

MNA Knowledge Notes

Lessons from Projects



By Julia Bucknall and Hassan Lamrani¹

Introduction. This operation provides a \$70m Loan for a Project that would help participating farmers in the Oum Er Rbia basin increase the productivity of their farming and to promote more sustainable use of irrigation water to overcome current and future water deficits. This would be achieved by providing participating farmers with the level of irrigation service necessary for high efficiency drip irrigation through (i) replacing irrigation canals with pressurized systems or adapting existing pressurized systems, (ii) providing irrigation water on-demand, with a predetermined annual quota according to surface water availability, and (iii) providing supporting services. The Project went to the Board in May 2010 and is planned to be completed in 2016. This Note is based on the Project Appraisal Document (PAD)². The project was declared effective only in September 2010 so it is too early for any implementation lessons to be collected.

Background. Scarcity and degradation of water resources have reached alarming levels in Morocco. In addition, water resources are unevenly distributed throughout the country and rainfall is highly variable. Droughts are common. Ninety percent of economically accessible surface resources are already controlled by dams, leaving few options for additional surface water storage. Population and economic growth have increased demand even as supply has fallen. The country has seen a 30 percent drop in average precipitation since 1970, increasingly accepted as a sign of climate change. Severe restrictions for irrigation water have been common in the last 15 years.

Wherever possible, farmers have been making up the shortfall in surface water by tapping into groundwater, making the problem of aquifer depletion more and more serious. The allocation for urban and municipal water is only around 15 percent of the total water abstracted in Morocco, but gets priority in allocation decisions. Urban growth and further decline in average precipitation associated with climate change make it almost sure that the amount of water available for irrigation will decline over the next few decades in most basins of Morocco.

The problems are particularly acute in the Oum Er Rbia basin. This river supplies water to half of Morocco's large scale irrigated areas (322,700 ha), accounting for 60 percent of the country's sugar beet production, 40 percent of olive production and 40 percent of milk production. However, on average over the past decade, the basin's Large Scale Irrigation (LSI) schemes received only 60 percent of the water for which the system was designed.

The government has long been aware of these issues and has acted accordingly. Since 1995, when a new Water Law was published, the Government of Morocco has been pursuing reforms to improve water management and service delivery. The water allocation system is the responsibility of the River Basin Agencies, which were created to promote integrated and participatory water resource management.

For agriculture, the Government launched a new strategy called the "Morocco Green Plan" in April 2008 which has two strategic pillars. First, it promotes high-value agriculture. Second, it improves productivity in poor areas. The "Green Plan" also promotes cross-cutting reforms relating to land tenure, agricultural water, free trade agreements, domestic market, business environment, farmer organizations and the structure of the Ministry of Agriculture.

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² [Morocco - Oum Er Rbia Irrigated Agriculture Modernization Project, Project Appraisal Document](#)

A thorough reform of the Ministry of Agriculture and associated agencies began shortly after project appraisal. The project is designed to support the Green plan.

Lessons learned and reflected in the project design

International experience shows that conversion of gravity irrigation systems to the more water efficient drip irrigation does not necessarily result in a reduction in overall water consumption by farmers. Data from a number of countries have emerged recently showing that while drip irrigation may be beneficial for the individual farmer is not necessarily helpful at the basin level. An individual farmer will convert a larger share of his allocated water into crops by reducing “losses”. But a share of the water that was formerly “lost” infiltrated into the ground and was used elsewhere in the basin. So the new technology can benefit the farmer who makes the investment at the expense of other water users downstream. If the allocations are not controlled (especially in groundwater areas), the farmer may even increase his overall water consumption in response to the new technology. Schemes that promote drip irrigation when there is no limitation on the amount of water used by individual farmers in many countries have resulted in aggravating the water deficit at the basin level. Projects in some countries (including China, Mexico, and the United States) have shown that it is possible to reduce overall water consumption by individual farmers by combining investments to increase water productivity with controls on overall consumption.

A key aspect of this success, particularly in China, is to maximize agricultural production per unit of water consumed rather than per unit of water abstracted. Other lessons include the need to integrate irrigation projects into a water resource management framework. In addition, experience shows that projects need to include technical assistance and targeting mechanisms to help small farmers reap the potential benefits of modern irrigation technology. To take into account these lessons, the project includes technical assistance for monitoring the water

consumed (actual evapotranspiration measured by remote sensing techniques) and advisory services for farmers to improve their irrigation and groundwater management practices. In addition, the Bank has secured a grant³ to build capacity in the Oum er Rbia Basin Agency including activities for strengthening the monitoring of groundwater abstraction in project areas.

Evaluation of the Bank-supported Second Large Scale Irrigation Improvement (LSII2) project (1993-2000) indicated that the project would have generated more successful results if: (i) it had paid more attention to improving on-farm irrigation, rather than just network improvements, and (ii) it had integrated efforts to improve agricultural productivity rather than tackling them in a separate project (the Irrigated Areas Agricultural Services project).

The Bank-financed Water Resources Management Project (1999-2004) financed pilot installations of drip irrigation on ten small farms in the Tadla, Doukkala and Souss areas. These pilots achieved outstanding results. Farmers diversified crops, improved water productivity and reported increased incomes. The project financed drip irrigation systems on one hectare and farmers used their own funds to extend the equipment to the remaining areas of their farm.

Alternatives considered and reasons for rejection

In designing this project, the team considered several options:

Should the project address both the water quantity and quality problems of the basin, or concentrate on the quantity problems associated with irrigation? This proved to be a difficult issue. Addressing both aspects together was the initial concept for the project, which envisaged both aspects being implemented by the Oum er Rbia River Basin Agency. However, it was also preferable from

³ PHRD grant No TF092827 Strengthening Capacity to Adapt to Climate Change Impacts on Water Management in the Oum er Rbia Basin project

a fiscal viewpoint for part of the project funds to be borrowed and paid back by the implementing agency but detailed financial analysis of the River Basin Agencies showed that they would have insufficient resources to borrow directly from the Bank and should not be burdened with debt at this stage in their development. Since close involvement by the Ministry of Agriculture and the ORMVAs⁴ would be essential anyway for the success of any irrigation investments it was decided to avoid the complexity of both quantity and quality issues in the same project and concentrate on the irrigation aspects using the ORMVA's as implementation agencies. The Bank then secured a separate grant to build capacity in the Basin Agency, and is developing a separate project to tackle quality problems in the basin (Oum er Rbia Sanitation project).

Should the project aim to improve water use efficiency by farmers not directly involved in the project? The project objectives concentrate on the farmers directly using the project-financed infrastructure. The project-financed information systems will have spillover benefits to other farmers as well.

Should the project concentrate on upgrading to pressurized systems (off farm investments) or help farmers build storage tanks on their property and convert to drip irrigation in that way? The team considered the storage tank option and determined that it is not suited to small farmers who could neither benefit from economies of scale nor have sufficient financial resources to build individual tanks and pumping stations.

How much institutional reform should the project promote? The 2006 water development policy loan had supported a number of policy reforms in irrigation management. The present operation will help the government implement investments in line with the new policies. The decision was therefore to concentrate on implementation of the new policies already developed.

Should the project consider tariffs as a means of curbing demand for irrigation water? The

literature is clear that price is not an effective way to curb demand in irrigation since demand is price inelastic at prices less than approximately ten times the cost of providing the service. Furthermore high prices of surface water push farmers to additional unregulated extraction of groundwater, threatened by overexploitation.

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⁴ Offices Regionaux de Mise en Valeur Agricole, or Agricultural Development Agencies

