

Multipurpose Agricultural Machine

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ABSTRACT

Agriculture has been the backbone of the economy and it will continue to remain. Agriculture is the science and art of farming including cultivating the soil, producing crops and raising livestock. Generally, cultivation of any crop involves various steps like ploughing, harvesting, sowing, and irrigation. Farmer has to use various agricultural equipment's and labors for caring out these steps, our purpose is to combine all the individual tools to provide farmers with multipurpose equipment which implements all the scientific farming techniques and specifications, suitable for all type of seed to seed cultivation with minimum cost as possible. All this can be done in this same machine. This multipurpose agro machine is wireless remote operated & designed and fabricated as a multipurpose equipment which is used for agricultural processes like ploughing, sowing seeds and sprinkling water. This machine works in both directions when it is pushed forward it ploughs the field with the help of plough. The height of the plough can be adjusted, with the help of screw arrangement and the seed feeder is mounted directly to the motor. The motor rotates and the shaft attached to it has holes. The motor is directly attached to the shaft with holes. When we push the agriculture machine in a backward direction, we can pick the plough up from the ground and the pump which is attached to the front shaft will start pumping the water from the tank and it will sprinkle water over the field.

1. INTRODUCTION

Agriculture has been the backbone of the Indian economy, and it will continue to remain so for a long time. A man without food for three days will quarrel, for a week will fight and for a month or so will die. Agriculture is a branch of applied science. Agriculture is the science and The art of farming includes cultivating the soil, producing crops and raising livestock. It is the most important enterprise in the world. Over the years, agricultural practices have been carried out by small holders cultivating between 2 to 3 hectares, using human labor and traditional tools such as wooden plough, yoke, leveler, harrow, mallot, spade, big sickle etc. These tools are used in land preparation, for sowing of seeds, weeding and harvesting.

Modern agricultural techniques and equipment are not used by small land holders because these equipment are too expensive and difficult to acquire. By adopting scientific farming methods we can get maximum yield and good quality crops which can save a farmer from going bankrupt but majority of farmers still uses primitive method of farming techniques due to lack of knowledge or lack of investment for utilizing modern equipment. The use of hand tools for land cultivation is still predominant in India because tractors require resources that many Indian farmers do not have easy access to. The need for agricultural mechanization in India must therefore be assessed with a deeper understanding of the small holder farmer's activities. There is huge gap in technology adoption and Implement used with small and marginal farmers. Sustainable improvement in the livelihoods of poor farmers in developing countries depends largely on the adoption of improved resource conserving cropping systems. While most of the necessary components already exist, information on the availability and performance of equipment is lacking and effective communication between farmers and agricultural research and development department is unsuccessful.

2. OBJECTIVE

The purpose of this project is to provide farmer with multipurpose equipment which implements all the scientific farming specifications and technology to get maximum yield and good quality crops by reducing investment and number of labor. There are many tractor powered equipment which are suitable and economical only for more than 5 acres of land. There are many hand pulled equipments which are only suitable for gardening purpose. Our objective of making powered equipment is suitable for 1 acre to 3 acres of land it is both economical and modernized with scientific methods. Majority of the Indian formers are the land owners of 1 to 3 acres. Hence it is most suitable for Indian economy and farming techniques.

To Increase productivity

- Time and labor savings
- Cost reduction
- Versatility
- Precision farming
- Soil health and sustainability
- Adaption to small farms
- Mechanization of labor-intensive task
- Increase profitability.

3. COMPONENTS

Frame:

Mild Steel & Aluminium

The frame is the main structure of the project where the different parts are attached. The main function of the frame is supporting the main assembly and transfer of the load. As the mild steel is easily available in the local market, and it can be machined according to use we used the mild steel for the manufacturing of the frame.

Seed Feeder:

Made up of Aluminium

Motor:

We are taking electrical components such that it can operate on 12V. As the 12V supply battery can be small and efficient to take load of the whole circuit. 12V DC Motor with 30RPM is used to drive the vehicle.

Wheels:

We are using wheels made up of Plastic and Rubber.

Water Tank and Pump:

12V DC pump operated water tank is used

Atmega 328:

ATmega328 is an eight-bit Microcontroller. It can handle data sized of up to eight bits. It is an AVR based miniaturized scale controller. Its built-in interior memory is around 32KB. It works extending from 3.3V to 5V. It has a capacity to store the information notwithstanding when the electrical supply is expelled from its biasing terminals. Its brilliant highlights incorporate the cost effectiveness, low power dispersal, programming lock for security purposes, genuine clock counter with isolated oscillator. It's ordinarily utilized as a part of Embedded Systems applications.

RF Modules:

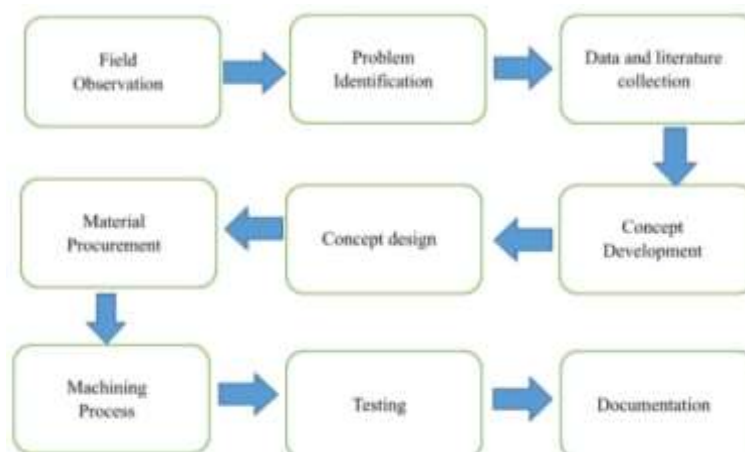
RF itself has become synonymous with wireless and high-frequency signals, describing anything from AM radio between 535 kHz and 1605 kHz to computer local area networks (LANs) at 2.4 GHz. However, RF has traditionally defined frequencies from a few kHz to roughly 1 GHz. If one considers microwave frequencies as RF, this range extends to 300 GHz. The following two tables outline the various nomenclatures for the frequency bands. The third table outlines some of the applications at each of the various frequency bands.

RF RECEIVER:

The ST-RX02-ASK is an ASK Hybrid receiver module. An effective low-cost solution for using at 315/433.92 MHZ. The circuit shape of ST-RX02-ASK is L/C. Receiver Frequency: 315/433.92 MHZ Typical sensitivity: -105dBm

Supply Current: 3.5mA IF Frequency: 1MHz

4. METHODOLOGY



In the process of cultivation, the farmer has to use a number of individual tools which increases the complexity of the process. This project allows us to complete the cultivation process using a single machine.

The project's introduction and the problem specification are covered in this chapter. As a project for this topic in the academic year 2024–2025, creating a working scale model of this machine will help to overcome all the issues covered above. This methodology is broken down into several sections, each with its own title.

5. ADVANTAGES

The following are some benefits of using a Multipurpose agricultural Machine:

Efficiency Improvement:

The implementation of the Multipurpose Agricultural Machine in farming fields with smaller areas the efficiency can be greatly increased of the tasks that were previously being done by labour. The reduction in the time required for the agricultural process

Enhanced User Experience:

The implementation of the Multipurpose Agricultural machine will result in enhanced user experience as it helps reduce required manpower to a great extent

Continuous Improvement:

The introduction of the Multipurpose Agricultural machine in the Indian markets will help in revolutionizing the life of the majority of farmers life - By gathering feedback from library staff and patrons, the library can identify areas for enhancement and refinement in the LMR's functionality and performance. This iterative approach ensures that the LMR remains responsive to the evolving needs of the library and its users, driving continuous improvement and innovation in library services.

Cost Savings:

The implementation of the Multipurpose Agricultural machine can help severely in the cost saving of the farmers as its cost is far less than that of any other automated agricultural machine

Less Labour Requirement, To Increase productivity, Time and labour savings, Versatility, Precision farming, Soil health and sustainability, Adaption to small farms, Mechanization of labor-intensive task, Increased profitability etc are the many advantages of using a Multipurpose agricultural Machine.

6. CONCLUSION

The multipurpose agricultural robot gives an advance method to sow, plow and spray water with minimum manpower and labor making it an efficient vehicle. The machine will cultivate the farm by considering particular rows and specific columns at fixed distance depending on crop.

- Based on the overall performance of the machine we can definitely say that the project will satisfy the need of small-scale farmers, because they are not able to purchase costly agricultural equipment.
- The machine required less manpower and less time compared to traditional methods, so if we manufacture it on a large scale its cost gets significantly reduce and we hope this will satisfy the partial thrust of Indian agriculture. So, in this way we solve the labour problem that is the need of today's farming in India.

7. REFERENCES

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