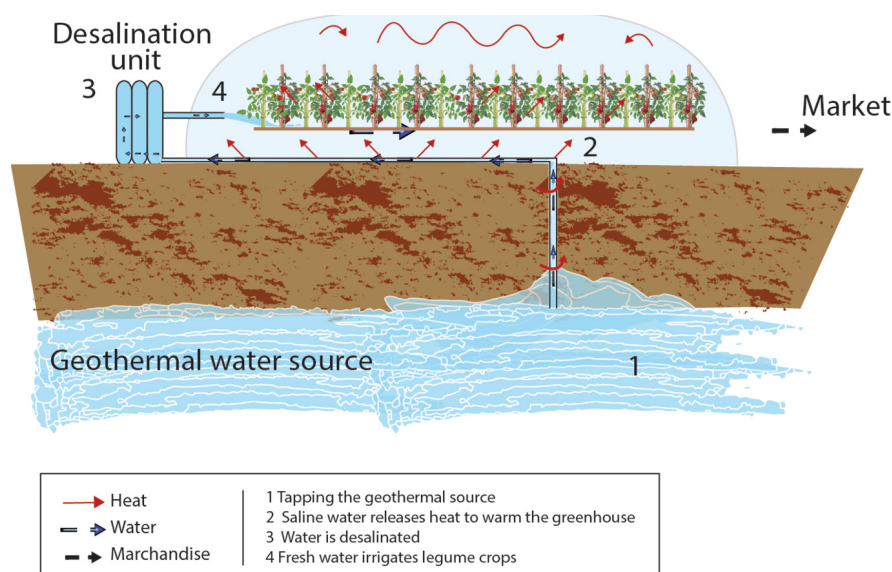


*This MENARID project is a knowledge sharing and learning partnership for improved natural resource management, with Morocco, Algeria, Tunisia, Yemen, Jordan, and Iran. This briefing was produced during a special consultation of the group in March, 2013.*

## EXPLOITING GEO-THERMAL WATER TO SUSTAIN INTENSIVE IRRIGATION IN DRYLAND AREAS OF TUNISIA

The effective exploitation of geothermal springs has the potential to raise agricultural productivity and sustain rural economies in arid areas

An innovative demonstration pilot implemented in south-eastern Tunisia is exploiting geo-thermal water to irrigate high-value export crops. In a region suffering from water scarcity and the effects of aquifer depletion, this resource offers a precious life-line. A tripling of yields in recent trials demonstrates significant potential and the means to maintain crop production and sustain rural economies.



Geothermal irrigation value chain

Source: "pictures from project managers"

### Purpose

This briefing describes preliminary work on a pilot project aimed at exploiting geo-thermal water for irrigated agriculture and the production of high-value export crops. It is aimed at policy-makers, donors, and other potential partners and supporters.

### Suitability

This intervention is suited for high-value export production systems in areas where geo-thermal waters can be exploited.

### The project in numbers

- Project size: Initial trials on 12 ha.
- Output: 20-30 kg/m<sup>3</sup>
- Income: 1-2.5 EU/kg
- Investment: 0.1 million EU/ha

### Partners

- Observatoire du Sahara et du Sahel (OSS)
- GEF

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### Points to Consider

- Secure funding: Exploitation can only occur where access to significant funding is available – through bank loans, subsidies, and donors.
- Hyper-intensive production: Investment is only realistic in hyper-intensive production systems geared towards the export of high-value export crops
- Farmer cooperatives: Organizing farmers into cooperatives can help to improve the management of export channels
- Sustainability: Incorporating this production system into export-development plans can ensure long-term investment and impacts
- Local conditions: Exploitation is only realistic in areas with significant geo-thermal resources

Decades of over-exploitation in Algeria, Libya, and Tunisia has significantly reduced water levels in the of the North West Sahara Aquifer System (NWSAS). Regional governments are therefore desperately seeking new sources of water that are capable of maintaining agricultural production and supporting the viability of rural communities. One source rarely considered by agricultural researchers is geo-thermal water.

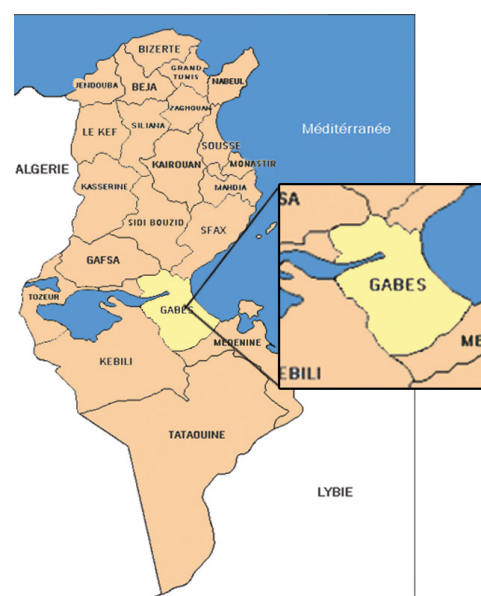
Despite the significant amounts available, geo-thermal water is found below the world's surface – meaning that exploitation requires a significant financial investment. In most production systems excessive costs therefore prevent usage – tapping this resource remains beyond the means of the vast majority of smallholder farmers in developing countries. However, a pilot project near El Hamma de Gabes in Tunisia is demonstrating that in scenarios where initial costs can be covered, the use of this resource is a real possibility.

One possible area of application could be hyper-intensive production systems that cultivate high-value export crops such as tomatoes or aubergines. Production systems targeting developed countries are capable of retaining their competitive advantage and generating enough earnings to cover the costs of initiating geo-thermal usage. Project leaders therefore recommend incorporating the exploitation of geo-thermal water into regional export development plans.

Exploitation could also be financed by facilitating access to bank loans, government subsidies, or donor investments – the scheme is already attracting the attention of several large European donors. In addition, the establishment of farmer cooperatives helps to share the costs of initial investments. Moreover, costs may not seem excessive when potential returns are taken into consideration. Expected profits are more than capable of covering initial costs – returns are expected to occur within five years and are capable of reaching one million Euros for an initial investment on just 12 hectares.

## Exploiting geo-thermal water

Geo-thermal water has a dual purpose: it can be used to heat greenhouses and achieve optimal growing conditions, and after cooling and undergoing a process of desalinization, provide a much-needed source of water in parched environments. Initial results have been impressive: the quality of produce has been excellent and farms have produced between 20 and 30 kg of produce per m<sup>3</sup>. The system also generates wider socio-economic impacts. The construction and maintenance of infrastructure needed to exploit geo-thermal water effectively is capable of supporting a significant number of jobs for the local population.



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