

Design And Manufacturing of Solar Powered Seed Sprayer Machine with Double Hopper: Case Study

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Abstract

New methods must be adopted in order to meet future food demands in an era of rapid expansion in all sectors, including agriculture. This project focuses on the "Design and Manufacturing of a Solar Powered Seed Sprayer Machine With Double Hopper" in order to meet this demand. This creative method removes the need for human labour during seeding by employing a fan or blower to spray seeds from a hopper onto the ground. Seeds are effectively seeded during plowing by simplifying the procedure, which saves time and labour cost. Notably, this device doesn't require any other energy sources because it runs entirely on solar power. All things considered, this approach provides an effective and sustainable way to increase crop yields while maintaining soil texture and requiring the least amount of human intervention. One piece of agricultural equipment is a seed sprayer machine.

I. Introduction

India is agricultural country and whose economic balance is based on farming development farming increases economic level of country. As everyone knows that agriculture has been the backbone of the Indian economy and it will continue so for

long time. It has to support almost 17 percent of world population from 2.3 percent of world geographical area and 4.2 percent of world's water resources. The basic objective of the sprayer operation is to put the seed and fertilizer in row at desired depth and spacing, cover the seeds with soil and provide proper compaction over the seed. The recommended row to row spacing, seed rate, seed to seed spacing and depth of seed placement vary from crop to crop and for different agricultural and climatic conditions to achieve optimum yields and an efficient sprayer machine should attempt to fulfil these requirements. In addition saving in cost of operation time, labour and energy are other advantages to be derived from use of improved machinery for such operations. In this project an attempt has been made to provide the low cost spraying machine and also it reduces the human efforts.

II. Methodology

The development and manufacture of the solar-powered seed sprayer machine involve integrating solar panels for energy generation, designing components such as the seed hopper and distribution system, assembling the machine. The design of manufacturing seed spray machine is

more important for this paper. So the design of system architecture is very important as for the proper development in seed system. This design ensures proper balanced of system during the design periods.

III. working

The solar-powered seed sprayer machine operates manually. It is lightweight, making it easy to use. With the help of this machine, we can reduce human effort and also minimize the wastage of seeds and fertilizers. The body of the sprayer is made of a mild-steel frame and mild-steel bars to keep the weight of the machine low. It consists of a solar panel, battery, DC motor, blower, and hopper. On the top end of this frame, a solar photovoltaic panel is fixed to convert solar power into electricity. The solar-powered seed sprayer machine works by converting sunlight obtained from a solar panel into electricity. This electricity is then supplied to the battery via a charging circuit. The electrical energy is stored in a battery with a capacity of 12 volts, which then provides the necessary power to the DC motor. Electric power from this battery is given to the electric motor. A blower fan is connected to the shaft of the electric motor. The blower blows high-speed air through the outlet. The blower has rotating blades that propel air at high speeds. Two hoppers are provided in front of the blower—one for seeds and one for fertilizer. The seed and fertilizer are sprayed using the blower. A valve is employed to control the flow of the seed and fertilizer.



Figure(1): Solar powered seed sprayer machine

IV. Conclusion

A solar seed sprayer machine is designed for small farmers to improve their productivity and reduce human effort. In this machine, a common seed storage place is introduced to reduce the cost. The drawbacks of the existing seed spraying machines have been successfully addressed in our design. It will be more useful for small farmers and the agricultural community. Thus, the solar-operated seed spraying machine will help farmers in remote areas of the country where fuel is not easily available.

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