



Funded by
the European Union



المركز الوطني للبحوث الزراعية
National Agricultural Research Center



Water-efficient Innovative Solutions Portfolio for Enhancing Resilience (WISPER)

ENI/2020/417 630

Implemented by Istituto per la Cooperazione Universitaria (ICU) - ITALY

in partnership with

National Agricultural Research Center (NARC) - JORDAN

and

Institut National des Recherches en Génie Rural, Eaux et Forêts (INRGREF) - TUNISIA

OVERALL

Countries involved: **Tunisia and Jordan**

WISPER project works to introduce modern and innovative technologies in the partner countries. These technologies are known to be scarce in partner countries and to contribute to raising the water use efficiency to the optimum level.

Project seeks to introduce modern technologies that save water, while at the same time making sure to introduce low cost technologies to achieve the possibility of acceptance and application by farmers.



RESULTS

Identified, tested and showcased a portfolio of water-efficient innovative solutions at different maturity stages, that have the potential to be scaled up.

JORDAN

1. Decentralized TWW Systems.
2. Soilless-system prototypes.
3. Automation of fertilizer system for an existing hydroponic system.
4. Water-retention polymer.
5. Sub-surface tape irrigation system.
6. Water boxes (**Cocoon**).
7. Use of brine (desalination-by-product).

JORDAN - Soilless-system prototypes.



Simple and “low cost” soilless system prototypes to make this innovation accessible.

3 ways of cultivation: water, volcanic soil and coconut fiber.

Save 30-60% water comparing with traditional cultivations.

JORDAN - Fertilizer injector for an existing hydroponic system.



The automatic fertilizer injection system is known for delivering precise IntelliDose of nutrients tailored to the crops' needs, managing nutrient levels, pH, and salinity autonomously, with remote alarm settings and optional data recording to an electronic account.

JORDAN - Water-retention polymer



PROS: Innovative polymer (pollution free and 100% biodegradable). The polymer may retain water for 4 to 6 weeks, tested in an open field of 1 dun (Squash) and 450 m² greenhouse (Cucumber). About 20% more production in open field, about 22% in greenhouse.

CONS: Biodegradability level still under verification.

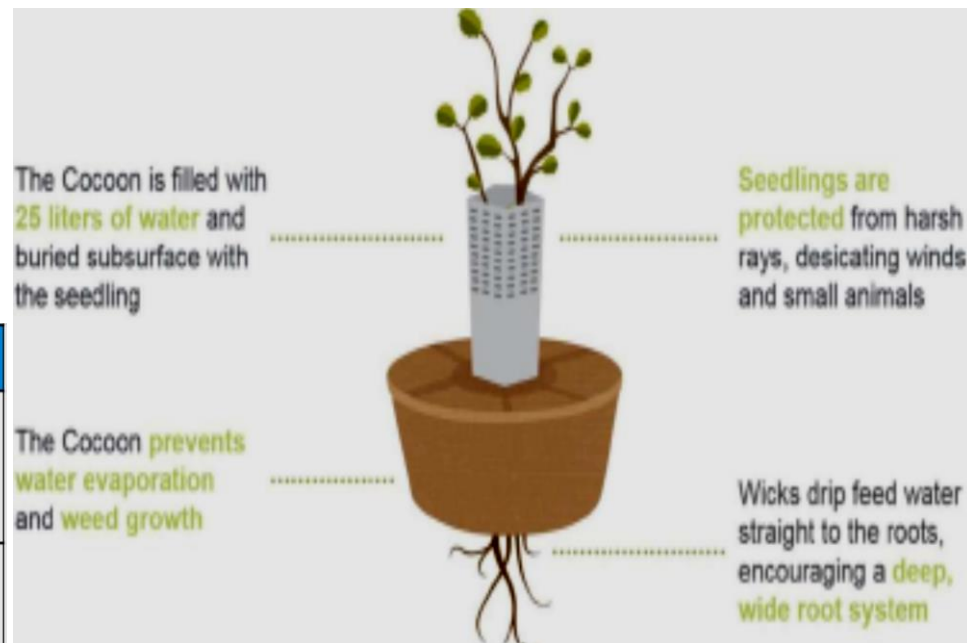
JORDAN - Sub-surface tape irrigation system



PROS: Sub-surface drip irrigation tape system on 1 dunum open field at NARC Deiralla Research Center thus decreasing the evaporation losses of water. **About 30%** more production for corn with tape. The irrigation system used significantly reduced irrigation water use for corn production by 20% compared to drip irrigation method.

JORDAN - Water boxes-Cocoon technology.

In Jordan, this activity was executed across three distinct locations, each focusing on a different type of tree crop.



Site	Region	Name of Beneficiaries	Type of System	Cultivated Species
Site A	Balqa Governorate – Era'a Village	M.A.	Cocoon Boxes	Almond Trees
Site B	Balqa Governorate - Subihe Village	J.N.	Cocoon Boxes	Lemon Trees
Site C	Karak Governorate – Wadi Bin Hammad Village	B.A.	Cocoon Boxes	Olive Trees

The scientific community recognizes the importance of such innovations in enhancing water use efficiency and promoting sustainable agricultural practices, particularly in water-scarce regions.

JORDAN - Photovoltaic-Powered Irrigation Systems

Canceled activity

- The integration of photovoltaic (PV) units for irrigation presents a sustainable alternative, capitalizing on the region's abundant solar energy resources to reduce operational costs and dependency on fossil fuels.
- This initiative served as a practical demonstration of renewable energy's viability in agriculture, showcasing best practices in filtration, fertilization, and irrigation tailored for small-scale farmers.
- The project also extended the technology to an additional 25 farms, providing various system configurations to accommodate diverse economic situations.

JORDAN - Experimental Research on Desalination- By-Products.



The disposal and reuse of by-products from desalination processes are critical environmental challenges, particularly in regions reliant on desalination for water supply.

WISPER project initiated experimental research to explore innovative solutions for managing these by-products, mitigating their environmental impact.

Aquaponics is a sustainable, integrated system that merges recirculating aquaculture with agriculture. The project was carried out at NARC station in Karama.

The experiment features a range of key components including a fish pond, various fish species, a net shade, a metal net enclosure, an irrigation network, pumps, an air blower, a control unit, and portable laboratory testing devices.



Key achievements of the WISPER project include:

- **Increased Water Efficiency:** The project successfully implemented water-saving technologies, leading to a substantial reduction in water usage without compromising crop yields.
- **Improved Crop Productivity:** The adoption of precision irrigation techniques has resulted in higher crop yields and better quality produce, contributing to increased agricultural profitability.
- **Enhanced Environmental Sustainability:** By reducing water wastage and promoting efficient resource use, the project has contributed to the conservation of natural resources and the mitigation of environmental impacts associated with traditional farming practices.

Challenges & Recommendations

- The high initial costs of technology, the need for ongoing monitoring and maintenance, and overcoming cultural and logistical barriers must be addressed.
- The project's adaptability and scalability, proven in specific locations, suggest it could serve as a model for other regions with similar challenges.
- Future work in this initiative should focus on enhancing the cost-effectiveness of technologies, fostering community engagement for broader adoption, and ensuring that the solutions are culturally sensitive and logistically feasible.
- Continued research and development, coupled with a focus on training and education, will be key to advancing these sustainable practices globally and contributing to addressing larger challenges such as climate change and water scarcity.

Thank You

