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Solar Based Fertilizer Harvesting Machine

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Abstract: *The increasing demand for sustainable agricultural practices has driven innovation toward energy-efficient and environmentally friendly farm machinery. This project presents the design and development of a solar-based fertilizer harvesting machine that utilizes renewable energy to collect, process, and distribute organic or bio-fertilizer materials directly on the field. The system integrates photovoltaic panels to generate the required power, eliminating dependence on conventional fuel sources and reducing operational costs and emissions. The machine incorporates mechanisms for fertilizer collection, shredding or pulverizing (where applicable), and controlled dispensing to ensure uniform field application. A microcontroller-based control unit optimizes power distribution, monitors operational parameters, and enhances user safety and efficiency. Experimental testing demonstrates that the solar-powered system offers reliable performance under typical daylight conditions, significantly lowers energy consumption, and provides a sustainable alternative to traditional fertilizer handling methods. This solar-based fertilizer harvesting machine contributes to cleaner agricultural operations while promoting resource efficiency and improved soil management in rural farming Environments.*

This paper provides a study of solar-powered fertilizer sprayers used in agriculture. The study reports the sprayer's design, materials, methodology, and results. The sprayer allows rural areas to limit their need for fossil fuel and human labor, improving convenience and efficiency while being more eco-friendly. Moreover, the paper mentions the components of the presented mechanical device, such as the solar panel, battery, motor, and nozzle, to list their technical definitions and areas of application. The purpose of this research is to ease the issues associated with the facial lifestyle and support modern-day challenges in farming.

Keywords: *agricultural*

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