Chapter 3
Renewable Energy for Agriculture Sustainability Conservations:
A Step Towards Green Revolution

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ABSTRACT

This study outlines sustainable agriculture practices in Simdega District, India, emphasizing the critical role of agriculture using the renewable energy. With a focus on long-term environmental, social, and economic viability, the study employs a multidisciplinary approach, integrating field surveys, policy analysis, and literature review. In the agriculture industry, including renewable energy solutions may improve resource efficiency, lower greenhouse gas emissions, and foster climate resilience. Additionally, effective post-harvest processing technology like solar dryers and biomass-based systems may be powered by renewable energy reducing food loss and enhancing the quality and marketability of agricultural products. Increased production, water conservation and soil health may all be achieved by using sustainable agricultural practices including organic farming, precision agriculture and agro-forestry.

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INTRODUCTION

Simdega district centrally located in India thrives on agriculture, not merely as an economic pursuit but as an integral way of life for its residents. The agricultural sector holds a pivotal role in supporting the livelihoods of a significant proportion of the local population. Despite its agricultural prominence, Simdega encounters challenges akin to those experienced globally-issues of environmental degradation, resource depletion and the impacts of climate change. The system proposed in this study includes the use of solar as a primary source and grid as the secondary. The grid used in this study purchases as well as sells the energy enduring for a sustainable development in the area. The proposed system does not uses a storage unit as the grid been installed fulfils any need for the use of electricity and also a step towards reducing the capital cost for setting up the system. Jharkhand's Simdega district is home to a wide variety of year-round crops, including grains like rice, maize, and wheat; oilseed crops like Niger, tori, mustard, and groundnut; pulses like black gram, pigeon pea, chickpea and pea; vegetables like lady finger, cowpea, potato, and tomato; and fruits like papaya, mango, guava and jackfruit (Abot, 2020). There are continuous efforts to boost agricultural output through programs like artificial insemination centres for cattle to improve milk yield, despite obstacles including dependency on rain-fed agriculture and poor irrigation infrastructure as shown in Table 1. The temperature and terrain of the district enable a range of crops to be cultivated in certain locations according to the fertility and composition of the soil. In Simdega area, sustainable farming methods are essential for maximizing agricultural productivity and enhancing lives. The gases controlled using the system are carbon dioxide, nitrogen oxide and sulphur dioxide.

Table 1. Initiatives for agriculture taken in India

Sl.	Agricultural segmentation	Sustainable Initiatives	Location	Date	Reference
1.	Integrated Portal for Farming Investment	The development of the "Krishi Nivesh Portal"	India	February 29, 2024	The Hindu Business Line
2.	To promote agricultural exports from India	Value-added millet products.	India	March 6, 2024	ANI News
3.	Smart agricultural practices	Aims to uplift and empower rural communities.	Jharsuguda, Odisha.	February 28,2024	Times of India
4.	leveraging technology and market research	Aligning existing agricultural policies with the UN Sustainable Development Goals.	India	October 18, 2021.	The Economic Times
5.	Capsber Agrisciences	Sustainable farming practices for greener future	India	February 29,2024	The Economic Times
6.	Diagnosis of plant disease severity	Digitizing agriculture with AI, ML and IOT	India	February 5,2022	Nature
7.	Effective farm methods	Precision Farming SaaS	India	September 23, 2023	Agriculture post
8.	Modernising and transforming our farming practices	Agri-drone technology	India	December 23, 2023	Hindustan Times
9.	Region specific smart agricultural technologies	IOT	India	January 21, 2024	MDPI
10.	Weed removal	Robotics	India	March 20, 2023	MDPI