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Design and Fabrication of Multi Agricultural Equipment

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ABSTRACT

Every year in INDIA, an average of 1980 Cr of rupees is wasted due to weeds. Our country faces the total loss of 33% of its economic from weeds. The losses are due to some of the following reasons, total loss of 26% from crop diseases, total loss of 20% from insects and worms, total loss of 6% from rats has been surveyed. Weeding control is done by mechanical weeding, thermal weeding, flaming, biological control, and by farming pattern. It has always been a problem to successfully and completely remove weeds and innocuous plants. Invariably, weeds always grow where they are not wanted. This work involved the design and construction of mechanical weeder. The mechanical weeder was made of two implements attachments i.e: the primary cutting edge which is in front to loose soil above and the secondary cutting edge which is behind to do cutting and lifting the weeds. The overall machine field efficiency was 98.67%. The single wheel weeder being manufactured is the equipment, which is used for very special purpose when the weeding is required at narrow places or between rows.

Keywords: *Spreyer, Frame, Equipment.*

1. INTRODUCTION

Manual weeding requires huge labour force and accounts for about 25 per cent of the total labor requirement which is usually 900 to 1200 man M hours/hectares. This operation is mostly performed manually with cutlass or hoe that requires high labour input, very tedious and it is a time-consuming process. Moreover, the labour requirement for weeding depends on weed flora, weed intensity, time of weeding, and soil moisture at the time of weeding and efficiency of worker. Often several weeding operation are necessary to keep the crop weed free. Reduction in yield due to weed alone was estimated to be 16 to 42 % depending on crop and location which involves one third of the cost of cultivation .Weeding and hoeing is generally done 15 to 20 days after sowing. The weed should be controlled and eliminated at their early stage. Depending upon the weed density, 20 to 30 percent loss in grain yield is quite usual which might increase up to 80 per cent if adequate crop management practice is not observed. Manual and mechanical techniques such as pulling, cutting, and otherwise damaging plants, may be used to control some invasive plants, particularly if the population is relatively small. These techniques can be extremely specific, minimizing damage to desirable plants and animals, but

they are generally labour and time intensive. Treatments must typically be administered several times to prevent the weed from re-establishing, and in the process, labourers and machines may severely trample vegetation and disturb soil, providing prime conditions for re- invasion by the same or other invasive species. It is necessary to design the weeder which minimize the human effort and provide efficient work output. The tool we going to design is able to fulfil the present requirement for the weed control. Accordingly, the present invention is directed to an improved manual tilling, mulching and weeding tool.

Since weeds can be killed easily when they are at early stages of growth. This practice can also reduce labour and cost substantially Small holder farmers need low cost implements which can be purchased or made locally. Therefore the objective of this project was to develop a small hand weeder to be used for getting rid of young weeds growing between crop rows; and this implement must be relatively cheap and could be made locally. Before the existence of chemical weed control, mechanical weed control was the best option to solve issues related to manual weeding. In mechanized agriculture, there were times where weeding tools were pulled by draft animals such as buffaloes and horses, which now in the developed world have generally been replaced by tractors. There are various types of mechanical weeding implements in the market that use three main techniques: burying weeds, cutting weeds and uprooting weeds. The burial of weeds through the action of tillage tools, and is usually done during land preparation. The earliest and the simplest weed control method is manual weed control. This method was and is accomplished by a person bending down and using their hands to pull weeds out of the soil. This method then advanced to hand tools, from using a stick to using a hand-hoe. The labour required for weeding is expensive, time consuming To achieve a high yielding vegetable production, good agricultural practices are required. One of the most important practices is to properly manage weeds. Weeds affect crop yield due to competition to acquire plant nutrients and resources. Weeds have very fast growth rates compared to crops, and if not treated and managed, they may dominate the field. There are various methods for controlling weed infestation in crop- production. Some farmers adopt agronomic practices that improve crop competitiveness such as Planting vigorous crop seeds at relatively shallow depths and planting right after a weed control operation. This method is used to prevent the weed seeds from germinating before the crop is planted and to ensure that crop plants emerge before the weed plants. This practice will not only ensure a maximized crop yield and reduce weed infestation, but also minimize any economic losses.

The most common methods of weed control are mechanical, chemical, biological and traditional methods. Out of these four methods, mechanical weeding either by hand tools or mechanical weeders are most effective in both dry land and wet land. Weeding and tilling that reduce the time spent on weeding (man hours), cost of weeding and drudgery involved in manual weeding. Weeds can cause several damages to the farming enterprise. These include: decrease in crop yield, impairment of crop quality, harbOring of plant pests and diseases, increase in irrigation costs, injury to livestock and decrease in land Values That 50 to 70 % of yield reduction is caused by poor weed control.

2. OBJECTIVES

- To construct and test manually operated weeder which will be compared with a traditional one.
- To fabricate manually operated weeder to test and evaluate the prototype machine to compare the machine performance with existing traditional weeding method.
- To utilize renewable energy sources for the purpose of pesticides sprayer.
- To reduce the discomfort occurs to the farmers during spraying.

- To fabricate Hybrid Agricultural Vehicle.
- Its main objective is to reduce the manpower as in today's scenario labors are very hard to find as well as it reduces the working time.

3. METHODOLOGY

In our country farming is done by traditional way, besides that there is large development of industrial and service sector as compared to that of agriculture. The spraying is traditionally done by labour carrying backpack type sprayer which requires more human effort. The weeding is generally done with the help of Bulls which becomes costly for farmers having small farming land. So to overcome these above two problems, we tried to eliminate these problems and designed the equipment which will be beneficial to the farmer for the spraying and weeding operations.

- Weeding efficiency (Functional efficiency) was determined by removing manually the weeds in 1m × 1m area of the farm, the weeds was weighed and recorded. The process was repeated in five randomly selected locations on the farm.
- The average weight of the weeds in 1m × 1m area was calculated for the types of soil. The average weight of the weeds in 1m × 1m area after pass of the weeder through the farm was deducted from the actual weight of the weeds in 1m × 1m area.
- Thus, functional efficiency: It is the ratio of Weight of the Weeds removed using weed remover to actual weight of weeds removed manually.
- The functional efficiency was carried out on different types of soil at the same average speed
- Figure-1 shows the complete part information of the our project work

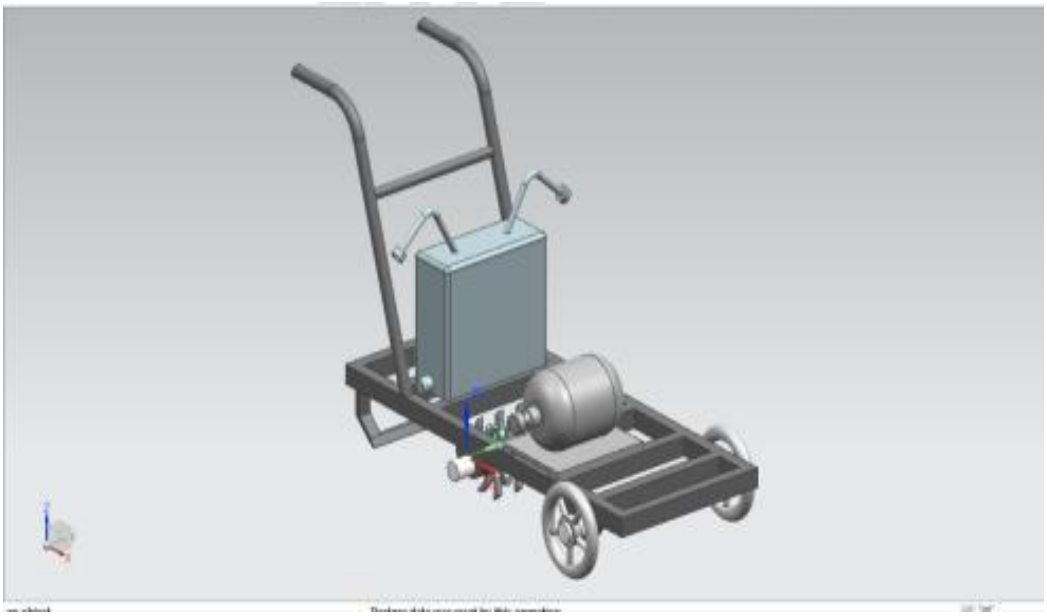

Figure1.1: Isometric view of the model

4. FUTURE SCOPE

Through observation, this work was good for local farmers and small scales agro base industries that need a better treatment and operations carried out on farms.

- Flow can be implement.
- The weight of weeder can be reduced by using lightweight materials and by reducing size of wheel.
- Since weeder was designed for low cost the weeder was made manual but it can be made automatic by placing motor.
- By using some advanced attaching mechanisms the time required for assembling can be reduced for additional attachments.
- Fixing the extra attachment of leveler.

5. CONCLUSION

Recent trend of labour shortage and seasonal price hike as led the farmers to use efficient farm machinery. From the experiment it was found that the power weeder could be an effective means for fast and low cost weeding of different crops. The yield was slightly higher in mechanical method than in manual method. The costs of weeding and ultimate benefit were significantly higher in mechanical and chemical method.

In conclusion, it was found during observations after the design, construction and testing of this particular manually operated weeder that the overall benefits accruing and associated with use of the equipment includes:

- It was faster than the traditional method of controlling weed
- High efficiency
- It cannot work where there was stones or any obstacles.

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