European Commission

SCIENCE FOR POLICY BRIEF

Agri-photovoltaics workshop

Agri-photovoltaics (Agri-PV): how multi-land use can help deliver sustainable energy and food

HIGHLIGHTS

- → Agri-PV has the potential to be a **win-win** for **renewables**, **agriculture** and other **sustainability** dimensions.
- → An EU wide Agri-PV **definition** is needed. A related **standard** at European level would be helpful.
- → More consistent approaches for Agri-PV projects will enhance its **public acceptance**. Communication is important.
- → Geospatial planning, potential fast-track applications and identification of preferred Agri-PV zones could facilitate the **permitting** procedures.
- → The primary use of Agri-PV should be agriculture. **"Greenwashing"** of Agri-PV must be avoided. Farmers need to be at the centre of Agri-PV developments.
- → Agri-PV projects should be recognised and promoted in the agricultural context and supported by the Member State **Common Agricultural Policy (CAP) strategic plans**.
- → Agri-PV **technology** has developed significantly but needs to be further strengthened through R&D and pilot schemes.

Agri-PV has the potential to simultaneously ensure food and energy security while at the same time contributing to sustainability and to the European Green Deal (EGD) targets. JRC hosted an Agri-PV workshop with key stakeholders on 24 March 2022. This briefing note summarises the main messages from the discussions.

Why Agri-PV?

Agri-PV is the simultaneous use of areas of land for both solar **photovoltaic** power generation and **agriculture**. It interacts with a range of policies related to renewables, agriculture and research & innovation (EU strategy on solar energy, future Horizon Europe calls). Agri-PV's multi-

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use of land has the potential to make a major contribution to achieving the targets set in the European Green Deal (EGD).

A win-win situation

There is considerable evidence for the mutually beneficial application.

From the point of view of agriculture, scientific studies clearly show that for certain types of crop there is a higher crop yield due to the beneficial effect of shading by the photovoltaic modules and/or the mitigation of risks on crops caused by extreme weather events. In addition, Agri-PV can help decarbonise the agricultural sector, avoid plastic waste, promote circularity, favour sustainable land use and create "green" jobs.

From the energy production point of view, the need for energy independency in times of high geo-political risks and the need to significantly increase the renewable energy production from photovoltaics, make Agri-PV an important and promising solution. Plans for photovoltaics to reach multiple terawatt levels by 2050 imply that finding suitable space can be a challenge. Already for 2030, it is estimated that about 1 million hectares of land currently designated arable (approx. 1%) would be needed for ground-mounted PV systems.

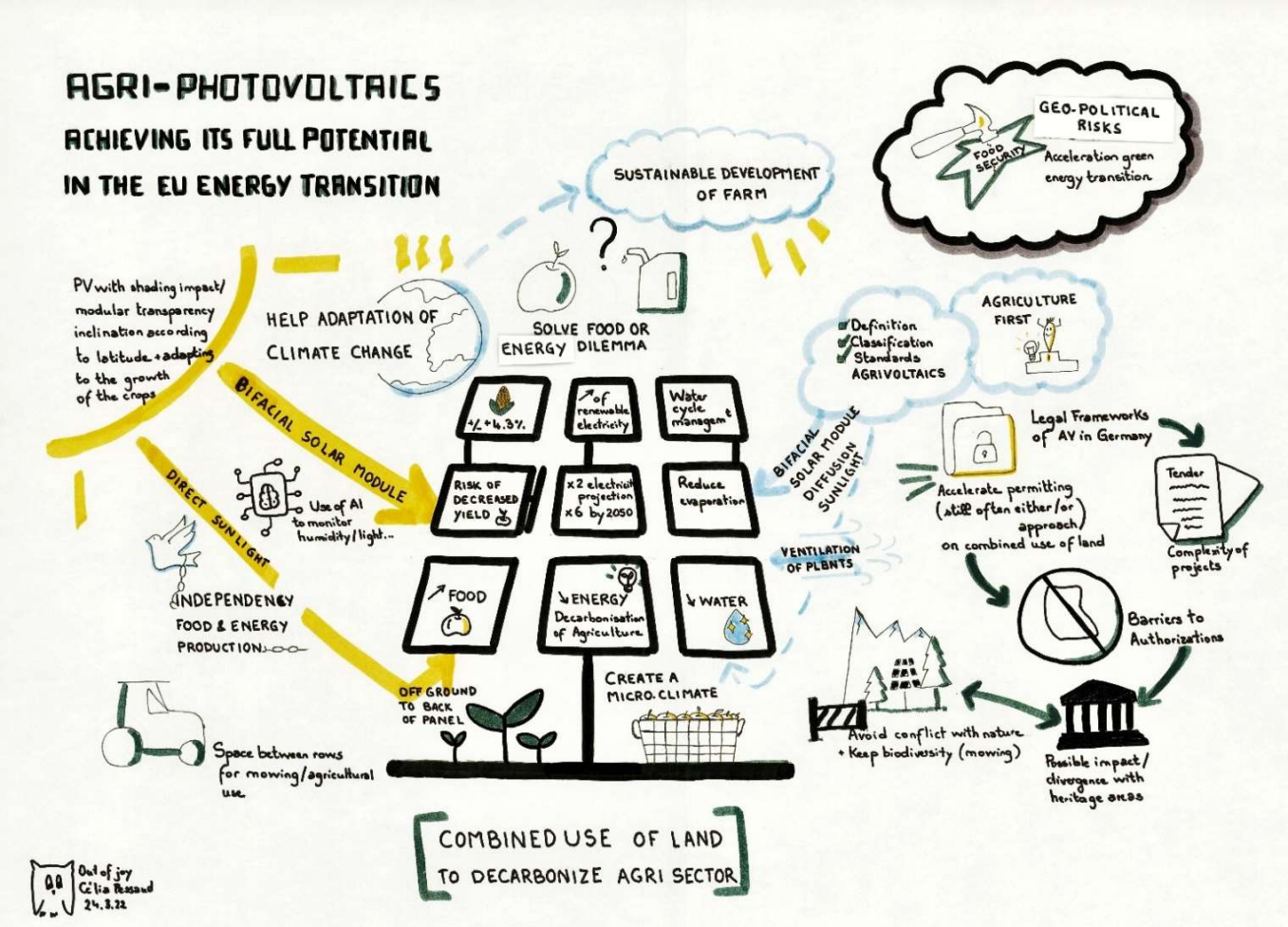
Multi-use via Agri-PV can help gain public acceptance and directly benefit farmers and rural communities.

Definitions and standards

The lack of a universal definition for Agri-PV is a major issue. Germany's new technical specification (DIN SPEC 91434) is the first step towards standardisation for Agri-PV applications, albeit with some limitations. Other countries have also started working on their own standards. Harmonisation of the definitions and standards at EU level is seen as important both for the deployment of Agri-PV and as a protection against "greenwashing" practices.

From an environmental protection point of view, Agri-PV should not impact in a negative way its surrounding ecosystem.

Visual harvesting drawing during the workshop



The current coexistence between the ecosystem and the modern agricultural activity should not be disturbed. The addition of photovoltaics should induce only minimum acceptable changes and preferably impact the ecosystem in a positive way.

Finally, the communication of all the above is considered crucial to avoid confusion.

Land permitting and public acceptance

There is a lack of consistent approaches to land permitting at local level. Different requirements exist for different member states: in Italy for example, landscape preservation and heritage sites are of primary importance. France is working on “fast-track” procedures for identified “essential” Agri-PV projects and also on a plan for a standardised approach rather than a case-by-case permitting.

A need for geospatial planning is evident and alongside with a clear definition of agricultural land suitability for Agri-PV applications. One option being considered by the Commission is to introduce a new land use category on "farmland with integrated solar power generation".

All agree that public acceptance and awareness amongst farmers and the rural communities directly affected is absolutely essential.

Albers raspberry farm in Babberich (The Netherlands)

Agri & Energy Policy Synergies

The EU’s Common Agricultural Policy (CAP) encourages synergy between the development of renewable energy sources and agricultural activities, and in principle installation of Agri-PV systems does not affect the eligibility of agricultural activities for financial support.

However, according to the JRC’s scan of the member state draft CAP strategic plans for 2023-2027, only two directly referred to Agri-PV and just seven mention any form of PV installation.

While it is recognised that the CAP is not primarily intended as a source of funding for renewables, it can be useful to signal the benefits of multi-use of land for food and Agri-PV energy production to help member states contribute to the EGD targets without compromising the crop yield production.

Agri-PV technology

There are several established concepts, as diverse as agriculture itself, that have been put into practise and their validation is constantly verified and monitored.

More research and development (R&D) is still needed, for example on aspects like partial shading, agricultural and photovoltaic yield, biodiversity impacts, pilot schemes and monitoring of the systems.

More pilot schemes may be needed and these can be encouraged to share experiences. Best practises and guidelines can constitute the basis of further development.

Recommendations

- A concrete Agri-PV definition and a European standard (CEN: Comité Européen de Normalisation) for Agri-PV systems and applications can facilitate deployment, avoid confusion amongst stakeholders, promote public acceptance and reduce “greenwashing”.
- Consensus on biodiversity and other ecosystems requirements is of primary importance.
- Reinforcement of geospatial planning at national level together with EC recommendations on agricultural land zoning and characterisation for Agri-PV suitability could accelerate the permitting process.
- Further promotion of solar energy production in the agricultural sector should be supported under the CAP strategic plans. The recognition of the importance of PV and Agri-PV in the agricultural context through the CAP strategic plans will send a valuable signal to authorities involved in geospatial planning and permitting.
- Farmers and rural communities should be at the centre of efforts to promote Agri-PV projects.
- Research and development (R&D) regarding the performance of Agri-PV projects from the agricultural (crop yield), the energy (energy yield) and biodiversity side. Data sharing is also important for further reduction of costs and derisking investments.

PARTICIPATING ORGANISATIONS

European Commission staff from DG JRC, DG ENER, DG RTD, DG AGRI, EISMEA, SolarPower Europe (AgriSolar Workstream), Amarenco (AgriSolar Workstream), Nature And Biodiversity Conservation Union (NABU), University of Hohenheim, Fraunhofer Institute for Solar Energy Systems ISE, Next2Sun GmbH, REM Tec, France Agrivoltaïsme Association, ENEA (Agrivoltaico Sostenibile), Iberdrola, BayWa r.e. Solar Projects GmbH, Agro-voltaics working group of the Polish Photovoltaics Association, Institute for Renewable Energy of Poland (IEO).

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