

Research on Insecticide Sprayer Machines for Domestic Application

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Abstract:- India is a land of agriculture that comprises of small, marginal, medium and rich farmers. Small-scale farmers are very interested in manually lever-operated knapsack sprayer because of its versatility, cost, and design. But this sprayer has certain limitations like it cannot maintain required pressure; it leads to the problem of back pain. However, this equipment can also lead to misapplication of chemicals and ineffective control of target pest which leads to loss of pesticides due to dribbling or drift during application. This phenomenon not only adds to cost of production but also cause environmental pollution and imbalance in natural ecosystem.

Keywords:- Insecticide sprayer, domestic application.

I. INTRODUCTION

Agriculture plays a vital role in Indian economy. Around 65% of population in the state is depending on agriculture. Although its contribution to GDP is now around one sixth, it provides 56% of Indian work force. The share of marginal and small farmer is around 81% and land operated is 44 % in 1960-61. As far as Indian scenario is concerned, more than 75 per cent farmers are belonging to small and marginal land carrying and cotton is alone which provide about 80 % employment to Indian workforce. So, any improvement in the productivity related task help to increase Indian farmer's status and economy. The current backpack sprayer has lot of limitation and it required more energy to operate. The percentage distribution of farm holding land for marginal farmers is 39.1 percentage, for small farmers 22.6 percentage, for small and marginal farmers 61.7 percentage, for semi-medium farmers 19.8 percentage, for medium farmers 14 percentage and for large farmers 4.5 percentage in year 1960-61. Clearly explain that the maximum percentage of farm distribution belonged to small and marginal category.

A. Embedded System

An embedded system combines computer hardware and software designed for a specific function. Embedded systems may also function within a larger system. The systems can be programmable or have a fixed functionality. Industrial machines, consumer electronics, agricultural and processing industry devices, automobiles, medical equipment, cameras, digital watches, household appliances, airplanes, vending machines, and toys, as well as mobile devices, are possible locations for an embedded system.

II. LITERATURE REVIEW

Sandeep H. Poratkar, Dhanraj R. Raut , the authors reviews on development of multi-nozzle Pesticides Sprayer Pump. Agriculture land in India comprises of small, marginal, medium and rich farmers. Small scale farmers are around 30% are used manually lever operated knapsack sprayer and by use of this sprayer cannot maintain uniform required pressure. This leads to problem of back pain. The suggested model has removed the problem of back pain, since there is no need to carry the tank (pesticides tank) on the back.

Varikuti Vasantha Rao, et al the authors were reviews about the multiple powered supplied fertilizer sprayer. The design and implementation of multiple power supplied fertilizer sprayer and proposed system is the modified model of the two stroke petrol engine powered sprayer which minimizes the difficulties of the existing power sprayer such as operating cost, changing of fuel etc. The two stroke petrol engine has been replaced by a direct current motor and operated by the electrical energy stored in the battery attached to the unit.

Shivaraja kumar, et al the authors were reviewed about design and development of wheel and pedal operated sprayer. The equipment that is wheel and pedal operated 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 and also peddling the equipment. In this equipment using reciprocating pump and there is a accumulator provided for the continuous flows of liquid to create necessary pressure for the spraying action. This wheel operated pesticide spray equipment consumes less time and avoids the pesticide from coming from front of the nozzles which will in contact of the person who sprays pesticides.

Sumit D. Raut, et al, the authors were reviews about the design and construction of a pedal operated reciprocating pump used in large irrigation project areas and orchard and drainage line. They have conducting a different types of pumps and reciprocating devices were constructed and tested at different suction heads in the laboratory to evaluate their performances. The pedal-operated reciprocating pump can be available by local markets and simple skills are required to manufacture it. But this would be suitable to irrigate large and orchard land, especially to pump water from a tank (capacity of up to 15 lit.) to irrigate small plots like vegetables and seed beds with less physical effort.

Abhilash Gurjar, et al, the authors were reviewed on the solar-powered sprayer. Solar powered sprayer is a technology suitable application in the farming community of India. The solar-powered sprayers can be used as fuel alternating devices. It works on the principle of solar photovoltaic (PV), with certain modifications on the existing power sprayer in the market. The annual maintenance charge of the sprayer is expected to be around Rs.500 with an initial investment of Rs.5000 towards the cost of the sprayer. "Solar Sprayers" as "Energy Alternate Devices".

III. METHODOLOGY

This signal is directly passed to microcontroller ATmega 328 which is a family member of AVR microcontrollers as this microcontroller is easily compatible with Arduino ID so we are directly using Arduino UNO for the platform now start the system. Arduino give the digital command to motor driver L293d which helps to rotate motors respectively for single L293d motor driver it is able to rotate two motors at a time so first motor driver will move positive X to negative x-axis and another motor will rotate positive y to origin again.

When both the motors have completed their task motor driver give a signal to the microcontroller of completion the stars and the microcontroller will rotate another motors which is connected to the directly wheel and robot move forward of 1 feet this process will continue till user stop the process.

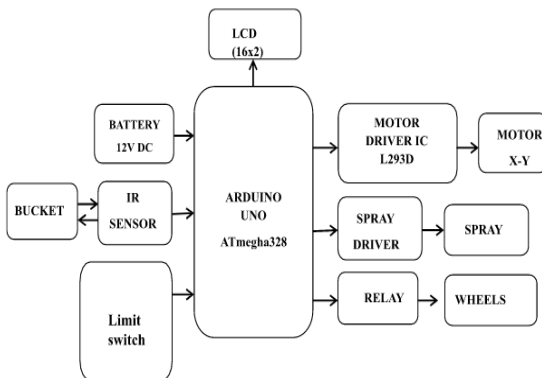


Fig. 1: Block diagram

IV. SYSTEM REQUIREMENT

A. Hardware Requirement

- Arduino uno
- Rack & pinion
- IR sensor
- Limit Switch
- LCD
- L293D motor driver
- Wheel
- Battery

B. Software Requirement

- Arduino IDE

V. RESULT & EXPERIMENTAL SETUP

The project title "insecticide sprayer machine for domestic application" is implemented successfully. The result of the proposed system shows the movement of the machine. the command followed by a robot-like forward. LCD shows the start command and the spraying on and off command.

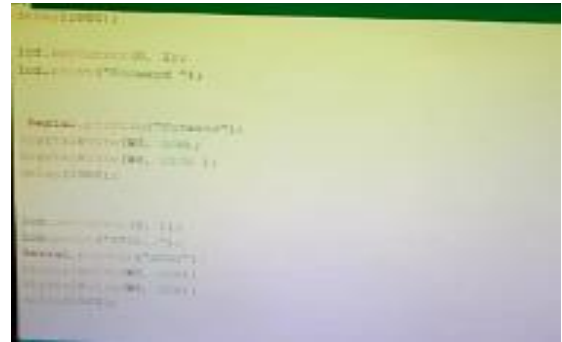


Fig. 2: Shows the output of the proposed system



Fig. 3: Shows the experimental setup of the proposed system

A. Advantages

- Reduces human efforts.
- Good performance with higher efficiency.
- Less consumption of time.
- Easy maintenance and repair.
- User and eco-friendly

B. Disadvantages

- Applications are limited for some crops.
- Uses limited for dry land.
- Additional maintenance costs.

VI. CONCLUSION

The suggested model has removed the problem of back pain since there is no need to carry the tank on the backbone. It requires comparatively less time for spraying so we can get more fields spraying per day. It is cost-effective. than the existing spraying pumps available in the market as no direct fuel cost or cost for maintenance is needed for this. It consumes less time and saves money as compared with conventional spraying.

VII. FUTURE SCOPE

To minimize pesticide wastage by using height and width adjustable for various crops.

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