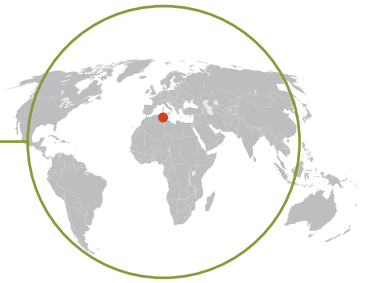
CASE STUDY 9 EXTENDED



When farmers' acceptance is challenged by consumers' buy-in and the quantity and quality of the effluents, Ouardanine, Tunisia

Olfa Mahjoub, Associate Professor at the National Research Institute of Rural Engineering, Water and Forests, Tunisia

Headline summary

In Ouardanine, Governorate of Monastir, Tunisia, the acceptance of wastewater reuse by farmers is driven by several, primarily economic, factors and water shortages. However, due to variability in the quality of treated effluents and the low levels of consumer acceptance, there has been a negative impact on the agricultural industry's ability to deliver market-fresh produce. To address this challenge, the diversification of crops was explored, including plant nurseries, industrial and less perishable crops.

The issue/barrier to water reuse that is addressed

In Ouardanine, where natural water resources are lacking, farmers are forced to rely on wastewater reuse to irrigate their crops. In the summer months, the demand for water is high while the supply can be erratic. This, combined with the illegal discharge of industrial effluents into the sewer system, has resulted in lower quality of irrigation water and an increased risk to human and environmental health.

Peaches have been an important and high-yielding crop in the region; but consumers have been reluctant to purchase them due to their perception of using wastewater to irrigate.

The response

The positive attitude from farmers in relation to utilizing wastewater for irrigation versus the resistance from consumers to buy fresh products grown in this manner

Figure 1: *Plant nurseries covering a wide range of species (Source: Olfa Mahjoub 2022).*

has fuelled the development of adaptive measures for increasing resilience to water scarcity and guaranteeing stable agricultural production and economic benefits. A prominent farmer in the region decided to overcome this by introducing new food and non-food crops, and adopting new practices, enhancing production across the region.

Partnerships and support

This long-term project was initiated in 1997 by farmers (currently 46 in total) gathered under the umbrella of the Agricultural Development Groups (NGO) as the local irrigation manager. At the regional level, treated wastewater is supplied by the National Sanitation Utility and managed by the Regional Commissary for Agriculture Development of Monastir, which also oversees the operation and maintenance of the wastewater irrigation network and wastewater quality monitoring.

Figure 2: *Geranium grown intensively for steam distillation (Source: Olfa Mahjoub 2022).*

Results, accomplishments and outcomes

The farmer expanded the plant nursery area and diversified the species grown. Plants like geraniums were not previously a primary crop but are now intensively harvested and sold for steam distillation. Most significantly, the peach trees were replaced with pomegranate trees, because the latter are likely to be more acceptable to consumers (as the edible part is protected and less prone to microbial/bacterial contamination) and are generally less perishable during transfer to markets.

Other types of fruit trees such as almonds, pears, medlars and figs are grown under drip irrigation, therefore reducing health risks and again reducing consumer concern. The farmer also used dried sludge for compost in the plant nurseries to improve soil fertility and enhance crop production. Water reuse and adaptative measures have substantially improved agricultural productivity and boosted investments in the agricultural area.

Challenges

Consumers' acceptance of agricultural products irrigated with reclaimed wastewater is still unpredictable. The diversification of agricultural products to grow non-food and alternative food crops can give farmers the opportunity to build their resilience to future water shortages and variability in the quality of reclaimed wastewater available for irrigation. In the short term, the tertiary treatment of effluents in Ouardanine is expected to favourably impact wastewater reuse, with augmented positive perception leading to reduced restrictions on reuse. In the long term, strengthening national regulations and quality standards will benefit both the consumer perception of wastewater reuse for irrigation and farmers' confidence when investing in a particular crop. Once in place, such measures will support the value chain of crops to the market.