Retracted: Agrophotovoltaics (APV) Improving the Land and Water Use Efficiency: A System Dynamics Analysis: An Overview

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Authors’ contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

ABSTRACT

India is on the verge to reduce its intensity of carbon emissions with an significant impetus to increase grid-based solar photovoltaic capacity, but there is a rising carbon footprint in the agricultural sector. In irrigated agriculture, there is a huge subsidies for electricity and diesel to pump groundwater combined with lack of water withdrawal regulations resulting in both groundwater over-exploitation and increased carbon emissions. To meet global energy demands with renewable energy such as solar Agrophotovoltaic (APV) systems are needed because of the relatively diffuse nature of solar energy requires large surface areas. Huge portions of the land will increase the competition for land-based resources by using solar APV farming, while demand for food production as well as energy grow and compete for limited land resources with increasing population. There was also a marked increase in the late-seasons biomass for APV panels were considerably more...
water-efficient. In order to minimize conflicts between food and energy production on land use, APV combines biomass cultivation and solar energy production at the same site for increasing land and water use efficiency. In conclusion, this review study suggests that little adaptation of crop practices should be required to move from an open crop to an agri-voltaic crop system, and attention should be focused on minimizing light reduction and selecting plants with maximum radiation efficiency under these fluctuating shade conditions for improving land and water use efficiency. Further, APV increases the economic benefit of agriculture in rural areas will contribute to decentralized, off-grid electrification and thus boost farm productivity. As such, APV can serve as a valuable technical approach to sustainable agriculture, helping to meet energy and food production challenges and also climate change hazards, simultaneously serving land and water resources.

Keywords: Renewable energies; land use intensification; solar farming; agrophotovoltaics.