to: encourage a highly participatory approach to small-scale irrigation development; improve catchment area planning; support construction of small-scale irrigation schemes covering about 12,000 ha; improve farming practices, particularly in soil and water conservation and seed production; and promote home gardens for women. Between 2008 and 2015, interventions under PASIDP developed 116 small-scale irrigation schemes that covered over 12,000 ha of arable land. The project interventions are estimated to have reached more than 311,000 people in 62,200 households in the four regions. Beneficiary households were able to double their average crop yields and revenues and had food consumption expenditures that were twice as high.[19]

In the Tigray region, another joint project between the Ethiopian Bureau of Agriculture, local extension officers, and the NGO Farm Africa was established in 2012 to support women and young people to increase their incomes and improve their nutrition through, among other approaches, small-scale irrigation. Under this project, 27 motorized pumps, 200 treadle pumps, and 200 pressurized and drip irrigation pumps were installed in 200 households, together with a 500-meter canal. The local community received intensive support and training on community management, use, and maintenance of irrigation equipment and irrigation scheduling, and technical support on agricultural production. In addition, 600 fruit and vegetable seedlings were distributed to 300 farmers. Overall, the project reached nearly 6,400 women and landless people, of which 700 farming families benefitted directly from the irrigation project.[20,21]

In 2003, a collaboration between the MoWR and the Ministry of Education initiated the Water Works Technical and Vocational Training Programme, with 480 trainees in six training centers in four regional states. During the three-year program, students are trained on irrigation, water supply, and electromechanics. The curricula include the design, construction supervision and operation, and maintenance of irrigation and water supply projects.[22] In addition to vocational training, some universities provide specialized courses and general training on aspects of irrigation and water resource management.[23] Furthermore, the government has focused investment in agricultural water management technologies. Different irrigation water control structures have been applied, such as temporary or permanent river or stream diversions, spate irrigation, micro-dams, rainwater harvesting and ponds, and pumping systems (from groundwater, rivers, or lakes). Surface (gravity-fed) canal systems are currently the most common irrigation technology in the country.[24] Data from the Ethiopian Revenue and Custom Authority state that around 800,000 motor pumps were imported between August 2004 and December 2010.[25] The government imports these pumps free of duty and tax and sells them through cooperatives.[26]

Ethiopia's remarkable growth in irrigation expansion has largely been driven by the government's commitment to comprehensive institutional innovations and targeted policy and programmatic interventions, as well as strong regulatory frameworks that govern irrigation and the use of water in agriculture.

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