

ELECTRICALLY OPERATED MULTI OPERATIONAL WEED CONTROL MACHINE

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ABSTRACT

In the today's agriculture scenario it is always observed that requirement of labours for seasonal work is in demand but there is always shortage for the labours in farm during the weeding and insecticides spraying operations. This is the main cause to decrease the productivity of crop.

As per the general observation it is proven that 50-60% of productivity of crop is decreased as because of different weeds. By this machine we are capable to do the weeding operation within less time and less man power as compared to the conventional method of weeding. The machine is electrically driven using the battery pack.

Keywords: Weed, Agriculture Scenario, insecticides, Productivity, electrically driven

INTRODUCTION

A weed is essentially any plant which grows where it is unwanted. A weed can be thought of as any plant growing in the wrong place at the wrong time and doing more harm than good. It is a plant that competes with crops for water, nutrients and light. This can reduce crop production. Some weeds have beneficial uses but not usually when they are growing among crops.

Weeding is the removal of unwanted plants in the field crops. Mechanical weed control is very effective as it helps to reduce drudgery involved in manual weeding, it kills the weeds and also keeps the soil surface loose ensuring soil aeration and water intake capacity. [5]

The main objective is the development of a weeding tool, which can be used in different plant spacing systems, various plant intra-row distances and growth stages. The need for non-chemical weed control techniques has steadily increased in the last fifteen years, as a consequence of the environmental pollution originated by the intensive application of pesticides in agriculture. Another reason why non-chemical weeding is in the limelight nowadays is increased interest in the organically produced agricultural products and foodstuffs. [1]

In agriculture, it's a very difficult task to weed out unwanted plants manually as well as using bullock operated equipment which may further lead to damage of main crops. More than 33 percent of the cost incurred in cultivation is diverted to weeding operations there by reducing the profit share of farmers. Weeders are machines used for weed removal. Mechanical weeding is one of the prominent forms of weed removal. Smaller weeding machines commonly known as portable weeders are solely used for weed removal in agricultural fields, gardens, public parks, etc. Unlike tractors, weeders are nonconventional so far as the displacement of labours is concerned. In promoting weeders especially considering the fact that the majority of farmers are having small land. So they can hardly afford costlier tractors. Therefore, the weeder

should become a useful machine in the internal cleaning of crops which having small distance between them like groundnuts, sugarcane, soya bin crops, cultivation of paddy, in particular, and other crops in general for the smaller farmers. Its main objective is to reduce the manpower as in today's scenario labours are very hard to find as well as introduces the working time. [7]

PROBLEM STATEMENT

From survey we found that the productivity of the crops is affected by weeds in large extent. Weed ploughing is the seasonal process and it should be done in the period of intermediate crop period. But during the season of the weeding there is always shortage of labours which affects the productivity of crop. So to reduce this two measure problem we are designing and fabricating the Electrically Operated Multi operational Weed Control Machine.

OBJECTIVE

- 1) To reduce the man power in agricultural sector.
- 2) To reduce the power consumption during weeding.
- 3) To maintain the accuracy during weeding and move towards Precision Farming
- 4) To perform the most rigid operation with high speed weeding & to reduce time in Weeding.

Scope

Here are a few suggestions or modifications which can be incorporated into the existing machine which would make it more user-friendly. [2]

- 1) Develop good Ergonomics in product.
- 2) Make use of Positive Drives where possible.
- 3) Speed Control system should be prepared

Methodology: Weed Control Methods

- 1) Chemical Weeding: Chemical weeding is the most extensively used method of weed removal. But these chemicals used for weeding are harmful to living organisms and toxic in nature. [3]
- 2) Mechanical Weeding: Mechanical control is the use of powered tools and machinery to manage weeds. It is suitable for larger infestations such methods include pulling, digging, disking, ploughing and mowing.
- 3) Biological Weeding: Biological control involves the use of insects or pathogens that affect the health of the weed. Biological control is most commonly thought of as 'insect bio control. [3]
- 4) Manual Weeding: Manual control is the use of the hands or handheld tools to deal with weeds. Extensive amount of cheap manual labour is necessary for manual weeding. Manual weeding is commonly employed by smaller Indian framers for weed removal. [7]

STEPS IN METHODOLOGY

1. Market Analysis to identify problems and requirements
2. Concept design of structure
3. Analysis of design and optimization
4. Selection of suitable fabrication materials
5. Start of production and fabrication
6. Testing and evaluation of overall performance
7. Incorporating necessary modifications
8. Regular Service and maintenance.

LITERATURE REVIEW

Table 1. Literature Review

Author	Title of the Paper	Findings
K. Sripriyan, K. Anantharuban	Experimental Analysis Of Fork Type Semi-Automated Weeding Machine In Paddy Field	investigate the influence of weeder machine with varying paddy field
Dr. B. Paulchamy, Akshay P.K., Gokulraj. M	Design And Implementation Of Proficient Techniques In Agriculture For Weed Detection And Irrigation System Using GSM Technology	3 in 1 prototype design based on automatic weed detection and sprayer system and automatic irrigation system with GSM protocol
Mr. Mahesh Gavali, Mr. Satish Kulkarni	Development Of Rotary Weeder Blades By Finite Element Method	an efforts is made to reduce power required to drive these machines and to increase the life of these blades
Mr. Vivek Raut, Prof B.D. Deshmukh, Prof Dinesh Dekate	Design Modification And Analysis Of Rotavator Blade	This paper is work towards analyzing weeding equipment aspects for economical cultivation which will help to minimize the working fatigue and to reduce labour cost
Subrata Kr. Mandal	Design and Fabrication of Single Axle, Self-Propelled Multi Attachment Agricultural Machine	This paper presented there is scope for these power tillers to be used as seedbed preparation and inter culture operation in wide spaced row crops like cotton and sugarcane.
Sirisak Chertkiattipol	Performance Evaluation of an Indigenous Rotary Power Weeder	in this paper study was the performance of rotary power tiller .Rotary tiller is advantages over the conventional implement
B. Devojee, S. S. Meena. A. K. Sharma	Development of portable knapsack power weeder	Studied about weed management is an ever-present challenge to crop production. Presence of weeds in general reduces crop yield by 31.5 per cent
A.K.M Saiful Islam, M. T. Islam, M. Sh. Islam	Performance Evaluation of BRRRI Power Weeder for Low Land Rice Cultivation	Researchers are Finding ways to manage weeds in rice field using suitable mechanical devices instead of conventional hand weeding. The weeding Efficiency was the highest in HW (92%), followed by BPW (78%) and BW (73%).

PROPOSED MODEL

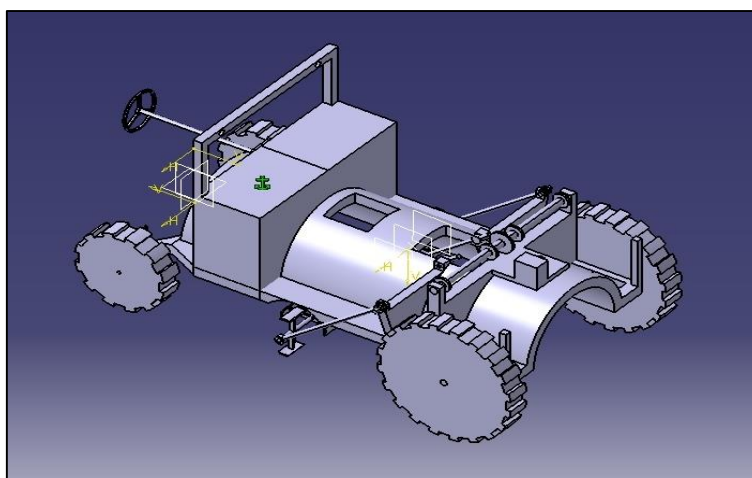


Figure 1: CATIA model of the weeding machine

CONSTRUCTION

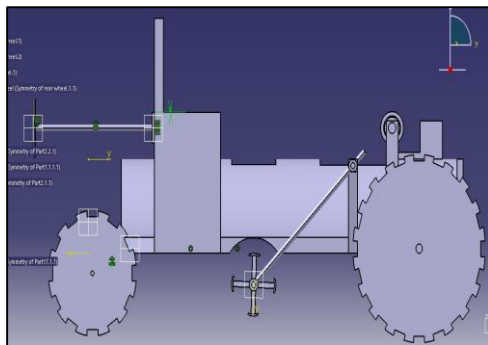


Figure 2

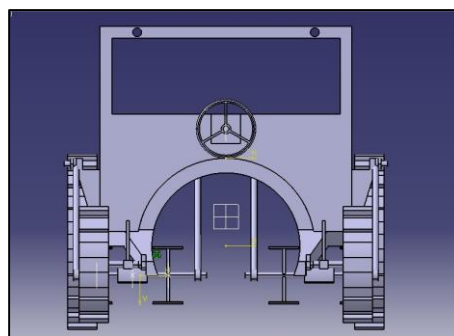


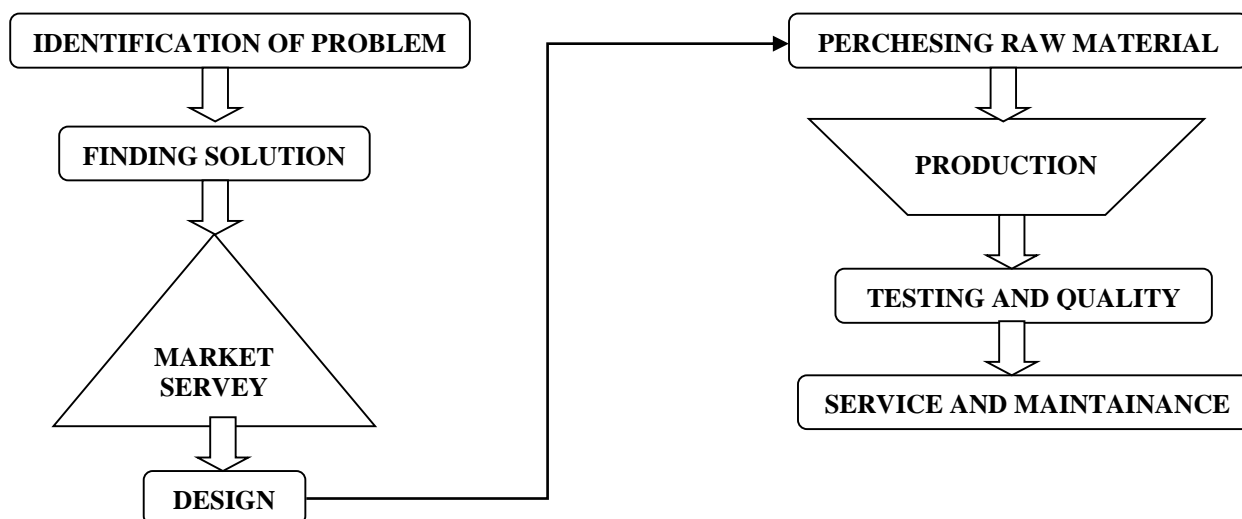
Figure 3

PREFERRED DIMENSIONS

Table2: Preferred dimensions

Component	Dimensions
Motor	1 HP
Chassis	1700*850*450mm
Rotor	D=200mm
Rotor shaft	L=450mm, D=20mm
Front wheel	ID=30mm, OD=600mm, W=100mm
Rear wheel	ID=15mm, OD=400mm, W=100mm
Rotor support inner	L=590mm
Rotor support outer	L=590mm
Overall dimension	1850*1050*480mm

Execution Flowchart



APPLICATION

- 1) Gardening
- 2) Tilling
- 3) Soil cultivation
- 4) Spraying Pesticides
- 5) Future agriculture

ADVANTAGES

Weeding Machine Perform Multiple Operations.

We Can Add A Trolley.

It Is Pollution Free Vehicle.

The Special Feature Of This Machine Is The Rotor Shaft Of Machine Can Adjust Between Different Size Crop Rows I.E.2.5 Ft, 3 Ft And 3.5 Ft.

We Are Arranging All These Features In Single Machine.[6]

DISADVANTAGES

The cost lithium-iron battery is more.

There is no seat for driver, so driver will have to be walking.

CONCLUSION

Agricultural development plays important role as a driver of rural poverty reduction. The effort require to develop a weeder will meet the demand of farmers. The efficiency of weeder should be satisfactory and it's easy to operate. It was faster than the traditional method of removing weed. Less labour needed and it is more economical than hand weeding. Here do not use any fuel and power, Hence maintenance cost is very less. Cost of weeding by this machine comes to only one-third of the corresponding cost by manual labourers.

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