

Next-Gen Farming Meets Renewable Energy in \$9.3 Billion Agrivoltaics Market by 2031

Agrivoltaics merges farming and solar power, easing land-use conflicts while boosting food and energy output and providing dual income for farmers.

WILMINGTON, DE, UNITED STATES, June 19, 2025 /EINPresswire.com/ -- According to a new report published by Allied Market Research, titled, "Agrivoltaics Market," The agrivoltaics market was valued at \$3.6 billion in 2021 and is estimated to reach \$9.3 billion by 2031, growing at a CAGR of 10.1% from 2022 to 2031.



Agrivoltaics, also known as agrophotovoltaics, is an innovative approach that integrates agricultural activities with photovoltaic (PV) energy generation on the same land area. This dual-use system allows for the cultivation of crops beneath solar panels, optimizing land use and addressing the growing global demand for both food and clean energy. The shading effect provided by solar panels can help reduce crop water stress, enhance soil moisture retention, and create a more favorable microclimate, especially in arid and semi-arid regions.

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Agrivoltaics offers a sustainable solution by maximizing land use efficiency, combining renewable energy generation with agricultural productivity on the same land.”

Allied Market Research

The agrivoltaics market is gaining traction globally due to its potential to improve agricultural productivity while generating renewable energy. Growing awareness about climate change, land scarcity, and the need for sustainable

farming practices is driving investment in agrivoltaic projects. Governments and research institutions are also promoting pilot programs and incentives to encourage adoption. As the renewable energy sector continues to expand, agrivoltaics presents a promising solution to balance energy needs with food security, positioning itself as a key component of future sustainable land management strategies.

Agrivoltaics Market Dynamics

1. Market Drivers

The agrivoltaics market is gaining momentum through its dual-benefit model—simultaneous food production and renewable energy generation on the same land. This integrated solution addresses land scarcity and rising demands for both food and clean energy. The solar panels provide shade that can reduce soil moisture loss and plant heat stress, enhancing crop quality and yield. Supportive government policies, financial incentives, and growing awareness of sustainable agricultural practices are further propelling adoption of agrivoltaic systems globally.

2. Technological Advancements

Recent innovations in panel design, mounting structures, and shading configurations have improved the efficiency and flexibility of agrivoltaic installations. Adjustable and bifacial solar panels now allow for more precise light control and higher power yields without compromising crop growth. Advances in remote sensing, IoT-enabled farm controls, and agronomic research are enabling optimized system performance—balancing solar output with crop productivity through data-driven insights.

3. Market Restraints

Despite its advantages, agrivoltaics faces several adoption barriers. High capital expenditure for installation and infrastructure remains a key concern for farmers and investors. Furthermore, the need for customized solutions tailored to specific crops, climates, and farm practices increases complexity. Regulatory issues, such as land-use zoning and grid interconnection approvals, can also slow deployment. Establishing economic viability on smaller-scale farms remains especially challenging.

4. Market Opportunities

Expanding installations in arid, semi-arid, and water-stressed regions open new growth avenues by combining enhanced crop resilience with solar power output. Partnerships between agribusinesses and solar developers are emerging to share costs and benefits. Additional opportunities include co-locating energy storage, greenhouse integration, and livestock grazing under panels, as well as tapping carbon credit markets and sustainability-linked financing to improve project economics.

5. Market Outlook & Sustainability

As sustainability and circular resource use gain prominence, agrivoltaics is poised to transition from pilot projects to mainstream deployment. Increasing global investments in net-zero agriculture, renewable energy, and food security initiatives will support long-term growth. Technological standardization, stakeholder awareness, and evolving policy frameworks will drive uptake—positioning agrivoltaics as a scalable solution for integrating renewable power into modern, sustainable farming systems.

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Segment Overview

The [agrivoltaics market forecast](#) is categorized by system design, cell type, crop, and region. Based on system design, it is divided into fixed solar panels and dynamic systems. In 2021, the fixed solar panel segment held the largest market share and is expected to maintain its dominance throughout the forecast period. This is primarily due to their ease of installation, low maintenance, and consistent power output. Unlike dynamic systems—where panels must be regularly adjusted to optimize sunlight exposure—fixed systems offer a hassle-free alternative that ensures reliable performance with minimal intervention.

Based on cell type, the agrivoltaics market is segmented into microcrystalline and polycrystalline cells. Microcrystalline cells led the market in 2021 and are projected to grow at the highest CAGR during the forecast period, primarily due to their superior efficiency in commercial applications. In terms of crop type, the market is categorized into vegetables, fruits, crops, and others. The crop segment held the largest share in 2021, driven by the growing impact of extreme weather conditions, where solar panels help protect crops from excessive sunlight and dehydration. This segment is expected to maintain its lead throughout the forecast period, followed by the vegetable segment.

Regional Analysis

Regionally, the agrivoltaics market is analyzed across North America, Europe, Asia-Pacific, and LAMEA. Asia-Pacific held the dominant position in 2021 and is anticipated to maintain its lead during the forecast period. This growth is attributed to the region's strong agricultural base, rapid adoption of renewable energy technologies, and favorable government initiatives promoting sustainable farming practices. Countries like China, Japan, and India are actively investing in agrivoltaic projects to enhance land-use efficiency and meet growing energy demands, thereby driving market expansion in the region.

Competitive Analysis

The agrivoltaics market is highly competitive, with key players focusing on technological innovation, strategic partnerships, and pilot projects to gain a competitive edge. Companies are investing in advanced solar tracking systems, bifacial panels, and optimized mounting structures to maximize both agricultural productivity and solar energy output. Collaborations between solar energy firms and agricultural research institutions are also on the rise to develop region-specific agrivoltaic models that ensure crop compatibility and energy efficiency.

In addition, several companies are expanding their presence in emerging markets such as Asia-Pacific and Latin America, where the dual benefits of increased agricultural yield and renewable power generation are attracting significant interest. Market participants are also leveraging government incentives and sustainability goals to introduce cost-effective agrivoltaic solutions. This ongoing innovation and regional expansion are expected to drive intensified competition

while opening up new opportunities for [technological advancements in the global agrivoltaics market](#).

Key findings of the study

- Fixed solar panels are projected to grow at the highest CAGR of approximately 10.5%, in terms of during the agrivoltaics market forecast period
- The monocrystalline segment dominated the agrivoltaics market share by over 51.7% in 2021
- By region, North America dominated the agrivoltaics market and is expected to grow at a CAGR of 10.7% during the forecast period

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