

# Design and Fabrication of Multipurpose Farming Equipment

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**Abstract:** The Multipurpose machine is used to sowing the seeds and fertilizer spray into land and grass cutting for making lots of plant production in agricultural field. It is a mechanical device here no electrical or other power source is not required. The cost of this machine is very low and easy to operate simple in construction. As there is tremendous development in the field of engineering the current scenario makes us to find solution for major problems faced by the agricultural field. Lot of equipment was invented to sophisticate the work of labor in the farms. The main objective of this project is to improve the current way of farming by introducing multipurpose equipment. It helps farmers by grass cutting and sowing the seeds and fertilizers.

The fabricated device called “Design and Fabrication of Multipurpose Farming Equipment (Sowing, Ploughing, Sprayer) With Solar”. To sow the seeds first land should be cleaned and after sprayed the seeds the land should be filled. This equipment which we build will do the mentioned functions automatically. It will be very useful for agricultural purpose and very simple in construction and economical.

**Keywords:** Agriculture, Farming, Fertilizer, Microcontroller, Sprayer.

## 1. Introduction

It is essential to increase the productivity of agriculture and farming processes to improve yields and cost effectiveness with this technology, so we are introducing this multipurpose agriculture machine. This machine mainly consists of a water sprayer, seeder and a weeder which performs 3 multipurpose functions such as the spraying of water, the seeds being disposed into the soil and the weeding operation. The machine is mainly operated with solar power, which makes the machine eco-friendly with the environment. The major highlight of this machine is that, the operations of weeding, spraying and seeding can be controlled by microcontroller which makes it highly efficient and easier. Microcontroller focuses on the automation of the processes by lessening human interaction, microcontroller collects data using sensors and process the data using controllers and completing the automation process by actuators. A Sprayer is a tool used to spray fluids. In agriculture, a sprayer is part of the equipment that sprays nozzles using herbicides, pesticides, and fertilizers on agricultural crops.

## 2. Methodology

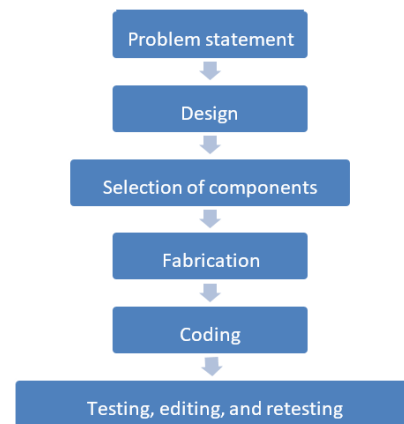


Fig. 1. Flow chart of methodology

### A. Problem statement

The problem statement is done according to need of the device in the present scenario. This multipurpose agricultural vehicle is designed for small farmers in future. By this machine it becomes much easier for the farmers to easily control the different operations of farming with the help of microcontroller.

### B. Design

The designing of the vehicle is done with the help of CAD software. Therefore, proper design of tillage equipment is necessary in order to increase their working life time and reduce the farming costs. So we analysed different tillage equipment like subsoiler, rotavator blade and M.B. plough in CAD software for static structural analysis.

### C. Selection of components

The selecting of raw material according to the need also decides the selection of IFS components in any farm. Soil types, rainfall and its distribution and length of growing season are the major factors that decide the selection of suitable annual crops, trees and livestock components. The needs and resource base of the farmers.

### D. Fabrication

The farmer must use a variety of agricultural equipment and labor to take care of these measures. All of this can be done on

the same machine. This remote wireless agrourose machine operates and is designed and manufactured as a multiplication machine used for agricultural processes such as plowing, seed sowing and water spraying.

#### E. Coding

Coding crops is essentially farming as a service. It is the process of combining all of these technologies into a single automated process for farming, one that can seamlessly scale up and down, and all operating remotely through code.

#### F. Testing editing and retesting

Testing the vehicle, and editing the problems and again testing process doing to check the vehicle. n agriculture, a soil test commonly refers to the analysis of a soil sample to determine nutrient content, composition, and other characteristics such as the acidity or pH level. This procedure must be done so that government sampling requirements are met. With gene editing comes a new model of how crops are improved and produced, who produces the plants, and how they will be introduced to farmers and importantly how plant breeding can quickly respond to change including arming crops with traits to combat our changing climate. Retesting is testing of a particular bug after it has been fixed. In some cases the entire module is required to be re-tested to ensure the quality of the module.

### 3. Working Principle

India is a country where farming is a priority and culture and in India most farmers are trying to commit suicide after this is mechanical, as in India 10-20% of farmers are rich but some farmers do not have much source to buy heavy machinery and equipment. Therefore, the machine that can meet the basic demand for plowing and the price of the machine should be very low compared to the market. The purpose of the machine is to drive, spray, fertilize and plant.

Initially the vehicle moves under solar power which undergoes the ploughing or weeding operation. A 12-volt battery system is attached to the vehicle which helps the motor to function and undergoes the disposal of seeds from the seed box to the tilled soil This functioning of the motor can be controlled by the microcontroller. A plastic water container is attached to the front which helps the spraying of water through a connected hose/pipe. The operations are automated and can be controlled through Bluetooth which makes it easier for the farmers. A solar panel of sufficient power balancing the weight of the vehicle is installed on the top frame depending on the total weight of the chassis thus makes it more ecofriendly.

Sowing and Fertilizer It is used for line sowing and fertilizing of cereals and other crops. It is a low cost line-sowing device in which seed metering is done manually by the operator by dropping the seeds in the funnel provided for the purpose. Spraying Designing of spraying mechanism which is driven by the chain and sprocket by the front wheel of the unit. In this concept as shown in fig. 2, a single frame is used to mount all

the equipment's like chemical sprayer at the front side of the wheel and the cylinder to maintain the chemical in liquid form at the middle of the frame. The attachments like inter cultivation sowing and feeding and chemical sprayer can be replaced on the final assembly for specific functions.

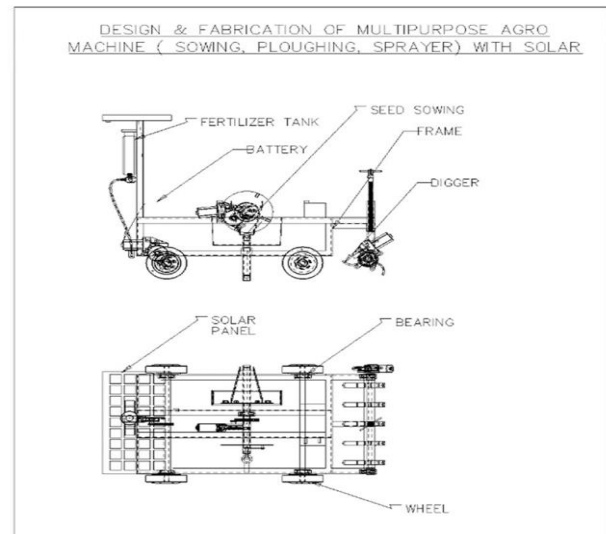


Fig. 2. 2D model of multipurpose farming equipment

### 4. Result and Conclusion

Many of these agricultural machinery can be used for weed making, fertilizing, sowing, growing and for weed control purposes. All components are connected in such a way that in all agricultural sectors the equipment can be rebuilt or easily integrated with fasteners the required length and specification of field operation.

There are many ideas from various fields of mechanical engineering and agricultural knowledge to improve yields and reduce labor and cost. This whole concept of repetitive machines is a new, innovative concept and can work effectively in real-life situations.

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