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# Weed Removing Machine for Agriculture Purpose

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**Abstract:** *The main concept of this project is to build machine which can be used for clearing the lettuce and the other weeds which grow very often at land bodies. The clearing of these agricultural weeds is a difficult process and consumes lot of time when done manually. This machine is made so simple such that when it is switched on, it removes the weeds which are trimmed off and they can be later removed and disposed manually. Another advantage of this machine is that they can be operated by the solar powers. Also the battery power can also be made used. Hence this is a dual power project such that the power from the battery can be used and also the solar energy can be used for powering up the machine.*

**Aim:** *The basic objective of sowing operation is to put the seed in rows at desired depth and spacing, cover the seeds with soil and provide proper compaction over the seed. The recommended row to row spacing, seed rate, seed to seed spacing and depth of seed placement vary from crop to crop and for different agricultural and climatic conditions to achieve optimum yields and an efficient sowing machine should attempt to fulfil these requirements. In addition, saving in cost of operation time, labour and energy are other advantages to be derived from use of improved machinery for such agricultural operations.*

*The main intention of this is reducing the cost of the machine and to remove the all weeds in the agricultural lands.*

**Keywords:** *Wall's Stress Factor.*

## I. INTRODUCTION

Weeder is a mechanical implement used to take away the unwanted plants in the field. Indian agriculture is reliant on human power and also animal power. It is a time consuming process. Most of the Indian farmers are having small agricultural land. Farmers still follow the conventional methods in the cultivation for weeding purpose. These methods require high labour force to perform the operations. In order to overwhelm this, a new type solar powered rotary weeder is designed based on mostly available nonconventional energy. This motorized agricultural equipment works with the support of rotating blades that breaks the soil to cut the weeds. This machine helps to minimize the expenses caused by labour and fuel. The major occupation of the Indian rural people is agriculture and both men and women are equally involved in the process. Agriculture has been the backbone of the Indian economy and it will continue to remain so for a long time. It has to support almost 17% of world population from 2.3% of world geographical area and 4.2% of world's water resources. The present cropping intensity of 137% has registered an increase of only 26%. Weed control is an important issue in the agriculture field. Automatic weed removing is achieved by the help of the machine system which typically uses sharp blades jointed at the bottom of the machine.

## II. LITERATURE SURVEY

- 1) *M.G.Jadhav:-* He presented principles of motion of trolley which transmit its rotary motion from chain and sprocket arrangement and reciprocating piston into the cylinder for pumping the pesticides which is used to the manually operated organic fertilizers cum pesticides sprayer.
- 2) *R.Y. Van Der Weide:-* He studied concern about herbicides polluting ground and surface water, human health risks from herbicide exposure or residues, effects on the flora and fauna, development of herbicide resistance and the lack of approved and effective herbicides for minor crops such as vegetables, are the major factors driving the present and increasing interest in non-chemical weed control.
- 3) *Manish Chavan:-* He found one of the major reasons for lack agricultural productivity is weeds. So they decided to select a project based on weed removal machine. Weed is an everyday term usually to describe a plant considered undesirable. The word weed is commonly applied to unwanted plants in human-controlled settings, such as farm fields, gardens, lawns, and parks.
- 4) *G. Selvakumar:-* Concluded that there is a problem with removing weed such as the design of the weeder machine removes weed only in vacuum land for cultivation. If the sensor is used in the machine, sometimes it may cause damage to the plants when the plant was falsely regarded as a weed. This machine has only the primary cutter called weeder. So it cannot be adjustable to remove the weeds at a distance after cultivation i.e, at the time of plants are growing.

- 5) *Francis*:- In this present day elimination of weeds in agricultural uncultivated land is done by various machines, which are available. But there is no special machine for eliminate the weeds in cultivated agricultural lands. The weeds reduces the growth of plants and productivity. The existing machines for cultivate the land by using the source of fuel. The previous design of machines consumes maximum amount of fuel. It can be reduced that various innovators are designing the solar powered machines. But it can't work for long time. The climatic conditions also affects the performance.
- 6) *M. Reddi Sankar*:- Solar assisted bicycle is modification of existing bicycle and driven by solar energy. It is suitable for both city and country roads, that are made of cement, asphalt, or mud. This bicycle is cheaper, simpler in construction & can be widely used for short distance travelling especially by school children, college students, office goers, villagers, postmen etc.

### III. METHODOLOGY

There are two motors which power up the entire system. One motor is charged by the solar energy. And the other motor is used for providing the reciprocating motion to the cutter. As the machine moves, the cutter cuts the weeds. The motor are operated by a battery and also a solar panel is provided in the machine such that it converts the sunrays falling on it into electrical energy and is stored in a battery. The power from the battery in turn can be used for powering up the machine. By this process the machine can be operated in dual methods. Also on both sides of the machine, two pair of wheels are provided for the movement of the setup on front and rear side. The operator operates the wheels and this decides the path of the movement of the entire setup.

### IV. MANUFACTURING PROCESS

Manufacturing processes are the steps through which raw materials are transformed into a final product. The manufacturing process begins with the creation of the materials from which the design is made. These materials are then modified through manufacturing processes to become the required part. Manufacturing processes can include treating (such as heat treating or coating), machining, or reshaping the material. The manufacturing process also includes tests and checks for quality assurance during or after the manufacturing, and planning the production process prior to manufacturing.

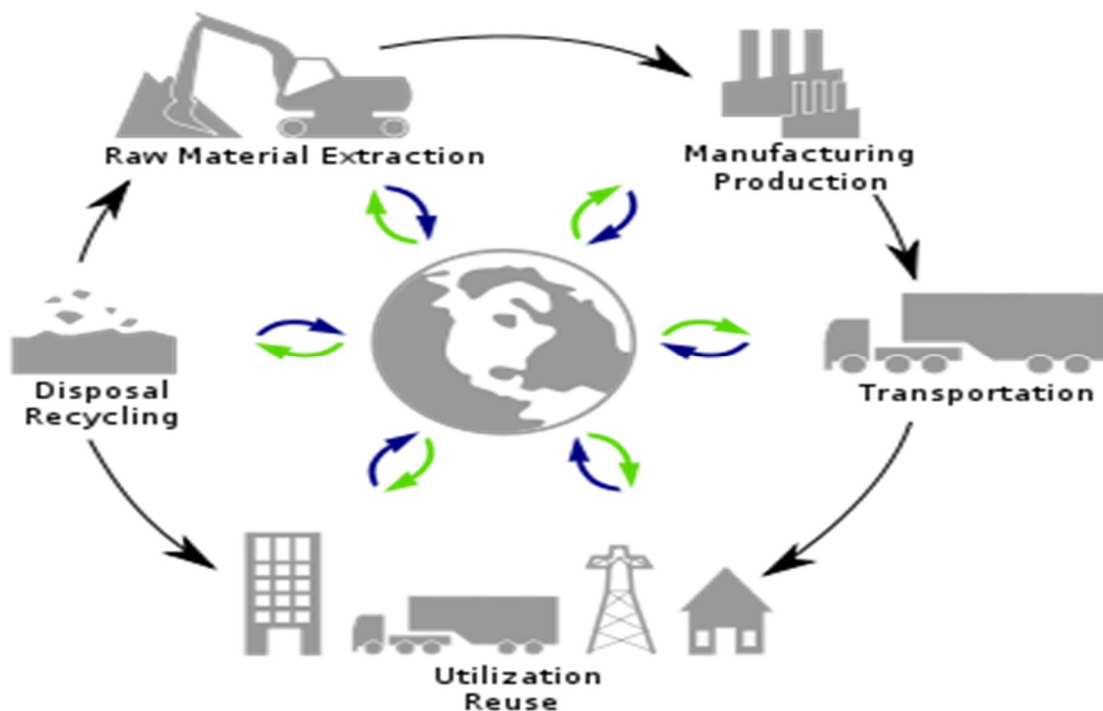


Fig. Manufacturing Process

#### A. Metal Cutting

Metal cutting or machining is the process of by removing unwanted material from a block of metal in the form of chips. Cutting processes work by causing fracture of the material that is processed. Usually, the portion that is fractured away is in small sized pieces, called chips. Common cutting processes include sawing, shaping (or planing), broaching, drilling, grinding, turning and milling.



### B. Sawing

Cold saws are saws that make use of a circular saw blade to cut through various types of metal, including sheet metal. The name of the saw has to do with the action that takes place during the cutting process, which manages to keep both the metal and the blade from becoming too hot. A cold saw is powered with electricity and is usually a stationary type of saw machine rather than a portable type of saw.

### C. Welding

Welding is a process for joining similar metals. Welding joins metals by melting and fusing 1, the base metals being joined and 2, the filler metal applied. Welding employs pinpointed, localized heat input. Most welding involves ferrous-based metals such as steel and stainless steel. Weld joints are usually stronger than or as strong as the base metals being joined.

Welding is used for making permanent joints. It is used in the manufacture of automobile bodies, aircraft frames, railway wagons, machine frames, structural works, tanks, furniture, boilers, general repair work and ship building.

### D. Assembly

An assembly line is a manufacturing process (most of the time called a progressive assembly) in which parts (usually interchangeable parts) are added as the semi-finished assembly moves from work station to mechanically moving the parts to the assembly work and moving the semi-finished assembly from work station to work station, a finished product can be assembled much faster and with much less labor than by having workers work station where the parts are added in sequence until the final assembly is produced. By carry stationary piece for assembly.

## V. COMPONENTS AND DESCRIPTION

The major components involved in the design and the fabrication of the “SOLAR WEED REMOVING MACHINE” is as follows,

- 1) *Body*:- This frame is prepared & assembled by a welding process. This frame is made up of Mild Steel material. This material made up of 1 inch square hollow pipe and 1 inch angular frame body.
- 2) *Solar Panel*:- The energy extracted from solar radiation by solar cells is vital to expanding our source of energy. Alternative sources of energy are being sought out constantly and solar energy has already been a primary source as solar cells have been in existence for many years. By figuring out how to maximize the efficiency of solar cells, engineers can build better cells and models for usage in homes and businesses. The purpose of adopting this is to gain a better understanding of the relationship between solar cell voltage output and the angle of incidence with the Sun's rays. Since the Sun is never stagnant, an understanding of this relationship will help in designing practical positioning of solar cells.
- 3) *Battery*:- A battery is said to float when charging voltage is slightly greater than the open circuit voltage of the battery. Floating current required to keep lead calcium cells at full charge is about one-fourth to one-third that of lead antimony cells, but lead-calcium cells usually must be floated at a slightly higher voltage. Lead-selenium cells require float voltages slightly above those of lead-calcium. The operation of a battery by float method is based on overall voltage applied to the battery terminals.
- 4) *Cutter*:- This blade is made up of High Carbon Steel. This cutter is coupled to the shaft and this shaft is connected to the high torque motor. This cutter blade is rotates in clock wise direction. This cutter removes the weeds. This cutter is a major part of this weed removing machine. The tip of the cutter is in a V-shape.
- 5) *High Torque Motor*:- A torque motor can be any type of motor that is designed to operate continuously while stalled or turning very slowly. It can apply torque to a load without actually turning at all. An ordinary motor, even one that normally operates at a low speed, will overheat if stalled for very long. In order to tolerate stalled operation, torque motors must be designed to dissipate more heat than an ordinary motor. They must also be designed to not draw a level of stalled current that is out of proportion to torque.
- 6) *Lead Screw Arrangement*:- A leadscrew also known as a power screw or translation screw is a screw used as a linkage in a machine, to translate turning motion into linear motion. Because of the large area of sliding contact between their male and female members, screw threads have larger frictional energy losses compared to other linkages. They are not typically used to carry high power, but more for intermittent use in low power actuator and positioner mechanisms.
- 7) *Wheels*:- This machine consists of two pair of wheels. One pair of wheels are placed on the front side of the machine & this is made up of nylon material & of 2 inches size. While another pair of wheels are placed on the rear side of the machine & this is also made up of nylon material & of 4 inches.

## VI. WORKING PRINCIPLE

There are two motors which power up the entire system. One motor is charged by the solar energy. And the other motor is used for providing the reciprocating motion to the cutter. As the machine moves, the cutter cuts the weeds. The motor are operated by a battery and also a solar panel is provided in the machine such that it converts the sunrays falling on it into electrical energy and is stored in a battery. The power from the battery in turn can be used for powering up the machine. By this process the machine can be operated in dual methods.

Also on both sides of the machine, two pair of wheels are provided for the movement of the setup on front and rear side. The operator operates the wheels and this decides the path of the movement of the entire setup.

## VII. ADVANTAGES, DISADVANTAGES AND APPLICATIONS

### A. Advantages

- 1) The wastes in bodies where a man cannot access can be easily collected and cleared away.
- 2) Need no or very little maintenance.
- 3) No need of skilled operators to operate the machine.
- 4) Highly reliable.
- 5) Time consumption for clearing the water bodies is less.

### B. Disadvantages

- 1) The disposal of wastes that are collected in a tray must be done manually.
- 2) If any of the motor gets damaged, the entire process gets disturbed.
- 3) More number of moving parts and hence handling must be done carefully.

### C. Applications

This weed removing machine has a wide range of applications in the fields like,

- 1) Suitable for government projects for clearing the water bodies.
- 2) In theme parks and restaurants for cleaning up the pools.
- 3) In tourist places for preserving the natural beauty.

## VIII. COST ESTIMATION

Sl.No.	Material Name	Quantity	Cost in rupees
1	Solar Panel	1 No's	1600
2	Battery	2 No's	2500
3	High torque motor	1 No's	1500
4	Wheels	4 No's	600
5	M.S.Material	9 kgs	1000
6	Welding Charges		500
7	Painting Charges		700
8	Machine Shifting & Travelling Expenses		1000
9	Total expenditure of the project		9400

## IX. FUTURE SCOPE

Based on the experience gained from this project, there are several recommended future scopes coming into picture. 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. The future scopes of this project are,

- A. The weight of the weeder can be reduced according to the requirement by using lightweight materials.
- B. Since the weeder was designed for low cost, but it can be extendable by considering human comfortness.
- C. By using some advanced attaching mechanisms, the time required for assembling can be reduced for additional attachments.

## X. CONCLUSION

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between the institution and the industries.

We are proud that we have completed the work with the limited time successfully. The fabrication of “Weed Removing Machine” is working with satisfactory conditions. We can able to understand the difficulties in maintaining the tolerances and also the quality. We have done to our ability and skill making maximum use of available facilities.

In conclusion remarks of our project work, let us add a few more lines about our impression project work. Thus we have developed an “Weed Removing Machine” which helps to clear out the weeds in agricultural lands as well as also in other garden areas with less involvement of manual effort. Also the time taken is less and thus the labour costs can be saved. By using more techniques, it can be modified and developed according to the applications.

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