



## DESIGN AND FABRICATION OF AUTOMATIC SEED SOWING MACHINE

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**Abstract**— Sowing machine should be suitable to all farms, all types of crops, robust construction, also it should be reliable, this is basic requirement of sowing machine. Thus we made sowing machine which is operated automatically but reduces the efforts of farmers thus increasing the efficiency of planting also reduces the problem encountered in manual planting. For this machine we 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. We made it from raw materials thus it was so cheap and very usable for small scale farmers. For effective handling of the machine by any farmer or by any untrained worker we simplified its design. Also its adjusting and maintenance method also simplified. The real power required for machine equipment depends on the resistance to the movement of it. Even now, in our country 98% of the contemporary machines use the power by burning of fossil fuels to run IC engines or external combustion engines. This evident has led to widespread air, water and noise pollution and most importantly has led to a realistic energy crisis in the near future. Now the approach of this project is to develop the machine to minimize the working cost and also to reduce the time for digging and seed sowing operation by utilizing solar energy to run the robotic machine

**Keywords**— Funnel, Wheels, Supporting, Frame, Joints, electric motor, Battery

### I. INTRODUCTION

Today the environmental impact of agricultural production is very much in focus and the demands to the industry is increasing. In the present scenario most of the countries do not have sufficient skilled man power in agricultural sector and that affects the growth of developing countries. Therefore farmers have to use upgraded technology for cultivation activity (digging, seed sowing, fertilizing, spraying etc.). So it's a time to automate the sector to overcome this problem. In India there are 70% people dependent on agriculture. So we need to study on improving agricultural equipment. Innovative idea of our project is to automate the process of digging and seed sowing crops such as sunflower, baby corn, groundnut and vegetables like beans, lady's finger, pumpkin and pulses like black gram, green gram etc. and to reduce the human effort. Since we have lack of man power in our country, it is very difficult to do digging and sowing operation on time, Automation saves a lot of manual work and speed up the cultivation activity. The energy required for this robotic machine is less as compared with other machines like tractors or any agriculture instrument, also this energy is generated from the solar energy which is found abundantly in nature. Pollution is also a big problem which is eliminated by using solar plate. Cropping is

important and tedious activity for any farmer, and for large scale this activity is so lengthy also it needs more workers. Thus agriculture machines were developed to simplify the human efforts. In manual method of seed planting, we get results such as low seed placement, less spacing efficiencies and serious back ache for the farmer. This also limited the size of field that can be planted. Hence for achieving best performance from a seed planter, the above limits should be optimized. Thus we need to make proper design of the agriculture machine and also selection of the components is also required on the machine to suit the needs of crops. The agriculture is the backbone of India. And for sustainable growth of India development of agriculture plays vital role. The India has huge population and day by day it is growing thus demand of food is also increasing. In agriculture we saw various machines. Also there traditional methods are there. Since long ago in India traditional method is used

## II MOTIVATION

The motivation for developing a seed sowing machine to complete the tasks like digging sowing and covering that area again with soil to reduce human efforts and reduce consuming time. The basic objective of sowing operation is to put the seed in rows at desired depth and seed to seed spacing, cover the seeds with soil and provide proper compaction over the seed. In this power transmission mechanism, seed meter mechanisms, plunger mechanism etc. mechanisms are used. The working as machine is pushed; power wheel is rotating which transmit power.

## III RELATED WORK

Project by-Solar powered seed sowing machine V. Surya Prakash, G. Manoj Kumar, S.E. Gouthem, A. Srithar

In this project many components are used they are, Solar panel, Battery, Charge Controller, DC Shunt Motor, Seed Storage tank, Soil plough, Soil cover, Seed Disc.

2.1. MCU (micro controller unit) The Micro Controller Unit is a compact integrated circuit design to give specific operation in embedded system. Micro controller unit is key component in this project the IR sensor gives the output signal to the micro controller unit based on the IR sensor output the Dc Motor is controlled by the Micro Controller unit. The All rights reserved. Selection and peer-review under responsibility of the scientific committee of the International Conference on Materials, Manufacturing and Mechanical Engin V. Surya Prakash, G. Manoj Kumar, S.E. Gouthem et al., Solar powered seed sowing machine, Materials Today: Proceedings, <https://doi.org/10.1016/j.matpr.2020.12.976> Controller used in this project is Arduino Nano V3 micro controller

2.2. IR sensor IR sensor is used in this project to control the motion of the machine and path of the machine and sense the obstacles in the path. Which gives its output to the MCU which controls the machine 2.3. Solar panel The main concept solar panel is used to convert solar energy to electrical energy. The solar panel used is 12 V solar panel. The solar panel is made of material of semiconductor and it

consist of pv cell. Which supplies the energy to the Dc Shunt Motor 2.4. Battery The battery is an electrochemical cell which is used to store the electrical energy and in this project we use 12 V Lead acid battery.

#### IV METHODOLOGY

**Step 1:** - We started the work of this project with literature survey. We gathered many research papers which are relevant to this topic. After going through these papers, we learnt about Seed Sowing Machine..

**Step2:** - After that the components which are required for our project are decided.

**Step 3:** - After deciding the components, the 3 D Model and drafting will be done with the help of CATIA software.

**Step 4:** - The components will be manufactured and then assembled together.

**Step 5:** - The testing will be carried out and then the result and conclusion will be drawn



#### V EXPERIMENTAL SETUP-

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## 1) ELECTRIC MOTOR

An electric motor is an electrical machine that converts electrical energy into mechanical energy. Most electric motors operate through the interaction between the motor magnetic field and winding currents to generate force in the form of rotation. Electric motors can be powered by direct current (DC) sources, such as batteries, motor vehicles or rectifiers, or by alternating current (AC) sources, such as a power grid, inverter first, determine certain features of the design, such as drive mechanism, rough dimensions, distances moved.

- Confirm the required specifications for the drive system and equipment (stop accuracy, position holding, speedrange, operating voltage, resolution, durability, etc.).
- Calculate the value for load torque, load inertia, speed, etc. at the motor drive shaft of the mechanism.
- Select a motor type from AC Motors, Brushless DC Motors or Stepping Motors based on the required specifications.
- Make a final determination of the motor after confirming that the specifications of the selected motor/gearhead satisfy all of the requirements (mechanical strength, acceleration time, acceleration torque etc.)

## 2 BATTERY.

We have used this type of batteries for our sowing machine. There are many different types of batteries available in market but the reason behind selection these batteries that we referred this type for battery for same type of other components like motors as a power source. But there are lot factors that decide selection battery like your required component voltage for its working, battery should be capable of store enough energy in it for enough working time and it should charge as fast as possible. The power unit supplies, to each unit, a driving power and an operation power required when the machine moves moves or performs a sowing operation. When the remaining amount of battery power is deficient, the power unit moves to a charging base to be supplied with a charging current. A sealed lead acid battery or gel cell is a lead acid battery that has the sulfuric acid electrolyte coagulated (thickened) so it cannot spill out. They are partially sealed, but have vents in case gases are accidentally released for example by overcharging. They can be used for smaller applications where they are turned upside down. They are more expensive than normal lead acid batteries, but they are also safer. A battery converts chemical energy into electrical energy by a chemical reaction. Usually the chemicals are kept inside the battery. It is used in a circuit to power other components. A battery produces direct current (DC) electricity i.e. electricity that flows in one direction, and does not switch back and forth.

## VI. CONCLUSION

As we know that in our country about 70% of population lives in villages & their mainly income depend on the agricultural source. Hence my prominent aim of this project Solar operated automatic seed sowing machine is to fulfil the tasks like digging, seed sowing, water pouring and fertilizing by using nonconventional energy sources.

Thus solar operated automatic seed sowing machine will help the farmers of those remote areas of country where fuel is not available easily. And also they can perform their regular cultivation activity as well as saves fuel up to larger extent. At the same time by using solar energy environment pollution can also be reduced. Thus aiming to save the revenue of government & also most demanded fossil fuel The basic objective of sowing operation is to put the seed in rows at desired depth and seed to seed spacing, cover the seeds with soil and provide proper compaction over the seed.

From this we know that mechanical factors effects on seed germination like uniformity of depth of placement of seed, uniformity of distribution of seed along rows. In this power transmission mechanism, seed meter mechanisms, plunger mechanism etc. mechanisms" are used. The working as machine is pushed; power wheel is rotating which transmit power to plunger through chain and sprocket mechanism.

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### REFERENCES

- [1] R.S. Khurmi and Gupta, "Machine Design" 14<sup>th</sup> edition, S. Chand
- [2] V.B. Bhandari, "Machine Design" 3rd edition, Tata McGraw Hill
- [3] U. C. Jindal, "Machine Design".2 reprint edition, Pearson Education India
- [4] Richard G. Budynas and J. Keith Nisbett "Mechanical Engineering Design" 9th edition, Tata McGraw Hill
- [5] Hall, Holowenko, Laughlin "Theory and problems of Machine Design" Reprint 2005 edition, McGraw Hill