

► ILO Brief

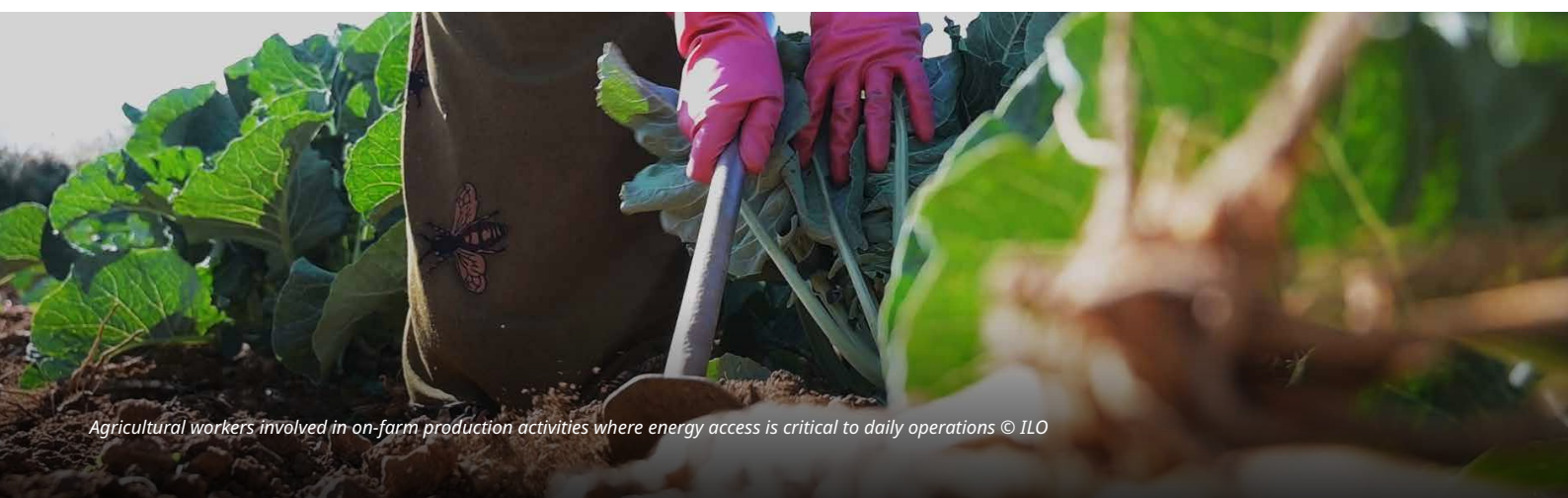
April 2026

From information gaps to market solutions: expanding solar energy access for agricultural customers in Lebanon¹

Key points

- Through the [Building Inclusive Markets and Decent Work for Syrian Refugees and Lebanese Host Communities \(BOUZOUR\)](#) project, funded by the Swedish International Development Cooperation Agency (Sida), the International Labour Organization (ILO) is supporting **the adoption of sustainable energy solutions in Lebanon's agricultural sector**. The intervention addresses key market constraints, including limited access to reliable technical information on energy-producing solar photovoltaic (PV) systems, high investment uncertainty and weak linkages between agricultural energy demand and solar service provision.
- This intervention presents results from the operationalization and pilot testing of a user-centred solar decision-support tool focused on energy efficiency and energy demand quantification during the pre-design phase of solar PV systems. The pilot operationalized the PV assessment tool and **deployed 17 trained village agents, who conducted 156 on-site assessments with farmers and agri-businesses**. The intervention supported agricultural customers in assessing energy needs, estimating system sizing and payback periods and enabled solar providers to more efficiently identify technically viable and reliable agricultural customers.
- The intervention **strengthened market linkages between agricultural customers and solar energy providers** by reducing information asymmetries and early-stage customer screening costs. Through locally embedded technical intermediation and pre-qualified customer assessments, it contributed to improved market efficiency, reduced diesel dependency, and increased adoption of sustainable energy solutions in agriculture

¹ This intervention and brief were carried out by Hala Obeid with support from Luana Ayala.





Solar energy solution adapted to farmers' needs in the agriculture sector in Akkar region. © ILO

Energy constraints and agricultural resilience in Lebanon

Lebanon's prolonged economic crisis and electricity shortages have significantly affected agricultural production systems and agri-food value chains. Between 2020 and 2022, fuel shortages and subsidy removal caused major electricity disruptions and rising energy costs, affecting irrigation, cold storage and agri-processing, leading to lower productivity and higher post-harvest losses

Within this broader context, rising energy costs and supply instability have become structural features shaping the operating environment of agricultural enterprises. The increased reliance on private energy generation and diesel-based solutions has significantly increased production costs, reduced profit margins and increased exposure to market volatility. For many small and medium agricultural producers, energy expenditure has shifted from a variable cost to a critical operational risk, directly affecting production planning, investment decisions and business continuity across agricultural and agri-food value chains.

Moreover, agriculture continues to represent one of the few sectors providing employment opportunities for vulnerable Lebanese populations and Syrian refugees. Ensuring the resilience and competitiveness of the agricultural sector therefore remains critical not only for food systems but also for sustaining livelihoods and supporting decent work opportunities.

Understanding the barriers to solar energy adoption in agriculture

Against this backdrop, despite growing interest in solar photovoltaic (PV) solutions among farmers and agri-businesses, adoption has remained limited.

A main constraint relates to the limited availability of accessible and independent technical guidance tailored to agricultural energy needs. Many agricultural customers lack the technical capacity to accurately assess their energy needs, determine the right solar system size or judge whether a solar investment makes financial sense. Energy efficiency assessments are usually carried out by certified consultants and most agricultural customers find these services too expensive to hire. At the same time, solar system sizing is typically done by solar companies themselves, but many customers do not fully trust the quotations they receive, as they often feel suppliers may be oversizing systems to increase costs. As a result, farmers tend to rely on informal advice or delay investment decisions due to uncertainty and perceived risk, while independent technical and advisory services remain limited in the market and financially out of reach for many.

Meanwhile, solar energy providers face operational challenges in effectively serving agricultural customers, particularly in rural areas. Agricultural profiles are often complex and vary across production cycles, requiring significant time and technical effort to assess. As a result, solar providers frequently incur high costs in identifying and screening potential customers, many of whom may not yet be technically or financially ready to invest. These dynamics reduce incentives for solar providers to actively target the agricultural sector.

Together, these factors contribute to a persistent gap between growing demand for solar energy solutions and the effective provision of technical services and investment support required to enable adoption at scale.

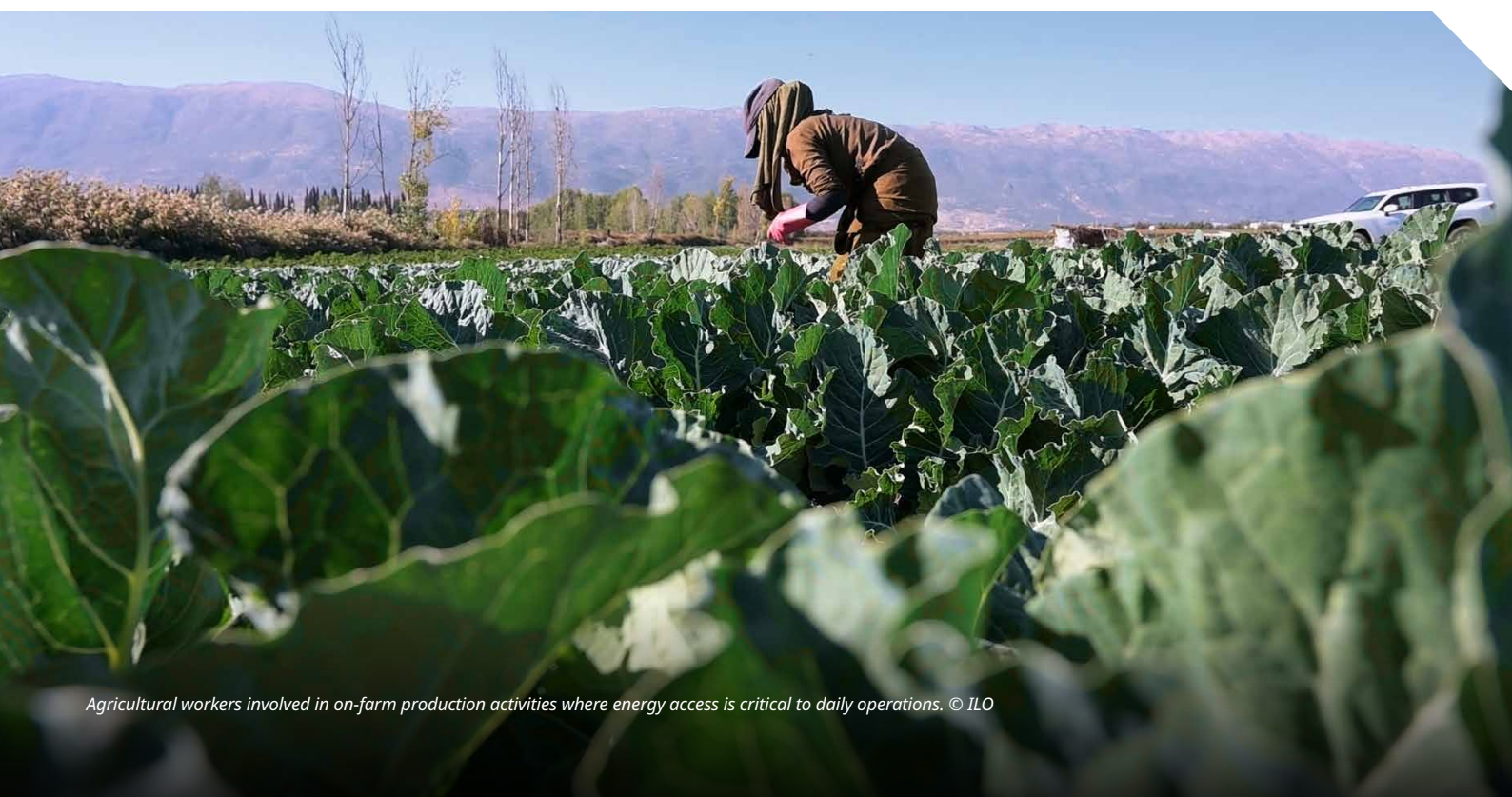
Designing a practical solution to bridge information gaps

These constraints highlighted the need to strengthen access to reliable and independent technical guidance to support informed solar energy investment decisions among agricultural customers and improve the effectiveness of engagement between farmers and solar service providers. While solar companies typically provide system sizing and quotations at no cost, many farmers remain hesitant to rely on supplier-driven assessments due to concerns about potential oversizing. Simultaneously, more reputable solar companies often deprioritize agricultural clients, given the high transaction costs and lower conversion rates associated with financing constraints in the sector. As a result, farmers

frequently rely on less reputable providers or informal sources of advice. Establishing access to a trusted, neutral assessment tool can help address these trust and information gaps by providing farmers and solar providers with a consistent, transparent and technically reliable basis for investment planning and system design decisions.

Yet, addressing these constraints required improving how solar providers identify and engage potential agricultural clients and for the latter to access reliable pre-investment technical information. This pointed to a missing system function linking demand and supply at the pre-investment stage, which the project helped address by supporting the establishment of a technical intermediation role within the market system. In practice, solar companies often relied on word-of-mouth referrals and existing networks to source agricultural clients, given the cost and uncertainty of conducting early-stage technical screening. This created a gap in the value chain at the pre-investment stage. Strengthening access to credible and structured pre-investment technical assessments helped close this gap by lowering early engagement costs, reducing information asymmetry and ensuring that both farmers and solar companies could rely on consistent and technically reliable information.

Strengthening functions related to early-stage client sourcing, market intermediation and pre-investment technical assessment was considered key to improving transparency in solar investment planning, increasing confidence across market actors and supporting the gradual development of more sustainable technical advisory and service delivery mechanisms within the agricultural energy market.



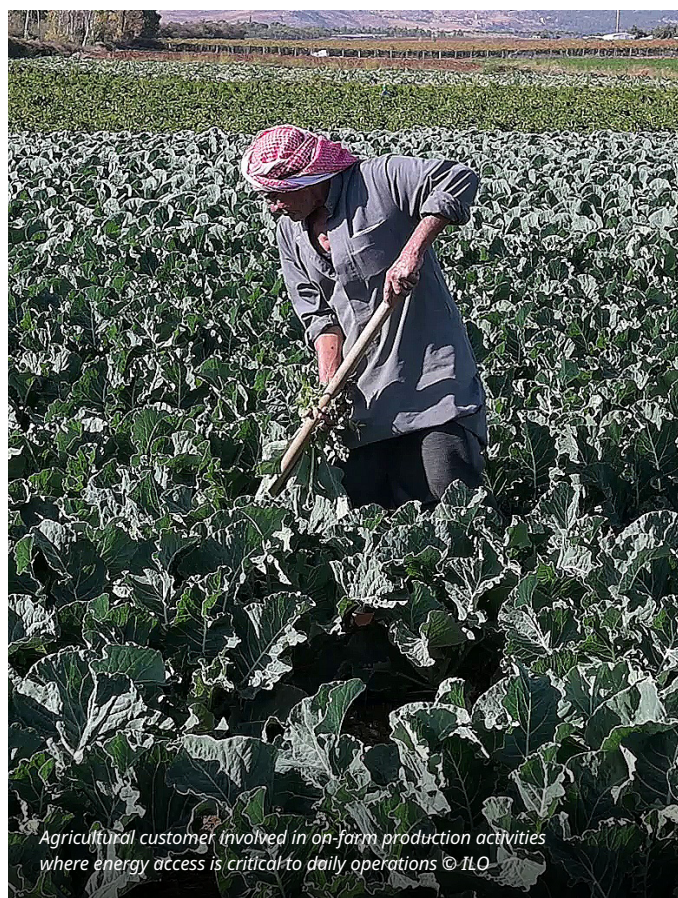
Partnering with LSES and piloting the village agent model

To operationalize this approach, the Bouzour project partnered with the Lebanese Solar Energy Society (LSES), identified as a credible technical partner with sector-wide reach and expertise in renewable energy standards.

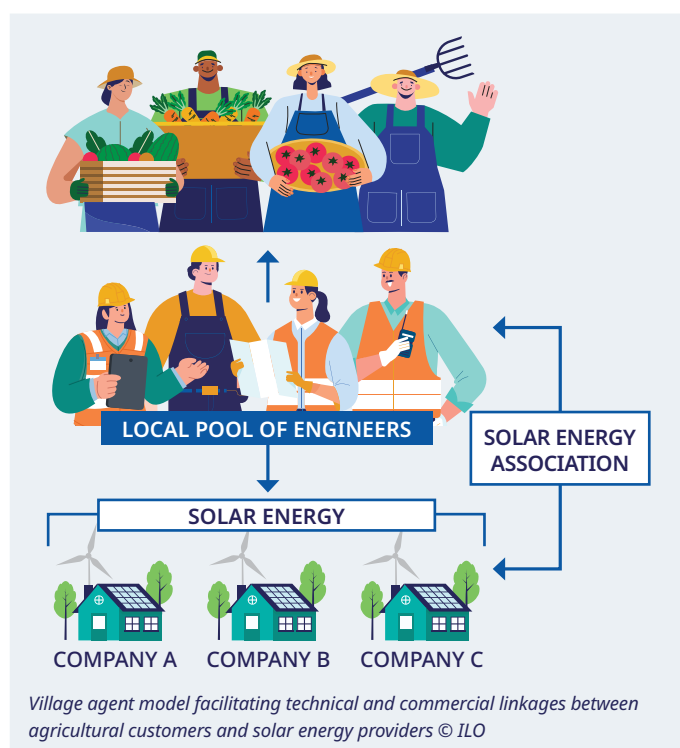
LSES developed a user-oriented PV assessment tool designed for non-technical users. The tool enables farmers and agri-food businesses to estimate energy demand, receive indicative system sizing, assess budget ranges and calculate payback periods based on their specific operational context. Importantly, the intervention went beyond the tool itself. The project piloted a field-based village agent model - a pool of regionally based engineers who maintain direct contact with agricultural customers through ongoing advisory and farm business support.

Through this model, LSES trained local engineers to conduct on-site assessments and provide direct support to farmers. These village agents acted as neutral intermediaries, translating technical information into practical guidance and linking farmers with qualified solar providers. During the pilot phase, the project provided a small fee to conduct these assessments to test whether this could become a commercially viable service. The objective was to demonstrate the model to solar companies and understand what type of commercial arrangement they would be willing to adopt to engage village agents, such as payment per customer referral, a commission percentage, or other performance-based incentives. The model and costing approach were then presented to solar companies, including LSES, to assess their willingness to integrate and pay for this service within their commercial operations.

Over time, sustainability is expected through solar companies integrating this model into their customer engagement and pre-sales functions, with service delivery aligned to the quality assurance and neutrality principles set under the LSES model. Through this model, farmers and agri-businesses were assessed across targeted regions. Farmers reported that the assessments provided information rarely available during initial discussions with installers, including energy efficiency considerations, realistic cost expectations and investment feasibility.



Agricultural customer involved in on-farm production activities where energy access is critical to daily operations © ILO



Improving efficiency and transparency in the solar market

The combined tool and agent model also addressed long-standing inefficiencies faced by solar companies. Installers highlighted that the standardized assessment reports allowed for faster feasibility screening, clearer system design assumptions and more focused engagement with serious, technically viable clients.

Reducing uncertainty at the early stages of engagement, helped lower transaction costs for installers, improve pricing accuracy and reduce unnecessary competition driven by poorly defined project scopes. Solar companies emphasized that receiving independent assessments strengthened trust with clients and shortened the time required to move from initial inquiry to project proposal.

Results and early market effects

The pilot phase demonstrated strong operational and market-level results. The PV assessment tool was successfully developed, deployed and integrated across multiple stakeholder platforms. The pilot also resulted in the training and deployment of 17 village agents, who conducted 156 site assessments with farmers and agri-businesses during the five-month intervention period (June–October). Following the conclusion of the pilot, LSES continued disseminating the tool and model, while maintaining engagement with solar companies to support the integration of this approach into their regular operations. In parallel, 20 solar companies engaged with the model and validated its relevance for improving customer screening and project design processes.



This tool gives agricultural customers technical advice to help them understand what application works best for them without being guided toward systems that are not beneficial for their situation.

► **Sandra Aoun**
DAWTEC Lebanon - Solar Energy Company

This was particularly significant as many had not previously targeted agricultural clients due to high transaction costs, limited access to reliable pre-investment information and perceived sector risks. The model helped reduce these barriers which demonstrates its potential to unlock new market participation and expand solar companies' engagement in the sector.

Farmers reported improved confidence when evaluating solar investment options, stronger understanding of energy demand requirements and clearer expectations regarding system performance and financial returns. Solar companies reported faster feasibility assessments, improved quality of customer engagement and reduced time spent on preliminary screening.



Many farmers come to us unsure about solar energy. This tool helps them understand their needs clearly before speaking to a solar company.

► **Najla Choufani**
Agriculture engineer

The pilot also demonstrated the feasibility of a technical intermediation role capable of bridging technical and commercial gaps between agricultural customers and solar providers.

Pathways toward sustainability and scale

Building on pilot results, LSES will embed the technical assessment and local service delivery functions within its core service offering to ensure continuity beyond project phase.

Moving forward, LSES will prioritize expanding the village agent network, strengthening collaboration between actors and advancing commercially viable service models. Through these actions, LSES aims to support the emergence of sustainable technical services that reduce information gaps and transaction costs, while improving confidence in solar investment planning and strengthening trust among market actors to accelerate solar adoption in agriculture.



Licensed under CC BY 4.0 © International Labour Organization 2026

ILO. *Boosting productivity and decent work through affordable greenhouse upgrade*, ILO brief, Geneva: International Labour Office, 2026. © ILO. <https://doi.org/10.54394/00033371>

Contact details

International Labour Organization
Aresco Center, Justinien Street
Riad El Solh 1107-2150
Beirut – Lebanon

T: +961-1-752400
E: beirut@ilo.org

    @iloarabstates