

# **Agricultural Sprayer with Remote Control Based on Mechanical Principle**

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## **INTRODUCTION**

Insects are largely responsible for the crop destruction. Insecticides or pesticides, a man made or natural preparation are used to kill insects or otherwise control their reproduction. These herbicides, pesticides, and fertilizers are applied to agricultural crops with the help of a special device known as a "Sprayer," sprayer provides optimum performance with minimum efforts. The invention of a sprayer, pesticides, fertilizers, bring revolution in the agriculture or horticulture sector especially by the invention of sprayers, enable farmers to obtain maximum agricultural output. They are used for garden spraying, weed and pest control, liquid fertilizing and plant leaf polishing. There are many advantage of using sprayers such as easy to operate, maintain and handle, it facilitates uniform spread of the chemicals, capable of throwing chemicals at the desired level, precision made nozzle tip for adjustable stream and capable of throwing foggy spray, light or heavy spray, depending on requirement. Agriculture sector is facing problems with capacity issues, shrinking revenues, and labour shortages and increasing consumer demands.

Renewable Energy is generally defined as energy that comes from long lasting resources. The sun is the most abundant and unlimited source of energy. As solar energy is one of the most important non-conventional sources of energy. This energy is environmental friendly, which is mainly free from pollution. Solar energy get from the sun is harvested on the solar panel the panel is made up of photovoltaic cells, which converts energy from photon to electric. And these cells are made up of silicon semiconductor. Solar panel is used to store electric energy or charge the battery from the solar energy. And the battery charged is used to operate DC pump for spraying the pesticides.

The prevalence of traditional agriculture equipment intensifies these issues. In addition, most farmers are desperately seeking different ways to improve the equipment quality while reducing the direct overhead costs (labour) and capital. Thus, a significant opportunity rests with understanding the impact of a pesticide sprayer in an agriculture field.

A pesticide sprayer has to be portable and with an increased tank capacity as well as should result in cost reduction, labour and spraying time. In order to reduce these problems, there are number of sprayer introduced in the market but these devices do not meet the

above problems or demands of the farmers. The conventional sprayer having the difficulties such as it needs lot of effort to push the liver up and down in order to create the pressure to spray. Another difficulty of petrol sprayer is to need to purchase the fuel which increases the running cost of the sprayer. In order to overcome these difficulties, I have proposed a wheel driven sprayer, it is a portable device and no need of any fuel to operate, which is easy to move and sprays the pesticide by moving the wheel. The mechanism involved in this sprayer is reciprocating pump, and nozzles which were connected at the front end of the spraying equipment.

## **PROBLEMSTATEMENT**

Pesticide is sprayed by a human by carrying reservoir tank throughout the field and manually spraying it on the plants. Taking into the account weight of the reservoir tank, human efforts in carrying it and moving all over the field and pesticide ill-effects on the human health, there is a need to develop an automated machine/device to do the job effectively and efficiently.

## **OBJECTIVES**

Based on the extensive literature review, the following objectives are set:

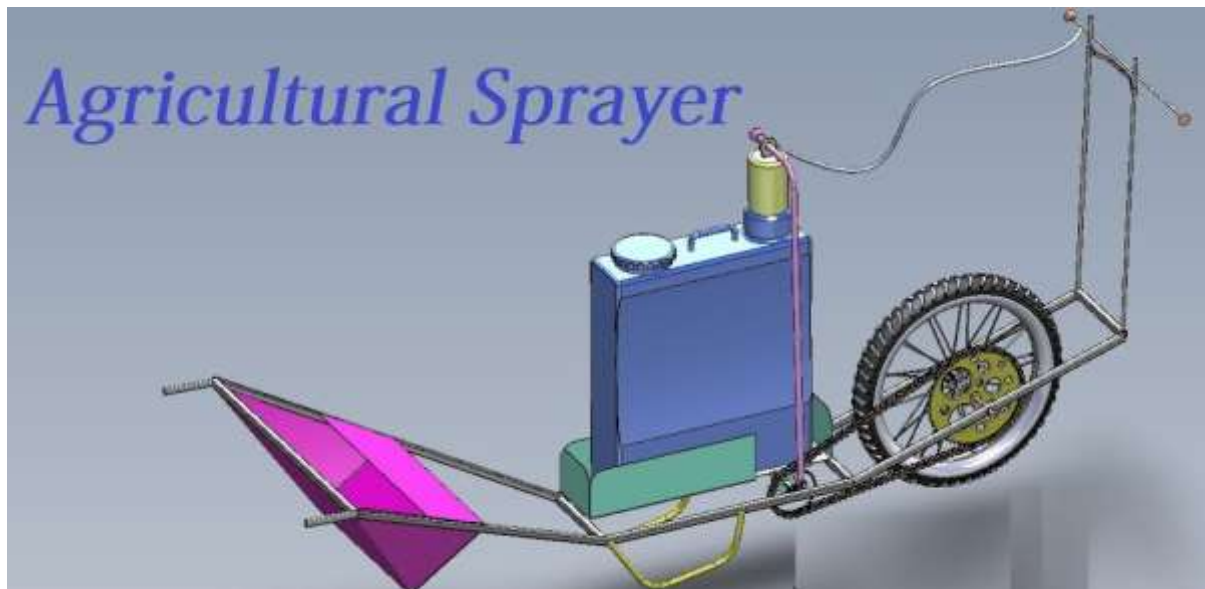
- To design and fabricate the solar based pesticide sprayer.
- To prevent the operator getting exposed from harmful and noxious chemicals and pesticides.
- To navigate and control the machine using Radiofrequency.

## **METHODOLOGY**

- 1. Study of the problem statement:** The problems associated with the manual operated spraying machine are rectified and designed a new machine to overcome those problems.
- 2. Solid Model:** The model is designed by using Solid edge (CADsoftware).
- 3. Selection of motor calculation:** Selection of the motor is a major problem because it depends on the torque required and weight to be pulled, by using formals the motor has been selected. The battery selection also places an important role the required power is delivered to the system by thebattery.
- 4. Selection of material:** The choice of materials for a vehicle is the first and most important factor for automotive design. In this we used Mild Steel bar alloy as a base material for chassis it will provide maximum strength and minimum deflection compared to other chassis material. Analyzed design of chassis is selected which has

robust design and best suitable for agricultural works.

5. **Fabrication:** The selected Materials are fabricated by using permanent joints as well as temporary joints. All the components are fitted and connected as in electronic circuit.
6. **Demonstration and troubleshooting:** It is aimed more at an agricultural land by spraying long distance. The studies demonstrated that each stages have potential to be the most cost effective solution to perform well in agricultural land and there are two failure modes which the solar system may be experience. These two conditions which may require troubleshooting are Zero power output (no power), low voltage issue and solar panel defects.
- 7.
8. **Working Principle & Components**



This project operates on solar energy. The concoction is accomplished by the use of solar panel, a centrifugal pump which runs on dc supply is attached to the solar panel the solar panel generates the power that power is DC power its positive and negative terminals are connected to a battery in order to store the power and use it when the sun rays are not present by using this device we can spray pesticides to the herbs and plants and any agriculture spraying it is economical as compared to the other means used like petrol/diesel pesticides sprayers. There is no much maintenance cost and no operating cost as it is using solar energy it is free of cost and there is no pollution its working principle is very simple and the it is economical of the farmers which has one more advantage that it can also generate power that power is saved in the battery and it can be used for spraying. And where as in rainy season when the sun rays are not there that time we can charge the battery and use it to spray pesticides to the herbs and plants as compared to petrol/ diesel it is economical no efforts to human just he has to carry the device the device is light in weight so it is much feasible.

## **CONCLUSION AND FUTURE SCOPE**

### **Conclusion:**

The proposed system is very efficient and can be used in agricultural field very effectively. This technology is most suitable for Energy Alternate Device for power sprayers.

This system is user friendly and also environment friendly as it doesn't produce any pollution. Also this robot can be used at very remote place where fuel and power are not available. As this sprayer is economical than that of the conventional engine operated Sprayers, Moreover the same technique and technology can also be extended for all types of power sprayers.

### **Future Scope:**

- The use of Latest computer technology will make to automate the system completely.
- By adopting adjustable width of frame, the robot can be used for all crops.

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