



EcoFuture Pilot Demonstration in Jordan

Descriptive Summary

The Jordanian pilot under the EcoFuture Project aims to restore degraded agricultural land and enhance water supply for irrigation. This pilot introduces advanced water harvesting techniques to collect water from three dunums of greenhouses to irrigate tomato crops. To maximize energy efficiency, the collected water is stored in an irrigation pond, and photovoltaic (PV) panels are supplying the electricity needs of the system. The fertility of soil is also being improved with organic matter amendment to the soil. These integrated technologies additionally minimize the irrigation water losses to groundwater.

Background

The Jordanian part of Jordan Valley suffers from serious agricultural issues influenced by water scarcity, changing environmental and climatic scenarios, and socio-economic factors impacting the agricultural community. Thus, it is facing escalating agricultural problems influenced by shifting climatic conditions, and socio-economic dynamics that shape its farming community. Local groundwater has high salinity that reduces its viability for agricultural use and the soils have extremely low organic carbon and thus fertility. As such, Jordan is currently recycling close to 95% of the treated wastewater for irrigation.

Aims and Goals

The overall aim of the Jordanian pilot is to optimize the agricultural sector which is the main user of water in the region through a WEFE Nexus approach and solutions. The Jordanian pilot uses water harvesting techniques to collect the water from the three dunums of greenhouses to demonstrate it as an alternative water supply source as well as uses a desalination unit to improve the groundwater quality. These new sources of water combined with the techniques developed in the PRIMA-Lenses project that reduce the volume of irrigation (irrigate the plant and not the field) by 2/3 the recommended values as well as increase the organic matter of the soil to improve soil fertility and soil biodiversity provide an integrated combination that addresses all aspects of the Water-Ecosystem and Food Nexus. Renewable energy is also used to cover the energy needs of the pilot.

Actions taken

The pilot site intervention focuses on the following activities:

- Soil quality is being improved by applying a compost-manure mixture, which enhances soil moisture retention. This, combined with an efficient irrigation system and soil moisture-based irrigation management, is reducing water consumption in plastic houses while optimizing fertilizer use efficiency.
- An efficient fertilizer injector is in use, ensuring that fertilizer applications account for existing soil nutrient levels. This approach minimizes the addition of chemicals, contributing to a healthier environment.
- Pesticides are being applied strategically and only as needed, reducing overall usage and environmental impact.
- Higher yields in plastic houses are already being achieved through improved irrigation management, enhanced water quality, and better soil conditions.
- Harvested rainwater and desalinated water are actively lowering soil salinity in plastic houses, leading to improved soil productivity and a more sustainable growing environment.
- Solar energy is now being utilized over irrigation ponds, reducing reliance on grid electricity while also decreasing water evaporation (by an average of 6.7mm/day) and inhibiting algae growth. This mitigates issues with water filters and drip irrigation systems, addressing long-standing challenges in Jordan Valley irrigation ponds.
- Water quality continues to improve through active water harvesting and desalination efforts.

Main Achievement to date

The construction and instrumentation of the pilot has been implemented and planting of tomatoes in the greenhouse has been completed. Data is being collected to assess the benefits and co-benefits across the four WEF dimensions. The achievements of the demonstrator will be updated as data become available.



Partners

NARC TUC

Lessons, replicability and scalability potential

The Jordanian pilot addresses ways of obtaining additional good quality of clean water (water harvesting and desalination), improving soil fertility, reducing the agricultural demand for water and minimizing the environmental footprint of agriculture.

The Jordanian section of the Jordan valley has 75000 dunums of greenhouses. It has been estimated that if the harvesting technology used in this pilot is applied to all of the greenhouses, more than 20 million m³/ year of water will be collected and used which represents 10% of the water agricultural needs.

The technologies used in this demonstrator can be upscaled in the other aquafarms in the Jordan valley and can be used as prototypes for the whole Mediterranean region.

Affiliation

National Agricultural Research Center

Keywords

Wefe prima water harvesting agriculture soil fertility Jordan Jordanvalley

Country

Jordan

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Sun, 01/01/2023 - 12:00

End year

Thu, 01/01/2026 - 12:00

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Acknowledgement of funding source

PRIMA

Total funding

10 - 100k €

Environmental

High

Social

Medium

Technological

High

Financial
Medium

Institutional
Medium

SDGs



YouTube

<https://www.youtube.com/watch?v=nvfSfCS3Wpk&list=PLrID75EsOmZkoeDxCyZ3urs1UuNIh...>

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Nexus Dimensions

Ecosystems

Energy

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