

Solar Powered Seed Sowing Machine

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Abstract

Today's life is heading towards the rapid growth of all divisions like agriculture as well. The farmers need to improve their techniques in order to provide good food demand that techniques will not affect the soil but will increase the crop. Sowing machine should be suitable for all fields, all types of bodies, sturdy construction, durable as well, and this is the basic requirement of the sowing machine. Thus we made a solar operated sowing machine which reduces farmers' efforts thus increasing the efficiency of planting also reduces the problem encountered in manual planting. This also increased the efficiency and precision of the planting. We made it from raw materials, so for small farmers it was so cheap and very usable. We simplified its architecture for efficient handling of the system by any farmer or by any untrained worker. It also streamlined the method of modification and repair. The important thing about this project is to solve the problems of the farmer and to develop a farm using solar seed sowing machine..

Keywords: DC Motor; Mechanization; Seed Hopper; Solar Energy; Digging; Battery;

I. Introduction

Agriculture has been and will continue to be the backbone of the Indian economy for a long time. It has to help approximately 17% of the world's population from 2.3% of the world's geographic area and 4.2% of the world's water supplies. Since 1950-51, the current crop intensity of 137 percent has increased by only 26 percent. The basic aim of the sowing operation is to place the seed and fertilizer in rows at the desired depth and spacing, to cover the seeds with soil and to provide proper compaction over the seed..

Seed sowing machine is a tool that helps to sow seeds in a desired position to help farmers save time and money. The farming industry has always been the foundation of the sustained growth of India. While India's population continues to grow, demand for supply is also growing. Therefore, on farms there is a greater need for multiple cropping, and this in turn requires high-capacity and efficient machines. Agricultural industry mechanization in India is still in its infancy due to lack of knowledge and specialized equipment and machinery being unavailable. Seed sowing is achieved by manually broadcasting in traditional methods, opening furrows by a plough and dropping seeds by hand. There are many drawbacks to a traditional seed sowing process. Atomic energy has long been thought to be a solution to the rising energy problem, but solar energy has been available in recent times. Solar-related concepts have been under constant heavy

research and development. The fundamental objective is to optimize the energy generated from photovoltaic cells by making the overall systems more efficient and cost-effective.

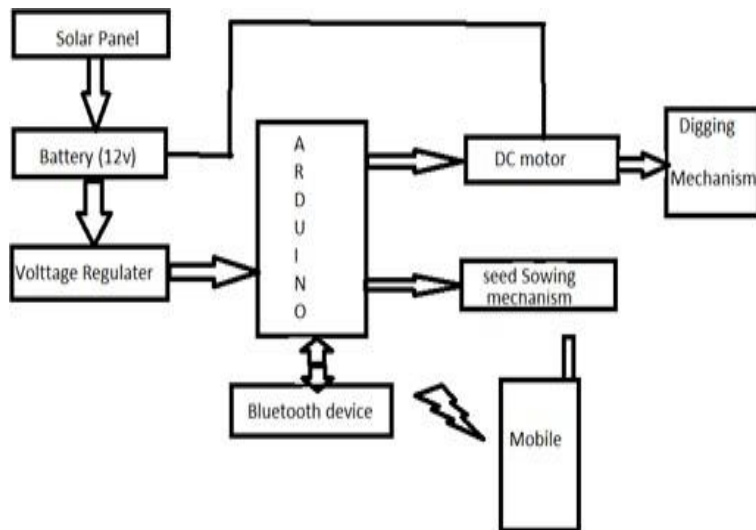
II. Literature Survey

- A. **Mahesh R. Pundkar et al (2017).** "A Seed sowing machine: A review". The researcher stated that the seed sowing machine is a key component of agriculture field. High precision pneumatic planters have been developed for many varieties of crops, for a wide range of seed sizes, resulting to uniform seeds distribution along the travel path, in seed spacing.
- B. **Kiran G. Bhosale et al. (2017).** "Development of Solar powered seed sowing machine and fertilizer spraying machine", this research paper provides information about the various types of innovations done in seed sowing machine available for plantation. It also deals with various sowing methods used in India for seed sowing.
- C. **Swapnil Thorat et al. (2017).** "Design and Fabrication of seed sowing machine". The researchers made sowing machine which is operated manually but reduces the efforts of farmers thus increasing the efficiency of planting also reduces the problem encountered in manual planting. For this machine a farmer can plant different types and different sizes of seeds also we can vary the space between two seeds while planting. This also increased the planting efficiency and accuracy.
- D. **Nivash et al (2018).** "Design and Modification of seed sowing machine". The researcher states that the agriculture plays an important role in the life of economy. It is the backbone of our economy system. Sowing is one of the basic and best operations needed to get better revenue from agriculture. In Manual sowing has the problem of not giving acceptable spacing between row to row and plant to plant. It also leading to less population of crops than recommended by the agriculture. In this project work they focused on seed sowing processes and tried to solve the problem. In seed sowing machine system they are used wheels.

III. Proposed System

We are proposing a machine that can perform various agricultural activities such as digging and sowing, etc. Figure 1 displays our experimental setup's block diagram. This is an electric vehicle with a four-wheel drive. At a very low cost, the seed sowing machine is built. It's cheap and easy for rural farmers to buy. It requires low maintenance and can be easily adjusted for continuous operation.

Fig.1Block Diagram



IV. Hardware

The machine consists of the following components:

- A. Solar Panel-** Panel provides an energy source that is renewable and environmentally friendly. It consists of photovoltaic (PV) cells. It absorbs sunlight and converts to electrical energy this solar energy

Specifications-

Rated Power- 14Volt

Dimension- 200mm x 100mm

Cost- INR 750- 900

- B. Lead Acid Battery--** It is made up of electrochemical cells that transform stored chemical energy into electrical energy. There is a positive terminal and a negative terminal in each cell. Electrolyte is in control of the mobilization of ions between electrodes and terminals. The mobilization of these ions helps the current to stream out of the battery for work.

Specifications-

Rated Voltage- 12V

Cost- INR 700- 800

- C. D C Motor-** According to Ampere's Law, a wire which carries an electric current produces a magnetic field around it. Following this law, DC Motor creates the mechanical work from electrical energy.

Specifications-

Rated Voltage- 6V

Speed- 300 rpm

Cost- INR 300-500

- D. Chassis-** A chassis is a skeleton of the fabricated object, which supports the object in its construction and use.

Specifications-

Material- Mild Steel (Hollow Pipes) Dimensions- 450mm x 915mm x 450mm Weight- 20-25 kg

Cost- INR 1500- 2000

- E. Belt- Pulley System-** A belt and pulley system contain two or more pulleys in common to a belt. This allows for mechanical power, torque, and speed to be transmitted across shafts which contain the pulleys. If the pulleys are of different diameters then a mechanical advantage is produced.

Specification-

Cost- INR 400- 500

V. Methodology

- Solar panels are used in this machine to consume solar energy and convert this energy into electrical energy. The electrical energy is stored in a 7.5 Amp Hour capacity 12V battery, which then provides a DC motor with the required electricity. By belt and pulley system, this power is then transferred to the cutter
- Due to the shear deformation created by the cutter's teeth, the farm field will be ploughed to create a furrow for the unsown seeds.
- Digging mechanism rotate due to the rotation of pulley system. Due to which 2 – 4cm seed bed is created. Seeds will be dropped on the ground from the holes due to their own weight.
- The basic objective of sowing operation is to put the seeds in rows at desired depth, to maintain seed to seed spacing and to 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 can vary from crop to crop and for different agro-climatic conditions to achieve optimum yields. Typical application of seed sowing of Cereal's including ground nut, all types of dal's, oil seed crop's etc.
- To put the soil back on the seeds, an adjuster is used which adjust the soil towards the furrow created by the cutter.
- Tires of the machine are rotated by pulling the machine with the help of motor. Tires need to be rotated for forward movement of the vehicle and rotating the seed Hopper.
- Various fabrication processes involve cutting and welding of mild steel, cutting of solid shaft, cutting and welding used in cutter, clamping of ball bearings, bolting of DC motor, slot making for lateral movement of DC Motor, clamping of batteries and solar panel, wiring and clamping of seed sower and adjuster etc.

VI. Future Scope

- Drilling can be used as soil erosion equipment in place of cutter.
- Multi-hopper can be used to sow a large farm instead of a single hopper.
- For precise spacing, seed spacing sensors can be used.

VII. Conclusion

In India, about 70% of the population lives in rural areas and their main source of income depends upon the farming sector. It is therefore important to focus specifically on the agricultural sector and to apply the latest advanced and more productive technologies and methods. This will add to the country's increased growth rate. Our machine which operates on solar power when compared to different traditional seed sowing methods, it can be concluded that:

- 1) Sowing rate can be controlled.
- 2) Seed spacing can be achieved.
- 3) Less manual power is required.
- 4) No pollution is caused.
- 5) Economical.

• References

- [1] V. Nivash, N. Kavin, S. Manikandan. "*Design and Modification of seed sowing machine*" ,International Journal for Scientific Research and Development (IJSRD), Vol. 06, May 2018.
- [2] Mahesh R. Pundkar, A.K. Mahalle. "*A Seed sowing machine: A review*".International Journal of Engineering and Social Science (IJESS), Vol. 03, pp 68-74, December 2018.
- [3] Kiran G. Bhosale, Manoj Kindare, Mayur Kumbhar. "*Development of Solar powered seed sowing machine and fertilizer spraying machine*", Journal of Information, Knowledge and Research in Mechanical Engineering, Vol. 04, October 2017.
- [4] Swapnil Thorat, Girish Patil, Rajkumar Patil. "*Design and Fabrication of seed sowing machine*", International Research Journal of Engineering and Technology (IRJET), Vol. 04, September 2017.
- [5] Pranil Sawalakhe, Amit Wandhare, Ashish Sontakke. "*Solar Powered seed sowing machine*", Global Journal of Advanced Research, April 2015.
- [6] Byre Gowda¹, Karthick N² , Lingaraj R B³ , Bhavana C⁴ 1,2,3, "Solar Seed Sowing Machine".
- [7] Prof. Pranil V. Sawalakhe Amit Wandhare, Ashish Sontakke, Bhushan Patil, Rakesh Bawanwade & Saurabh Kurjekar "SOLAR POWERED SEED SOWING MACHINE"
- [8] D'souza¹, Ankith Rai² , Aster Fernandes³ , Jolene Shaina Vas⁴ , Mr. Vaishak N.L⁵"Agricultural Robots: A Different Approach Arnold Flavious"
- [9]V. Nivash¹ N. Kavin² S. Manikandan³ K. J. Nethaji⁴ S. M. Meyvel⁵ "Design and Modification of Automatic Seed Sowing Machine"
- [10] Braide F. G , Adisa A. F. "Design and Modification of Automatic Seed Sowing Machine"

