

## Institutional reform for irrigation management

Egypt

### water scarcity impact

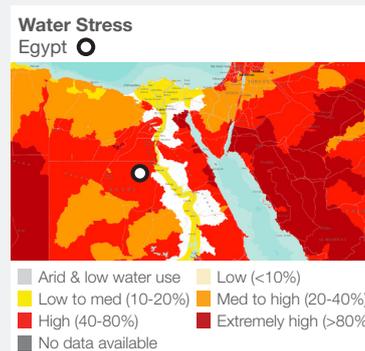


Reduced withdrawal	
Reduced consumption	
Improved water quality	●
Increased productivity	●
Net basin benefit	

volumetric impact  
**500 000 000 m<sup>3</sup>/yr**

capital cost  
**\$303 000 000**

estimated unit cost of water  
**61 ¢/m<sup>3</sup>**



**Water Stress Map:**  
F. Gassert, P. Reig, T. Shiao, M. Luck and M. Landis, 2015. "Aqueduct Global Maps 2.1."

**Confidence level**  
● Low ● Medium ● High

**Water Scarcity Impact Key**  
● Main ● Minor

**Credits**  
We would like to acknowledge Bekele Debele of World Bank and Engr. Khaled Bakheit of Ministry of Water and Irrigation (Egypt) for their input in the preparation of this case study.

### Project Overview

Egypt has less than 700 m<sup>3</sup> per capita per annum freshwater availability of which 85% is withdrawn for irrigation purposes. The Integrated Irrigation Improvement and Management Project (IIIMP) in the Nile Delta has been implemented to improve water distribution, quantity, quality, equity and timeliness and hence to increase agricultural production and alleviate poverty.

The project was implemented on the two main canal and branch networks in the Nile Delta in Mahmoudia and Mit Yazid. It has involved an extensive relining of irrigation canals to substantially reduce leakage, this has been combined with institutional reform to decentralize operational decision making and accountability and training and education of farmers on on-farm water management to increase productivity.

The \$303 million was funded by the Government of Egypt, of which \$68.7 million was through government expenditure and \$120 and \$86 million in loans from IBRD and KfW banks respectively. A further \$28.3 million in grant was provided by Government of The Netherlands and KfW.

### Key Elements

- Water user associations established to manage and operate the local branch canals and tertiary canals..
- Canal refurbishment and repair (\$60 million) and installation of electrified pumped piped network to reduce leakage (\$165 million).
- On farm improvements to irrigation offtakes, land levelling and drainage, funded through loans to farmers (\$49 million).
- Establishment of demonstrator farms to showcase irrigation practices which included crop selection, crop rotation, crop intensification and irrigation based on climatic conditions.
- Preventing of sewerage entering the drainage systems back to the canals.

### Key Outcomes

- Improved collection rate of water user association charges rates at cost recovery levels.
- Increase in water availability by 500 million m<sup>3</sup> directly benefitting 1 million residents.
- Reduced runoff with 60% of withdrawn water now applied to the crops with corresponding increases in crop productivity and net income for farmers.
- Increase in consumptive use of water, thus reducing the impact of the project on the catchment water balance.



Egypt

## Intervention Features

- Institutional reform
- Stakeholder Engagement
- Education, technical training and capacity building
- Irrigation metering
- Infrastructure improvement for leakage reduction

## Project Levers

### (1) Institutional reform, capacity building and decentralization of decision making

Institutional reform at national level coupled with decentralization of powers and responsibilities to local Water User Association (WUA) level enhanced local accountability of decision making and increased user participation. Over 2 100 local WUAs were created to take over the responsibility of operation and maintenance of local irrigation and drainage systems, water allocation and dispute resolution. The WUAs were given responsibility for determining, setting and collecting operation and maintenance charges, this has resulted in significantly improved collection rates and improved cost recovery. 22 Integrated Water Management Districts were created for guidance and oversight of the WUAs.

### (2) Reduced leakage

The project implemented Improvements to the canal (refurbishment and replacement with buried pipes) and installation of piped distribution networks at farm level to reduce the losses from the system. This component of the project was financed through central government out of World Bank grants.

### (3) On-farm water management

The 50 demonstrator farms helped to showcase and train 10 000 farmers in on-farm water management practice. The training included crop selection and rotation, system of rice intensification, assessing crop water requirements based on climate conditions, localized irrigation in fruit and vegetable fields, and adopting better surface irrigation techniques.

The costs for on-farm improvements, such as land levelling and field drainage improvements, are financed through loans to beneficiary farmers at preferential interest rates.

## Outcomes and Challenges

The project helped redefine the role of public agencies. To tackle the fragmented water service delivery, the project implemented cross sector and departmental coordination to limit duplication of effort and to better manage differing objectives.

The project overall has been a success with more local and accountable decision making, greater farmer participation, increase in financial sustainability or operation and maintenance, increased in-field irrigation efficiency, on farm productivity and improvements in water quality.

As a result of the project, improvement have been made to 42 km of canals supplying water to 230,000 hectares of irrigated land and renewed subsurface piped tertiary distribution network installed in of which over 50,000 hectares. Water use reduction of between 10 and 20% was achieved on most of the farms, rising to 30% when tertiary piped networks were installed. The water made available as result of reduced leakage and increased in-field irrigation efficiency has enabled a further 1 260 hectare of farmland to be irrigated with freshwater instead of drainage water.

Whilst improved irrigation processes have resulted in increased freshwater availability and crop productivity, the overall increase in consumptive use has led to decrease in return flows and have limited net benefit in terms of increased availability of water for the environment.

The project did not lead to an increase in irrigated area, but improved the freshwater supply to the farmers.



Above: Irrigation Canal (© World Bank)