

*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.*

## REPLENISHING DEPLETED AQUIFERS IN ARID AREAS (TUNISIA)

Recharge wells convey water to sub-strata levels to ease water constraints, raise productivity, and generate higher incomes

Recharge wells are a novel approach to water management in arid areas, controlling excess flood waters and injecting this precious resource below ground to replenish depleted aquifers and ensure a regular supply of water for farmers and other users.

### Purpose

This briefing describes preliminary work on a pilot project aimed at constructing recharge wells to replenish depleted aquifers. It is aimed at policymakers, donors, and other potential partners and supporters.

### Suitability

This intervention is suited to dry land areas where aquifers are depleted and the risk of contaminated floodwaters is minimal.

### The project in numbers

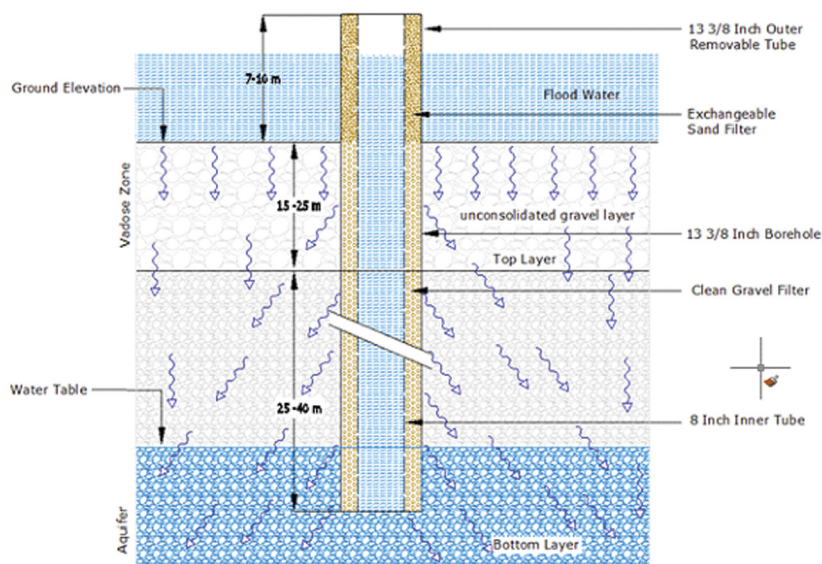
- Investment: 100,000 TND
- Beneficiaries: 20,000 people
- Cost of recharge well: 10,000 TND
- Area: 270 km<sup>2</sup>
- Number of wells: 10
- Potential recharge rate: 1 liter/second

### Partners

- CRDA Médenine
- IRA Médenine

### Contact

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Recharge wells convey excess floodwaters directly from the surface to sub-strata layers in a bid to replenish depleted aquifers.

*Source: "pictures from project managers"*

### Points to Consider

- Aquifer characteristics – consideration must be given to the characteristics of an aquifer and whether the water contained within the aquifer is usable, contaminated, or too saline.
- Aquifer depth – the costs of drilling may be prohibitive if the aquifer is too deep
- Geology – assessments of the local geology is required to determine the permeability/impermeability of rocks lying above the
- Surface characteristics – surface characteristics such as topography will determine run-off rates and how much surface water can be retained.

Initial costs may be high and require financial support. But the process of drilling and maintaining wells over time can generate local employment opportunities.

This intervention is currently being applied in the Koutine Watershed of Tunisia where evaporation rates are high – reaching between 1000 and 1300 mm/year – and groundwater is being rapidly depleted by competing users in the agriculture, industry, and tourism sectors.

This initiative is targeting 20,000 people and approximately 100,000 TND has already been invested.

The concept is simple and easy to implement in areas where aquifers are relatively close to the surface: flood waters are interrupted by small check dams as they flow across a surface area, and this accumulated water is diverted into wells and injected directly into aquifers, or indirectly into overlying permeable layers.

Drilling wells is necessary because check dams and the storage of water above ground are not realistic, given the high evaporation rates and the sedimentation that often accompanies the construction of check dams – a process that forms an impermeable surface layer and prevents the downward infiltration of water.

The wells include filters that effectively remove gravel and debris from floodwaters before it percolates down into the aquifer. These are movable and exchangeable and efforts are needed to train local people to replace or repair these features – thereby generating employment opportunities.

Although there is potential for water user associations to implement and maintain recharge wells, initial government investment is needed to cover costs that are likely to be above the means of most farmers – implementation is expected to reach approximately 10,000 USD.

Cost-benefit analyses have not yet been produced but there is significant potential to increase water availability in a region which is experiencing significant constraints. There is further potential to boost local employment opportunities – there is a need to drill the wells in the first instance and then to maintain the wells over time.



Source: "pictures from project managers"



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