

# FABRICATION of MULTI PURPOSE SPRAYER by SOLAR

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## Abstract:

Spraying of agricultural chemical compounds (herbicides, pesticides etc.) is an necessary subject activity to shield crops from distinct insect, pests and diseases. Conventionally, knapsack sprayers are most generally used in agricultural crops. Recently, the hand operated knapsack sprayer has been upgraded to strength operated sprayer with the aid of addition of diesel operated pumps. In this study, a solar PV based totally sprayer was once designed and developed. The developed solar PV sprayer operates each on direct mode and indirect mode. In the direct mode, the sprayer was once operated by using the use of electricity generated via a hundred Wp polycrystalline PV modules established on the sprayer and in the oblique mode it was operated on battery mode using saved electric powered strength in a deep cycle battery (12 V, 32 Ah). In each modes, a DC motor pump of 60 W used to be used to generate the required working pressure to spray the liquid pesticide formulations. Among exceptional kinds of nozzles accessible in the market, the exceptional appropriate one for spraying is the brass nozzle, which

Key Words— mechanization, back type sprayer, weeding, modernization

## INTRODUCTION

India is set to be an agricultural based totally country of approximately 75% of the population of India is based on farming directly or indirectly. Our farmers are using the identical strategies and gear for the ages. e.g. seed sowing, spraying, weeding etc. there is need for development of superb spraying and weeding machine for growing the productivity. a status of agricultural mechanization in India most of the developing countries of Asia have the hassle of high populace and low stage of land productivity as compared to the developed nations. one of the predominant reasons for low productivity is insufficient power availability on the farms and low stage of farm mechanization. this is especially genuine for India. it is now realized the world over that in order to meet the needs requirements of the developing populace and fast industrialization, modernization of agriculture is inescapable. it is said that

on many farms, production suffers because of incorrect seedbed preparation and delayed sowing, harvesting and threshing. Mechanization permits the conservation of inputs

via precision in metering ensuring higher distribution, lowering extent needed for higher response and prevention of losses or wastage of inputs applied. Mechanization reduces unit value of manufacturing via higher productivity and input conservation. Agricultural put into effect and equipment application of the authorities has been one of selective mechanization with a view to optimize the use of human, animal and different sources of power. In order to meet the requirements, steps have been taken to expand availability of implements, irrigation pumps, tractors, strength tillers, combine harvesters and different power operated machines and also to amplify the production and availability of extended animal drawn implements. Special emphasis used to be laid on the later as greater than 70% of the farmers fall in small and, marginal category. It is normally said that mechanization of small farms is difficult. But Japan having average land maintaining even smaller than ours, with suitable mechanization has led agriculture to terrific heights. In order to decrease the drudgery of small farmers, to amplify efficiency and store farmer's time for taking up additional /supplementary generating activities, the use of current time saving machines/implements of terrific dimension wanted to be suitably promoted. B. Research & Development System The Indian Council of Agricultural Research (ICAR) is the main company searching after all agricultural research,

including agricultural implements and machinery. It coordinates a number of lookup tasks with centers at specific places in the country. Some of the State Governments have additionally facilitated in setting up of lookup corporations at nation level. Each of the nation has at least one agricultural university.

A research software commonly concentrates on the improvement of equipment suitable to a given farming conditions. The goal is to improve upon the overall performance of indigenous implements or develop a new put into effect that can either beautify labor productivity or appropriately mechanize the operation the place a labor or electricity shortage hinders finishing the challenge in time.

**II. LITERATURE REVIEW**

**A. Spraying Methods**

One of the more frequent forms of pesticide application, mainly in traditional agriculture, is the use of mechanical sprayers.

1. Backpack (knapsack) sprayer  
One kind of backpack sprayer is a compressed air sprayer with a harness that permits it to be carried on the operator's back. [1]

Another type of backpack sprayer has a hand-operated hydraulic pump that forces liquid pesticide through a hose and one or extra nozzles. The pump is commonly activated via moving a lever. A mechanical agitator plate may additionally be attached to the pump plunger. Some of these sprayers can generate pressures of 100 kilos per square inch (psi) or more. Capacity of each these sorts of backpack sprayers is usually 5 gallons or less.

**Figure 1: Backpack type spraying**

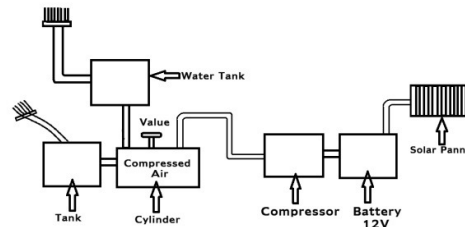
Hydraulic sprayers consist of a tank, a pump, a lance (for single nozzles) or boom, and a nozzle (or more than one nozzles). Sprayers convert a pesticide formulation, often containing a mixture of water (or another liquid chemical carrier, such as fertilizer) and chemical, into droplets, which can be giant rain-type drops or tiny almost-invisible particles. This conversion is carried out by forcing the spray mixture via a spray nozzle below pressure. The measurement of droplets can be altered through the use of unique nozzle sizes, or through altering the strain under which it is forced, or a aggregate of both. nevertheless wind conditions are required. But, in this type of spraying, the labor has to lift all the weight of the pesticides filled tank which motives fatigue to labor and subsequently reduces the human capacity.

**2. Lite-Trac**

Lite-Trac is a buying and selling title of Holme Farm Supplies Ltd, a producer of agricultural equipment registered in England and based totally in Peterborough. The Lite-Trac name comes from "lite tractor", due to the patented chassis sketch enabling the inherently very heavy machines manufactured via the organisation to have a light footprint for

minimal soil compaction. Figure 2: Lite-trac spraying Holme Farm Supplies Ltd agricultural products, bought below the Lite-Trac name, encompass tool carriers, self-propelled lime and fertilizer spreaders, sprayers, granular applicators and tank masters. Lite-Trac is presently the producer of Europe's greatest four-wheeled self-propelled crop sprayers. The company's merchandise are identifiable with the aid of the mixture of unpainted stainless metal tanks and booms with vivid yellow cabs and detailing. A Lite-Trac crop sprayer, or liquid fertilizer applicator, mounts onto the SS2400 Tool Carrier centrally between each axles to hold equal weight distribution on all 4 wheels and a low centre of gravity whether empty or full. The stainless steel tanks are manufactured in capacities of up to 8,000 liters, whilst Pommier aluminium booms of up to 48 meters can be fitted, making these Europe's biggest four-wheeled self-propelled sprayers. [2]

**III. METHODOLOGY**



In our us of a farming is accomplished by using standard way, except that there is massive improvement of industrial and carrier region as compared to that of agriculture. The spraying is historically done by using labor carrying backpack type sprayer which requires more human effort. The weeding is usually carried out with the help of Bulls which will become steeply-priced for farmers having small farming land. So to overcome these above two problems, we tried to dispose of these problems and designed the tools which will be recommended to the farmer for the spraying and weeding operations.

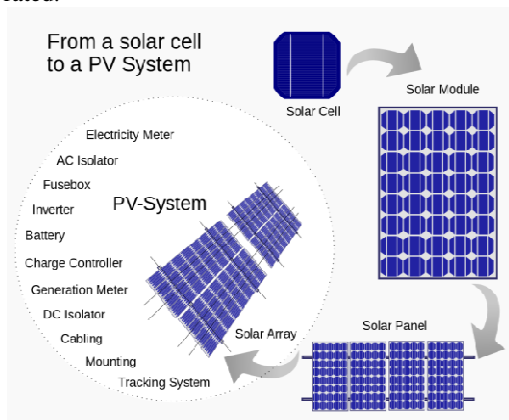
**B. Objectives**

- Decrease the operational price by using using new mechanism.
  - Work reliably under exclusive working conditions.
  - Decrease the value of machine.
  - Decrease labor cost by advancing the spraying method.
  - Machine can be operated in small farming land (5 acre).
  - Making such a desktop which can be able to function both the operation (spraying and weeding).
- So considering these factors associated to spraying and weeding an try is made to plan and fabricate such tools which will able to perform both the operations greater successfully and also will consequences in low cost.

First the solar strength is trapped by way of solar panel This photo voltaic strength is utilized for charging battery The battery is attached to the motor which runs the compressor. The compressor will suck the mospheric air and make bigger its strain This pressurized air is then transferred to the chamber which is used to keep pressurized air . The compressor is ed Solar panel

Solar PV modules (top) and two photo voltaic warm water panels (bottom) hooked up on rooftops

Solar panels absorb sunlight as a source of electricity to generate electricity or heat. A photovoltaic (PV) module is a packaged, join assembly of typically 6x10 photovoltaic photo voltaic cells. Photovoltaic modules constitute the photovoltaic array of a photovoltaic gadget that generates and elements solar electrical energy in business and residential applications. Each module is rated with the aid of its DC output strength underneath general test prerequisites (STC), and normally levels from one hundred to 365 Watts (W). The effectivity of a module determines the place of a module given the same rated.



### Conclusion

The proposed sprayer gives the average values in all aspects like weight, discharge, pressure and cost. The proposed rayer requires 10 hours for complete charging and fully charged battery gives 4 hours of backup to the application. It reduces the discomfort to the operator while spraying and it creates the awareness about renewable energy to the farmers. The proposed system has got very good aesthetic design and the operator feel easy to operate this new sprayer because of it is light weight, easy to carry, portable and environmental friendly. The proposed sprayer is most suitable for small and medium scale farmers and remote areas like field, forest fuel

is not available easily. weight of stand can be still reduced by incorporating fiber reinforced plastic (FRP) instead of mild steel. The whole system can be made automated by using micro controller. By incorporating the concentric collector instead of flat plate collector the charging efficiency can be increased. The sprayer can also be charged by AC by adopting AC converting system.

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