



Methods for Irrigation and Agriculture
لتطوير أساليب الري والزراعة

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From Concept to Field: MIRRA Hosts NARC, GIZ and Fraunhofer ISE for a Technical Visit on Agrivoltaics in Jordan

NARC, GIZ and Fraunhofer ISE Explore Crop-Focused Solar Applications for Vineyards and Greenhouse Production

MIRRA welcomed a technical team from the National Agricultural Research Center (NARC), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), and the Fraunhofer Institute for Solar Energy Systems ISE to its Climate-Smart Farm.

The visit aimed to introduce the team to MIRRA's farming activities, assess the farm's agricultural and environmental conditions, and discuss two potential agrivoltaic applications: partial shading for vineyards grown for grape-leaf production and photovoltaic (PV) shading along the western wall of the farm's greenhouse.

Picture 1: Eng. Ammar Namarneh presents the greenhouse control room and fertigation unit, explaining how irrigation and nutrient delivery are managed.



The visit forms part of wider efforts by NARC, GIZ and Fraunhofer ISE to assess the suitability of agrivoltaic systems under Jordanian conditions, within the Water Sector Governance project and its Water-Energy-Food-Ecosystems Nexus component, implemented by GIZ with funding from the German Federal Ministry for Economic Cooperation and Development (BMZ).

Agrivoltaic systems combine agricultural production and solar-energy generation on the same land. Depending on their design, PV modules can be installed above, beside, or between crops, while allowing agricultural activities to continue. They can also provide partial shade that may reduce excessive solar radiation, crop heat stress, and water loss through evaporation.



giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH



Picture 2: Representatives of MIRRA, NARC, GIZ and Fraunhofer ISE during their technical visit to the vineyard's solar-powered pumping system.



Two Potential Applications at MIRRA's Farm

Agrivoltaics for Grape-Leaf Production

The first concept considers partial PV shading above or between grape rows grown for grape-leaf production. Published vineyard studies indicate that well-designed shading can moderate soil and canopy conditions, help retain soil moisture, and reduce excessive solar radiation. However, shading can also affect berry development and delay ripening, making the intensity, timing,

and distribution of shade important factors. Since existing research focuses mainly on grape and wine production, with limited evidence on grape-leaf harvesting, MIRRA's feasibility study will assess suitable shading configurations and their potential effects on grape-leaf quality, marketable yield, water use, farm operations, and electricity generation under local conditions.



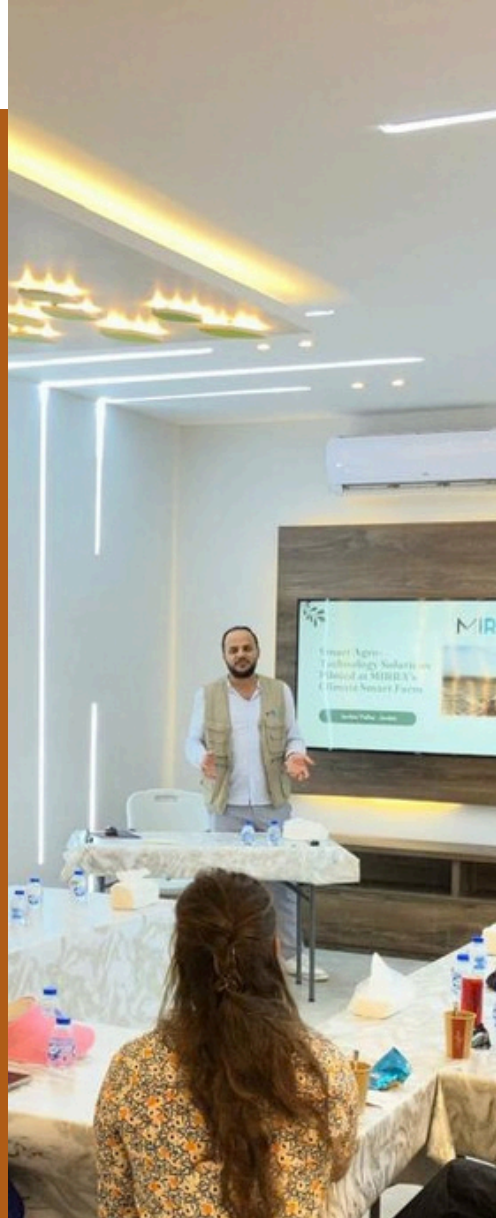
Picture 3: Eng. Ammar Namarneh explains the operation of the vineyard's irrigation pumping system and its integration with renewable energy.

Western-Wall PV Shading for Greenhouse Production

The second concept addresses conditions observed at MIRRA's multispans greenhouse, which measures 39 metres in length and 18 metres in width, with two nine-metre spans. Its western wall receives strong direct sunlight from noon until sunset, increasing afternoon solar gain and heat exposure near that side.

MIRRA presented the concept of covering approximately half of the western wall, around 19.5 metres, with PV modules. The aim is to intercept part of the intense afternoon radiation before it enters the greenhouse, while keeping the roof, eastern side, and remaining wall area open to morning and overhead daylight.

Unlike installing PV modules across a large section of the greenhouse roof, this approach specifically targets the area where excessive afternoon light and heat are most noticeable, while seeking to maintain sufficient daylight for the crop during the rest of the day.



Picture 4: Eng. Ammar Namarneh presents MIRRA's Climate-Smart Farm and its potential agrivoltaic applications to the visiting technical team.

From Site Visit to Feasibility Assessment

The technical visit allowed the team to observe MIRRA's vineyard and greenhouse directly and to discuss how agrivoltaic technologies might respond to the farm's actual conditions.

The visit purpose was exploratory: to exchange technical perspectives, present the two farm-specific concepts, and identify the main issues that require further assessment.

MIRRA's next step is to prepare a feasibility study for the vineyard and greenhouse options. The study will document the existing conditions, review relevant scientific evidence, assess the main technical and agricultural considerations, and outline the potential benefits, limitations, risks, and data requirements associated with each option.

From Farmer Needs to Field Validation: MIRRA Launches It's New AgriTech Service Line

Picture 1: MIRRA, GJU, GIZ and participating stakeholders marking the launch of the AgriTech Service Line and its pilot phase.



On 21 September 2026, **MIRRA**, together with the **German Jordanian University (GJU)**, launched the AgriTech Service Line, bringing farmers, SMEs, technical experts, and ecosystem actors together to connect real agricultural challenges with field-ready and market-oriented solutions. The pilot phase is supported by **GIZ under the Green Action in Enterprise (GAIN) project**.

For MIRRA, the launch placed farmer needs and field realities at the centre of the AgriTech innovation process.

Starting with Farmer Needs

MIRRA led the session **“Market Demand for AgriTech: What Do Farmers Need?”**, presenting findings from its Farmer Needs Assessment covering **120 farmers** across the **Jordan Valley, Mafraq, and Azraq**.

The assessment showed that AgriTech needs vary significantly by location and farming system, influenced by factors such as water availability, energy costs, farm size, production systems, market access, post-harvest challenges, and investment capacity.



Picture 2: Participants sharing perspectives and discussing the practical challenges, opportunities, and conditions for AgriTech adoption in Jordan.

Strong demand was identified for **energy efficiency, mechanization, monitoring and decision-support tools, fertigation, irrigation management, pest management, and post-harvest services**. For SMEs, these findings provide insight into priority problems, relevant farmer segments, and the value technologies need to demonstrate for adoption.

MIRRA will continue strengthening this evidence base through its farmer networks and ongoing engagement with agricultural communities as the Service Line develops.

From Technology to Field Evidence

The launch also highlighted that a technically functional technology does not automatically lead to adoption. Despite the growing availability of solutions in areas such as **smart irrigation, hydroponics, monitoring, digital platforms, controlled-environment agriculture, and agricultural data services**, adoption may be affected by costs, uncertain returns, limited technical support, trust, and adaptation to local farming conditions.

Within the Service Line, MIRRA leads the **AgriTech Field Lab and On-Farm Piloting Track**, supporting SMEs with functional or market-ready solutions to test their technologies under real agricultural conditions.

Through on-farm testing, MIRRA supports the assessment of **agronomic performance, technical reliability, potential input and cost savings, and economic value**, while farmer feedback and direct engagement help assess practicality, usability, trust, and relevance.

This approach connects **technical performance with adoption potential**, generating evidence that can help SMEs refine their solutions and strengthen their value proposition for customers, partners, and investors.



Picture 3: Eng. Ammar Namarneh, MIRRA, presenting the farmer-centered innovation approach, linking farmer needs with solution development, validation, on-farm testing, and commercialization.



Picture 4: Participants engaging directly with AgriTech SMEs and exploring technologies, solutions, and potential areas for collaboration.



Picture 5: Participants engaging directly with AgriTech SMEs and exploring technologies, solutions, and potential areas for collaboration.

Connecting SMEs with the Market

MIRRA also supports SMEs by connecting them with **farmers, early adopters, cooperatives, and other market actors**. During the GIZ-supported pilot phase, **GJU leads the Product Development Track**, while **MIRRA leads the On-Farm Piloting Track**, combining GJU's technical and business-development expertise with MIRRA's farmer networks, agronomic expertise, field access, and validation capacity.

A Field-Driven Approach to AgriTech

The launch reinforced a principle central to MIRRA's work: **innovation should begin with a real agricultural problem and be validated under real farming conditions**.

Through the AgriTech Service Line, MIRRA will continue bringing farmer needs into the innovation process, facilitating on-farm validation, generating performance evidence, and ensuring that farmer feedback contributes to technology refinement.

By connecting SMEs more closely with farmers and field realities, the **AgriTech Field Lab** aims to help promising solutions progress beyond the prototype or sales-pitch stage toward technologies that are technically sound, economically relevant, and useful to farmers.

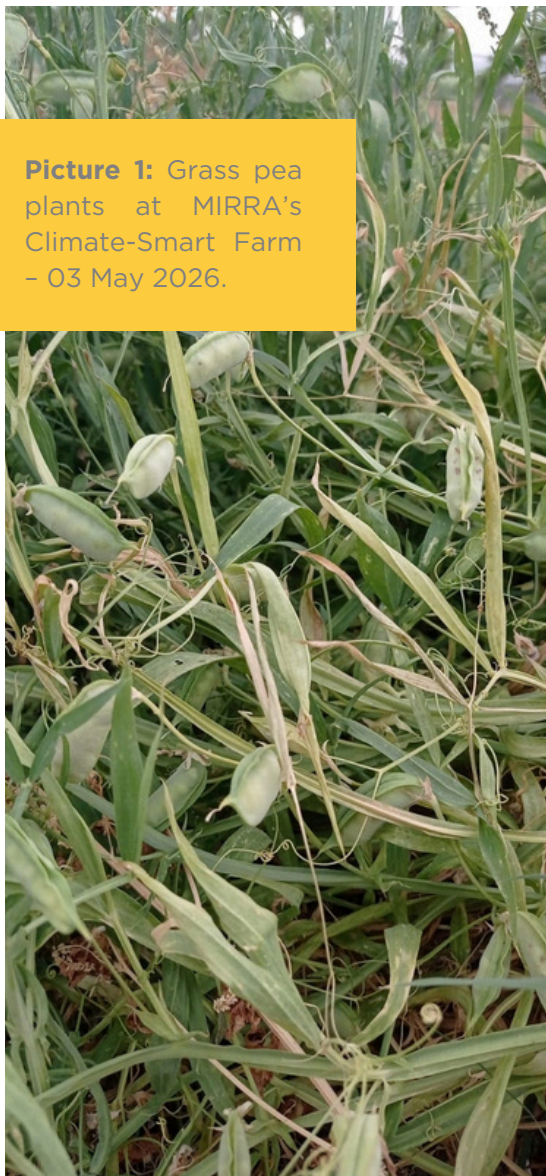


Picture 6: MIRRA presenting findings from the Farmer Needs Assessment and highlighting priority AgriTech demand segments across the Jordan Valley, Mafrqa, and Azraq.

MIRRA thanks GJU for its partnership, GIZ for supporting the pilot phase through the GAIN project, and all farmers, SMEs, experts, and ecosystem actors who contributed to the launch and discussions.

FACT SHEET

Grass Pea: A Climate-Smart Legume for Resilient Farming and Feed Systems



Picture 1: Grass pea plants at MIRRA's Climate-Smart Farm – 03 May 2026.

Overview

Grass pea (*Lathyrus sativus* L.) is a neglected and underutilized legume known for its ability to grow under challenging conditions, including **drought**, **heat**, **waterlogging**, and **salinity**. It can provide grain, forage, and crop residues for livestock while contributing to soil fertility through biological nitrogen fixation.

Why Grass Pea Matters

Feed Value

Grass pea is a potential source of **protein-rich grain**, **forage**, and **straw for animal feed**. Its residues can provide an additional locally available feed resource, particularly in dryland farming systems where feed availability can be limited.

Agricultural Value

As a legume, grass pea can contribute to **crop diversification** and **rotation systems**, helping farmers make better use of marginal and low-input areas while supporting more resilient farming practices.

Quick Facts



Crop type

Legume



Key strengths

Drought and stress tolerance



Main Use

Grain, forage, straw and animal feed



Key evaluation

Protein, fibre and digestibility

Environmental Benefits

Soil Health

As a nitrogen-fixing legume, grass pea can contribute to **soil fertility** and support more sustainable crop rotations.



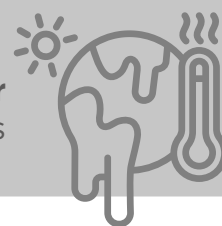
Resource Efficiency

Using grass pea grain, forage, and residues for livestock can help make better use of available agricultural resources and support more **circular farming systems**.



Climate Resilience

Grass pea is well adapted to **drought** and **other environmental stresses**, making it relevant to farming systems facing increasing water scarcity and climate variability.



Grass pea in the NUSTALGIC Project

Within **NUSTALGIC**, grass pea is explored as a **neglected and underutilized crop and feed resource**.

The project identifies **grass pea as feed** as a new crop/product application in **Tunisia**, while it was identified as underutilized before NUSTALGIC in **Lebanon** and **Spain**.

NUSTALGIC also evaluates legume-based feed resources based on **crude protein, fibre content, and digestibility**, supporting the development of more diversified and sustainable dry-farming and livestock systems.

Key Message

Grass pea is a resilient, multi-purpose legume with potential to support climate-smart agriculture, soil fertility, and locally available livestock feed resources. Through NUSTALGIC, its potential is being explored as part of more diversified and sustainable farming systems in the Mediterranean.



Picture 2: Grass pea plants at MIRRA's Climate-Smart Farm – 26 April 2026.



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