MIRRA

Methods for Irrigation and Agriculture

لتطوير أساليب الري والزراعة

NEWSLETTER

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RESEARCH AND DEVELOPMENT

Fusing innovation, sustainability and action to fight food waste across the Mediterranean: MIRRA participates in the Second General Assembly meeting for the FUSION project in Cairo

Picture 1: Eng. Ammar Namarneh presenting MIRRA's pioneering work on crop residue recycling at the Climate-Smart Farm in Jordan, demonstrating how agricultural waste is transformed into natural mulch.

Between 15–17 September 2025, the **FUSION Project** held its **Second General Assembly in Cairo, Egypt**, hosted by the Agricultural Research Center (ARC). Partners from across the Mediterranean came together to advance the work on **good practices and training content**, exchange experiences on the **tomato and pepper value chains**, and to visit a pioneering local company that turns fruit and vegetable by-products into new products through **dehydration and freeze-drying technologies**.

The assembly was not only a space to showcase technical progress, but also a powerful demonstration of collaborative strength across the consortium. Combining innovation, technology, and knowledge exchange, FUSION partners are taking concrete steps to reduce food loss and waste across the Mediterranean. MIRRA, represented by Eng. Ammar Namarneh, stood out in this effort, presenting Jordan's contributions and leading discussions on pre-harvest challenges and solutions.

Day One – Presentations & Group Work

On the first day, Egyptian partners outlined the country's food waste challenges and showcased new hybrid drying technology. Eng. Ammar Namarneh then presented MIRRA's progress within the development of good practices, technological recommendations, and training demonstrating how farm residues in Jordan are recycled into organic mulch—enhancing soil fertility, conserving water, reducing costs, and preventing harmful burning while promoting circular farming practices.

Following the presentations, participants divided into three working groups to identify the main problems driving food waste along the value chain: pre-harvest and harvesting (MIRRA's group), post-harvest handling, and consumer/market stages. Ammar led the reporting for his group, identifying challenges and preliminary solutions for all partners at the end of the session.

Picture 2: Eng. Ammar Namarneh leading Group 1's findings on pre-harvest and harvesting challenges, outlining the key drivers of food loss across the agricultural sector.

Group Work – Pre-harvest and Harvest Problems

In Group 1 (Pre-harvest and Harvest), MIRRA collaborated with other FUSION project partners to analyze early-stage causes of food waste. The group identified critical issues ranging from poor soil quality, weak irrigation and crop management, and limited farmer training, to improper fertilization, climate vulnerabilities, and outdated harvesting and storage practices.

Day Two – Solutions & Strategies

On the second day, partners transformed the identified challenges into concrete solutions across the food chain. MIRRA contributed actively within the pre-harvest and harvesting group, presenting measures such as enriching soil with compost and biofertilizers, adopting smart irrigation and Integrated Pest Management (IPM), training farmers, and modernizing harvesting and storage methods. The discussions emphasized sustainable practices to strengthen field management, conserve resources, and reduce food waste from farm to market.

Picture 3: Eng. Ammar Namarneh presenting the solutions developed by Group 1, highlighting innovative approaches for soil preparation, irrigation efficiency, pest control, and improved harvesting practices.

Day Three – Field Visit

The final day of the meeting included a field visit to a pioneering company, DRIED quality - Driven Dehydration, in Egypt that specializes in valorizing fruit and vegetable by-products. Partners observed how fresh produce is transformed through dehydration and freeze-drying technologies, creating new products with extended shelf life and added market value. This innovative approach not only reduces food waste but also exemplifies how technology can turn agricultural residues into sustainable business opportunities.

THE FUSION meeting in Egypt underscored the partners' collective determination to tackle food waste through innovation, collaboration, and practical solutions. MIRRA's contributions, presented by Eng. Ammar Namarneh, showed how farm-level practices in Jordan are already turning waste into value and serving as a model for the wider Mediterranean region.

The discussions, strategies, and field experiences shared during these three days will not stay within meeting rooms—they will translate into tangible actions on the ground. Together, the FUSION partners are building more resilient, efficient, and sustainable food systems, ensuring less waste and more value across the Mediterranean.

Picture 4: Partners visiting a local food drying factory in Egypt, observing how fresh produce is transformed into dried products to reduce food waste and create new market opportunities.

CAPACITY BUILDING

In collaboration with the European Institute of Peace: a delegation from Yemen visits MIRRA's Climate-Smart farm in the Jordan Valley.

Beneficiaries

12 international environment, agriculture, and peacebuilding professionals

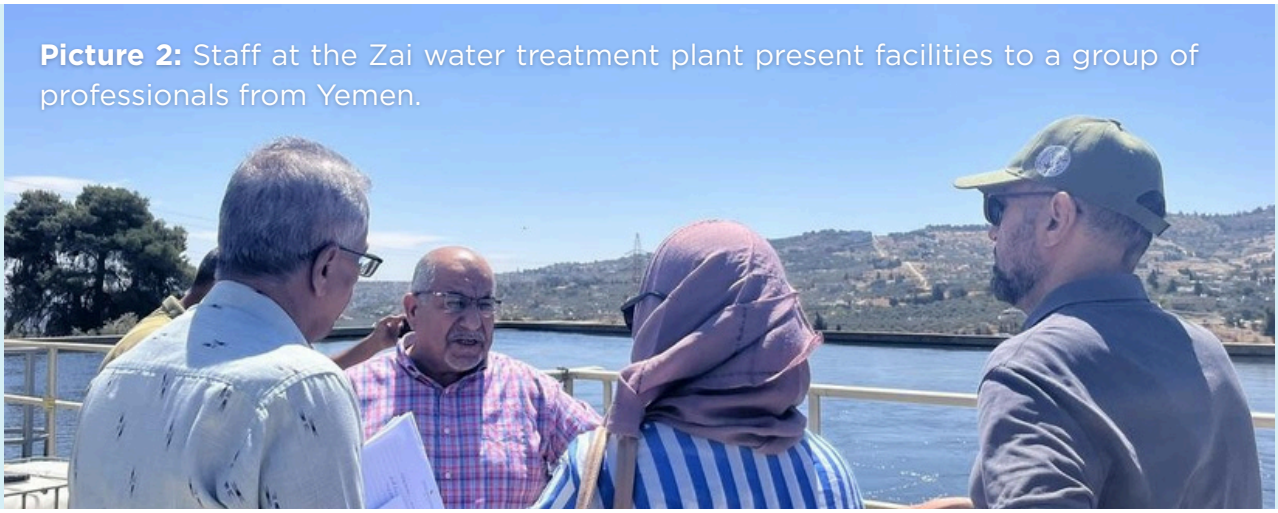
In collaboration with the European Institute of Peace, MIRRA had the opportunity to present elements of Jordan's water and agriculture sector to a team of Yemeni and European environment, agriculture and peacebuilding professionals.

Both Yemen and Jordan face severe water crises exacerbated by climate change, regional conflicts, inefficient irrigation, and over extraction of groundwater. In Yemen, the EIP has found that addressing environmental concerns is an important element of reconciliation. This tour promoted international, cross-cultural learning by presenting Jordan's environmental and agricultural challenges, and innovative solutions that MIRRA is implementing across Jordan.

Thoughtful discussions about sustainable agriculture and water-conserving measures were a significant element of the tour. As our bus travelled across Jordan's hilly landscape, MIRRA's recent initiatives to improve water security across Jordan were highlighted and visited. These include initiatives to expand the use of treated wastewater and the social challenges associated with its reuse. This sparked discussions on the importance of communication and education during implementation of sustainable infrastructure adaptations

Picture 1: Delegates from Yemen watch out the window as the tour bus drives to the Jordan Valley

As we travelled through Jordan, the group was able to not only discuss, but also witness, the country's water infrastructure. The first stop on the tour was the Zai water treatment plant, which treats water for West Amman. This water treatment plant receives water from the King Abdullah Canal, which receives water from Yarmouk River, Al Mukhiebieh wells, Lake Tiberias, and Wadi El Arab dam. Each year, about 90 million cubic meters of water are pumped from King Abdullah Canal to the Zai water treatment plant. On our visit to the treatment plant, the group received a guided tour of Zai facilities.



Picture 2: Staff at the Zai water treatment plant present facilities to a group of professionals from Yemen.

Next, the group travelled to the King Abdullah Canal in the Jordan Valley and discussed the impact of regional water scarcity on agriculture with a local farmer. Agriculture in the Jordan Valley is dependent on the water that flows through the KAC. Upstream diversions and conflicts directly reduce water flow and worsen water quality for the Jordan Valley farms.

Picture 3: MIRRA's engineer presents the drip irrigation technology in use at the Climate-Smart farm.

Lastly, we visited MIRRA's Climate-Smart farm in the Jordan Valley. Here, MIRRA presented the agricultural challenges of the farm and sustainable technologies that MIRRA has adopted as a solution. The MIRRA team showcased multiple components of the ultra-low energy drip irrigation system, such as the filtration system, monitoring system, and irrigation lines.

Water scarcity is a dire issue experienced by many nations. The impact of sustainable solutions can be maximized through sharing knowledge and experience on an international scale. This tour allowed MIRRA and the international delegation to exchange ideas and knowledge, potentially helping all parties advance sustainability in their home countries.

Picture 4: International delegation observing the field of Okra at MIRRA's Climate-Smart farm in the Jordan Valley.

*The field visit was conducted within the context of the **Environmental Pathways for Reconciliation** project, which is implemented by the European Institute of Peace with support from the German Federal Foreign Office and is part of the Weathering Risk Peace Pillar led by adelphi. You can read more about the project at www.epfryemen.org.*

OPINION ARTICLE

A reflection on my time in Jordan and at MIRRA: People, geography, agriculture and climate change.

Picture 1: An orange tree near the MIRRA office in Amman

By Desirae Krzeczkowski[1], intern at MIRRA, Summer 2025.

One of the things that I always share with others when describing Jordan's beauty is the abundance of fruit trees: the pomegranates, citrus, olives, grapes and figs of the Highlands. From Amman to Ajloun to Madaba, these fruits are abundant. The intense summer sun that rises over hills speckled with olive trees and beige structures remains strong from morning until night. It feels as though the land is so overwhelmed with energy that it cannot help but to sprout delicious, colorful fruit. The people on the land have existed alongside these fruits for millenia, their customs, foods, and routines, shaped by layers of ancient history and a deep relationship with the land.

The city of Amman hums with the sounds of prayers, voices, car honks, and the jingle of the gas trucks. The streets are energetic: the traffic is loud, and the windy, uneven sidewalks lead a wanderer to new heavenly views at every turn. There exists a balance of serenity and chaos, as the wise old olive trees sit patiently under the sun while the people chatter, shop, work, and socialize. The shop owners sell vegetables, paintings, sand bottles, and clothing. People gather in cafes, sipping tea, smoking shisha, and playing board games.

The city has a heartbeat: the sun, food, and water are the pumps that maintain its rhythm. People are part of this dynamic, complex environment that determines whether people may continue exploring, playing, working, reading, gathering, and learning. The intricate networks that deliver the resources to keep this heartbeat must constantly adapt. As populations grow and climate changes, it is crucial for farmers, engineers, water treatment systems, pipelines, and energy grids to evolve to meet new challenges.

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The impacts of climate change are felt across the lands of the Sham (the Levant), observably worsening as time passes. The water-scarce nation of Jordan is particularly vulnerable to these climate threats as it is nearly landlocked and mostly arid. Furthermore, the population has grown rapidly as Jordan has become a safe haven for those fleeing conflict in neighboring countries. Jordan's population includes Palestinian, Syrian and other refugees. These influxes have strained water supply, leading to negative consequences such as unsustainable over-pumping of groundwater. It is particularly urgent for Jordan now to improve water, agriculture, and energy systems to become made more efficient, resilient, and climate-friendly so that communities in Jordan can thrive far into the future.

Methods for Irrigation and Agriculture (MIRRA) plays a critical role in improving water and agricultural sustainability in Jordan. In order to encourage usage of "smart" agricultural practices while expanding opportunities for vulnerable communities, MIRRA has led education and capacity building initiatives for youth, vulnerable Jordanians, and Syrian refugees. They also have been active in research and development on optimizing irrigation to reduce water and energy use at the farm level. Currently, MIRRA is working on projects that will minimize food waste and expand usage of drought-resilient crops on Jordanian farms, making farms more resilient to climate change. Not only does MIRRA tackle issues within Jordan, but they also collaborate with nations around the world to work on improving global sustainability.

Picture 2: A street in Amman, Jordan

Picture 3: Grapes picked from a vine in Madaba

Picture 4: A freshly picked fig in Ajloun

Organizations like MIRRA, who recognize the importance of viewing problems through multiple lenses, are crucial to ensuring water security in Jordan and around the globe. Living in Jordan while working with MIRRA was particularly useful as I travelled across Jordan from the desert regions to the highlands to the Jordan Valley. This allowed me to witness the varying physical, social, and cultural landscapes which must shape solutions to any sustainable intervention. To make progress toward more long-lasting, environmentally friendly operations and infrastructure, adaptations must be not only technologically feasible but also socially accepted, integrated into the culture, financially sensible for all stakeholders, and fit into regulatory frameworks.

I am grateful for the chance to have witnessed Jordan's beauty: the people, fruits, sunshine, and rolling hills. Additionally, I thank those, such as MIRRA, who are committed to protecting this precious region by working toward a more sustainable future.

Picture 5: MIRRA's Climate-Smart farm, the Okra field in front and the vineyard in the background

Welcome

Introducing MIRRA's Newest Intern:

Elizabeth McGillen joins our Team!

Hello, my name is Elizabeth McGillen. I am a sophomore at the George Washington University studying International Economics and Sustainability. I chose to study abroad in Jordan to improve my spoken Arabic and learn more about the regional culture. I am thrilled to be an intern with MIRRA this fall, where I will be conducting research, participating in field work and contributing to MIRRA's public presence through social media and web - based initiatives.

Something I love about MIRRA's work is that it bridges the gap between R&D and real farmers. I can't wait to learn from and contribute to MIRRA's mission of developing sustainable and efficient agriculture solutions! Thank you to MIRRA for your warmth and hospitality inviting me on to the team.

MIRRA

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