



DESIGN AND ANALYSIS OF A PROPOSED MULTI PURPOSE AGRI-MACHINE

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ABSTRACT

All the successful achievements in science and technology in this world are due to the human endeavor and curiosity for new inventions and development. Taking safety as prime consideration the present work focus on developing a device that which does not uses any electrical power so that it is a self propelled device without human intervention, in turn reducing human effort and time. The work shows that the devised equipment can be used for multipurpose operations and for sowing different seeds (radishes, leeks, spinach, carrots, lettuce, corn, chill, beans etc). The proposed device is also cost effective and will benefit a large population of farmers. keywords: Agriculture, pesticides, agri-machine, environment friendly.

1. Introduction

Agriculture in India is under intense economic and environmental pressure today. The high cost of pesticide and the need to protect the environment are incentive for applicators to do their best in handling and applying pesticides. Applicators of pesticide need to know proper application methods, chemical effects on equipment, equipment calibration and correct cleaning methods. Equipment should be recalibrated periodically to compensate for wear in pumps, nozzles and metering systems. Dry flowables may wear nozzle tips and may cause an increase in application rates after spraying for even about 50 acres of land.

Improperly used agricultural pesticides are dangerous. It is extremely important to observe safety precautions, wear protective clothing when working with pesticides and follow directions for each specific chemical. Sprayers purchased are safe to users and to the

environment as well as being efficient and durable in operation. Price will always play an important part in purchase decisions on equipment but even the cheapest sprayer models should meet minimum standards of safety and durability. A pesticide is a substance or mixture of substances intended for preventing, destroying, repelling, or lessening the damage of any pest. A pesticide may be a chemical substance, biological agent (such as a virus or bacteria), antimicrobial or a disinfectant. Many chemical pesticides are poisonous to humans also. Pesticides are used both in farms and within our homes and gardens.

2. Literature survey

Different researchers have worked and are working to contribute their best to the agriculture sector in India. N. J. Simcox et.al. (1999) conducted studies in Washington on the effect of pesticides on the children of the agriculturists. They studied the amount of pesticides in dust and soil. This study was designed to determine whether such children are exposed to higher levels of pesticides than children whose parents are not involved in agriculture and whose homes are not close to farms. The results of their research demonstrated that children of agricultural families have a higher potential for exposure to pesticides than children of nonfarm families in that region. Children's total and cumulative exposure to this pesticide class from household dust, soil, and other sources warrants further investigation [1]. A.R. Frost (2001) in his paper a novel metering system is described in which a metered flow of water is used to control the flow rate of the chemical, making the system independent of the characteristics of the chemical. The technical problems preventing the widespread adoption of pesticide injection

metering systems include the need for a system to provide a wide range of dose rates of aggressive chemicals with widely varying ranges of physical properties. A verified mathematical model of the plumbing on a spraying machine is used to show how the time taken for the chemical to travel from the injection point to the nozzles can be minimized [2]. He Xiongkui (2004) performed the research studies on Improving severe dragging actuality of plant protection machinery and its application techniques [3]. Liu Xiujuan et.al. (2005) conducted the studies on recent advances on the technologies on spray drift control of pesticide application and proposed various methods in China [4].

3. Effect of pesticides on farmers.

Pesticides are, by design, poisonous to at least some organisms. They attack mechanisms by which organisms live. Thus, it is no surprise that exposure to pesticides is not good for humans. All pesticides affect humans to some extent. This extent is what differentiates pesticides from one another. Some may have negligible effects while others a large impact. Pesticides are thus classified according to its toxicity and attack mechanism. Effects of pesticides on farmers may range from short-lived to chronic, minor to serious and sometimes fatal ailments. The most common reason for this is lack of information about the pesticide or unavailability of it to the farmer. In many cases, farmers do not practice safe application methods leading to skin contact, inhalation and even ingestion. Overuse of

pesticides compounds this issue as farmers are exposed to several times the safe limits.

4. Present model details

Various models of pesticide sprayers are available like hand operated sprayers, motorized sprayers, boom sprayers, boomless sprayers, air blast sprayers etc. The present proposed model of mechanically operated pesticide pump consists of piston cylinder arrangement, carriage, spray nozzles, hoses, and tank. When the operator gives a push or pull the equipment, the wheels rotate, this rotary motion of wheels are converted into reciprocating motion of piston in the cylinder with the help of connecting rod and crank. This reciprocating action generates the pressure by which spraying of pesticides occurs. This equipment also consists of carriage which helps to carry the required materials like fertilizers, unwanted plants etc. The working of this machine is very simple, resembling just like pulling the machine in a straight line in the farm. Sowing of different seeds can be done by using this device having very simple operation and no skilled operator is required thus making the work simple and efforts less. This is a better substitute to the hand laying of seeds, and solves the problem of uniform sowing of seeds by maintaining proper distance maintain between the rows. The device being operated mechanically no external force is required hence reducing human efforts. The Multi Purpose Agri-Machine model diagram is as shown in the figure 1 below

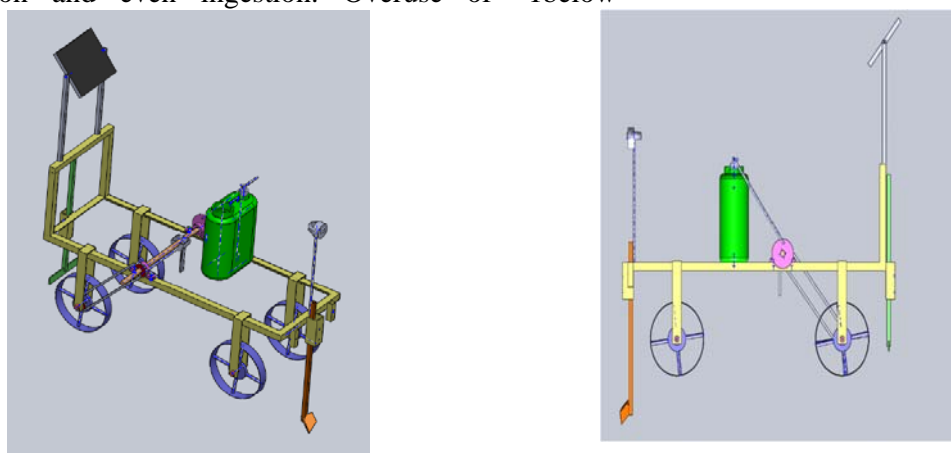


Figure 1: Isometric and Side view of the proposed Multi Purpose Agri-Machine.

The actual assembled model of the Multi purpose Agri-machine can be seen in Figure 2.

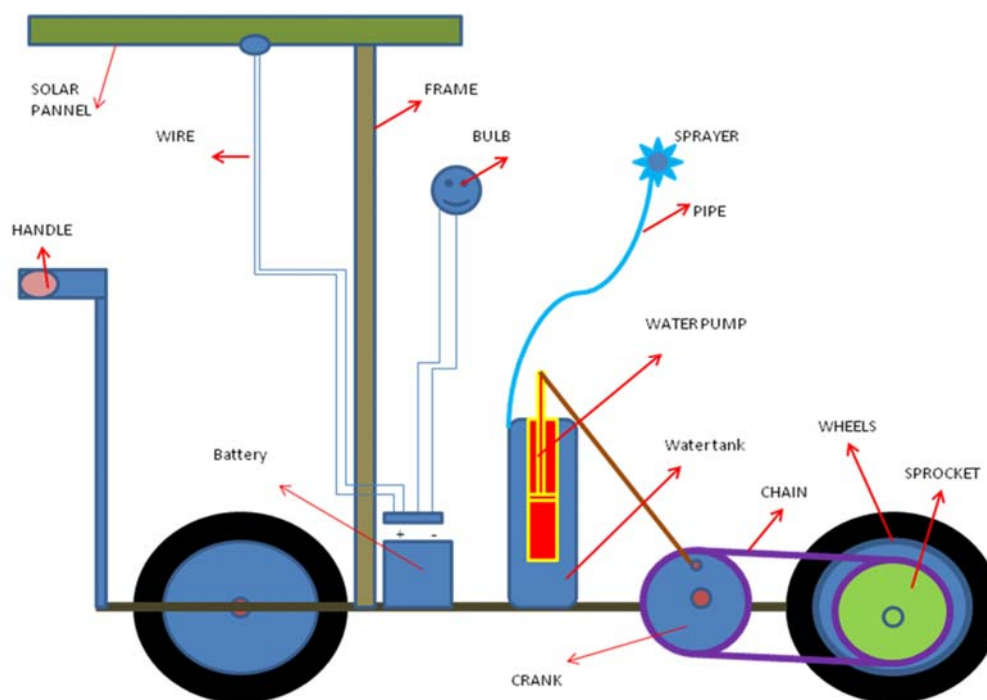


Figure 2: Assembled view of Multi Purpose Agri-Machine.

The design of the machine is made as per the standard design specifications. The mild steel material is used for shaft, L-angle, bearing assembly, fasteners, drum plate, bush, handle, crank and frame. The tank is made up of plastic material.

5. Advantage of the proposed model include:

- 1) Used for seed sowing
- 2) Ease of construction & disassembling
- 3) Portable, low cost and an adaptable device.
- 4) High capacity with good performance that can be operated manually.
- 5) Environmental friendly with light weight and least maintenance
- 6) Skilled worker is not required.

The proposed model could be successfully applied to spray pesticides in farms, ploughing, sowing etc.

6. Conclusion

The present model aims to make a new design with safe, cheap and easy to operate, save the time and labor. The “Multi Agro-

Machine” can play a very important role in agriculture as well as horticulture.

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