

## A REVIEW ON SPRAY WHEEL MACHINE

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### ABSTRACT

*India is a land of husbandry which comprises of small, frontline, medium and rich growers. Small scale growers are really interested in manually switch operated pack sprayer because of its versatility, cost and design. But this sprayer has certain boundaries like it cannot keep up required pressure; It leads to problem of reverse pain. Notwithstanding, this paraphernalia can also lead to misuse of chemicals and ineffective control of target pest which leads to loss of poisons due to dribbling or drift during play. This portent not only adds to fetch of produce but also generate environmental pollution and imbalance in natural echo system. This paper suggests a model of manually operated multi smelter dispenser pump which will sow at extreme rate in lowest time.*

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**Keywords:** Nozzle, Pump, Cultivation, Sprinkler, Chain-Sprocket.

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### Introduction

Agriculture plays an important role in Indian economy. Around sixty fifth of population within the state is betting on agriculture. though its contribution to gross domestic product is currently around one sixth, it provides fifty-six of Indian workforce. The share of marginal and tiny farmer is around eighty-one and land operated is forty four you bored with 1960-61. As so much as Indian state of affairs thinks about, quite seventy-five per cent farmers are happiness to tiny and marginal land carrying and cotton is alone which offer concerning eighty the utilization to Indian men. So, any improvement within the productivity connected task facilitate to extend Indian farmer's standing and economy. this backpack sprayer has ton of limitation, and it needed a lot of energy to work. the proportion distribution of farm holding land for marginal farmers is thirty-nine.1 share, for tiny farmers twenty-two.6 share, for tiny and marginal farmers sixty one. 7 share, for semi-medium farmers nineteen.8 share, for medium farmers fourteen share and for big farmers four.5 share in year 1960-61. Clearly justify that the most share of farm distribution belonged to tiny and marginal class.

The project may be a Pesticide/Fertilizer Sprayer mounted on a Cart that is operated automatically with none external supply of energy. The aim of developing such an inspiration is primarily thanks to preventing the three major drawbacks of the pump getting used presently first of all, the farmer has got to carry the whole weight of the chemical spraying (approx. 20+ kg) pump on his shoulder; second, he has got to unendingly use his one hand to pump mistreatment the handle; third, reduction in spraying time. of these factors are taken care of during this project at the side of being price effective, light-weight in weight and sensible in strength. The pump already on the market with the farmer will be directly employed in this mechanism. The handle of the sprayer is going to be automatically operated through the rod of the wheels of the cart mistreatment associate economical mechanism. this may result into the mutual motion of the piston and thus pumping is going to be done. The user can currently simply get to push the cart and therefore the whole mechanism are going to be operated with ease. this may be a case of Pure Mechanical Automation.

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### Problem Summary

The farmers WHO use these varieties typical backpack sprayer faces many varieties of issues like fatigue, tiredness, pain in spiral twine and muscles etc. Following issues will occur by use of this typical form of pump:

- **Common Problems**
  - Significant in weight causes issue in lifting manually.
  - Fatigue to the operator thanks to significant weight.
  - Thanks to significant weight throughout spraying, operator feel terribly weariness and fatigue that reduces his potency.
  - Massive size of pump cause inconvenience to the operator.
  - Poor choice and quality of apparatus.
  - These issues combined with an absence of awareness and technical information and inadequate maintenance and poor field use of apparatus has light-emitting diode to unacceptable risks to setting and human health.

### Literature Review

**R.D. Dhete** has worked on "Agricultural fertilizer & pesticides sprayers". In his work he emphasizes on totally different methodology of spraying devices Day by day the population of Bharat is increasing and to fulfil the requirement of food modernization of agricultural sectors area unit necessary. Thanks to chemical fertilizers the fertility of soil is decreasing. Thence farmer's area unit attracted towards organic farming. By mechanization in spraying devices fertilizers and pesticides area unit distributed equally on the farm and scale back the number of wastes, which ends up in bar of losses and wastage of input applied to farm. it will scale back the price of production. it'll scale back the price of production. Mechanization provides higher productivity in minimum input. Farmer's area unit victimization same ancient ways for spraying fertilizers and pesticides. Instrumentation is additionally constant for ages. In Bharat there's an oversized development in industrial sectors compared to agricultural sectors. Conventionally the spraying is finished by labours carrying backpack sprayer and fertilizers area unit sprayed manually. The efforts needed area unit additional and helpful by farmers having little farming land.

**Pavan B. Wayzode, Sagar R. Umale, Rajat R.Nikam, Amol D.Khadke, Hemant administered** their add "Design Fabrication of Agricultural sprayers, weed with cutter Chemical's square measure wide used for dominant sickness, insects and weeds within the crops. They're ready to save a crop from persecutor attack only applied in time. The chemicals square measure expensive. Therefore, instrumentality for uniform and effective application is crucial. Dusters and sprayers square measure typically used for applying chemicals. Dusting, the less complicated methodology of applying chemical, is best suited to moveable machinery and it always needs straightforward instrumentality. however, it's less economical than spraying, as a result of the low retention of the dirt. during this work we've planned associate degree instrumentality that's wheel and pedal operated sprayer, it's a conveyable device and no want of any fuel to control, that is straightforward to maneuver and sprays the chemical by moving the wheel and conjointly hawking the instrumentality. during this instrumentality mistreatment reciprocatory pump and there's a accumulator provided for the continual flows of liquid to form necessary pressure for the spraying action. This wheel operated chemical spray instrumentality consumes less time and avoids the chemical from coming back from front of the nozzles which is able to in tuned of the one that sprays pesticides. Weed management is one in all the tedious operations in crop production. because of labour prices, time and totally manual weeding is unfavorable. thus, effort is formed to style and develop economical Farm instrumentality to perform weeding while not mistreatment power.

According to literature published on flow control of agricultural spraying machine by massey university Newzeland on totally different spraying mechanism area unit studied New Zealand depends heavily on its agricultural trade. an outsized portion of this trade is pastoral farming, wherever eutherian mammal area unit raised to graze on pasture. This includes beef, sheep and dairying. a crucial facet of this sort of farming is maintaining pasture quality. so as to extend growth fertilisers area unit typically applied to the pastures. This increase yields in each meat and milk production. However, the raised application of fertilizer is joined with decreasing water quality. Whereas the results of element natural action and therefore the best ways in which to manage fertilizer use area unit still being investigated, it's clear that management over the applying can become a lot of and a lot of necessary. The Tow and Fert may be a vary of fertilizer machines designed and inbuilt New Zealand by Metal kind Dannevirke.

The Tow and Fert vary is capable of spraying a large vary of fertilizers together with each soluble and non-soluble fertilisers. The Tow and Fert is exclusive in its ability to spray fertilizer slurries consisting of mixture ratios of up to three-parts fine particle fertilizer to one-part water. this can be achieved by the utilization of a recirculating system. presently there's next to no management on the rate of flow of the machines and therefore the application rate is decided by the speed the operator maintains. the aim of this thesis is to style and build a flow system for the Tow and Fert product vary and investigate the result of the dynamic rate of flow on the spray characteristics. the flexibility to spray such a large vary of fluids with drastically totally different properties presents several challenges. several flow meters were thought of and a inexpensive inaudible device (TUF2000M) was put in and investigated. when restricted success of the inaudible device, a straightforward rotary engine flowmeter was put in. A flow controller was developed and tuned. primarily based off a pelvic inflammatory disease management loop, the controller was ready to maintain flowrate well between ten L/min and twenty-five L/min looking on the put in nozzle.

**Sandeep H. Poratkar, Dhanraj R. Rout** carried out their work in "Development of Multinozzle Pesticides Sprayer Pump" India may be a land of agriculture that contains of tiny, marginal, medium and wealthy farmers. tiny scale farmers square measure terribly inquisitive about manually lever operated rucksack sprayer as a result of its skillfulness, price and style. however, this sprayer has bound limitations am passionate about it cannot maintain needed pressure; it results in drawback of back pain. However, this instrumentation can even cause misapplication of chemicals and ineffective management of target tormenter that results in loss of pesticides thanks to actuation or drift throughout application.

This development not solely adds to price of production however additionally cause environmental pollution and imbalance in natural echo system. This paper suggests a model of operated by hand multi nozzle pesticides sprayer pump which is able to perform spraying at most rate in minimum time. Constant flow valves may be applied at nozzle to own uniform nozzle pressure.

**Prof. S.V. Deshpande, Damre Mayur & Diwanale Swapnil** has worked on "Agricultural Reciprocating Multi Sprayer". Pesticides Sprayer Pump" India may be a land of agriculture that contains of tiny, marginal, medium and wealthy farmers. tiny scale farmers square measure terribly inquisitive about manually lever operated rucksack sprayer as a result of its skillfulness, price and style. however this sprayer has bound limitations am passionate about it cannot maintain needed pressure; it results in drawback of back pain. However, this instrumentation can even cause misapplication of chemicals and ineffective management of target tormenter that results in loss of pesticides thanks to actuation or drift throughout application. This development not solely adds to price of production however additionally cause environmental pollution and imbalance in natural echo system. This paper suggests a model of operated by hand multi nozzle pesticides sprayer pump which is able to perform spraying at most rate in minimum time. Constant flow valves may be applied at nozzle to own uniform nozzle pressure.

### Objectives

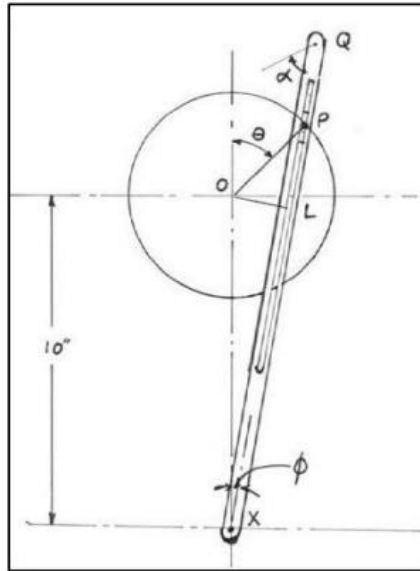
- Aim of this project is that the farmer needn't carry the whole chemical sprayer pump on his shoulders however simply pull/push the mechanism mounted on the streetcar to work the pump and spray the pests. This makes the farmer feel snug, relaxed and fewer irksome.
- To scale back human efforts because of the constant pumping action for making pressure within the chemical sprayer and thereby offer appropriate surroundings for the user reducing the fatigue load functioning on the body. As mentioned, antecedental, the farmer must incessantly stick with it pumping exploitation one amongst his hands and spray the pests on the crops exploitation the opposite hand. This at a protracted run could be a irksome and cumbersome job and therefore the farmer slowly loses interest from it.
- This project focuses on the matter of health-related problems with the farmer (operator). Majority of them don't use any precautions like facemasks and hand-gloves against the unsafe chemicals and add direct contact with it. Consequently, this harms the farmer because the spray within the typical methodology directly hits the face. Multi-nozzle is employed, and thence larger space of field is sprayed at quicker rate

### Methodology

Multi sprinkle system work on principle of reciprocal pump. This reciprocal pump uses single slider crank mechanism, within which wheel sprocket works as crank. There are 2 sprockets that is mounted on 2 completely different shafts within which one sprocket is directly hooked up to wheel axle. rod is hooked up to a different sprocket shaft through disc. During this power is given to piston of reciprocal pump through rotation of wheel.

When piston reach at high position, it creates negative or low within the cylinder because of pressure distinction between reservoir and cylinder house, water moves to fill the cylinder chamber house. During this method suction valve open and delivery valve shut. Once piston reaches at heart position, it creates high within the cylinder chamber & because of the pressure distinction between cylinder & delivery pipe. Water moves through pipage to sprinkle. During this method suction valve closed and delivery valve open. This method repeats once more and once more to urge want output.

- Motion transmission by chain and sprockets arrangement.
- Slider cranks mechanism motility born-again into reciprocal motion



Above figure shows the assembly of the agricultural reciprocatory multi sprayer. The operator grabs the handle and pushes the cycle forward as cycle moves forward, the wheel rotate. Once the wheel rotates then the gear sprocket mounted on wheel is additionally rotate at same speed. The chain drive transfers the motion of substances sprocket to pinion sprocket. The pinion sprocket and crank is mounted on either facet of same shaft, the motion of shaft is regenerate into the reciprocatory motion with the assistance of crank and rod mechanism. The rod is additionally connected with lever so the lever oscillates at pin. The piston connected at pin turn out reciprocatory motion in cylinder and therefore the needed pressure is achieved. The chemical from tank.



Sucks in cylinder and piston forced the chemical to nozzle through the pipe; the numbers of nozzles area unit connected to spray the chemical. We are able to regulate the pressure that is needed for spraying with the assistance of special arrangement is to vary the length of crank by providing slot on crank. By providing some adjustment at joint of rod and lever free rotation of crank or neutral position is achieved. Victimization these changes pumping is stop and therefore the wheel rotate freely after you needn't spray chemical. Height, position and angle of the nozzle is adjustable. Water is for many sensible functions incompressible. Consequently, if a tight piston is drawn through a pipe packed with water .it will displace water on the pipe. Similarly, raising a piston in an exceedingly submerged pipe can draw water up behind it to fill the vacuum which might otherwise occur this is applicable after all solely up to a precise limit of the peak water is force by a vacuum, as mentioned earlier in Section within the 1st case water is displaced by the piston, however within the second case, the piston serves to make a vacuum and therefore the water is truly displaced by gas pressure pressing on its external surface, as indicated within the figure. So, water can be displaced either by "pushing" or by "pulling", however it may be "displaced" by a solid object being pushed into water in order that the amount around it rises once there's obscurity else for the water to travel, as indicated in fig

#### Single Slider Crank Mechanism

The Slider-Crank Mechanism is employed to remodel motion motion into translational motion by suggests that of a rotating drive beam, a rod and a slippery body. In another word Single Slider Crank Mechanism is employed to remodel line motion (Reciprocating Motion) into motility and the other way around.

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