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Agriphotovoltaic System to Improve Land Productivity and Revenue of Farmer

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Abstract

Abstract:Aggressive growth of the world population influences land crisis, energy-food demand, climate change, and the income of developing countries like India. More than 50% of ... **View more**

Document Sections

- I. Introduction
- II. Methodology
- III. Crop Management
- IV. Result and Discussion
- V. Conclusion

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Abstract:

Aggressive growth of the world population influences land crisis, energy-food demand, climate change, and the income of developing countries like India. More than 50% of the Indian manpower hangs on agriculture for livelihood and provides around 20% of the country's GDP. In this context, a co-development system of the land area has been encouraged as a synergetic solution for these issues. We suggest calling this an "agriphotovoltaic" or "agrivoltaic" system, where sunlight is mutually shared between solar photovoltaic panels and crops. The system is good practice for those places where sun radiation is accessible adequately and land productivity is likely low. This paper summarizes the dual land-use technique to improve both land productivity and revenue of farmers. The important performance parameters of the system such as land equivalent ratio, revenue from solar, revenue from crops, and payback period have been found as 1.41, 52211 USD, 1535 USD, and 8 years respectively. Further, the government targets can be fulfilled by adopting new technology, efficient design, and installation of the system in the country.

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Contents

I. Introduction

Global population growth and technology developments are making realization about the long- and short-term effects of climate change and land crisis on peoples. Also, the demand of energy-food production and consumption and economic value are rising speedily in both developed and developing countries. It is predicted that around 0.8 billion people starve to access electricity, mostly from Africa and Asia. According to the sustainable development goals (SDG-15) outline, around 0.013 billion hectares of land are lapsed per year in terms of dryness and deforestation [1]. The leading sources of greenhouse gas emissions (GHGs) are energy by 76% and agriculture by 12%. Climate change has escalated the significance of energy-food security in the world. In 2019, CO₂ accounted for 65% of world GHG emissions [2], [5].

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