Selection of Current Projects on Agrivoltaics

“APV Obstbau (Orcharding)” – Agrivoltaics as Resilience Concept for Adaptation to Climate Change in Orchading
Fruit growing in Germany is already affected by the consequences of climate change: strong solar radiation, rising temperatures and increasingly frequent extreme weather events such as hail and heavy rain. In the project “APV Orcharding”, the researchers are investigating the extent to which an agrivoltaic system can take on a protective function instead of hail protection nets and foils. In addition, research is being carried out to determine which system design works best with which crop and to what extent the PV system has an effect on crop yields.

“APV-MaGa” – Agrivoltaics for Mali and Gambia: Sustainable Electricity Production by Integrated Food, Energy and Water Systems
In “APV-MaGa” a threefold land use for rural regions in West Africa is being investigated and implemented.

- cultivation of food crops
- solar power production
- rainwater harvesting and storage via the installed solar panels
- overarching goals: Demonstrate potential and technical feasibility for West Africa and develop economically viable business models for rural regions.

Further Information

Project website “APV Obstbau”

Project website “APV-Maga”

Fraunhofer ISE

Fraunhofer Institute for Solar Energy Systems ISE

Contact

Max Trommsdorff
Agrivoltaics
Phone +49 761 4588-2456
pvmod.apv@ise.fraunhofer.de

Fraunhofer Institute for
Solar Energy Systems ISE
Heidenhofstr. 2
79110 Freiburg, Germany
www.ise.fraunhofer.de/en

www.agri-pv.org/en

Integrated Photovoltaics

Dual Use of Land with Agrivoltaics

9-291-21

R&D for the Energy Transition

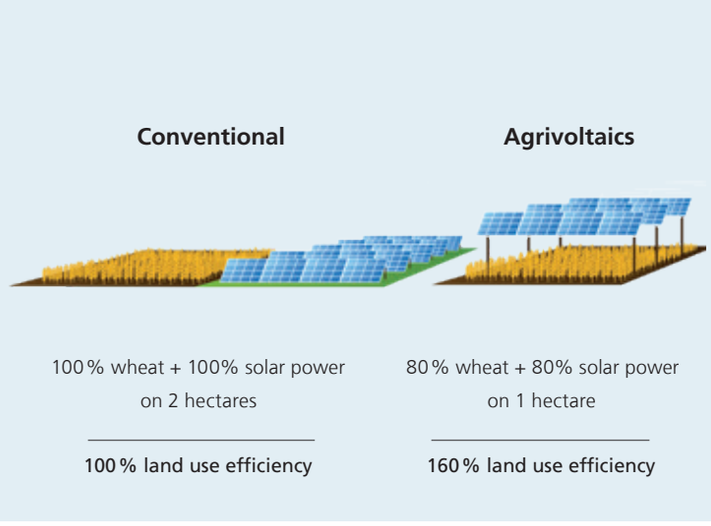
Agrivoltaics Creates Synergies

The energy transformation requires a massive expansion of solar electricity production, combined with a high demand for space. The problem for ground-mounted systems: Agricultural land is a very limited and valuable resource. Agrivoltaics solves this conflict by enabling food production and electricity generation on the same area.

Through dual land use, agrivoltaics not only increases land efficiency but also increases the resilience of agricultural production to the consequences of climate change. Agrivoltaics provides farmers with additional income and promotes the economic development of rural areas.

Our Services

- GIS-based potential analyses
- analysis and optimization of PV and crop yield (also bifacial, tracking systems)
- light management, profitability
- design of agrivoltaic plants
- prototype development and implementation
- quality assurance and monitoring
- optimization of self-consumption of PV electricity
- social and environmental impact studies, feasibility studies
- technology transfer to other countries and climate regions



Land use efficiency for agrivoltaics in wheat cultivation in Heggelbach/Germany in 2017.

Apple orchard with agrivoltaic system in Gelsdorf, Germany with 258 kW_p installed capacity.

High Potential for Agrivoltaic Systems

In recent years, agrivoltaics has developed very dynamically in almost all regions of the world. Government subsidy programs in Japan, China, France and the USA, among others, led to an increase in globally installed agrivoltaic capacity from approx. 3 MW_p to almost 14 GW_p between 2012 and 2021. The estimate of technical potential for Germany is around 1700 GW_p.

Intelligent Lighting Management

To harvest solar energy and crops on the same area, a balanced ratio of light and shade is required. Fraunhofer ISE has developed models and concepts to optimize yields in form of energy production and agricultural products through targeted light management.

By selecting and adapting module types, mounting frames and installation parameters, it is ensured that the respective plants receive sufficient light throughout the day and year.

Sun Protection in Times of Climate Change

Central elements of agrivoltaic research are interactions and synergies between the fields of agriculture and photovoltaics. An adapted PV system design with targeted light management and the selection of suitable plant species can stabilize or even increase agricultural yields. Particularly in increasingly dry periods, crop failures can be reduced or avoided altogether. The need for irrigation is reduced due to partial shading, and wind erosion decreases. The PV substructure can also be used for protective nets or foils or even replace these. The resilience of fruit and vegetable cultivation to hail, frost and drought increases.

Detailed Studies and Planning

Dual land use for agriculture and photovoltaics is accompanied by high legal, economic and social requirements. The know-how of the interdisciplinary team of agrivoltaics at Fraunhofer ISE provides the ideal basis for the development and implementation of agrivoltaic projects.