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DESIGN AND FABRICATION OF E-WEEDER

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ARTICLE DETAILS

Research Paper

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ABSTRACT

A weed is a plant that is deemed unwanted in a specific environment; it is essentially a "plant in the wrong place." Because weeds contaminate crops and lower crop quality, weed control is necessary. Weeds suffocate pastures, overrun crops, lower agricultural productivity, and even pose a threat to livestock. Their fierce competition for sunlight, nutrients, and water reduces crop quality and output. One of the hardest things to do on an agricultural land is control weeds. Farmers who are persuaded of the benefits of mechanical weed management often adopt it. With the help of a motorized agricultural weeder, weeds between crop rows can be pulled up and the soil surface left loose for improved water intake and soil aeration. Labor costs are decreased and time is saved by using a motorized weed eater. Muscle force is needed to operate a human-operated weeder, therefore prolonged use is not possible. Hand weeding by hand is a laborious process that requires time. The motorized system in this battery-powered motorized weed eater is battery-powered. It is designed to automate this operation by using weeding blades that resemble connector arms in a rotational motion to create a certain digging motion arrangement. A powerful motor, couplings, connection arms, mounts and joints, screws, wheels

and rods, and a battery are the components of this system.

I. INTRODUCTION

One of the trickiest jobs in agriculture is weed control, which contributes significantly to the production costs of agriculture. Farmers in general voiced worry about the need for efficient weed management methods to halt the spread and growth of weeds. In Indian agriculture, pulling undesirable plants by hand or with bullock-driven machinery is an extremely tough labor that might further harm the major crops. Farmers' profit share is decreased since weeding operations receive over 33% of the costs incurred in cultivation. In essence, any plant that develops in an undesirable area is considered a weed.

Any plant that grows in the wrong spot at the wrong time and causes more harm than good can be considered a weed (Parish, 1990). It's a plant that faces competition from crops for light, nutrients, and water. Crop productivity may be impacted by this. While certain weeds can be useful, they typically don't work well when growing among crops. Weeds raise the expense of cleaning and drying crops and reduce the value of land, especially perennial weeds that grow on extended fallows. Weeds hinder progress by using an excessive amount of farmers' time. An essential but similarly labor-intensive agricultural unit task is weeding.

II. EXISTING SYSTEM

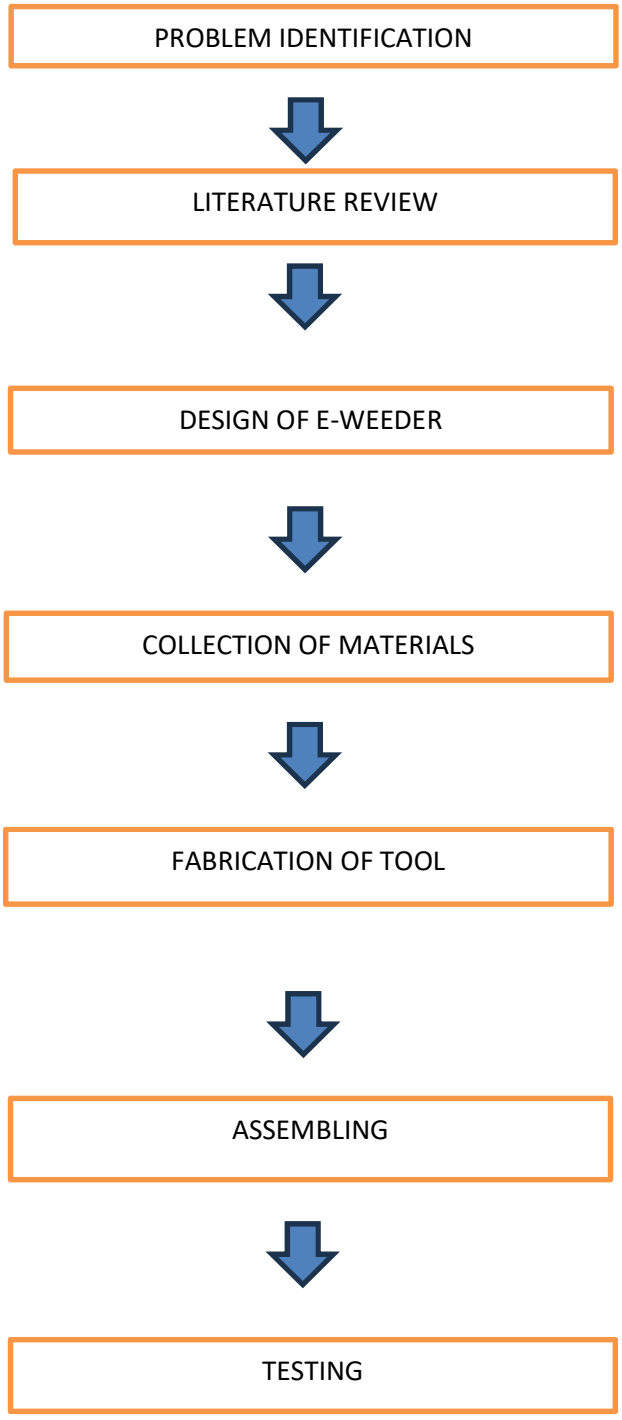
The existing system for e-weeder is an agriculture, the backbone of our economy, faces numerous challenges in today's rapidly evolving world. Among these challenges, weed infestation stands out as a significant threat to crop productivity and farm profitability. Traditional methods of weed control, such as manual labor and chemical herbicides, are labor-intensive, time-consuming, and often detrimental to the environment. In response to these challenges, there is a pressing need for innovative and sustainable solutions that can enhance efficiency, minimize labor costs, and reduce environmental impact. The development of the electric weeder represents a promising step towards addressing these challenges by leveraging modern technology to revolutionize weed control practices in agriculture.

III. OBJECTIVES

1.To fabricate the electric weeder in miniacher size

2.To compare time efficiency of manual weeder & E-Weeder

IV. METHODOLOGY



V. DESIGN AND ANALYSIS

Our e-weeder is designed to cut labor costs and time requirements by using weeding as its primary purpose.

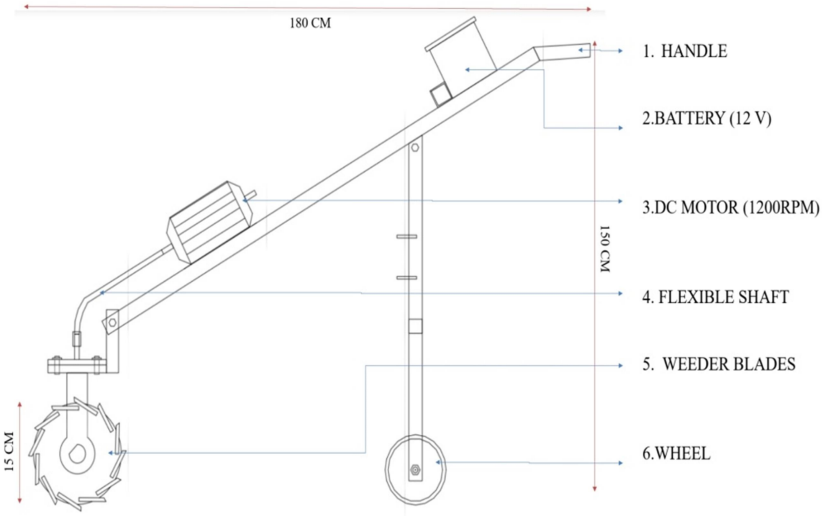


Figure 2.1 Design of e- weeder

Collection of material

We collect the material like weeder blade, stainless steel rod, electric motor, battery (12v-24v), wires, adaptor, gear, shaft, wheels.

Fabrication of tool

Fabricate the equipment like Rotary weeder blader, Rotary shaft and Steel rod framework for making the tool.

Assemmbling

Attach the handles to the 1.5-meter long hollow square steel pipe using weeding. Weld the weeder blade to the bottom end of the steel pipe for secure placement. Position the battery between the handles and connect it to the steel pipe to power the system. Mount the electric motor at the top center of the weeder and secure it in place. Connect the motor to the weeder blade using a flexible shaft to transfer rotational power for effective weed removal.

Testing

We test the time taken efficiency of E-weeder with the manual weeding methods.

Problem Identification

•**Labor Intensity:** Traditional manual weeding methods require significant labor

input, leading to increased costs and time constraints for farmers.

•**Environmental Impact:** Chemical herbicides used for weed control pose environmental risks, including soil contamination and water pollution, while also potentially harming beneficial organisms and biodiversity.

• **Crop Damage**: Mechanical weed removal methods, such as hoeing or tilling, can

inadvertently damage crops or their root systems, reducing overall yield and quality.

VI. LITERATURE REVIEW

"The innovation of this project stemmed from a comprehensive review of existing literature, which highlighted the pressing need for sustainable solutions to weed control in agriculture. Traditional manual weeding methods are labor-intensive and time-consuming, while chemical herbicides pose environmental and health risks. Through extensive literature collection and analysis, it became evident that there is a critical gap in the market for an efficient, eco-friendly alternative. By synthesizing insights from various sources, including studies on electric weeder prototypes and alternative weed control techniques, this project aimed to address this gap and contribute to the advancement of agricultural technology. The literature review served as the foundation for the development of an electric weeder prototype that not only improves efficiency and effectiveness in weed removal but also minimizes environmental impact and promotes sustainable farming practices."

VII. PROPOSED DESIGN

Design is the process of creating a plan or specification for the construction or creation of something. It involves a variety of activities, such as researching, brainstorming, sketching, prototyping, and testing, to arrive at a final product or solution that meets specific objectives and requirements. The goal of design is to

solve problems, improve functionality, and create a better user experience. Design plays a vital role in evolving field that requires creativity, innovation, and adaptability to keep up with changing trends and technologies. Once initial ideas are formed, sketching and prototyping come into play. Sketching allows designers to visually represent their concepts, while prototyping involves creating tangible models or mock-ups to test and refine ideas. These prototypes are then subjected to testing and evaluation to identify any issues or areas for improvement. Feedback obtained from testing is used to iterate and refine the design further, until a final product or solution.

VIII. RESULT&DISCUSSION

Efficiency Testing

S.No	Method	Time taken for weeding	Area in cent
1.	Manual method	20 mins	3
2.	E-Weeder	10 mins	3

Table 1.1 Efficiency Testing

The electric weeder completed the task in half the time of manual methods, demonstrating significant time savings.

- This efficiency improvement translates to increased productivity, cost-effectiveness, and reduced physical strain on workers.
- The observed results underscore the superiority of the electric weeder in weed removal efficiency, highlighting its potential to revolutionize weed control practices in agriculture.

Hence,

The time efficiency of the electric weeder compared to the manual weeder in covering the specified land area is 100%.

This means that the electric weeder is twice as efficient as the manual weeder in terms of time taken to cover the given land area.

Figure 2.2 Design and fabrication of e-weeder

IX. CONCLUSION

The alleviation of rural poverty is significantly influenced by agricultural growth. Farmers' demands can be met by the work required to build a weeder. It should be easy to use and have a good level of efficiency. It removed weeds more quickly than the conventional approach. Compared to manual weeding, it requires less labor and is more cost-effective. This requires extremely little maintenance because there is no need for fuel or electricity. Merely one-third of the expense would be incurred by manual laborers to weed using this machine. Locally accessible materials are used to fabricate the Low Cost Weeder. The weeder offered a fair overall performance.

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