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Irrigation project for farmers of Faryata - Modernization of the actual water distribution system 2018

Executive Summary

OeKB
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IMPRESSUM:

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Background

The study investigates the possibilities for securing the water supply for the 1,510 ha of irrigation land for agricultural activities in Faryata, around 15 km from Beni-Mellal City. The region has a semi-arid climate and experiences a yearly water deficit of almost 53 %. Models from the World Bank estimate that this annual irrigation deficit will rise even more until 2030, to between 5 % and 15 %. Currently, water for irrigation is obtained mainly from a spring at Fachtala.

Findings and recommendations

We built upon the outcomes of the original study in 2008, where the initial solution was **to switch to drip irrigation** and change from the old open concrete channels to a pipe system in order to decrease the high water losses. At the time this suggestion was a good solution and is still valid for the region. An important input and suggestion for improvement from the current study is **to add modern technology in order to obtain additional water for the region**, which is urgently needed and requested by the farmers.

The team assessed the option of using a photovoltaic-driven ground water pump for irrigation. However, the very high need for pumping and the lack of available space for installation disqualifies this option right now. But given the local situation and the requirement for a very large amount of additional water (the spring does not supply enough water, and more importantly, the output of the spring is constantly decreasing over the years), a new solution had to be found.

Switch from flood to drip irrigation with ground water. Add a small hydro plant for irrigation using the water from the well.

Instead, we **propose the installation of a small hydro power plant (SHP)** to continuously **pump ground water together with the drip irrigation system**. Through continuous pumping, the diameter of the pipe system can also be reduced and investment costs saved.

In addition, we propose that **the original idea of building a large reservoir be dropped**, as the cost benefit ratio of such a major investment was not given and finding a suitable space was another major problem.

And finally, in order to promote the utilization of modern technologies for irrigation, including drip irrigation, we propose that we **actively involve the young farmers** in the workshops to create better long-term perspectives for the region.

Scenarios and economic potential

Several options were discussed, including the usage of PV for ground water pumping or several options related to an SHP plant. Details on the discussed and evaluated options are given below. **The final discussion includes three scenarios.**

All 3 scenarios with usage of ground water and a small hydro power plant are feasible.

1. **Basic scenario: manually operated irrigation system** including a main distribution pipe network, **groundwater wells and pumps and SHP; without the drip irrigation system,** with investment costs of EUR 5.9m.

2. **Manual drip irrigation scenario:** implementation of a manually operated drip irrigation system including the necessary pipe network, **groundwater wells and pumps and SHP** with investment costs of EUR 11m.

3. **Fully automated drip irrigation scenario:** implementation of a fully automated irrigation system, **groundwater wells and pumps and SHP** with investment costs of EUR 16.8m.

Depending on the scenario and amount of subsidies granted, the **amortization periods** for the investments range between **7 and 14 years**.

Dynamic amortization between 10 and 14 years

The 58 kW hydro power plant would have an NPV of EUR 0.4m and 13.9 % IRR.

Social and environmental impacts

A changeover to drip irrigation would reduce the need for manual labour in agriculture and increase the requirement for highly skilled personnel. In general, the system of drip irrigation favours larger farmers and farmers that own their land, as does the complicated system of subsidies and funding. Social inequalities have to be monitored closely and abatement measures planned.

Stand-alone hydro plant economically attractive.

The higher level of availability of water for irrigation and improved water efficiency will most likely lead to more agricultural activities in the region and to the planting of higher value crops. The higher estimated overall use of water might thus lead to a lowering of ground water levels.

Positive social and economic impacts in the region.

People using the open water channels for access to drinking water must be granted easy access to drinking water, also in the case of a closed pipe system.

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