

*This MENARID project is a knowledge sharing and learning partnership for improved natural resource management, with Morocco, Algeria, Tunisia, Yemen, Jordan, and Iran. This briefing was produced during a special consultation of the group in March, 2013.*

## REHABILITATING IRRIGATION CANALS AND OLIVE TREES BOOSTS FARMER INCOME IN JORDAN

Improving irrigation canals and rejuvenating old olive trees have dramatically increased olive yields and farmers' income in the Karak region of Jordan

Traditional spring-fed irrigation systems in the Karak region of Jordan waste a lot of water, reducing productivity of olive orchards and the amount of land that can be irrigated. A MENARID project has demonstrated that replacing traditional unlined irrigation canals with narrow, concrete-lined canals can double or treble the amount of water a farmer receives, boosting olive yields and allowing other high-value crops to be introduced into the farming system. Rehabilitating old olive trees further increases yields and farmer income.



Large amounts of water are lost from unimproved irrigation canals (left). Concrete-lined canals (right) and plastic pipes avoid these losses, delivering more water to the farmers.

*Source: "pictures from project managers"*

### Points to Consider

- Listen to local communities: involve farmers in identifying and prioritizing the problems they face.
- Identify and engage with key innovative farmers to demonstrate interventions and encourage others to follow suit.
- Encourage development of community-based organizations or water users' associations to ensure sustainability of interventions.
- Train community members in the skills they need to manage the organizations, maintain the interventions, and implement best practices.
- Monitor and address environmental and socio-economic impacts.

### Purpose

This brief is intended to promote widespread improvement of water delivery systems and rejuvenation of old olive trees in spring-fed irrigation systems in Jordan and elsewhere with similar conditions to increase the amount of water available to farmers.

### Suitability

The techniques and approach used can be beneficial wherever natural springs are used to irrigate tree crops on small farms.

### The project in numbers

- 500 hectares of olive orchards rehabilitated
- 65 kilometers of cement canals and plastic pipes installed to deliver water from 115 springs
- Water losses reduced by up to 75%
- Olive yields increased by up to 100%
- Farmer income from olives increased by up to US\$1800 per hectare per year
- US\$450,000 for rehabilitating and establishing canals and plastic pipes
- US\$290,000 for rejuvenating old olive trees

### Partners

- Agricultural Resources Management Project (phase 2)
- Community-based organization and water users' association

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Agriculture in the Karak region of Jordan is dominated by olive orchards irrigated by water from natural springs. A study of the traditional irrigation system showed that a major problem was loss of water from the unlined irrigation canals taking water from the springs to farmers' fields. This, combined with the age of the trees—many were found to be more than 50 years old, with some of 100 years or more—was restricting olive yields and limiting farmers' cropping options.

Consultations with farmers resulted in plans to improve the irrigation canals by lining them with concrete or replacing them with plastic pipes and to rejuvenate older olive trees through pruning and improved management. These actions were supported with efforts to establish water users' associations or other community-based organizations to ensure the future maintenance and management of the springs and irrigation canals and training for the farmers in improved tree and land management practices. Costs of the interventions were shared between the project (70%) and the participating farmers (30%).

To date, the project has rehabilitated some 65 km of irrigation canals delivering water from 115 springs to some 500 hectares of olive orchards, benefiting nearly 2000 farmers.

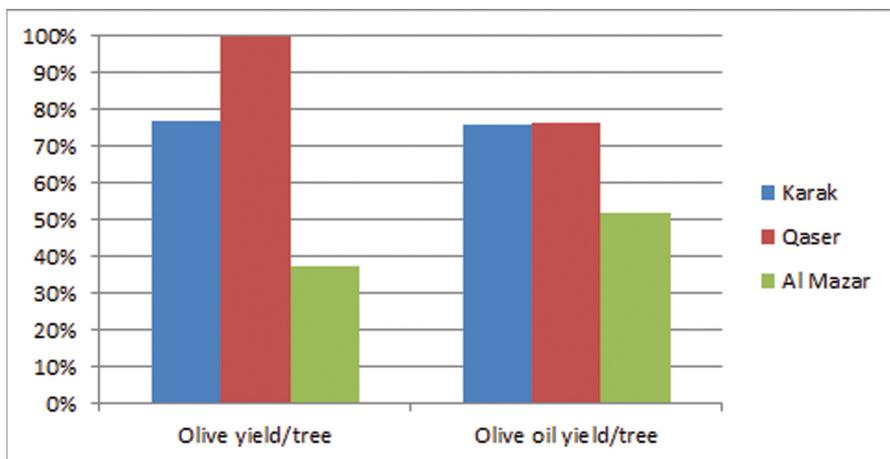
The results have been spectacular. Improvements to the springs (holding tanks, walls to direct the water into irrigation canals, etc.) have increased flow of water from the springs by up to 74%, while improvements to the irrigation canals themselves have increased the amount of water delivered to the farmers per hour by up to 75%. This has dramatic implications for the amount of water each farmer receives: farmers are allocated the right to irrigate their land for a certain number of hours each week, the number of hours depending on the size of their land holding and the number of trees they have on it. So, if the flow rate of the canals is doubled as a result of reduced losses, farmers receive twice as much water. Yields of olives per tree increased by 76–100% in orchards with 130 to 140 trees per hectare, but by less than 40% in orchards with over 200 trees per hectare. This demonstrates the need for correct spacing of trees to avoid competition for light and water, and has led to recommendations to plant new orchards at a

spacing of at least 8 × 8 meters.

With the increase in water coming to their farms, many farmers are growing additional crops, such as vegetables, or establishing new olive orchards.

Rehabilitating older olive trees through pruning and improved management proved a challenge—farmers were initially reluctant to allow project staff to prune the trees. But when a handful of farmers were persuaded to allow one or two of their trees to be pruned, the results spoke for themselves and more farmers came forward asking for their trees to receive the same treatment. The project had originally planned to rehabilitate the trees on 300 hectares, but demand was so high that more than 500 hectares have now been restored to production.

Doubling olive yields and increasing the area of olive orchards could cause a glut of olives, reducing producer prices, and the project is working with farmers, government agencies, and others to investigate ways to support producer prices and diversify income.



Increasing the amount of water applied and rejuvenating old trees increased yields of olives and olive oil per tree.

Source: "pictures from project managers"



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