MIRRA

Methods for Irrigation and Agriculture

لتطوير أساليب الري والزراعة

NEWSLETTER

MAY 2025 | ISSUE NO. 26

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What is EU PRIMA

The Partnership for Research and Innovation in the Mediterranean (PRIMA) is a funding initiative under the European Union for developing innovation and research in the sustainable use of natural resources and economic growth. The strive for innovation in natural resource management is motivated by the urgent challenge of climate change, population growth, desertification, insufficient infrastructure for sustainable agro-value chains, and unsustainable agricultural practices across the entire Mediterranean. Rural communities in arid climates face unreliable rainfall patterns and record-high temperatures with severe social and environmental consequences. The strategic aim of projects sponsored by EU PRIMA is to innovate new solutions for making the food and water systems of Mediterranean countries more resilient.

Project Donor

PRIMA PARTNERSHIP FOR RESEARCH AND INNOVATION IN THE MEDITERRANEAN AREA

Co-funded by the European Union

One characteristic of inefficient agro-value chains is food waste. The lack of refrigeration and efficient transportation contributes greatly to food loss and waste (FLW), particularly in developing contexts where the costs to improve infrastructure is beyond the financial abilities of many rural communities. Food waste is especially prevalent in fruits and vegetables within the Mediterranean region due to their importance in local culinary traditions. A comprehensive solution is needed to mitigate FLW by improving infrastructure, building awareness among consumers, addressing policies and regulations, and co-developing new technologies in partnership with local stakeholders across the agro-value chain.

MIRRA's Goals and Objectives under FUSION

The FUSION project addresses the need for more efficient agro-value chains in the Mediterranean by developing several new technologies while taking steps to integrate these technologies into the social and economic frameworks of pilot countries. The project's technological solutions will be adapted and optimized considering the specific conditions of each pilot site with a collaborative and participatory approach.

The Specific Objectives for FUSION and Supporting Activities

Objective 1: Develop a set of innovative technological solutions

- Develop natural and edible coatings for tomato and bell pepper
- Select crops with natural resistance to drought and heat
- Develop equipment for producing dehydrated and concentrated food
- Co-design portable refrigeration storage equipment to maximize the shelf-life of produce in the field
- Develop a demo-plant of a cold plasma reactor for disinfection
- Develop a monitoring technology for tracking FLW throughout the agro-value chain

Objective 2: Deploy a set of training content and a guide of good practices and recommendations for reducing food waste in the Mediterranean

- Training will enhance the capacity of small farmers with a particular focus on empowering women to efffectively implement sustainable solutions
- The FUSION consortium will coordinate capacity building sessions that are inclusive of many different stakeholders across civil society organizations

Objective 3: Demonstrate technological solutions to stakeholders using a collaborative strategy

- FUSION technologies will be designed for the Mediterranean area and target sensitive, short-cycle crops in order to make technological demonstrations relevant to small farmers

Objective 4: Implement a solid strategy of communication and dissemination to maximize acceptance of our solutions by local markets and societies

- Develop business models to reduce food waste

Within these four objectives, FUSION proposes a holistic solution for reducing FLW by combining both technological and non- technological actions in 9 countries: 3 EU countries, Spain, Italy and Greece, as well as 6 Mediterranean partner countries, Turkey, Jordan, Egypt, Morrocco, Lebanon and Tunisia.

New Horizons for Jordan

Jordan's agriculture sector, particularly in the Jordan Valley, is experiencing many logistical challenges for transporting food to local markets and preserving fresh produce until it reaches consumers. FUSION will inject new technologies at different locations along the agro-value chain whose cumulative impact will be greater than if each technology were developed in isolation. These technologies will provide critical investment into the agriculture sector's ability to cultivate competitive, high-quality produce both to the benefit of consumers and farmers.

FUSION Technologies for reducing FLW across the agro-value chain from harvesting to market shelf-life

Harvesting	Selecting crops with high resistance to heat and drought	Disinfection strategy
Packing	Food preservation technologies for storage chambers	Edible coatings on crops for longer shelf-life
Value-Chain	Sensor devices with electronic product tracking	Traceability module for monitoring parameters such as food storage temperature, humidity, time
Transportation	Developing dehydated snacks	Develop food concentrate from the waste of tomato and bell peppers

Capacity Building and Community Engagement

FUSION will create best practice guides, training materials, and co-create all activities in Jordan with local stakeholders. This communication strategy is integrated into the social innovation of the project as it aims to integrate the needs and requirements of consumers and industry professionals and to ensure that these are considered in the development of FUSION solutions.
Specific training will be dedicated to each of the developed technologies as a way of facilitating their adoption and market deployment.

MIRRA will lead workshops in theoretical and practical training for public and private stakeholders. The training content will be developed in a modular format and at three levels of knowledge (basic, intermediate, and expert) to facilitate its subsequent application to all target stakeholders. Further we will develop different support materials such as manuals, slides, videos, interactive modules, practical demonstrations, case studies, and hands-on activities to enhance learning.

TECHNICAL SERVICES

Strengthening Agrochemical Management and Compliance: MIRRA's Contribution to the Syria Recovery Trust Fund (SRTF) PERSUAP Update

Beneficiaries

Syria's agricultural sector

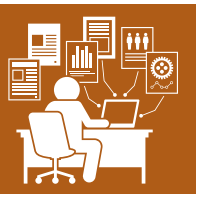
In an effort to enhance agricultural practices and ensure environmental safety in conflict-affected regions, Methods for Irrigation and Agriculture (MIRRA) partnered with the Syria Recovery Trust Fund (SRTF) to update and strengthen the Pesticide Evaluation Report and Safe Use Action Plan (PERSUAP). This critical project aimed to align the agrochemical procurement and usage processes of SRTF with U.S. Government Environmental Compliance procedures. The initiative contributes to sustainable agriculture by identifying safer alternatives, promoting informed agrochemical use, and ensuring compliance with international safety standards across Syria's agricultural recovery efforts.

The project's core objectives focused on supporting SRTF in updating its master agrochemical list and providing technical documentation aligned with USAID environmental policies.

Key activities included:

Identifying agrochemical companies operating in key markets: Turkey, Jordan, and Iraq.

Compiling detailed information for each agrochemical product relevant to wheat, potatoes, legumes, and common vegetables.



Clients

SYRIA RECOVERY TRUST FUND

صندوق الائتمان لإعادة اعمار سوريا

Categorizing agrochemicals based on active ingredients using the PERSUAP framework: Approved, Restricted Use Pesticides (RUP), and Rejected.

Providing expert advice on procurement, storage, mixing, application, and disposal procedures.

Picture 1: Flow of agrochemical products into Syria from neighboring agriculture companies in Jordan, Iraq, and Turkey.

To achieve these goals, MIRRA conducted extensive market research to identify suppliers in Turkey, Jordan, and Iraq offering agrochemical products compliant with international and local regulations.

This step laid the foundation for providing verified and environmentally safe products for SRTF-supported agricultural initiatives. Each agrochemical identified was thoroughly analyzed with technical reports covering the following:

- Chemical classification based on PERSUAP guidelines
- Recommendations for safe procurement, handling, and application
- Crop-specific usage recommendations.
- Technical specifications of each active ingredient.

The project's key deliverables included:

Tables outlining approved chemicals for each crop including wheat, vegetables, and potatoes.

A Master Pesticide Checklist referencing environmental compliance needs and suitable alternatives to RUPs.

A list of verified agrochemical companies across targeted countries.

An updated PERSUAP list that identifies Approved, RUP, and Rejected chemicals.

The implications of this work are far-reaching for agricultural recovery in Syria. By ensuring that agrochemical usage in Syria complies with U.S. Government environmental standards, the updated PERSUAP:

- Reduces risks to human health and the environment.
- Encourages the adoption of less hazardous and more sustainable products.
- Serves as a foundational tool for training and capacity building among local farmers and agricultural technicians.
- Guides implementers in safe pesticide handling and disposal.

MIRRA's collaborative effort with the SRTF represents a model for responsible agrochemical management in fragile and conflict-affected environments. The project ensures that agricultural development does not come at the cost of environmental degradation or public health risks thereby marking a significant step toward safer, more sustainable agriculture in Syria.

MIRRA's Commitment to Sustainable Development Goals: Three Years of Impactful Action

Introduction

The Sustainable Development Goals (SDGs) for 2030 were determined by the United Nations in 2015 as a set of transformative outcomes designed to eliminate global poverty and support the wellbeing and sustainability of societies and environments. These SDGs are the guiding principals for global development, and they represent an important foundation for Jordan's Green Growth Action Plan for the Water Sector, Climate-Smart Agriculture Action Plan, and country's National Climate Change Adaptation Plan. While the implementation of global SDGs into national programming is an essential first step, this top-down approach will succeed through bottom-up initiatives taken by subnational actors within the communities that SDGs are designed to target. Localization of projects and the participation of diverse stakeholders is critical to the promotion of new agricultural practices and transfer of new knowledge as drivers of sustainable development.

Over the past several years, MIRRA has made significant strides in agricultural and water development by targeting multiple stakeholders with projects that support numerous components of the water value-chain. In this manner, MIRRA's strategic programming has achieved important success advancing many different SDGs simultaneously

Putting People First

Investing in Jordanian farmers, women, youth, and other agricultural stakeholders has been a cornerstone of MIRRA's success and programming. The presence of women in projects encourages the full integration of all social groups into projects, and consequently, heightens the reach and impact of projects across Jordan.

As a result, MIRRA adopted a gender responsive approach in its capacity building programs that recognized the inequalities present within educational opportunities and prioritized incorporating women into agricultural training programs.

During the **NUFFIC 1 Project: Enhancing Capacities of Syrian and Jordanian Youth on Smart Agriculture**, MIRRA delivered a technical and vocational education and training (TVET) program tailored to market needs. The **ESWP Project: Empowerment of Syrian Refugee Widows in Water and Agriculture** was a 12-month, EU-funded initiative that focused on empowering Syrian refugee widows and Jordanian youth. The training was a multidisciplinary, hands-on educational program that combined technical skills along with market-relevant soft skills in communication and entrepreneurship.

MIRRA also partnered with the **Jordanian Agricultural Engineers Association** to train 50 Jordanian women and Syrian refugees in climate-smart agriculture to enhance female innovation within Jordan's agricultural sector and develop the skilled workforce needed to operate and maintain modern agricultural techniques. Structural barriers and high unemployment disproportionately affect women and refugees, and these programs offered relevant skills to support the self-reliance for many refugee and marginalized women which advances SDG 10 Reduced Inequalities.

The future of Jordan's agricultural sustainability depends greatly on the awareness and knowledge of the next generation. During a **5-day practical training program** for students from Al-Balqa Applied University, participants learned technical agricultural skills in the field. Between September 2024 until December 2024, MIRRA implemented an **awareness campaign called "Water is our Wealth"** across 10 primary schools in Amman targeting 500 students 60% of whom were girls. These programs were inclusive and participatory educational opportunities that spread awareness about the importance of water conservation and encouraged a new generation of agricultural engineers and climate-conscious citizens.

10 REDUCED INEQUALITIES

Picture 1: Amman, November 25, 2024 - Sewar Saleh from MIRRA with students from the My Little Dream School.

MIRRA's portfolio of capacity building has included agricultural professionals. During a comprehensive **training of trainers (ToT)**, MIRRA provided high-quality training to agronomists and agricultural engineers on methods of reusing treated wastewater and fertigation management. Both of these technologies are critical to enhancing water efficiency within Jordan as outlined in the country's National Water Strategy and Green Growth Action Plan for the Water Sector. Program participants have returned to their respective farms and will teach other workers and farmers about the knowledge covered under this ToT. By investing a small amount of time to target key stakeholders, MIRRA has been able to multiply its educational impact to many other groups across the agricultural sector. Such programming not only advances SDG 4 Quality Education, but raises awareness of novel irrigation systems and technologies in support of SDG 13 Climate Action, SDG 6 Clean Water and Sanitation, SDG 12 Responsible Consumption and Production, and SDG 17 Partnerships for the Goals.

Picture 2: Jordan University of Science and Technology, May 21, 2025 – Dr. Samer from MIRRA stands at the far left alongside trainees participating in the Training of Trainers (ToT) program.

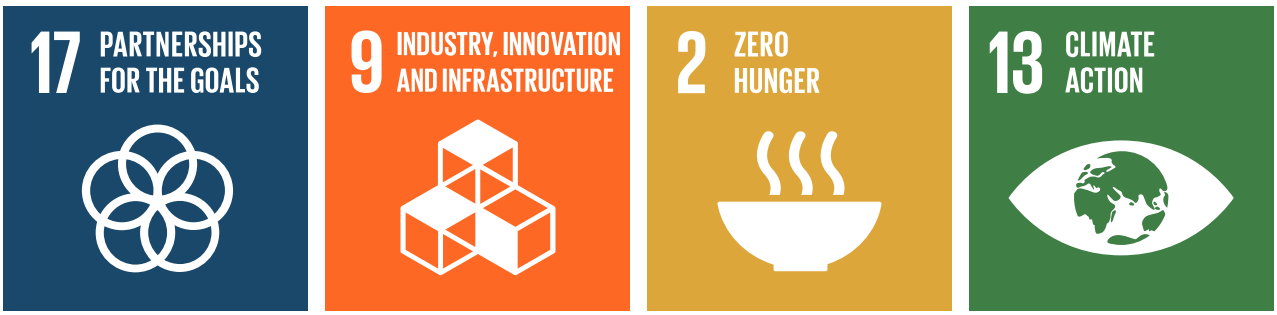
Advancing Sustainable Development

MIRRA has succeeded in advancing technologies for reducing water waste and improving water use efficiency in agriculture. Between 2020 and 2023, MIRRA participated in the **AZMUD project**: an EU PRIMA-funded project that enhanced the performance and sustainability of Mediterranean greenhouses through an ensemble of many different technologies.

Two of these technologies were magnetized water treatment and low-energy drip irrigation which improve water quality and reduce water waste. These advancements not only support **SDG 6 Clean Water and Sanitation**, but also contributes to Jordan's National Water Strategy. The **Massachusetts Institute of Technology** has partnered with MIRRA to develop an innovate irrigation system that minimizes water waste and improves water efficiency so farmers consume less water during cultivation.

To address the energy demands of irrigation and cooling systems in a hot mediterranean climate, the AZMUD project installed semi-transparent photovoltaics (PV) to power the greenhouse. The irrigation system developed in partnership with MIT was capable of cutting the energy needed for pumping water by 50% which saves both money and water for farmers.

This provides critical relief on scarce water resources for irrigation which consumes nearly 60% of the country's total water supply. The agricultural efficiencies from these technologies also allow Jordanian farmers to produce more food while spending less resources thereby improving Jordan's ability to feed its growing population and advancing SDG 2 Zero Hunger. Field demonstrations advance SDG 13 Climate Action by showing Jordanian farmers the advantages of solar energy and modern irrigation techniques.



Infrastructure as a Linkage for Partnerships and Training

The geographic location of MIRRA's climate-smart farm, situated in the heart of the North Jordan Valley, has facilitated the training of students and the engagement of numerous local stakeholders across the agricultural value-chain. The infrastructural investment into this strategic location has made MIRRA's climate-smart farm a technological and institutional conduit of knowledge transfer, trust-building, and co-development of climate-smart technologies. This is a highly effective method of participatory, sustainable development because local stakeholders help guide the direction of how technologies are used which not only makes these communities more likely to adopt these technologies on a larger scale, but also makes these technologies more efficient by tailoring them to local contexts. In this manner, MIRRA is able to achieve simultaneous advancements in SDG 9 Industry, Innovation, and Infrastructure and SDG 17 Partnerships for the Goals.

MIRRA

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لتطوير أساليب الري والزراعة

https://mirra-jo.org

info@mirra-jo.org

941454 Amman 11194 Jordan

Methods for Irrigation and Agriculture - MIRRA

7 Abdelaziz Al-Thaalibi Street, Shmeisani, Amman, Jordan.

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