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Solar Seeder Machine

** Mr. Ashish. A. Patil,*
Lecturer, Department of Electrical Engineering, Sanjay Ghodawat Polytechnic, Kolhapur, Maharashtra, India

***Dipak Sambhaji Pawar, Jaydip Suresh Khade, Aditya Prakashsing Rajput, Aditya Santosh Kelkar*
Student, Department of Electrical Engineering, Sanjay Ghodawat Polytechnic, Kolhapur, Maharashtra, India

Abstract—

India is the land of villages. This being said the major occupation of people in India is agriculture. The project deals with development of multipurpose agricultural machine. The problems faced by Indian farmers today are solved by developing a multipurpose agricultural machine which can be used for various applications. This single machine is capable of performing various operations such as seed sowing, Insecticide sparying and Tilling. The developed machine not only aims to reduce the problems faced by Indian farmer by providing them with a low cost economical machine but also helps them to increase productivity since the machine takes far less time as compared to manual operations. The machine consists of an Electric Motor as a prime mover which provides necessary energy for the operation of the machine. The major focus of the project is to develop an Portable multipurpose agricultural machine which can be used by farmers for their day to day agricultural activities and make the machine economical so that it can be afforded easily by all category of farmers. In addition the machine is solar powered there by making it completely green and eco-friendly as well as there is no cost for farmers to operate and use this machine. The machine also implements internet of things protocol giving the facility to control the machine over the internet. Thus farmer can sit in home and trigger all the agricultural operations in the field.

I. INTRODUCTION

The agricultural has always been the backbone of India's sustained growth. As the population of India continues to grow, the demand for production of crops, fruits, vegetable grows as well. Hence, there is a great er needed formal tiple cropping in the farms and this in turn requires efficient and time saving machines. The paper discusses different types of seed sewing machine which will be helpful for the agriculture industry to move towards machination. So, that we are going to develop and manufacture a machine for sowing seeds by use of solar energy or using, so it will increase productivity and reduce man hours. Under intensive cropping, timeline of operations is one of the most important factors which can only be achieved if appropriate agricultural machines are use. Solar seeding method of seed planting, results in effective seed placement, spacing efficiencies. So, for that Solar Seeder Machine is one of the best solutions. This machine is improvement in conventional seed planting method. This machine consist of various parts like Motor, solar penal, battery, and seed planting mechanism etc. This machine specially used for planting seed at specified distance and depth. 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. Also India has huge man power. This manual planting is popular in villages of India. But for large scale this method is very troublesome. The farmer has to spend his more time in planting. But time available is less for him. Thus it requires more man power to complete the task within stipulated time which is costlier. Also more wastage happens during manual planting. Hence there is need of developing such a machine which will help the farmer to reduce his efforts while planting. This process of using machines is called as mechanization.

system is nothing but 4wheel robot system on which seed tank, sowing mechanism and metering device is installed to turn it into automatic operated vehicle. This article represents the advanced system for improving the agricultural processes such as cultivation on ploughed land, based on robotic assistance. We developed a vehicle having 4wheels and operated by DC motor. The machine will cultivate the farm by considering particular column at fixed distance depending on crop.

II. REVIEW OF LITERATURE

A. Design of Solar Operated Seed Sowing Machine

There is a need for improvement in agriculture sector, which can be achieved by using advanced technological methods for farming processes like digging, sowing and irrigation etc. Automation reduces labour cost and improves the overall productivity without affecting the quality of soil. The seed sowing machine is a key component of agricultural field. The various technique used in India for seed sowing and fertilizer placement are manual, ox and tractor operator. The manual and ox operator techniques are time consuming and productivity is low. Also, the fossil fuel used by the tractor causes emission to the atmosphere which is hazardous in some quantity. The main aim of this project is to create a green technology for seed sowing which will be easily operated over solar power by farmers and at low operating cost. Thus, solar operated automatic seed sowing machine will help the farmers of those remote areas of country where fuel is not available easily. Hence our 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. 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.

B. Solar Seed Sowing Machine

In today's life moving towards the fast growth of all division including agriculture also. To give good food demand, the farmers must improve their techniques that techniques will not affect the soil but it will increase the crop. The important of this project is to solve the farmer's problems and to develop an agriculture using solar seed sowing machine.

III. PROPOSED SYSTEM/PROBLEM DEFINITION

A. Problem Statement

Today's era is marching towards the rapid growth of all sectors including the agricultural sector. To meet the future food demands, the farmers have to implement the new techniques which will not affect the soil texture but will increase the overall crop production. The aim of this project is to design and develop a solar operated seed sowing machine. The seed sewing machine is a key component of agricultural field. The various technique used in India for seed sowing and fertilizer placement are manual, ox and tractor operator. The manual and ox operator technique are time consuming and productivity is low. Tractor is running on fossil fuel which emits carbon dioxide and other pollution every second. 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, in order to make the development of our farmer as well as nation sustainable and cause less harm to our environment. Now the approach of this project is to develop the seed sowing machine which is to minimize the working cost and the time for digging as well as operate on clean energy. In this machine solar panel is used to capture solar energy and then it is converted into electrical energy which in turn is used to charge 12V battery, which then gives the necessary power to a shunt wound DC motor. This power is then transmitted to the DC motor to drive the wheels. And to further reduction of labor dependency, IR sensors are used to maneuver robot in the field. Here 4 post sensors are used to define the territory and robot senses the track length and pitch for movement from line to line. Seed sowing and digging robot will move on different ground contours and performs digging, sow the seed and water the ground after closing .The following are some of the problems.

B. Project Scope

At present many countries have shortage of skilled labour in agriculture sector, which affects the growth rate of the developing countries including India which hugely depends on agriculture sector. As the population of India is rising, demand of food is also escalating which leads to higher crop production per hectare. So, to fix these problems farmers should use latest technological advancements for the various agricultural practices like digging, sowing, irrigation etc., which are more efficient and less time consuming. The main work of sowing operation is to sow seeds at required depth with specific spacing between the two sowed seeds. This can be achieved with the help of seed sowing machine which will dig the furrow and sow the seeds. After the seeds being placed in the furrow land, it will cover the sowed seeds with soil and sprinkle water. Seed sowing machine saves time and labour requirement, thus saving a lot of money along with the assurance of proper seed broadcasting.

IV. OBJECTIVE OF PROPOSED SYSTEM

The main objective of this project is to develop an efficient and sustainable solar-powered seeder machine for precision and eco-friendly planting in agricultural fields, aiming to enhance crop yields, reduce manual labor, and minimize environmental impact.

- To develop an agricultural field by automotive system.
- To achieve autonomous operation and real-time data monitoring capabilities, enabling remote control and precision planting.
- To design a modular seed dispensing system that can accommodate a wide range of crop types and planting densities, ensuring adaptability for different agricultural needs

V. METHODOLOGY

Before we started with the actual fabrication of project the material survey is to be made to select the appropriate materials for the entire project. The second step is to layout a proper plan for the project so that project can be carried out in stages. Based on the concept of the project the following material was needed to the completion of the project.

1) Selection of frame material: Since the frame or chassis forms the integral part of the project on which all the other components can be mounted, care has to be taken while choosing the material for the frame of the project.

2) Choosing the optimum drive system: A proper drive system is needed for transmitting the power from motors to the spinning disc. Thus it is necessary to select the drive system in such a way that it is most efficient to with minimum maintenance. Also the selected drive system for the machine should have a proper transfer of energy and have least maintenance.

3) Hopper Fabrication: The hopper is used for storing the seeds to be sowed. The hopper is proposed to be made using 1.6 mm sheet metal using welding and cutting.

4) Chassis Fabrication: With the selected frame the next step is fabrication of the chassis. The chassis should be so fabricated that is is light weight , withstand all the forces and should have sufficient space for mounting all the components. The chassis also should sustain the forces which are induced as a result of tilling mechaism as tilling attachment is a part of chassis and is fabricated during the chassis fabrication itself.

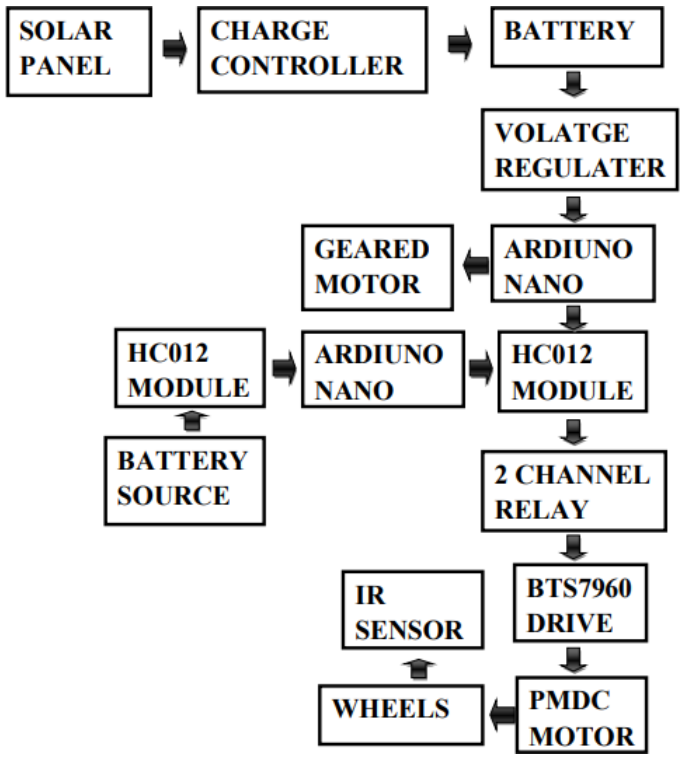
5) The Fabrication of mechanisms to drive the system: The mechanism which are used to drive the entire system are fabricated in this phase.

6) The Tilling attachment: The tilling attachment is the part of chassis and hence the motor power is not required for moving the tilling attachment. The tilling should be done by simple pushing the machine. In this phase the tilling attachment is fabricated as shown in the Coneptual diagram.

7) Assembly: The components fabricated in the above phases are assembled to form a complete machine in this phase

8) Testing The testing is carried out in this phase and optimizations if any are done.

Flow-Chart Diagram



REQUIREMENTS

Following material/facilities is required for project

a) Computer/ Laptop

b) Solar panel

c) Battery

d) Voltage Regulator

e) Sensors

f) PMDC Motor

VI. ADVANTAGES, DISADVANTAGES

i. Environmental Benefits: Solar seeders are powered by clean and renewable energy from the sun, reducing the carbon footprint associated with traditional fossil fuel-powered machinery.

ii. Cost Savings: Solar energy is free, which can lead to significant cost savings in the long run by reducing fuel and electricity expenses.

iii. Increased Productivity: Solar seeders are often designed for efficiency and precision, leading to improved crop planting accuracy and productivity.

iv. Low Maintenance: Solar machines have fewer moving parts compared to traditional equipment, resulting in lower maintenance costs and longer equipment lifespans.

Disadvantages

i. High Initial Cost: Solar-powered equipment can have a higher upfront cost compared to traditional, non-solar alternatives, which may be a barrier to adoption for some farmers.

ii. Weather Dependency: Solar seeders rely on sunlight to operate, so their performance can be affected on cloudy or rainy days, potentially leading to interruptions in planting operations.

iii. Limited Operating Hours: Solar seeders can only operate during daylight hours, which can limit the amount of work that can be done in a day compared to equipment that can run around the clock.

VII. Conclusion &Future Scope

Conclusion

Innovative seed sowing equipment has remarkable influence in agriculture. By using this innovative project of "SOLAR SEEDER MACHINE" we can save more time required for sowing process and also it reduces lot of labor cost. It is very helpful for small scale farmers. It is easy to operate for farmers. So we feel that this project serves something good to this world.

Future scope

1. Addition of multi-hopper can be attached side by side for sowing of large farm.

2. By using vacuum type seed conveying wheel we can achieve high seed dropping efficiency.

3. It should be modify into Sprinkler machine

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