European Solar and Energy Storage Solutions

Photovoltaic support in rice fields

Overview

Can agrivoltaic systems be used for rice production?

To avoid the potential food security issue caused by solar energy production, an agrivoltaic system producing both crop and solar energy is devised. This study aims to develop an integrated multi-modeling framework for an agrivoltaic system used for rice production.

Can photovoltaic systems improve paddy-field rice productivity?

This is the first study to investigate the influence of installing photovoltaic systems on the productivity of paddy-field rice, which is a staple crop cultivated in agricultural areas in Japan. This study provides novel results that may prove useful, not only in Japan, but also in other rice-producing countries.

Do photovoltaic systems affect rice crop yield?

Emerging interest in these systems led us to investigate their influence on rice crops. Various factors affecting rice crop yield, including fertilizer application, temperature, and solar radiation, were directly observed, and measured to evaluate changes associated with the shading rates of photovoltaic systems installed above rice crops.

Can agrivoltaic systems increase energy output above rice paddies?

Potential energy output of agrivoltaic systems above rice paddies in Japan. Agrivoltaic systems have the potential to increase the value of renewable energy, while adding functional value to the land, as opposed to the conventional function of only crop production [23, 37].

Are agrivoltaic systems bad for rice?

In Japan, rice (Oryza sativa) is one of the most widely cultivated crops, covering a total area of 1.47 million hectares [45]. Given that rice is a valuable crop, especially in Asia, the risks posed by agrivoltaic systems to rice

quality and quantity may be deemed too great.

Does photovoltaic shading affect rice yields?

Thus, no prior research has explored the effects of shading from photovoltaics on rice yields throughout the rice cultivation cycle. While some studies have examined the negative effects of shading on crops integrated with agrivoltaics, none have reported the impact on rice yield and quality.

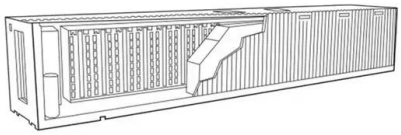
Photovoltaic support in rice fields

Application and Management of Nitrogenous Fertilizer in Rice Field...

Rice (Oryza sativa L.) is one of the most significant cereal in the world. Globally, the top rice producing country is China, while India is the world's second largest producer and ...

Crop Cultivation Underneath Agro-Photovoltaic ...

Fifteen-day-old seedlings of rice (cv. Ilmibyeo) were transplanted by machine in 30 × 16 cm spaces on 15 June 2021, in Naju. The fields were managed with N-P 2 O 5-K 2 O fertilization of 60-30-40 kg ha -1 for Seungju ...



Simulation Approach to Estimate Rice Yield and Energy

examined the influence of partial shading from solar photovoltaic panels on the rice (shade intolerant) in Japan. Most of the previous studies in AV focused on lettuce, tomato, cucumber, ...

Evaluation of Yield and Yield Components of Rice in ...

The agro-photovoltaic (APV) approach can be a

solution to produce solar energy and crop production at the same time by installing solar panels on the same farmland to increase land use efficiency. This study aimed ...

A Field Experiment and the Simulation on Agrivoltaic-systems ...

The objective of this study is to evaluate an agrivoltaic system by reflecting the deterioration of rice yield and quality. The agrivoltaic system means introducing photovoltaic power to ...

Optimization of a solar light trap for controlling the pest in ...

June, 2022 Optimization of a solar light trap for controlling the pest in rice field Vol. 24, No. 2 45 contributes relatively low to attract insects (Cowan and Gries, 2009), while the lifespan of such ...

Application of Nitrogenous Fertilizer in Rice Production: A Review

Rice (Oryza sativa L.) is one of the world's most important cereal crops. Nitrogen is one of the most important plant nutrients for rice. Different forms of nitrogenous fertilizer are ...

Impacts of agrivoltaics in rural electrification and decarbonization ...

Minimizing the total power costs and decarbonization of the power grid with agrivoltaics in the rice field. It has been noted that solar energy generation for agriculture, ...

A Sustainable Location-Allocation Model for Solar ...

Insect attacks are a very complicated problem in rice cultivation that cause a decrease in rice productivity. It is very important to not use pesticides to kill pests due to environmental and health issues. This study aimed to solve ...

Solar-Powered Soil Nutrient Detector for Rice Field

keys to h elp and support farmers in selecting c rops . powered by solar energy,? PLoS One, vol. 13, no. 3, p. e0195052, 2018. The rice field was irrigated up to a moisture level of 0.

(PDF) Agro-Environmental Observation in a Rice Paddy ...

In this study, to evaluate that agrivoltaic systems are suitable for realization of climate smart agriculture, we conducted agro-environmental observations (i.e., downward/upward shortwave

(PDF) Analysis of the Rice Yield under an Agrivoltaic ...

The results suggest that the allowable upper limit of the shading rate for agrivoltaic installations ranges from 27 to 39%, which sustains at least 80% of the rice yield, a condition set by the

Evaluation of Yield and Yield Components of Rice in Vertical Agro

Yield and yield components of rice between the agro-photovoltaic system and the control (open field) in four different solar panel directions. The different letters on the bars ...

Analysis of the Rice Yield under an Agrivoltaic System

This is the first study to investigate the influence of installing photovoltaic systems on the productivity of paddy-field rice, which is a staple crop cultivated in agricultural areas in Japan.

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