

Design & Fabrication of Agricultural Based Spray Pump

Prof. Ramakant M. Chaudhari¹ Mr. Mahesh I. Khachane² Mr. Rahul J. Dhande³

Miss. Chanda A. Shegokar⁴ Mr. Dipak A. Bagade⁵

^{1,2,3,4,5} Padm. Dr V.B.Kolte College of Engineering, Malkapur Maharashtra, India

Abstract— The population of the world is increasing rapidly. In order to fulfill their diet needs the production of food must be increased, but this must come at a cost affordable to everyone. Mechanization of agriculture enables conservation of inputs by precision in ensuring better distribution, reducing quantity required for better response or prevention of losses or waste of inputs applied. Mechanization reduces unit costs of production through higher productivity levels and the input conservation. The all agriculture equipment's often are hardly modernized due to its low productivity. In India farming is done by traditional ways, besides that there has been large development of industrial and service sector as compared to that of agriculture sector. The spraying of pesticides and insecticides is traditionally done by farm worker carrying backpack type sprayer which requires more human effort. Giving attention to these important problems an attempt is made to develop an equipment which will be beneficial to the farmer for the spraying operations. This equipment is easy to use and operate. It makes use reciprocating pump that creates the required pressure for the spraying action. This multifunction device will come in handy that can be put to use in different spraying stages of farming as per process requirement.

Keywords: Mechanization, Input Conservation, Reciprocating Pump

I. INTRODUCTION

Status of Agriculture in India India is predominantly an agricultural based country with approximately 75% of population of India is very much dependent on farming either directly or indirectly.

The farmers have been using the same methods and equipment for ages for example the seed sowing, spraying, weeding etc. operations are carried out by same techniques. There is need for development of an effective spraying machine for increasing productivity levels. Most of the late developing countries of Asia have the problem of higher population and low levels of land productivity as of compared to the developed nations. One the main reasons for lower productivity is insufficient power availability for the farms and very low levels of farm mechanization.

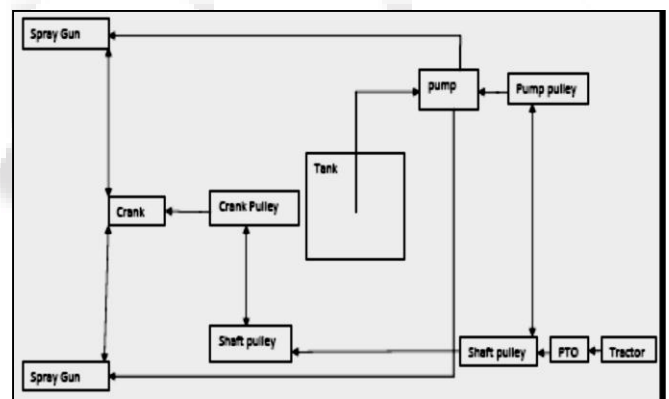
This is especially true for India. B. Mechanisation of Agriculture It is now accepted all over the world that in order to meet the food requirements of growing populations and rapid industrialization, the modernization of agriculture is indispensable. It is said that at many farms, production suffers due to no use of farm fertilizers or correct time pesticides and insecticides or improper application of these at required destination area of the affected crop. Mechanization enables conservation of inputs by precision in metering and ensuring better distribution, reducing the level of quantity required for the best response and prevention of loss or wastage of inputs applied.

The Mechanization reduces the unit costs for the production by the high level of productivity and by input

conservation. Agricultural equipment's and machinery program of the governments has been one of selective mechanization with a view of optimising the use of human, animal and other source of power. In order to meet requirements, steps are taken to increase availability of implement, irrigation pumps, tractors, power tiller, combine harvesters and other power operated machines and also for to increase the production and availability of improved animal driven implements.

Special emphasis was given on the later as more than the 70% of the farmers fall in small and, marginal categories. It is usually said that mechanization of small farms is difficult. But in Japan having average land holding even smaller of than ours, with proper mechanization has led agriculture to greater heights. In order to minimize the drudgery of the small farmers, to increase efficiency and save the farmer time which is taken for the taking up of additional supplementary and generating activities, also for use of modern time saving machines or implements of appropriate size needed to be suitably promoted therein.

II. BLOCK DIAGRAM



III. COMPONENTS

- Spray pump
- Spray gun
- PTO shaft
- Storage tank

IV. WORKING

In this project output of tractor shaft is connected to the larger pulley of section with the help of PTO so the rotation of tractor shaft is given to larger pulley

Larger pulley is connected to the smaller pulley with the help of rubber belt to operate pump mechanism

Pressure (suction) created is depend upon the speed of smaller pulley there for higher the speed higher pressure difference will create

Pump is consist with one inlet and two outlet inlet is used for suction and outlet is used to supply the fluid to sprayer gun sprayer gun is mounted on a mechanism which

oscillate in horizontal and reciprocated in vertical direction for its multipurpose.

V. ADVANTAGES

- Time Consume is Less
- Easily Movable in Farm
- Use for Any Liquid Pesticide
- Spray Gun Movement Is Adjustable In Horizontal, Upward & Downward Direction
- Also Pressure Is Adjustable

VI. DISADVANTAGES

- Manufacturing Cost Is High
- Only Tractor Attachment
- Construction Is Hard
- Spray Direction Is Horizontal

VII. APPLICATION

- It Is Use In Agriculture Purpose
- It Is Use In Lawn Spraying
- Also Use As Farm Firefighter
- Overall application over the whole treatment area.
- Band application in a band over or between crops

VIII. FINAL IMPLEMENTATION



IX. CONCLUSION

While conclusion this paper we fill file quite contended in having completed the project assignment well on time we had enormous practical experience on fulfil of manufacturing schedule of working project module we are therefore happy to state the calculations of mechanical aptitude proved to be very useful purpose agriculture pesticide sprayer is designed to reduce human effort is used to agriculture field by spray pesticide now a days farmer more used pesticide in farm to get better crop. The motive behind developing this equipment is to create mechanizations which will help to minimize effort of farming. It is suitable for the spraying at minimum costs for the farmers so that; he can afford it of the many product available. Also we will reduce the operator fatigue and cover the maximum area within minimum time as compare to single sprayer.

REFERENCES

- [1] Sanjay.S 1, Sridhar.R2, Syed Moinudeen.T 3, Harshitha.V. Design and fabrication of mechanical pest sprayer An ISO 3297: 2007 Certified Organization Volume 4, Special Issue 10, August 2015
- [2] Gururaj P. Bhumannavar, *Srinivasa, H. S. Lohit Design and development of a low cost mobile spray pump for indian middle class farmer
- [3] M. A. Gaodi1, A. S. Lonkar2, A. S. Wankhede3, S. D. Gandate4 Development of multipurpose sprayer – A review Volume: 03 Issue: 03 | Mar-2016
- [4] Siddharth Kshirsagar*, Vaibhav Dadmal, Prashant Umak, Govind Munde and P. R. Mahale
- [5] Design and Development of Agriculture Sprayer Vehicle Accepted 02 March 2016, Available online 15 March 2016, Special Issue-4 (March 2016)

- [6] Dhiraj Bhagat* Design, Development and Fabrication of Manually Operated Multinozzle Pesticide Sprayer Pump and Seed Sowing Equipment Accepted 26 April 2017, Available online 30 April 2017, Vol.7, No.2 (April 2017)
- [7] R.Joshua, V.Vasua and P.Vincent, Solar Sprayer- an Agriculture Implement, published in International Journal of Sustainable Agriculture 2(1): 16-19, 2010 ISSN 2079-2107.
- [8] M. A. Miller, B. L. Steward, M. L. Westphalen Effects of multi-mode four-wheel steering on sprayer Machine performance, American Society of Agricultural Engineers ISSN 0001-2351
- [9] Au WW, Sierra-Torres CH, Cajas-Salazar N, Shipp BK, Legator MS. Cytogenetic effects from exposure to mixed pesticides and the influence from genetic susceptibility. Environ Health Perspec 1999;107:501–505. (also in genetic polymorphisms list)
- [10] Joksic G, Vidakovic A, Spasojevic-Tisma V. Cytogenetic monitoring of pesticide sprayers. Environ Res 1997;75:113–118.

