



Battery Operated Weeder

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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 economy 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. Shrinking farm lands, acute labour shortage, decreasing income per acre of cultivation, and economic frustration are some of the key factors hurting a farmer's confidence in continuing farming. Weeding control is done by: mechanical weeding, thermal weeding: flaming, biological control, chemical control, and by farming pattern. It has always been a problem to successfully and completely remove weeds and other innocuous plants. Invariably, weeds always grow where they are not wanted. This work involved the design and construction of mechanical weeder, after discovering that tools such as cutlass and hoes require high drudgery, time consuming and high labour force. As a solution to these problems, mechanical weeder was designed and constructed. The mechanical weeder was made of two implements attachment 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 of weeds.

Keywords: Mechanical weeder, weed, cultivation, chemical weeding

1. INTRODUCTION

Weed control is one of the most difficult tasks in agriculture that accounts for a considerable share of the cost involved in agriculture production. Farmers generally expressed their concern for the effective weed control measures to arrest the growth and propagation of weeds. In Indian agriculture, it's a very difficult task to weed out unwanted plants manually as well as using bullock operated equipments 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. 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 (Parish, 1990). 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. Weeds decrease the value of land, particularly perennial weeds which tend to accumulate on long fallows; increase cost of cleaning and drying crops. Weeds waste excessive proportions of farmers' time, thereby acting as a brake on development. Weeding is an important but equally labour intensive agricultural unit operation. Today the agricultural sector requires non-chemical weed control that ensures food safety. Consumers demand high quality food products and pay special attention to food safety. Through the technical development of mechanisms for physical weed control, it might be possible to control weeds in a way that meets consumer and environmental demands. In Chhattisgarh, rice occupies average of 3.6 million ha with the productivity of the state ranging between 1.2 to 1.6 t/ha depending upon the rainfall. The state is comprised with three agro-ecological zones i.e. Chhattisgarh plain, bastar plateau and northern hill region of surguja. These zones have huge variations in terms of soil topography, rainfall intensity and distribution, irrigation and

adoption of agricultural production system and thus vary in the productivity of rice in these regions. In view of topographical structure prevailed in this part of the country, 20-30% of the rice is grown in low lying areas (Kanhar soil). The rice is cultivated in different field situations from upland to extreme lowland. The area under upper midland is about 25 per cent of total rice area. The weed in upland rice comes up more easily and vigorously than in low land rice. The weed control in these conditions is complicated. Rainfed upland rice is grown in an area of 7.1 million hectare in India. A major portion of it 85 percent is an eastern states like Assam, Chhattisgarh, Madhya Pradesh, eastern UP, West Bengal and Orissa. The remaining 15 percent is distributed in other states. The crop weed competition is greater in direct seeded line sowing of rice because the crop and weed seeds germinate simultaneously and they start competing with each other for air, water, sunlight and nutrients. In this method of cultivation, it becomes difficult to keep the surface submerged throughout the crop growth period and hence it becomes favours for germination and growth of weeds. In Chhattisgarh, women labours played a significant role in the rice cultivation (Marothia and Sharma 1985). They use a variety of hand tools and implements to perform various tasks in crop production process. The time has come when the tractor is also being operated by Indian women. Weeding is one of the most important field operations and consumes 15 per cent of total energy spent in crop production. With the advent of mechanization and the adoption of high yielding varieties interest in mechanical weeders is seen among the farmers. Mechanical weed control reduces the drudgery involved in uprooting of the weeds. Moreover mechanical weeders besides killing the weeds loosen the soil between rows thus increasing air and water intake capacity. But this method of weed control has received much less scientific attention compared to the other methods. As a result traditional tools, implements and methods are still used by majority of the farmers for weed control.

2. OBJECTIVES

1. The objective of the project is to design, construct and test battery operated weeder, to provide the best opportunity to farmer's to easily control and removing the weed from farm.
2. Weeding with the use of tools like cutlass and hoe requires high labour force in a commercial farming system hence mechanical weeder is necessary to reduce the labour force.
3. Environmental degradation and pollution caused by chemical is reduced by the use of Mechanical weeder. Low effective operation, high work effort and high time requirement for different types of hoe or cutlass, can be overcome with the use of mechanical weeder.
4. Presently in India, weeding with simple tools such as cutlass, hoe etc. is labour intensive and intensive and time consuming. Thus, there is a need for the design of manually operated weeder for intensive and commercial farming system in India.
5. For this study we are developed battery operated weeder by power of wiper motor.

3. COMPONENTS OF THE BATTERY OPERATED WEEDER

Various components images used for manufacturing for mechanical power weeder is shown

Motor type: Wiper motor,
Maximum speed: 4500+/-5000 rpm,
Stall torque: 71 NM
Weight: 3.81 K



Figure.1. Wiper Motor



Figure.2. Battery

4. ASSEMBLY

1. Assembly of machine consist the mounting of motor on the frame & chassis is mounted on wheel. Then the motor is assembled on chassis by using nut, bolt & somewhere by weld.



Figure.3. Battery Operated Weeder

2. Manufacturing of motor includes following procedure, Blades are cut by grinding cutter & Bending of blade is done manually. These blades are attached with the frame by adjusting setting.
3. Two wheels are fitted below the wiper motor. Fitted by nut & bolt
4. Capacity of battery is 12v is fitted on chassis between the motor and handle.
5. Square pipe is used for the handles with required dimensions & switch is fitted on handle & connected to battery by using wire.
6. Switch & electrical connections are made for on/off the engine & Switch is mounted on handle of machine.

5. COST SUMMARY

Table.1. Cost Summary

S NO	PARTICULATES	COST (RS)
1	Brought out items	8000/-
2	Raw material cost	4000/-
3	Fabrication	3000/-
TOTAL		15000/-

6. WORKING

1. Initially start the motor with the help of on/off switch mounted on handle. We used the wiper motor.
2. The blades are used for the forward movement of the machine.
3. Battery is used to transmit power from motor to intermediate shaft.
4. The blades are mounted on the front side of the machine. When blades start rotating forward motion occurs.
5. hence weeding is done with less effort and less cost.

7. RESULTS AND DISCUSSION

- 1) Time required to weeding of 1 Acre area is 30 minutes, For 12v of battery consumption.
- 2) The average weeding capacity of machine is 1.5 Acre area and time required for two time of battery consumption is 45 minutes.
- 3) Machine works for 3 hours and 30 minutes four time of battery fully charging.
- 4) Weeding efficiency of this machine is 80 %.

8. CONCLUSION

Weed control is one of the most difficult tasks in agriculture that accounts for a considerable share of the cost involved in agriculture production. Farmers generally expressed their concern for the effective weed control measures to arrest the growth and propagation of weeds. Lack of man power has been identified as one of the major problems for the sustainability of the rice industry. Hence transplanters and seeders were well developed as a step for mechanization. However, weeding method is still not well developed up to mechanization. Mechanical weed control not only uproots the weeds between the crop rows but also keeps the soil surface loose, ensuring better soil aeration and water intake capacity. Weeding by mechanical devices reduces the cost of labour and also saves time. Power weeders are one step towards the standardization of practices, e.g. it has a fixed max rotational speed, fixed direction of movement, and it goes from one side of the field to another. Conversely, manual weeders still rely heavily on the characteristics of the operator(s), which cannot obviously be standardized. It is affecting speed, direction of movement, and the movement needed to operate a weeder, e.g. back and forth or constant push. Looking to these problems and to give a new direction to the weeding operation an attempt was made to design, develop and test single row power weeder for rice. Design and development of power weeder would serve the purpose of minimum damages done to rice plants, cost effectiveness, easy manuvelling, low weight and fabrication by using freely available components and easy maintenance are main features of this design. Here comes the relevance of mechanised weeding, which is not a huge time consuming and significantly improves weeding efficiency as well as the quality of weeding. The developed power weeder was tested at different field conditions and on the basis of those results obtained. Design parameters and their application in developing battery operated weeder to be established.

9. REFERENCES

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