



# WATER-WISE

## Smart Irrigation Strategies for Africa



Morocco has shown strong ambitions in increasing its irrigation uptake and has positioned itself for large-scale adoption of water-saving irrigation technologies. The government has also tapped into the country's high potential for further irrigation expansion. With institutions dedicated to irrigation and strong public-private partnerships (PPPs), Morocco has proven itself to be a leader in irrigation development on the continent.

It is estimated that nearly 20 percent of Morocco's arable land is currently equipped for irrigation.<sup>1</sup> **The potential to increase the amount of irrigated land is high, estimated at 0.35 million hectares (ha) for large-scale irrigation schemes, with an internal rate of return (IRR) of 18 percent, versus 0.31 million ha for small-scale irrigation schemes, with an IRR of 11 percent.**<sup>2</sup> Irrigated agriculture comprises half of Morocco's agricultural gross domestic product (GDP), indicating its higher productivity compared to rain-fed agriculture. The 2018 Biennial Review Report by the African Union revealed that Morocco is on track to meet Malabo Commitment area #3.1, "Access to agriculture inputs and technologies," given its score of 7.46 out of 10, which vastly exceeds the 2017 minimum score of 5.53.<sup>3</sup> This is largely due to institutional and programmatic commitments by the government to improve irrigation for a more productive agriculture sector.

### INSTITUTIONAL INNOVATIONS

At institutional level the Directorate of Irrigation and Development of the Agricultural Area within the Ministry of Agriculture is in charge of the design, implementation, monitoring, and evaluation of irrigation policies and programs. The Directorate also leads on the promotion and regulation of PPPs focused on irrigation.<sup>4</sup> Morocco started to transform its institutions in 1966 with the creation of the Regional Offices of Agricultural Development (ORMVA), situated within the Ministry of Agriculture. A public institution with legal status and enjoying financial autonomy, ORMVA is responsible for technical studies, project execution and management of hydro-agricultural equipment, management of water resources for agricultural use, and dissemination of new farming technologies. Departments responsible for managing irrigation systems have been equipped with computerized tools and clear procedures and guidelines for the planning, programming, operation, and maintenance of irrigation systems. This enhances engineers' technical capacity to conduct computer-assisted maintenance, and to invoice for water used for irrigation. The government actively involves farmers in the planning of irrigation systems and developed an effective accountability system to manage resources and equipment that farmers use. In addition, a law for the creation of associations of irrigation professionals was passed in 1990.<sup>5</sup> Represented on the management board of ORMVA,

the associations participate in the development of annual irrigation programs and in rehabilitation and maintenance of equipment and ensure the distribution of water for irrigation to their members. At the other end of the value chain, the National Office for Health Security of Food Products (ONSSA) is in charge of regulating the conformity of products, including quality control of water used for irrigation, to prevent the consumption of food contaminated with foodborne pathogens.<sup>6</sup>

## POLICY AND PROGRAMMATIC INTERVENTIONS

Irrigation policy and programs are at the heart of Morocco's agriculture sector development strategy. To stimulate irrigation uptake, several incentives were put in place by the government. For instance, irrigation equipment is exempt from VAT (value-added tax), thereby making it more affordable.<sup>7</sup> In addition, subsidies of approximately 17 percent were offered for irrigation infrastructure from 1985 to expand irrigation across the country. From 1996, the focus of this financial incentive scheme was refined to encourage farmers to adopt water-conserving irrigation techniques. In 2002, subsidy rates for irrigation systems, including localized drip irrigation, were raised to 40 percent, depending on water availability. More importantly, the subsidies were expanded to all components of irrigation investment at farm level, ranging from mobilization of water resources and construction of storage basins to distribution of water to the plot. Thanks to these efforts, the use of modern water-saving irrigation technologies increased markedly in Morocco. In 2006, the subsidy rate was raised to 60 percent of the investment cost for drip irrigation, and all farmers producing under irrigated agriculture were eligible to request government support. As a result, at the end of 2008, the total area equipped with modern water-saving irrigation technologies by the private sector amounted to 196,500 ha, including 165,000 ha of drip irrigation, up from 108,400 ha in 2000. Currently, the government subsidizes investment in infrastructure and technologies for drip irrigation through the Agricultural Development Fund. The subsidy rate is 80 percent for individual farmers and 100 percent for groups of farmers and smallholders cultivating on less than 5 ha.<sup>8</sup>

As part of the *Plan Maroc Vert* (Agricultural Development Strategy of the Moroccan government), important irrigation programs were implemented. In 2008, the Program of Irrigation Expansion (PEI) was initiated to upgrade 1.5 billion cubic meters (m<sup>3</sup>) of water through hydro-agricultural developments, covering

an area of 160,000 ha by 2020.<sup>9</sup> In addition, in its pursuit of the objective of increasing water use efficiency in irrigation for sustainability, the Government of Morocco implemented the National Program for Irrigation Water Saving (PNEEI) over the period 2008–2020. PNEEI aims to improve and modernize traditional and collective irrigation systems for expanding the use of drip irrigation. To support this program, farmers can access financial assistance from the Agricultural Development Fund to help them purchase the equipment. In addition, farmers benefit from advice and guidance on how to increase the return on water used by producing high-value crops and joining aggregation systems. Due to these government efforts, the amount of land equipped with drip irrigation witnessed a significant increase between 2008 and 2014 to 450,000 ha, with the aim of reaching 550,000 ha by 2020 under the *Plan Maroc Vert*.<sup>10</sup>

Morocco also emphasized PPPs for irrigation development under the *Plan Maroc Vert*. In 2008, the government launched the Innovative Public-Private Partnerships Program, which seeks to encourage greater private sector involvement in the irrigation sector. For instance, the program offers long-term leases on land for private investors to develop new agricultural projects.<sup>11</sup> PPPs in irrigation reduce the financial burden of subsidies for investment on the public sector; improve sustainability and quality of irrigation and drainage services available for farmers, at an affordable cost; and promote more efficient use of water resources through appropriate incentives such as volumetric billing. The program encourages irrigation schemes in zones with high agricultural potential through the desalination of seawater.<sup>12</sup> In 2015, the Ministry of Agriculture contracted a private firm to build, operate, and co-finance the desalination and irrigation infrastructure over 13,600 ha in the plain of Chtouka in the region of Souss Massa Draa over a period of 30 years.<sup>13</sup>

The expansion of land under irrigation and the adoption of modern technologies greatly contributed to the growth and increased resilience of Morocco's agriculture sector. Since 2008, agricultural output has increased, and the sector and smallholder farmers have become less vulnerable to climatic shocks. For instance, the 2015–2016 agricultural season was marked by a drop in rainfall of over 50 percent compared to the usual average. However, agricultural GDP fell by only 7 percent, a tangible indicator that the irrigation program has increased farmers' resilience and protection against climatic variations. Prior to the expansion of irrigation, the fall in GDP might have reached up to 40 percent.<sup>14</sup>

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