



WATER-WISE

Smart Irrigation Strategies for Africa



Between 2003 and 2013, the uptake of irrigation increased moderately in Nigeria, with a 12.5 percent increase in the amount of arable land under irrigation.¹ Still, less than 1 percent of Nigeria's total arable land was equipped for irrigation over the period 2012-2014. The need to advance irrigation is reflected in the rating of the 2018 Biennial Review Report by the African Union which revealed that Nigeria is not on track to meet Malabo Commitment area #3.1, "Access to agriculture inputs and technologies". Its score of 0.37 out of 10 falls well below the 2017 minimum score of 5.53.² As a result, the potential to expand land under irrigation in Nigeria remains largely untapped. **An estimated 3.2 million hectares (ha) of land could benefit from large-scale irrigation systems, with an internal rate of return (IRR) of 6 percent, while small-scale irrigation systems could potentially be increased to 2.5 million ha, with an IRR of 22 percent.**³ **The government has undertaken several institutional and programmatic innovations to expand irrigation uptake.**

INSTITUTIONAL INNOVATIONS

Irrigation in Nigeria is overseen by units within the Federal Ministry of Agriculture and Rural Development (FMARD) and the Federal Ministry of Water Resources (FMWR). The Irrigation, Agriculture and Cottage Development Division within FMARD is responsible for development and execution of irrigation policies and programs, particularly for small-scale farmers.⁴ The Irrigation and Drainage Department under

FMWR is in charge of planning, operation, and maintenance of irrigation and drainage projects.⁵ The department also provides technical support and guidance on land tenure systems for irrigation development, and seeks to attract private sector participation in irrigation infrastructure development. In addition, under FMWR, 12 River Basin Development Authorities (RBDAs) established between 1973 and 1984, and four parastatals play an important role in water resources development, dam construction, irrigation and water supply, and operation and management of public irrigation.⁶ In 1993, FMWR's responsibility was expanded by decree to include the control and coordination of watershed management activities, water conservation, and public administration of water resources. The decree confers to FMWR the responsibility to make provision for adequate supplies of suitable water for, among others, irrigation purposes.

POLICY AND PROGRAMMATIC INTERVENTIONS

Irrigation policies and programs initially focused on large-scale public irrigation systems. Between 1967 and 1975, following the oil boom and an intense drought, the government launched several large-scale irrigation schemes through the National Accelerated Food Production Program, the Agricultural Development Program, and Operation Feed the Nation.⁷ Many of these initiatives focused on developing large-scale production of staple crops through modern inputs and technologies, including irrigation. These large-scale

irrigation schemes were managed by the RBDAs. Following the success of three pilot irrigation schemes developed in the early 1970s, government investment increased, especially in dams. The total storage capacity of the 162 dams built in the 1970s and 1980s was sufficient to irrigate up to an estimated 725,000 ha.⁸ However, economic reforms in the late 1980s resulted in a contraction of the infrastructure budget, including that for large-scale irrigation infrastructure. As a result, irrigation expansion in Nigeria remained limited, despite its high potential. Most schemes are no longer operational due to high operational costs, poor maintenance, and lack of ownership by the intended beneficiaries.⁹

Since the late 1980s, Nigeria's irrigation policies have shifted toward small-scale irrigation development. Government irrigation programs started financing the construction of boreholes and tube wells, as well as the distribution of motor pumps for the development of small-scale farmer-based and private irrigation systems. Currently, irrigation programs are embedded in food value chain development for relevant commodities, including rice and horticulture, under the Agricultural Transformation Agenda (ATA), which guides agricultural policies in Nigeria. The interventions under ATA focus on rehabilitating existing irrigation schemes where reservoirs already exist and where only the construction of irrigation and drainage canals is required for small-scale irrigation.¹⁰

Small-scale irrigation interventions show evidence of success in Nigeria. For instance, between 1993 and 1999, the National Fadama Development Project (FADAMA I) was implemented in nine states of Nigeria. The project covered approximately 55,000 ha of inland valley bottoms and subsidized simple, low-cost irrigation technologies including motorized pumps, boreholes, and tube wells. The beneficiaries, smallholder farmers, produced mainly rice, maize, and vegetables including tomatoes, cabbages, okra, and pumpkins. Thanks to the widespread adoption of these simple, low-cost improved technologies, incomes increased up to 65 percent for vegetable, 334 percent for wheat, and 497 percent for rice producers. The economic rate of return of the project was 40 percent compared to an expected 24 percent during the project design.¹¹

Despite its success, FADAMA I faced many constraints. Poor transportation infrastructure and an absence of processing,

storage, and other downstream activities caused postharvest losses and limited the project's impact. Based on lessons learnt in FADAMA I, the second National Fadama Development Project (FADAMA II) was launched over a period of six years starting in 2004 in 12 states. FADAMA II was a community-driven development project supporting the acquisition of irrigation equipment, rural infrastructure development, demand-driven extension services, and natural resource conflict resolution. Beneficiaries included farmers as well as traders and other stakeholders directly or indirectly affected by the inland valley bottoms production left aside in FADAMA I. Participation in the project increased beneficiaries' income by about 60 percent, well above the targeted increase of only 20 percent over the six-year project period.¹² Encouraged by the positive results of FADAMA II, the Government decided to expand the project to the entire country during its third phase from 2008 (FADAMA III).¹³

Furthermore, there is evidence showing that private sector is playing a more active role in the dissemination of innovative irrigation technologies in Nigeria. Zenvus, an AgTech business, is making first efforts to distribute hyperspectral imaging cameras, which can analyze images and identify stressed crops, droughts, and outbreaks of pests and diseases. In combination with soil sensors, farmers can use this technology to evaluate the effectiveness of their irrigation and fertilizer application by correlating soil data with overall vegetative crop health. The camera is available in two different versions, one to be mounted on a stick and one optimized to work with drones to monitor larger farms. The camera costs US\$190 and is currently only available in Nigeria.¹⁴

The Government has committed itself to increasing irrigation uptake through institutional and programmatic innovations, recognizing the importance of beneficiaries' ownership over programs for irrigation programs to deliver on the desired outcomes. Recent irrigation investment has largely been geared toward promotion and development of private and small-scale irrigation systems. However, a large part of Nigeria's irrigation potential remains unexploited. Tapping into this potential through public-private partnerships may increase agricultural production and further improve livelihoods and resilience. Furthermore, access to irrigation technologies based on renewable energy needs to be actively facilitated and promoted.

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