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## SMALL-SCALE WATER DESALINATION INCREASES FARM-LEVEL FOOD SECURITY AND INCOME IN THE DRIEST AREAS (TUNISIA)

A small-scale technology can help farmers create new water sources' to improve olive crop yields and grow high-income crops

A demonstration project using small-scale desalination, to clean brakish ground-water, provides the promise to rehabilitate degraded farm lands for communities in areas with less than 150 mm of rainfall per year. of fruit from their trees.



Farm-scale desalination unit in Medenine Governorate, Tunisia

*Source: "pictures from project managers"*

### Points to Consider

- The results presented here are based on a small-scale pilot scheme. The approach has promise but need further scrutiny and evaluation.
- The cost of the desalination unit – while reasonable considering the new income opportunities it brings farmers – will still require a nation or regional subsidy or credits scheme to ensure large-scale supply of the technology, and local suppliers to ensure service and repair as needed.
- The overuse of groundwater is not of immediate concern in these agro-ecosystem as the resource is degraded and cannot be used for cultivation. Nonetheless if the practice dies become widespread, a water use and sharing policy will be needed to ensure sustainable use of the aquifer.
- A water resource assessment of each site is require to assess the number of farmers the new source can sustainably serve.

### Purpose

This summary informs decision makers and planners at national and regional level about a potential approach to transition degraded drylands with available but saline groundwater, to irrigated legume production. It is also useful for extension planners and rural development groups (NGOs).

### Suitability

Drylands agroecosystems with available but degraded groundwater sources, receiving 150 mm rain/year or less.

### The project in numbers

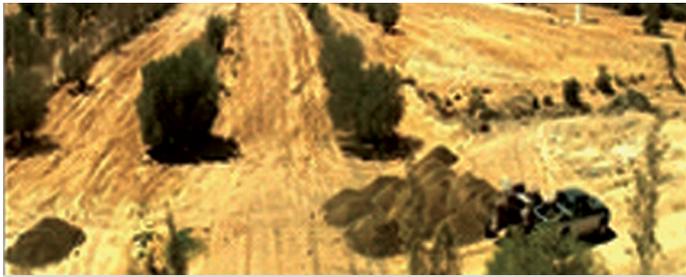
- \$12,000 - One-time investment for desalination unit.
- \$1000 – yearly maintenance cost.
- \$100 monthly ellectric cost.
- 20-60 kg/year - Increase yield in olive production per tree using monthly irrigation ('fertigation')
- \$3,500/ ha new income generated per desalination for legume and olive production.

### Partners

- OSS
- GEF
- FFEM

### Contact

Ali Mhiri: 00216 98 464 074  
mhiri.ali@planet.tn



Site before start of project

Source: "pictures from project managers"



Project site. Year 1 cropping season

Source: "pictures from project managers"

In severely dry areas of the southeast Tunisian steppe, water shortages faced by farming communities are becoming more acute due to increasing salinity of the groundwater. The livelihoods of communities in the Medenine Gouvernerate and similar areas are under threat. Over the past decade, the lack of water and decreasing water quality, have caused farmers to cease pastoral activities and the transition of most farming to rainfed olive cultivation. The continued degradation of water sources causes several thousand olive trees to die every drought event.

### Creating new water sources

Faced with lower rainfall, and increased salinity in the major aquifer, the only solution to continued farming for these communities is to 'create more water'. Small-scale desalination was tested over the past two years and seems to provide a cost effective way for farmers in very dry areas to develop their land and generate income.

The technology used is a reverse-osmosis unit that produces some 20 cubic meters of desalinated water per day – enough to irrigate two large greenhouses growing legumes that can be sold in local markets and to provide a steady source irrigation throughout the year for olive trees. The irrigated olive plantations increase yield from 20-60kg per tree in many cases. Farmers in the pilot project target exporting their tomato and zucchini production to nearby Libya for increased profits.

### Cost-benefit

When desalination is mentioned, the general perception of planners is that the practice is costly. But compared to what? Desalination cost needs to be put into perspective: the cost of creating new water for irrigated agriculture in disused rainfed farming areas can create more stability of existing olive trees and generate significant new household income.

This pilot scheme has shown that using local groundwater desalination to create a new water source to produce legume crops will generate sufficient income to cover the cost of the investment and leave a substantial profit for the farmer.

### Results and opportunities for scaling-up

This test was done on a very small scale (1.2Ha), but the evidence produced is promising and merits further scrutiny to evaluate the possibilities for wider use in this dryland production system of 200,000 Ha. In this pilot, a total new revenue of \$13,000 was generated in the first year from the new irrigation water produced by the desalination unit. After all running costs were covered, the farmer had a net yearly profit of \$3,500 – equivalent to a yearly teacher's salary.

The initial investment in such as desalination unit is \$12,000, with a yearly maintenance cost of \$1000.

The project team plans to expand the pilot to demonstrate the potential of the approach to more farmers. In the medium term, they also see significant potential in converting the current electric energy desalination units to solar power, a situation that they see as possible in the coming 3-4 years.

If such an approach is adopted by larger numbers of farmers, a regional policy and strategy will be needed to manage drainage water in a way that does not harm the environment. Here, the use of large evaporation ponds, shared and managed by each community, seems to be the best option.

