

A Review Paper on Fabrication of Multicrop Spraying Robot

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Abstract:- People in India use backpack type sprayer for spraying pesticides which is carry on back of the person with 15 lit maximum capacities and one nozzle in one hand while other hand is used to pump the machine to create pressure. But pesticides can cause short-term adverse health effects, called acute effects, as well as chronic adverse effects that can occur months or years after exposure. . Examples of acute health effects include stinging eyes, rashes, blisters, blindness, nausea, dizziness, diarrhea and death. Examples of known chronic effects are cancers, birth defects, reproductive harm, neurological and developmental toxicity, immunotoxicity, and disruption of the endocrine system. For example, infants and young children are known to be more susceptible than adults to the toxic effects of pesticides. Farm workers and pesticide applicators are also more vulnerable because they receive greater exposures.[1]

There are also such equipments in the market which solve this problem like machine which is consisting of water tank on tractor. This water tank contains liquid pesticides and many more which are costly enough that every farmer can't buy it. Also they are non eco-friendly as they are using fuel which emits hazardous gases cause damage to the environment

On looking all this problems we try to make such type of smart pesticide agriculture robot which is most needful for current farm sector. Project operates on solar energy. Which makes it eco-friendly which is most feasible advantage of this project? 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 as its working principal is very simple and it is economical of the farmers which is one more advantage. It can also generate power that power is saved in the battery and it can be use to spray pesticides on the herbs and plants. Also it can spray in multi-directions with more than one nozzle which is time reducing. At last It will help in minimizing adverse effect on human being, will be economical, time reducing and eco-friendly.

Key Words:- Solar Power, Robot, Spaying Machine, Pesticides, Eco-Friendly, DC motor, Nozzle, Battery, Remote control, Low cost.

I. Introduction

Agriculture has been the back bone of Indian^[11] and Nepalese economy and culture and it will be continued to remain as such for a long time in future. Spraying of pesticides is an important task in agriculture for protecting the crops from pests. In Nepal and India, near 70% peoples are dependent upon agriculture^[9]. Agriculture is a profession of many tedious processes and practices, one of which is spraying of pesticides in the crops. Solar pesticide sprayer is a useful machine which is ergonomics, motion stable which is more efficient to workers, and the energy source used in non conventional. Hence it poses a great scope in future.

Agriculture has a predominant role in our day to day life. Spraying of pesticides is an important task in agriculture for protecting the crops from pests. The conventional methods were a person carrying a sprayer and manually actuating a lever to generate and pump the pesticide through a tube or a mobile vehicle carrying an inbuilt compressor and sprayer unit. Another major drawback in human operated systems is that the operator is exposed to the harmful chemicals while spraying which is extremely detrimental to operator's health. A solar powered semi automatic pesticide sprayer model consists of a solar panel, a battery, two DC motors, pump, container, microcontroller and zigbee device which is operated by a wireless remote(range of 30 to 50meters) which runs on power source as a DC battery(12V, 7.5Ah). The capacity of the container in the sprayer was designed with 5 litres capacity for an uninterrupted operation with the discharge rate of 0.556 l pm. Analysis of solar radiation data from Bangalore showed that the sprayer can be best operated during 9 AM to 5 PM. The vehicle is powered using an onboard solar powered battery which runs down the running cost. Besides reducing

the cost of spraying, there is a saving on fuel as well. The farmers can do the spraying operation without human interference thus protecting them from noxious chemicals

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.

Objective

- Implementation and use of the solar technology.
- Modified the existing technology.
- To make use of solar system were working sun rays is readily available.
- To make cost effective system.
- To make the earth non pollutant
- The objective of this paper is to present robotic model which is easily operates agriculture operation
- Now a days it is necessity of automation in agricultural field to reduce the farmers efforts & labor cost
- To perform operation like spraying hence increases production & saves time.
- The farmer can operate robot very easily.^[2]
- Large amount of work completes in less time.^[2]
- For battery charging solar energy is to be used. The rays of the sun can be used for solar power generation.^[2]
- Design and build up a sun powered agro-sprayer framework which depends on sun oriented vitality
- Also create the model of a similar which would have the capacity to give same outcomes as necessity of plan idea.
- To test the model with its capacity to work dependably under various working conditions.

Components Utilised In Project

Materials And Components:-

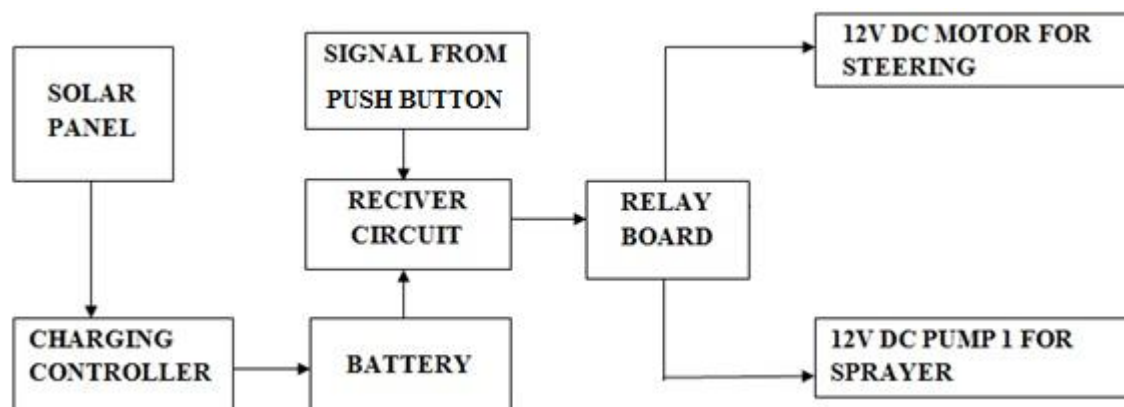
Materials used to conduct the present research are

1. Mild steel chassis
2. Tank
3. DC motors
4. Solar panel
5. Wheels
6. Battery
7. Pump, Sprayer and Nozzle

II. Methodology

Pesticide Operation is used in farm to sprayer the Pesticide to reduce the effect of insects and this process is also beneficial to human health.

- Pesticide is stored in the plastic box and the DC motor is connected with the plastic box and the pipe.
- The power for pump is regulated by a toggle switch.
- The water flows to the sprayer through pipe.



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 solar panel the solar panel generates the power that power is dc power positive and negative charges are connected to a batter in order to save the power, 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 principal 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 both for spraying and well as to light in 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.

III. Conclusion

In agriculture, by using the solar operated multi-purpose robot. We can easily reduce the farmer efforts and time. The machine required less man power and less time compared to traditional method. We hope this will satisfy the partial thrust of Indian agriculture. So in this way we can overcome the labour problem that is the need of today's farming in India. In future the robot also runs on PLC and SCADA with fully automation. [2]

This project demonstrates the implementation of robotics and mechatronics in the field of agriculture.. We are developing a robot whose construction is enough to withstand the challenges of the field. We are sure that once this concept is presented in a manner suitable to Indian market, it will definitely help in bringing down the 15% modality rate found in the Indian formers associated with the agricultural spraying operation.

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