

Digital Tools for Agrivoltaics: From Pre-Assessment to Operation

Executive summary

Agrivoltaic (APV) systems allow the same land to produce food and renewable electricity. Yet farmers, cooperatives and project developers still lack accessible tools to answer an essential early-stage question: could an APV project work technically and economically on a specific plot?

DIGI-GROW addresses this question through a digital workflow covering the different stages of APV projects: from early feasibility assessment and system sizing to operational performance management. This workflow is built on a modelling framework that integrates energy, crop, water, economic and environmental indicators. Midway through the project, the irradiance and photovoltaic (PV) models have been validated, the first demonstrator evidence published, and the calculator specification and navigable prototype completed.

1. The challenge

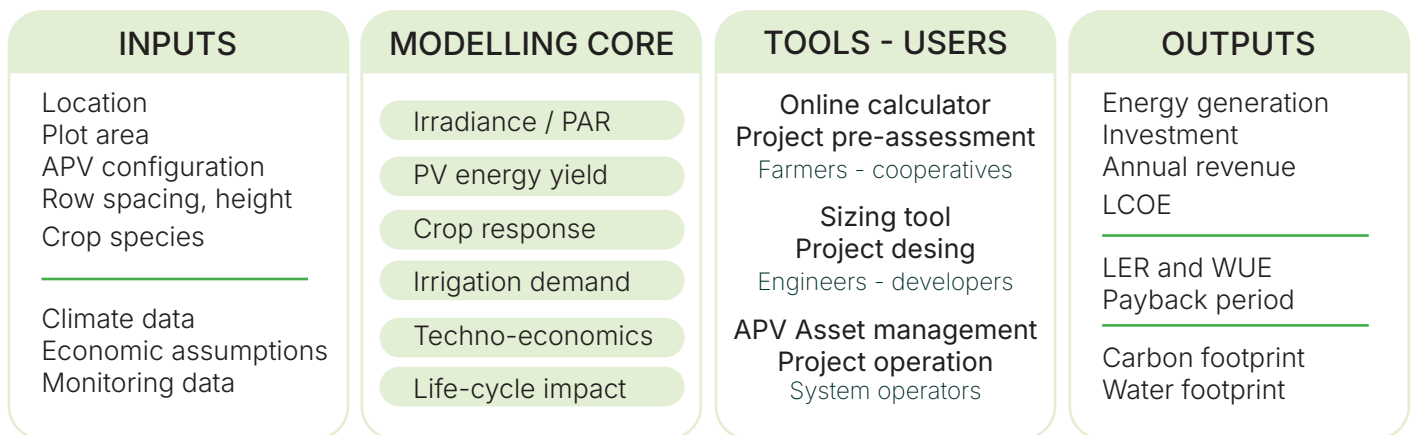
APV can reduce competition between solar energy and agriculture and, under suitable conditions, moderate heat stress and reduce crop water demand. APV performance depends on location, crop, system design, costs and energy use. Existing simulators mainly address individual technical aspects, while economic, environmental and operational factors remain fragmented.

2. The DIGI-GROW solution

- Online APV calculator – Project pre-assessment. A guided tool for farmers, cooperatives and promoters, providing an initial feasibility assessment before detailed engineering.
- Professional sizing tool – Project design. A professional tool for engineers, installers, developers and consultants, supporting project design and quotations.
- Asset management solution – Project operation. A future operational layer comparing monitored and predicted performance to identify deviations.

What makes DIGI-GROW different?

Rather than providing isolated simulations, DIGI-GROW connects APV pre-assessment, professional design and operation within a common digital framework. By integrating energy, crop, water, economic and environmental perspectives with field validation and user-oriented tools, the project aims to bridge the gap between research and practical APV decision-making. This approach makes APV assessment more accessible to non-experts while giving professionals more comprehensive support for design and operation.



operational data feed back into the models

3. Mid-project progress and first results

A geometry-based model estimates crop-level light distribution across different APV configurations, while the PV model uses public climate data and includes key performance losses. The calculator workflow, indicators, report and navigable prototype have been defined. Customized irrigation and life-cycle assessment models are also being developed.



Tool	Target user	Purpose	Current status
Online APV calculator	Farmers, cooperatives, promoters	Initial feasibility assessment	Prototype / First specification
Professional sizing tool	Engineer and project developers	Detailed system design	Under development
Asset management	Operators and asset owners	Performance monitoring and operational decision-making	Planned / Under development

Step 2 of 5

Installation location

Find the plot on the map or enter the coordinates, and indicate the total area.

Search address or place

PFX6+WG Málaga, España

Latitude

36,749873572046155

Longitude

-4,538709840912262

Total parcel area

2

ha

Mapa

Satélite

DIGI-GROW - WP4

Agrivoltaics Solar Calculator

Pre-dimensioning tool for agrivoltaic (APV) systems: enter a few parameters and get a technical-economic report in PDF.

✓ Guided capture of the installation parameters

✓ Summarised results visualisation

✓ Downloadable PDF report with the DIGI-GROW format

Get started →

Prototype: the calculation engine is not included in this phase, results are example values.

The dual shading-energy modelling framework and its application to actual APV systems have already been validated through two of the project's demonstration sites. A scientific publication has presented the accuracy of the PV and irradiance models and has assessed the performance of the project's demonstration sites in southern Spain, providing evidence of the potential benefits and trade-offs of APV systems under different agricultural conditions.¹ Two monitored demonstrators are currently operating in southern Spain, at the University of Seville and in a vineyard in Laujar de Andarax, while a third site is under construction in İzmir, Türkiye. The ongoing monitoring activities will provide further data to refine and validate the models and support the development of the DIGI-GROW digital tools.

4. Impact and next steps

Different stakeholders will use and benefit from the developments of DIGI-GROW:

- Farmers and agricultural cooperatives: Preliminary assessment of APV feasibility and potential benefits for their sites.
- Project developers, engineers and consultants: Quick comparison of APV configurations and support project design and technical proposals.
- System owners and operators: Monitoring, assessment and decision-making support by comparing predicted and monitored data.
- Researchers and technology developers: Benefit from validated integrated models and high-quality field data from demonstration sites.
- Policymakers and public bodies: Evidence to support informed decisions and policies for APV deployment.

The consortium will complete the calculator, extend its technical base into the sizing tool, and develop the asset management and user-interface layers. Crop, irrigation, economic and environmental models will be refined as new data become available. By integrating assessment, design and operation within a common digital framework, DIGI-GROW aims to make APV projects easier to evaluate, design and operate, supporting their more informed deployment.

¹ Fernández Solas, Á. et al. (2026), "Monitoring and assessment of elevated agrivoltaic systems in southern Spain, Solar Energy, <https://doi.org/10.1016/j.solener.2026.114845>.