MALABO MONTPELLIER PANEL

South Africa

WATER-WISE

Smart Irrigation Strategies for Africa

While hardly any smallholder land is irrigated and only moderate progress in irrigation development has been made, South Africa has huge potential in irrigation development. The country's total irrigated area was approximately 1.3 million hectares (ha) in 2014/15, which constitutes 10 percent of cultivated land.[1] The country is home to around a quarter million irrigators, including about 32,000 smallholder farmers. The latter accounted for about 3 percent of all area equipped for irrigation in 2010.[2,3] The 2018 Biennial Review Report by the African Union revealed that South Africa is currently not on track to meet Malabo Commitment area #3.1, "Access to agriculture inputs and technologies," given its score of 3.02 out of 10, which falls well below the 2017 minimum score of 5.53.[4] **However, according to research by the International Food Policy Research Institute, the economic potential for both large- and small-scale irrigation is considerable, with an internal rate of return (IRR) of approximately 8 percent and 14 percent, respectively, and the potential to bring 0.4 million ha for large-scale and 0.2 million ha for small-scale under irrigation.[5]**

INSTITUTIONAL INNOVATIONS

South Africa has demonstrated its dedication to irrigation at both domestic and international level. Soon after independence, South Africa joined the International Commission on Irrigation and Drainage (ICID) through its representative body, the South African National Committee on Irrigation and Drainage (SANCID). ICID was established in 1950 as a scientific, technical, professional, voluntary, not-for-profit, nongovernmental international organization. Drawing members from governmental,

quasi-governmental, and private business organizations as well as academic associations, ICID promotes the research and development of new technologies in the fields of irrigation, drainage, and flood control.[6]

Domestically, the National Water Act (NWA) of 1998 stipulated some fundamental reforms on the use and management of water resources. Central to the NWA of 1998 was the principle that water is a scarce natural resource that belongs to all South Africans and must be used beneficially and in the public interest (generating social benefits, economic efficiency, and environmental sustainability). The NWA sets out a legal framework for the government to protect, use, develop, conserve, manage, and control the country's water resources. It also incorporates the establishment of catchment management agencies, the transformation of existing irrigation boards into water user associations, and the possible establishment of an agency to manage the national water resource infrastructure. Although the approach showed ambition, its implementation has been rather limited.[7]

Since 2010, the Department of Agriculture, Forestry and Fisheries (DAFF), located within the Ministry of Agriculture, Forestry and Fisheries, has been responsible for guiding irrigated agriculture in South Africa. While the Ministry holds the overall responsibility for its Departments, Departments themselves are divided into Directorates. Within the DAFF, the Directorate of Water Use and Irrigation Development (DWID) in its Forestry and Natural Resources Management branch is responsible for the efficient development and revitalization of irrigation schemes and water use of the country.[8]

Under the DAFF, the DWID developed the Irrigation Strategy for South Africa in 2015, which provides direction for institutional reform and guidelines on public investment in irrigation initiatives. The Irrigation Strategy sets a target of a more than 50 percent increase in irrigated land in South Africa over the next 10 to 20 years by revitalizing smallholder irrigation schemes across the country, a goal estimated to cost US$1 billion.[9] The Strategy also calls for collaboration with the Provincial Departments of Agriculture and the Department of Water and Sanitation (DWS). Taking into consideration the natural resource base, the strategy focuses on the following objectives:

- Institutional arrangements
- Irrigation research, training, extension, and advisory services
- Revitalization
- New development
- Improved management and efficiency of water use

The DWS, which acts under the responsibility of the Ministry of Water and Sanitation, was established in 2014, following its division from the Department of Water Affairs and Forestry. The DWS is responsible for formulation and implementation of South Africa's water resources policy, and for water services provided by the local government. The 2nd National Water Resource

Strategy, implemented from 2013, also touches on irrigation and underlines the need for groundwater development and management, water harvesting, importation of water-intensive goods, and infrastructure management, as well as the advantages of multiple use planning.[10]

The DWS's assessments are highly relevant for local policies. The assessments were applied in 2016, when the city of Cape Town implemented Level 2 Water Restrictions, limiting the amount of water usage for personal, commercial, industrial, and agricultural use. The restrictions were gradually further increased, reaching their peak in January 2018 at Level 6b Water Restrictions. As of October 2018, Level 5 Water Restrictions are in effect, restricting personal water use to 70 liters per person per day and reducing water use for agricultural purposes by 50 percent.[11]

The Water Research Commission (WRC) is South Africa's premier water knowledge hub, established under the Water Research Act in 1971. The funds for the WRC are generated by a levy on water use. Today, the Commission's main activities include policy advice and decision-making, developing innovative water-related products and services, developing sustainable solutions to establish highly informed water decision-making through science and technology at all levels and deepening water research and development in South Africa, across Africa and other developing regions. The research results and new technology-based products and processes are subsequently disseminated to end-users. The WRC also supports projects that use satellite imagery and requests research to estimate the areas and water use associated with irrigated agriculture in South Africa.[12,13,14]

Finally, various institutes of the Agricultural Research Council (ARC) are involved in irrigation-related research, such as calibration of soil-based irrigation and identification of waterlogging and salt accumulation. The Council also designs irrigation systems and trains farmers on sustainable water management techniques to grow vegetables and to improve farmer productivity and food security in local communities, as well as to commercialize the production of crops.[15]

POLICY AND PROGRAMMATIC INTERVENTIONS

The WRC supports initiatives for multiple use water systems (MUS) that provide low-cost water services for domestic use, agriculture (irrigation, rainfed), and to rural enterprises. In this respect, a four-year "Operationalizing community-driven multiple use water services" project is being implemented in Limpopo in collaboration with the International Water Management Institute (IWMI) and local nongovernmental organization (NGO) Tsogang, with support from the WRC and the African Development Bank (AfDB). The project seeks to: demonstrate participatory planning for sustainable multipurpose infrastructure in selected rural villages; enhance the knowledge base of MUS; and bring to scale the MUS approach at district, provincial, and national level.

Outside of government-led interventions, South Africa's civil society is very active in promoting appropriate irrigation technology for water conservation and management. The nonprofit Association for Water and Rural Development (AWARD) was founded in 1999 to build active civil society participation in water and biodiversity stewardship, management, and governance. Jointly with the United States Agency for International Development (USAID), AWARD runs the RESILIM-Olifants Programme, which focuses on resilience building in the transboundary Olifants River Basin, shared between South Africa and Mozambique. The Olifants river water supply system provides water for domestic and industrial water use purposes, irrigation, mining, and power generation, serving more than 3 million people. The project also seeks to institutionalize water conservation and water demand management as a climate change adaptation strategy in two local municipalities through formal training courses and feedback sessions and through the provision of guidelines.[16]

The South African Irrigation Institute (SABI) is another nonprofit organization dealing with irrigation. It focuses on the promotion of improved designs, equipment, methods, and management for the efficient use of irrigation water and optimization of all other associated resources. Among other activities, SABI runs the IrrigationWise Academy, offering a range of training programs to boost optimum irrigation practices and water conservation for parastatal organizations, large farms, and commodity groups. Its emphasis is on strengthening technical and engineering skills in both the agricultural and landscape sectors.[17]

Alongside government and the nonprofit organizations, the private sector plays a major role as custodians of water in South Africa. With respect to irrigation it leads on the development of new technologies on irrigation and agronomy. For instance, Irritech Agencies International, a specialist irrigation company operating across Africa, was established in 1992 with offices in Pietermaritzburg, South Africa and Lusaka, Zambia. The company provides

irrigation solutions ranging from irrigation design and steel fabrication, attending to logistics, administration, and the sale of spare parts, to provision of travelling technicians, service, and repair in the field. Its teams are equipped and resourced to design, install, service, and repair drip, sprinkler, pod, micro, pivot, and bulk water systems anywhere in Africa.[18] Providing different types of irrigation systems, Irritech works with other companies like NETAFIM and Valley. NETAFIM is an international company specializing in smart drip and micro-irrigation products.[19] Valley is a US company that entered the South African market in 1999 mainly to provide pivot irrigation systems and smart technologies, including remote management modules for the control of irrigation systems.[20]

South Africa's strong institutional frameworks demonstrate the country's commitment to increasing irrigation uptake. Although the 2017/18 drought significantly impacted the country, the government's response offers important lessons for other countries looking to build and strengthen their own institutions and policies on irrigation and water management.

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