



Methods for Irrigation and Agriculture  
لتطوير أساليب الري والزراعة

## NEWSLETTER

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### YOUTH CAPACITY BUILDING



Al-Balqa Applied University Students receive  
Advanced Training in Modern Agriculture

# Farmers Field Day

Empowering Sustainable Agriculture:  
Field Day Highlights at MIRRA's  
Climate Smart Farm



## Beneficiaries

12 Jordanian farmers in the Jordan Valley



**MIRRA's** Climate Smart farm hosted a significant field day event that brought together a group of farmers from the northern Jordan Valley and a dedicated team of engineers from MIT. This event introduced low-energy pressure-compensating emitters for drip irrigation: an innovative irrigation technology designed to enhance efficiency, reduce operating costs, and promote sustainable farming practices. The event aimed to inform local farmers from the northern Jordan Valley about the benefits of adopting this new technology while also collecting valuable feedback to improve its design and dissemination.



# Key Characteristics Of Low Energy, Pressure-compensating Inline Emitters

## Energy Efficiency

- Low-energy pressure-compensating inline emitters reduce the need for larger solar power systems
- Reduced operating pressure allows for smaller pumps which decreases diesel fuel costs and promotes environmentally friendly farming practices
- Cost savings relieves intense financial pressure on farmers



## Increased Planting Area

- The design of low-energy pressure-compensating inline emitters allows for longer laterals which enables farmers to cultivate a larger planting area without compromising on efficiency



## Cost-Effective without Compromising Performance

- Despite operating at lower pressures, low-energy pressure-compensating inline emitters offer flow rates and yields comparable to current emitters.
- This ensures that farmers can achieve optimal crop growth while saving money on operating costs.



## Ease of Handling and Transport

- Smaller emitter sizes result in thinner tube walls and lighter drip tape
- This makes material transport and handling more manageable for farmers.



## Enhanced Durability

- The innovative design of low-energy pressure-compensating inline emitters reduces clogging thereby extending the lifespan of the emitters when operating at the same flow rates.
- Field testing demonstrated minimal clogging during a 6-week performance test outperforming industry leaders in this aspect.



## THE DESIGN

of the low-energy pressure-compensating emitter yields several benefits to farmers. First, this unique design of emitters is capable of maintaining the flow-rate of other emitters but at a lower pressure. This reduces the energy needs to maintain the drip irrigation system and provides critical energy-cost savings to farmers often burdened by a high cost of operating their farm. For many farming operations in the Jordan Valley, farmers use diesel pumps to operate their drip-irrigation systems. Energy savings, therefore, also reduce the need to burn fossil fuels and limits the pollution from operating drip irrigation systems. Their smaller size improves handling, transport, and clog at a smaller rate compared to current alternatives.



The field day commenced with a presentation by the MIT team, detailing the technical aspects and benefits of low-energy pressure-compensating inline emitters. This was followed by hands-on demonstrations at **MIRRA's** Climate Smart Farm where farmers had the opportunity to observe the emitters in action and ask the MIT any questions or concerns.

Farmers were particularly interested in the potential energy and cost savings associated with the use of low-energy pressure-compensating inline emitters, as well as the extended planting area they could achieve. The positive results from the field clogging tests further bolstered the farmers' confidence in the new technology.

The field day concluded with a feedback session where farmers shared their insights and experiences with the low-energy pressure-compensating inline emitters. Overall, the response was overwhelmingly positive, with many expressing eagerness to adopt this innovative technology in their farming practices.

**"MIRRA** has provided us with an incredible opportunity to visit farmers and local suppliers, giving us insight into the supply chain as well as the agricultural practices of farmers in Jordan. With this newfound understanding, we are better poised to research, adapt, and implement new technologies to assist in solving the problem of water scarcity in Jordan."

- Emily Welsh, MIT Team



# Youth Capacity Building

The Building Blocks of Scientific Thought: Scientific Research Training for School Students around the Region



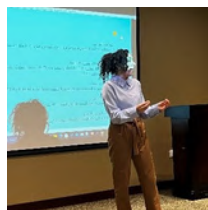
## Beneficiaries

13 students from 3 separate Arab Countries (Jordan, Oman, Qatar)



Scientific thinking is a critical skill for transforming environmental challenges into sustainable solutions. The Globe Near East and North Africa (NENA) Regional Program supports educational initiatives to educate youth on environmental challenges facing society today around the region. **MIRRA** is working to empower school students with essential research skills and lay the foundation for a future generation of scientists, researchers, and innovators who will contribute significantly to the advancement of knowledge and technology in the Arab world and beyond.

In a bid to foster a culture of scientific inquiry towards environmental issues, **MIRRA** organized a comprehensive training course entitled "Scientific Research" for Arab youth. This course was designed in cooperation with Globe NENA Regional Program for 13 students hailing from various Arab countries.





The “Scientific Research” course designed by **MIRRA** aimed to equip students with a diverse set of skills and knowledge crucial for navigating the complex world of research and innovation. The program covered a range of topics, providing a holistic approach to scientific research methodology: scientific writing, creative planning & design, intellectual property protection, guidelines for growing your scientific knowledge, and publishing scientific results.



**MIRRA's** staff delivered training material to education students on the wider process of how scientific research is conducted in order to provide a wider perspective on how the scientific community operates. Students were guided on how to refine their research capabilities and how to share scientific research with others through the publication process.

The course placed a significant emphasis on the publication of research findings to demystify the process by which information is shared and expanded within the scientific community. **MIRRA** staff guided the students through the intricacies of submitting their work for publication, exposing them to the broader scientific community and facilitating knowledge dissemination.



In this program, **MIRRA** and the Globe NENA Regional Program successfully designed and delivered an important workshop on the practical skills of scientific development critical to the future of Jordan's scientists. The course “Scientific Research” course went beyond theoretical instruction incorporating various student activities to enhance engagement and understanding. All material on the process of creating scientific research was delivered in an engaging and participatory way: students completed hands-on exercises, group discussions, and real-life case studies.



**MIRRA** designed and conducted a training session that was beneficial for building the capabilities of the students by helping them understand principals of scientific research. I am confident that the information delivered will enhance their academic skills and greatly benefit them in the future as they pursue their own research.”

– Salma Al-Zubi, NENA Regional Coordinator



# HIGHLIGHTS



**Total Number of Students**

13



**Number of Male Students**

07



**Number of Female Students**

06



**Number of Arab Countries  
Represented**

03



# Professional Training

Empowering Palestinian Agricultural Engineers: Advancing Irrigation Practices using Treated Wastewater in Palestine



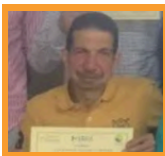
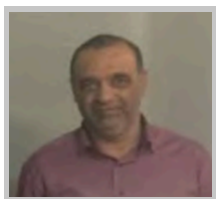
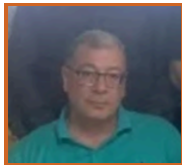
الأرض للتنمية الزراعية  
AFAD for Agricultural Development

Experts  
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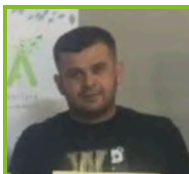
## Beneficiaries

9 Agricultural Engineers from Palestine



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Picture 1: Group of agricultural engineers from Palestine proudly display their certificates of completion.

# MIRRA

recently completed a training program titled:

Training of Trainers on Irrigation Techniques and Practices Through Theoretical and Practical Approaches Using Technology-Mediated Education (TMEs).” This 1-week training course aimed to enhance the capacity of agricultural engineers from Palestine to design, adopt and manage modern irrigation systems with a focus on treated wastewater reuse.

The training program was designed to address several core objectives: equipping trainers with in-depth knowledge of sustainable water reuse irrigation techniques, enhancing practical skills in implementing advanced irrigation methods, integrating technology-mediated education tools to improve training delivery, fostering interactive and participatory teaching methods, and developing the ability to adapt training content for diverse audiences. The training was conducted at **MIRRA's** climate-smart farm in the Jordan Valley which is a state-of-the-art facility equipped with advanced irrigation systems and tools. The climate-smart farm provided an ideal environment for blending theoretical lectures with hands-on exercises. The course curriculum was delivered through four separate modules designed for modularity and experiential learning.



**Picture 2-3:** MIRRA staff explain to the trainees the main objective for using treated wastewater during the training session at MIRRA's Climate Smart Farm

Participants engaged in practical activities such as operating and maintaining drip irrigation systems, sand filters, and fertigation units, using IRRICAD™ software for designing irrigation networks, and soil and water sampling to calculate distribution uniformity and analyze soil pH and electrical conductivity. Field trips to the National Agriculture Research Center (NARC) and wastewater treatment plants further enriched the participants' experience showcasing real-world applications of treated wastewater in irrigation outside of their theoretical and practical trainings.



**Picture 4:** MIRRA staff (middle) explain to the trainees about sand and disc filters during the practical training at MIRRA's Climate Smart Farm

**Picture 5:** Trainees examine soil samples during the practical training at MIRRA's Climate Smart Farm



**Picture 6:** An agriculture engineer trainee cleans filters during practical training

The program was designed to improve agricultural engineers' theoretical and practical knowledge of reusing treated wastewater in advanced irrigation methods. Participants demonstrated notable progress in their understanding of key topics, including crop water requirements, irrigation scheduling, and the technical aspects of fertigation systems. As a result of their training, they are equipped with the necessary skills to disseminate this knowledge to others and become qualified trainers to other agriculture engineers in Palestine. This multiplies the impact of the program's training to many other stakeholders down the value chain which ensures that the skills delivered in this training will extend beyond the participants to the broader agricultural community in Jordan, Palestine, and beyond.



MIRRA's expertise and resources were pivotal in the program's success. **MIRRA's** climate-smart farm provided access to new technologies, advanced equipment, and a team of skilled trainers which were the building blocks to an effective training course. Trainees are not only equipped with new skills, but also have experience in how these technologies are used in other contexts which is a necessary asset for effective dissemination after returning to their own farms.

The success of this training program underscores the need for continued investment in capacity-building initiatives for additional technology knowledge transfer. Future programs could delve deeper into niche areas like fertigation strategies or irrigation system optimization. By scaling up such efforts, **MIRRA** and its partners can further promote climate-smart agriculture and sustainable water management practices in Jordan and the region.



**Picture 7:** Palestinian agriculture engineers visit the Ramtha Research Station to learn about the National Agriculture Research Center (NARC) research activities related to the reuse of treated wastewater in irrigation

"The training on treated water reuse in irrigation and irrigation network design was an invaluable experience. It provided participants with the tools and knowledge to optimize water resources sustainably, supporting agriculture in innovative and responsible ways." - **Omar Al-Titi, Ard for Agricultural Development**



# Youth Capacity Building

Al-Balqa Applied University Students receive Advanced Training in Modern Agriculture



## Beneficiaries

9 Agricultural Engineers from Palestine

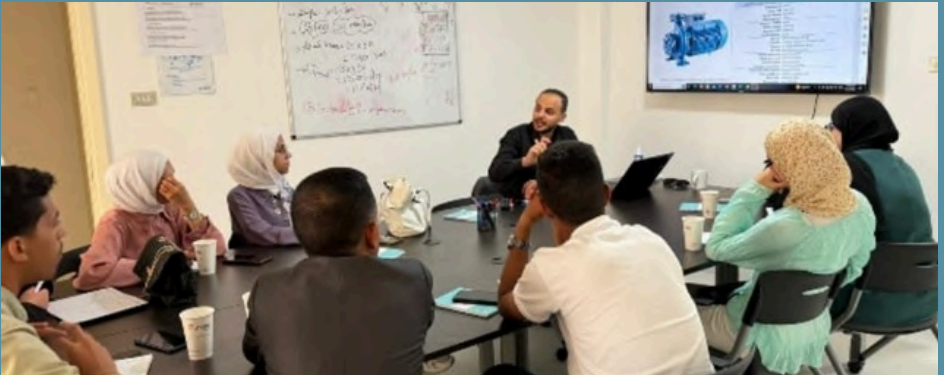


A comprehensive five-day training program was conducted to enhance the theoretical knowledge and practical skills of students from Al-Balqa Applied University in modern agricultural practices. The program was held at **MIRRA's** climate-smart farm in the Northern Jordan Valley for four days with the final day of training was conducted at **MIRRA's** offices in Amman. The primary goal of the program was to introduce students to various modern irrigation systems and techniques while also providing hands-on experience in soilless greenhouse agriculture using cocopeat as a growing medium.



During this time, students explored traditional methods of irrigation, drip irrigation (inline and online), as well as soilless agriculture. Students received training on fertigation systems, filtration methods, and the MaxGrow System which is used as electronic water treatment system for greenhouses to improve water quality and enhance plant growth. The students gained valuable insights into greenhouse systems, such as irrigation, cooling, and growing media used in soilless agriculture. On the final day, the training shifted to the office, where students received technical training in IrrCAD, a specialized software for designing irrigation systems. This session provided students with essential skills to optimize the design of irrigation systems.





The program's success stemmed from its combination of fieldwork and theoretical training to create a comprehensive educational experience. This training course's emphasis on climate-smart practices aligns well with the country's strategic environmental goals which will prepare students well for future careers in the agricultural sector.



**Picture 8:** Celebrating achievement: students from Al-Balqa Applied University pose with the MIRRA team after completing their training.

My training experience at **MIRRA** was one of the best experiences I have ever had. The company stood out with its wonderful atmosphere and unique organization, making the learning process enjoyable and productive. The training was clear and hands-on, and the supervising engineers were exemplary in collaboration and support. I learned a lot from them and gained valuable experiences that will benefit me in my professional career.”— **Rand Amjad Al-Huwaidi (Students from Al-Balqa Applied University)**





# HIGHLIGHTS



**Total Number of Students**

07



**Number of Male Students**

02



**Number of Female Students**

05



# Public Statement On The **GAZA** Ceasefire

It is with a great joy that an official ceasefire has been announced to end the horrors facing **Gaza**. After 15 months of violent conflict and humanitarian disasters that have sent shockwaves throughout the region, the people of **Gaza** can finally begin a new chapter towards rebuilding a peaceful future. Out of respect for their perseverance through war, MIRRA has refrained from social media activity and publishing newsletters in order not to call attention away from the dire humanitarian crisis occurring in **Gaza**. With the start of a new phase, MIRRA looks forward to resuming its newsletter and social media activities.

May the people of **Gaza** find respite and relief in peace as 15 months of humanitarian catastrophe comes to an end.





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