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Ground Wheel Operated Sprayer with Smart Technology for Farmers

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Spraying is one of the most important operations in crop production. The need of chemical application arises from man's desire to protect his crop from attack of various pests and diseases. Spraying operation is a complex process and can be influenced by many variables. The magnitude and uniformity of spray deposition depends on the crop canopy geometry, pesticide properties; spray equipment design, application parameters and weather conditions. The conventional sprayer having the difficulties such as it needs lot of effort to push the lever up and down in order to create the required pressure to spray. Another difficulty of petrol engine or diesel engine sprayer is to need to purchase the fuel, which increases the running cost of the sprayer. In order to overcome these difficulties, the study was undertaken to develop a wheel driven sprayer, the developed sprayer portable device and no need of any fuel to operate, which will be 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.

Hand operated knapsack sprayer and its losses

The Indian farmers (marginal, small, semi-medium and medium) are currently using lever operated backpack sprayer. A backpack sprayer consists of tank 10-20 litre capacity carried by two adjustable straps. Constant pumping is required to operate the sprayer which result in muscular disorder. Also, the backpack sprayer can't maintain required pressure because of operator unable to crank lever continuously, results in drifts/dribbling. Developing adequate pressure is laborious and time consuming. Pumping to operating pressure is also time consuming. Moreover, very small area is covered while spraying. So, more time is required to spray the entire land. Back pain problems may arise during middle age due to carrying of 10-20 litre tank on back.

Fig.1 Hand Operated knapsack Sprayer

Fig.2 Uses of knapsack Sprayer

Ground wheel operated knapsack sprayer

To solve these difficulties there is need of new equipment that will be manually operated and wheel driven mechanism. The sprayer will share major back load of the sprayer on wheel. The develop sprayer will not need any fuel to operate, which is easy to move and spray the pesticide by pushing in forward direction results in rotation of ground wheel that will provide reciprocating motion to the pump. This wheel operates pesticide spray equipment will consumes less time and achieves uniform nozzle pressure as compare to hand operated spryer. The area coverage by the sprayer will be more due to increasing nozzle from 1 to 4, as compare to hand operated knapsack sprayer. The field capacity and efficiency will be more while spraying with this sprayer.

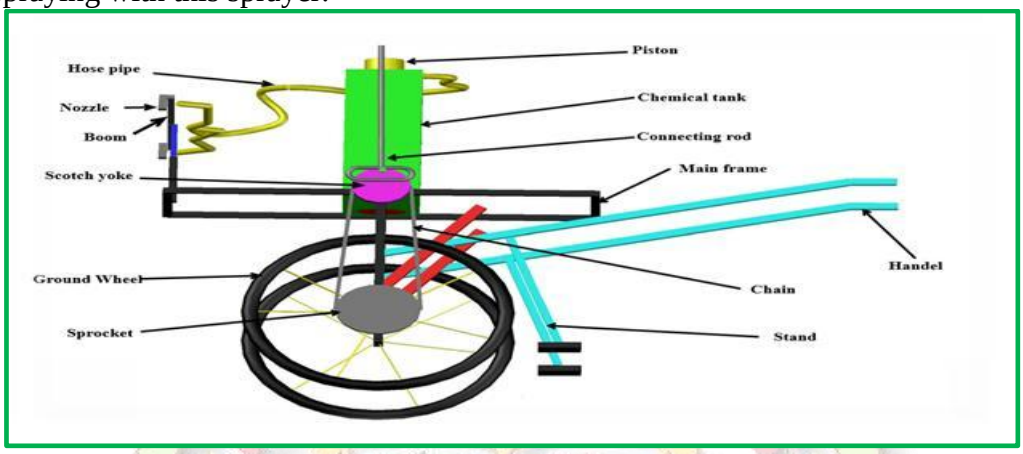

Fig. 3. 3D AutoCAD Design

Fig. 4 Applications of wheel driven sprayer

Advantages of wheel driven sprayer

1. Farmers are not much fatigue.
2. There is no need of fuel to run it.
3. In this new sprayer, the human can 't carry the weight of the tank to the back.
4. It has the same spray everywhere in field.
5. This type of sprayer in an area covers four times higher than the knapsack sprayer.
6. The area coverage by the sprayer will be more due to increasing nozzle from 1 to 4.