DEVELOPMENT OF DOUBLE WHEELED MULTIPURPOSE WEED REMOVER

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ABSTRACT: Weed control is one of the most important problems that will reduce the farmer's interest to continue cultivation. The farmer acute labor shortage, decreasing income per acre of cultivation, and economic frustration are some of the key factors hurting a farmer's confidence in continuing farming.

Hence mechanical weeder is necessary to reduce the labor force. Environmental degradation and pollution caused by chemical is reduced by the use of Mechanical weeder. Low effective operation, low work effort and high time requirement for different types of hoe or cutlass, can be overcome with the use of mechanical weeder.

The aim of the work is to construct and develop the powered weeder, to provide the best opportunity for the crop (Groundnut and Tomato at initial level) to establish itself after planting and to grow vigorously up to the time of harvesting. Invariably, weeds always grow where they are not wanted. For this a special type of powered weed remover is designed and constructed.

The weeder is driven by petrol engine to move in forward direction and the blade is attached at rear end is placed at the roots of weeds, once the engine get started then the blade start cutting the weeds and once the operation is completed the weeder is shifted to next row, like this the complete land of cultivation is made as weed free. It is faster than the traditional method of removing weed. Main advantage is reducing labor cost by reducing number of labors, less time consumption. The operation is made to be simple that even any person can handle, by just handling it without any stress.

Key Words: Weed Remover, Groundnut Cultivation, Chain sprocket mechanism.

1. INTRODUCTION

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 by Sridhar H.S Asst. Professor Department of Mechanical Engineering, Sri Basaveshwara institute of technology, Tumkur (D), India.

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. Weeds decrease the value of land, particularly perennial weeds which tend to accumulate on long fallows; increase cost of cleaning and drying crops (where drying is necessary). Weeds waste excessive proportions of farmer’s time, thereby acting as a brake on development. Shrinking farm lands, acute labor shortage, decreasing income per acre of cultivation, and economic frustration are some of the key factors hurting a farmer's confidence in
continuing farming.

2. CONCEPT OF THE WEEDING PROCESS

Weeding is the removal of unwanted plants in the field crops. 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. Weeding with the use of tools like cutlass and hoe requires high labor force in a commercial farming system.

Weeder demands less body effort as compared to operation by bullocks. The bullock implements require the hand and body pressure to achieve depth and alignment of the implement in use, whereas weeder the implements are mostly self guided. This reduces human drudgery to a great extent. The comparative higher output of operation by the weeder as compared to bullocks reduces the operational time and achieves timeliness in operation. The maintenance of the weeder is easy. It is ideally suited for mechanizing small farm holdings which account for 80 % of the farm holdings of the country. Cost wise weeder should be an obvious choice of smaller farmers, if they are intending to have a mechanical power source for farm-operation. Weeder reduces the drudgery of collecting the waste grass between crops in the field during operations as compared to operations by bullocks. Weeder makes the manual of that wastage grass by cutting it in small piece and thoroughly mixed with soil during operation. 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.

Weeding is an important but equally labor intensive agricultural unit operation. There is an increasing interest in the use of mechanical intra-row welders because of concern over environmental degradation and a growing demand for organically produced food. 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, such as precise inter-and intra-row welders, it might be possible to control weeds in a way that meets consumer and environmental demands. These mechanisms contribute significantly to safe food production. Weeds are a major problem in Groundnut cultivation. Herbicides are usually used for weed controlling despite the fact that herbicides have many negative effects due to environmental contamination.

It has been understood that mechanized weeding significantly improves weeding efficiency as well as the quality of weeding. However, it may consume non-renewable petroleum for operations; however, operational difficulties and slow weeding rate have been identified as major drawbacks of this weeder, particularly in large-scale cultivation.

The weeder is one of the main farm mechanization in promoting soil weeder especially considering the fact that the majority of farmers are having small land. It reduces human effort. The implements are mostly self-guided. Working of the project is based on engine and chain sprocket mechanism which drives the wheels. It is a great saver of time and expenses on field operations. Thus it will have very effective uses on the farm field either for seeding as well as for weeding. Because of smaller size, two wheels and limited constructional arrangements; the soil weeder becomes one of the lightest yet most effective farm power sources.
Now the project has mainly concentrated on this difficulty, and hence a suitable weed removal machine is developed. In this project the engine with petrol starts and shaft with the help of chain sprocket mechanism and gears drives two wheels an operator generally has to walk behind the weeder to guide the direction of travel for various operations.

Hence mechanical weeder is necessary to reduce the labor force. Environmental degradation and pollution caused by chemical is reduced by the use of Mechanical weeder. Low effective operation, low work effort and high time requirement for different types of hoe or cutlass, can be overcome with the use of mechanical weeder.

3. PROBLEM DESCRIPTION

AIM OF PROJECT

The overall goal of this project was to develop and evaluate the performance of a chain sprocket mechanism intended for power operated mechanical weeding in vegetable crop production. The specific objective of this project is to remove weeds by using power operated weeder rather than manual operated weeder to reduce time and increase work effort of labor.

4. STATEMENT OF PROBLEM

Weeding with the use of tools like cutlass and hoe requires high labor force in a commercial farming system hence mechanical weeder is necessary to reduce the labor force. Environmental degradation and pollution caused by chemical is reduced by the use of Mechanical weeder. Low effective operation, low work effort and high time requirement for different types of hoe or cutlass, can be overcome with the use of mechanical weeder.

5. JUSTIFICATION

Presently in India, weeding with simple tools such as cutlass, hoe etc is labor 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. One of the problems in crops and vegetables production is poor weed control; hence there is need of mechanical weeder to increase the production of these products. The cost for employing a Labor force when using simple tools is very high in commercial farming system. This can be reduced using mechanical weeder.

This Concept involved the development of mechanical weeder, after discovering that tools such as cutlass and hoes require high drudgery, time consuming and high labor requirement. As a solution to these problems, mechanical weeder was designed and developed. An extra attachment of seeding box and circular pipes for fertilizing and seeding of groundnut cultivation. The tool developed will be able to fulfill the present requirement for the weed control. Accordingly, the present development is directed to an improved manual tilling, mulching and weeding tool.

6. Factors to be considered when choosing a weed control strategy

There are few circumstances where there will be no requirement for weed control, but deciding on what your strategy will be, and how intensive it should be, is based on a number of factors.

- Type of tree chosen and area into which it is planted. Trees planted into more fertile land, for example well-restored brown field sites, are likely to need more intensive weed control measures than trees planted in infertile areas. This is because the land is likely to contain a large weed seed bank and repeated application of herbicides or a combination of several methods may be needed to gain full control of the weeds during the establishment phase.

- Environmental factors need to be evaluated as all weed control methods, whether cultural or chemical, will have both positive and negative environmental effects.

- Timing of weed control is important. It is
often better to control weeds pre-emptively rather than to try to deal with a weed problem retrospectively after the situation has become severe. Avoiding a problem is better than taking remedial action.

7. MAIN COMPONENTS OF THE VEHICAL
   1. Chassis
   2. Engine
   3. Chain
   4. Sprocket
   5. Handle
   6. Blades
   7. Seeding box
   8. Shaft and Wheels

Fig. 7.1 Main Parts

8. WORKING OF DEVELOPED MODEL

The manually operated power weeder is one of the much farm mechanization. Unlike tractors, manually operated power weeders are non-conventional so far as the displacement of labors is concerned in promoting manually operated power weeders especially considering the fact that the majority of farmers are having small land.

9. METHODOLOGY

The block diagram which is shown above represents the cycle of operation; the power from engine is transmitted from GV shaft to sprocket which is fixed to the shaft with the help of bushes. Then the Chain sprocket mechanism is going to actuate and power is transmitted to the shaft. Shaft will rotate then the two wheels mounted on the bearings and fixed by wheel hubs will be driven by the shaft. Vehicle moves in forward direction and the blades attached at rear end enter into the soil between rows of crops and removing of weeds takes place.

By this a huge amount of labour effort can be reduced and within less time more weeds can be removed with less cost and easy operation.

Then finally one labour is required to remove the weeds which are not removed by powered weeder around the plants.

10. NECESSITY OF WEEDER
Manually operated power weeder demands less body effort as compared to operation by bullocks. The bullock implements require the hand and body pressure to achieve depth and alignment of the implement in use, whereas in Soil Weeder, the implements are mostly self guided. This reduces human drudgery to a great extent. The comparative higher output of operation by the powered weeders as compared to bullocks reduces the operational time and achieves timeliness in operation.

The maintenance of the power weeder is easy. It is ideally suited for mechanizing small farm holdings which account for 80% of the farm holdings of the country. Cost wise the power weeder should be an obvious choice of smaller farmers, if they are intending to have a mechanical power source for farm operation. Power weeder reduces the drudgery of collecting the waste grass between crops in the field during operations as compared to operations by bullocks.

Power weeder makes the manual of that wastage grass by cutting it in small piece and thoroughly mixed with soil during operation.

11. RESULTS & DISCUSSIONS

The Manually Powered Weeder is tested in both dry and moisture lands, it can perform the weed removal task effectively when compared to traditional method of weeding. The performance can be shown in the following tables.

Table 11.1: Time spent when tested on semi moisture land

Table 11.2: Time spent when tested on dry land

Table 11.3: Weeding test result on semi moisture land
Table 11.4: Weeding test result on dry land

Functional efficiency for semi moisture land = 71.74%.

12. APPLICATIONS

1. This can be applied for controlling weeds as well as seeding purpose.
2. Mainly it is used in groundnut field and also other fields where there is a gap of 5-12 inches between the plants.
3. Other fields such as tomato, cotton etc., can be made weed free.

13. CONCLUSION

The result from this above project outcomes
are assurance of much efficiency, less time consuming, worker friendly Machine respective to
the conventional method of tilling. It assures you of
maximum work done with minimum Work effort.

Conclusion of the project work is that it
helps the students to their extended
imagination, engineering skills and Fundamental knowledge.
By selecting above topic we are understand,
familiar and know the details of agricultural
technology. This is our little effort to make
comfort to our farmers. This machine is
developed to reduce the time and effort required
for Production up to the great extent also this
machine manufacturing cost is less as compared
to other.

The project also teaches the way of
working as a unity proper coordination is to be
established with student in the project group. It
enhances the thinking or filling of mutual
cooperation in the project also the projects learn
to fabricate any model according to its
requirements. All the manufacturing processes are
carried out with a great concentration; any wrong
calculation may have result in the failure of
project model

Hence by comparing weed remover and
Cutlass it has been observed that weed remover
is more than 4 times faster than Cutlass and
more than 3 times faster than Hoe on dry land.

14. SCOPE FOR FUTURE WORK

Based on the experience gained from this
research, there are several recommended future
research topic:

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.
1. The weight of the weeder can be reduced
according to the requirement by using lightweight
materials and by reducing the size of setup.
2. Since the weeder was designed for low cost,
but it can be extendable by considering human
comfortness.
3. By using some advanced attaching
mechanisms, the time required for assembling
can be reduced for additional attachments.
4. The work generated by using fuels can be
modified by using suitable non-conventional
resources.

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