



Agricultural Single Equipment for Cultivation Seed Sowing Leveling and Pesticides Spraying

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Abstract: The core of the Indian economy is agriculture. India is a developing country, and as such, agriculture and industries based on crop products are crucial to the country's economy. The majority of Indians work in and depend on industries and businesses that are centred on agriculture. One of the many farm mechanisations is the soil tiller and weeder. Consider non-conventional energy sources in order to address the issues with fossil fuels. Regarding this concept, a solar-powered electrical tiller was created for this project. The four-wheel drive vehicle can be utilised for small-scale agriculture. The primary goal is to minimise the workforce because it is difficult to find labourers in the current environment, and Its primary goal is to minimise the workforce because labour is so hard to come by in the current economy. It also shortens the working day.

Index Terms - Cultivation, Seed sowing, Pesticides, Spraying, Mechanizations.

I. INTRODUCTION

Small farms do not use modern agricultural techniques and equipment holders because to the high cost and difficulty in obtaining this equipment. Using scientific farming techniques, we can increase crop yield and produce high-quality crops that can prevent a farmer from liquidation, yet the majority of farmers continue to use ancient farming methods due to ignorance about or lack of investment in modern technology. India still relies heavily on hand tools for land cultivation because tractors need resources that many Indian farmers do not have easy access to. Therefore, a deeper comprehension of the activities of small holder farmers must be taken into account when evaluating the need for agricultural mechanisation in India. There is a significant disparity in the adoption and use of technology.

Therefore, a deeper comprehension of the activities of small holder farmers must be taken into account when evaluating the need for agricultural mechanisation in India. The adoption of technology and the tools used by small and marginal farmers differ significantly. Adoption of enhanced resource-conserving agricultural systems is crucial for the long-term improvement of impoverished farmers' lives in emerging nations. While the majority of the required components are already present, there is a lack of knowledge regarding the availability and performance of equipment and ineffective communication between farmers and the agricultural research and development department.

II. MAIN FEATURES OF INDIAN AGRICULTURE

1. Source of livelihood: Agriculture is the main occupation. It provides employment to nearly 61% persons of total population. It contributes 25% to national income.
2. Dependence on monsoon: Agriculture in India mainly depends on monsoon. If monsoon is good, the production will be more and if monsoon is less than average then the crops fail. As irrigation facilities are quite inadequate, the agriculture depends on monsoon.
3. Labor intensive cultivation: Due to increase in population the pressure on land holding increased. Land holdings get fragmented and subdivided and become uneconomical. Machinery and equipment cannot be used on such farms.
4. Under employment: Due to inadequate irrigation facilities and uncertain rainfall, the production of agriculture is less; farmers find work a few months in the year. Their capacity of work cannot be properly utilized. In agriculture there is under employment as well as disguised unemployment
5. Small size of holdings: Due to large scale sub-division and fragmentation of holdings, land holding size is quite small. Average size of land holding was 2 to 3 hectares in India while in Australia it was 1993 hectares and in USA it was 158 hectares.

III. OBJECTIVES

- Cultivation, Seed sowing, Spraying and leveling operations are done by a single machine.
- To solve the problems of fossil fuels, there is a need to look at the non-conventional source of energy.
- With regard to this project proposed multipurpose farming machine that runs on solar energy.
- In case of non-sunny seasons, alternatively battery can be charged through direct electrical energy.
- To reduce human and animal effort in the agricultural field with the use of small machine.

- To perform cultivation, seed sowing, leveler operations at same time, hence increases production and saves time.
- To utilize the solar energy even at the agricultural land for power generation and hence→ battery can be charged.

IV. METHODOLOGY

The motor is battery-powered. The tool is rotated anticlockwise to the direction of the machine as a whole, which is useful for shifting earth between two rows of crops in a particular form. The solar radiations are immersed on the solar panel by this procedure, which converts the solar energy. This consists of A solar panel and it generates energy to run this machine. The solar energy is converted to electrical energy and then transferred from the battery to the controller kit, which allows us to adjust the motor speed to suit our needs. Once the controller kit has received the necessary power to start the motor, we can easily turn it once the rotor has finished its work.

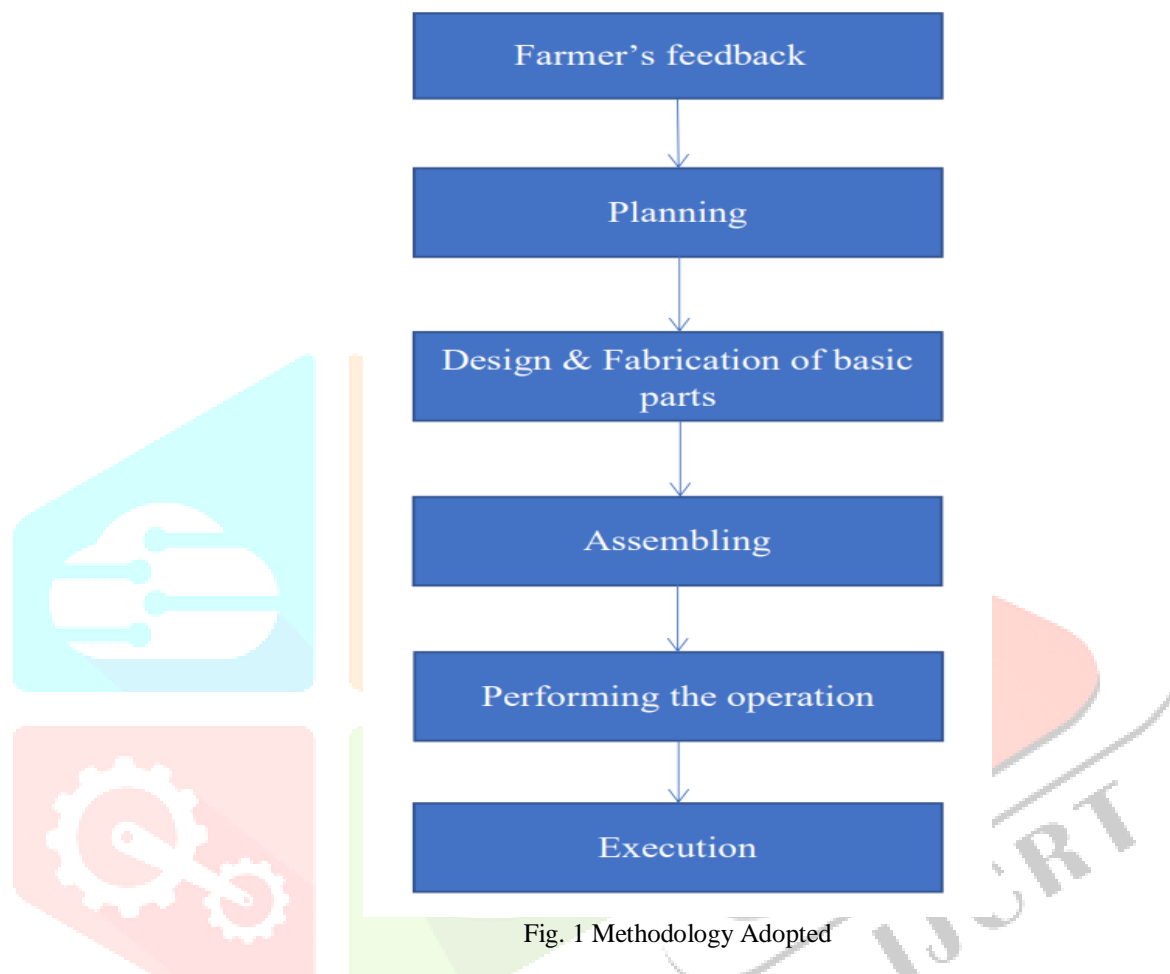


Fig. 1 Methodology Adopted

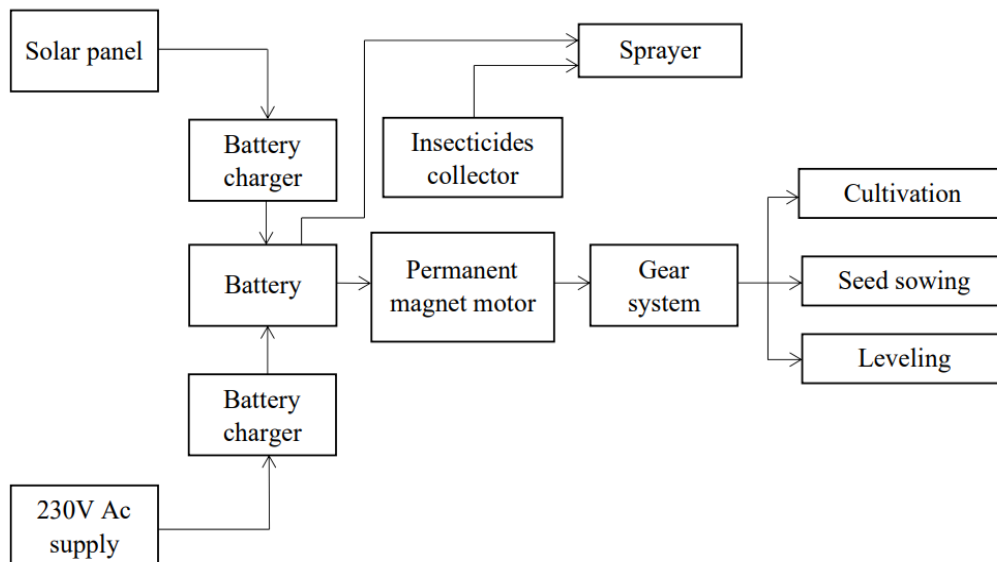


Fig. 2 Block Diagram

Battery voltage is kept in the form of DC. which is next provided to the boost converter, which transforms the dc to DC and raises the DC voltage level. To run the motor, the dc motor receives a boost in DC voltage. The batteries are charged using a 230 AC supply to power the engine if solar energy is not available throughout the winter. The chain system is connected to the motor

by a chain, and when the motor begins to rotate, the chain operates. This chain is attached to the cultivator teeth, and when the chain begins to operate the cultivator teeth, it will begin to cultivate the soil.

Solar cells are used to make solar panels. Similar to semiconductors, solar cells are constructed using silicon. They have a positive layer and a negative layer, which together, like in a battery, form an electric field. Electrons get separated from their atoms when photons strike a solar cell. An electrical circuit is created by connecting wires to a cell's positive and negative sides. Electricity is produced when electrons go through such a circuit. A solar panel is made up of several cells, while a solar array is made up of many panels (or modules). The ability to deploy more panels will increase the amount of energy you can produce.

A carrying conductor will suffer a mechanical force when it enters a magnetic field, and Fleming's left-hand rule determines the force's direction. The armature, like in a permanent magnet DC motor, is positioned inside the magnet's magnetic field and rotates in the force's direction. Each conductor of the armature encounters the mechanical force $F = BIL$ in this situation. I is the current in Ampere flowing through that conductor, L is the length of the conductor in metres under the magnetic field, and B is the magnetic field strength in tesla (weber / m^2). Each conductor in the armature is subjected to a force, and the sum of those forces results in a torque.

A sprayer is a tool used in agriculture to apply liquids like water, herbicides, and insecticides. In agriculture, they are also utilised to apply fertiliser and pesticides to crops. Components of sprayers include spray nozzles, liquid tanks, sprayer pumps, and others. Sprayers are used to apply liquid fertiliser, minimising the need for manual labour. However, using sprayers makes the job incredibly simple because the system can be automated and the task is finished quickly.



Fig. 3 Pesticides Sprayer



Fig. 4 Assembly of PMDC, gear Shaft with Cultivator

V. RESULTS AND DISCUSSION

A farming machine in agricultural implement fitted with rotary tillers which gives a smooth resistance to all farm activities. In the form machine which is mainly used to cultivating, seed sowing, spraying and leveling the land. Although it is mainly used for seedbed preparation in low land paddy field. It is also used as a power source or other. Sowing and fertilizer applications in agriculture field.

Based on the overall performance of the machine we can definitely say that the project will satisfy the need of small scale farmer, because of their requirements is fulfilled. The machine requires less manpower and less time compared to traditional methods, the unit cost of the product can greatly reduce by mass production and we hope this will satisfy the partial trust of Indian agriculture. Today's major labor problem in farming can be solved. The "Multi-Purpose Farming Machine" aims to perform various agricultural operations. The developed model runs successfully performing all the agricultural operations, i.e. Cultivating, leveler, seed sowing and water sprayer both simultaneously and individually with the help of electrical switches. Also the use of solar power to run the vehicle is an added advantage being a renewable source of energy.

Thus, being a multi-utility vehicle, it has other advantages like reduced manpower, increased rate of productivity and better efficiency as it is battery operated. It is cost effective which is affordable even for the poor farmers. Also by the use of effective seeding mechanism, the wastage of the seeds is reduced. The electrical switch mechanism makes it much easy to operate for the farmers. The vehicle can also be used for material handling and hence makes it feasible to move heavy loads.



Fig. 5 Proposed Model

The proposed model having below mentioned advantages:

1. Simple in design: The farming machine design is very easy compare to the other machine like diesel or petrol using machines.
2. Easy to operate: The farming machine is operate using solar energy and motor that's why the operation is easy.
3. Easy to maintain: The farming machine is operate using renewable energy source so the maintenance is easy.
4. Cheap cost: Cost of the renewable energy source that is solar energy is freely available in nature so the cost is less.
5. Pollution free: The solar energy source is not producing any pollutant from its operation.
6. Eco friendly: The solar energy is renewable and freely available and non-pollutant source in the environment.
7. It made agriculture reachable to formers by reducing the need of tractors and rotavator.

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