

# A Review on Design and Fabrication of Multi-Purpose of Crop Cutting and Weeding Machine

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**Abstract:** Agriculture is the backbone of Indian economy. weed removing process is one of the major activities in agriculture. In this work, the cost of labour and time consumed is reduced. In order to increase the efficiency, we designed and fabricated the multipurpose crop cutting and weeding machine. This machine targets the small-scale farmers. It is compact and can cut up to two rows of crops. The crop had been cut down by cutting blades while in a motion. The mechanism is operated by the battery (source). The power is transmitted to the cutting blades by DC electric motor for performing operation. A collecting mechanism is provided for collection of cut down crops and it is put inside of the collecting chamber. This project is used for multi-purpose crop cutting and at the back side of a machine to remove the soil by using weeding blades simultaneously.

**Keywords:** Cutting blades, Collecting chamber, Weeding blades, Electric motor.

## 1. Introduction

Cultivating and weeding process is most generally followed process in India. These days trained workers are not available for performing these operations. Removal of the grass is also a slow-paced job involving lot of human efforts. The main purpose of the project is for benefiting the small-scale farmers. Majority of Indian farmers are using hand-hoe method which requires 20-30 labours for weeding process. It is simple in construction where a very high-speed electric motor and cutting blade is connected to an end of a rod that is held by the hand. On the free end of this rod a battery is attached to motor. The weeding blade is adjusted by the steering rod. The weeding process is performed after crop cutting process.

## 2. Literature Survey

### A. Weed cutting machine

V. Pandit Shamuel et al. (2016) Farming is the foundation of Indian economy and weed evacuation is one of the significant exercises in agribusiness. Weed control is the one of the most significant issue that will decrease the rancher enthusiasm to proceed with development. The rancher intense work lack, diminishing pay per section of land of development, and financial disappointment are a portion of the key variables harming a rancher's trust in keeping cultivating. Thus, mechanical weeder is important to diminish the work power.

Natural debasement and contamination brought about by substance is diminished by the utilization of Mechanical weeder. We have created mechanical force weeder. The plan and assembling procedure of mechanical force weeder is clarified right now.

### B. Harvest cutting machine

Satyanarayan Sharma et al (2017) Harvest cutting machine is a mechanical gadget. It very well may be utilized for cutting the dry cut slows down of grain break or covering of trunk of tree. In the harvest cutting machine required less human exertion and it is truly sensible for white collar class rancher it isn't confounded structure and it is effectively worked by incompetent person. In this cutting machine have one edge revolving shaper. This can be appropriate for the cutting of harvest, for example, Javari, tuar, maize and so forth it can lessen work cost because of the just a single individual can deal with. Yield shaper machine doesn't require high support.

### C. Crop cutting machine

Shravan U. Burade et al (2016) This machine focuses on the little scale ranchers who have land territory of under 2 sections of land. This machine is smaller and can slice up to two lines of plant. It has cutting edges which cut the yield in a scissoring sort of movement. There are no is shaper on two metal strip (plate) upper shaper plate will be respond by scotch burden component. It runs on electrical AC engine with 1-Hp limit, this force from engine, is given through pulley and apparatus box game plan to the shaper. A gathering component is accommodated the assortment of harvests to the other side subsequent to cutting. This instrument is additionally fueled by pulley game plan, two sprockets and chain courses of action given for assortment of harvests. This smaller reaper is made utilizing locally accessible extra parts and consequently, it is effectively viable. This collector may be the answer for the issues looked by a little scale rancher with respect to cost and work execution. Subsequent to testing this machine in ranch it is discovered that the expense of reaping utilizing this gatherer is impressively less as contrast with manual collecting.

### D. Agricultural crop reaper

Ghumadwar et al (2018) This title shows the idea for plan

and investigation of yield shaper. The yield cutting is significant stage in horticulture field. As of now in India previous utilized traditional technique for the harvest cutting for example the regular technique for crop cutting is as physically cutting utilizing work yet this strategy is extensive and time consuming. This venture point is to plan and examination of little field crop shaper machine for little tallness crop. To examination cutting roller and flat cutting sharp edge by utilizing Pro-eand anise's product. The machine comprises of petroleum motor to work cutting roller and edge. At the point when contrast with manual harvest cutting by and this machine has an ability to cut the yield in quicker. This machine to supportive for both the little just as large ranch.

#### *E. Motorized weeding machine*

Ojomo A. O et al (2012) Studies were led on the impact of dampness content (10%, 13% and 16%) and the kind of cutting edges (Flat sharp edge, spike tooth edge and bended edge) on the machine effectiveness, quality execution proficiency, level of evacuated weeds and level of halfway removed weeds. Soil dampness substance and kind of cutting sharp edges factually influenced the machine execution at 5% level of noteworthiness utilizing Duncan Multiple Range Test (DMRT). The machine was seen as impacted by the dirt dampness substance and kind of cutting edges; anyway the machine gave the best machine effectiveness of 94%, quality execution productivity of 84%, and 2.8% level of removed weeds and least level of incompletely evacuated weeds of 1.8% utilizing the spike tooth sharp edge at 16% soil dampness content. Watchwords: - Effect, soil, dampness content, weeding machine, execution.

#### *F. Multipurpose agriculture cutter*

Lakshmi pathi Yerra et al (2015) Today, Agriculture particularly in India need to move in certain perspectives, for example, how to expand the efficiency and benefit how to diminish the expense and how to take care of the issue originates from laborers. To defeat these, another sun oriented controlled engine sharper is created exceptionally for cutting different yield assortments during the hour of reaping and named as a MULTIPURPOSE AGRICULTURE CUTTER. It involves three rules, for example, "simple to create, ease and lightweight" With this multipurpose agribusiness sharper, the whole issue can be understood effectively. There are a few methods associated with creating this gadget, for example, manufacturing the model utilizing appropriate material and test the working of this machine. So, the goals are to manufacture and test the exhibition of the model of a sun oriented fueled engine crop sharper for gathering the yield.

#### *G. Horticulture*

Prabhudev Patial et al (2014) The historical backdrop of horticulture in India goes back to the Rigveda, expounded on 1100 BC. Today India positions second worldwide in ranch yield. Horticulture and unified structures like ranger service and fisheries represented 13.7% of the GDP (Gross Domestic

Product) in 2013, about half other all out workforce. The financial commitment of farming to India's GDP is relentlessly declining with the nation's expansive based monetary development. In any case, horticulture is demographically the broadest financial part and assumes a critical job in by and large human science monetary texture of India. As Per the 2010 FAO world farming measurements, India is the world's biggest maker of numerous crisp foods grown from the ground, milk, significant flavors, select new meats, select sinewy harvests, for example, jute, several staples, for example, millet and castor oil seed. India is the second biggest maker of wheat and rice, the world's significant nourishment staples. India positioned inside the world's five biggest makers of over 80% of farming produce things, including many money yields, for example, espresso what's more, cotton, in 2010. India is additionally one of the world's five biggest makers of animals and poultry meat, with one of the quickest development rates, starting at 2011.

#### *H. Pesticides*

Krishna A Madalli et al (2017) A weed is basically any plant which develops where it is undesirable. A weed can be thought of as any plant developing in an unlucky spot and accomplishing more damage than anything else. It is a plant that rival's crops for water, supplements and light. This can lessen crop creation. A few weeds have helpful uses yet not for the most part when they are developing among crops. Weeding is the evacuation of undesirable plants in the field crops. Mechanical weed control is extremely powerful as it assists with lessening drudgery associated with manual weeding, it murders the weeds and furthermore keeps the dirt surface free guaranteeing soil air circulation and water consumption capacity. The primary goal is the advancement of a weeding instrument, which can be utilized in various plant dispersing frameworks, different plant intra-push separations and development stages. The requirement for non-compound weed control procedures has consistently expanded over the most recent fifteen years, as an outcome of the natural contamination started by the serious utilization of pesticides in horticulture. Another motivation behind why non-synthetic weeding is in the spotlight these days is expanded enthusiasm for the naturally created agrarian items and groceries.

#### *I. Weed control technique*

Pathade et al (2015) The weeds are plants which are viewed as unwanted in horticulture and cultivating. The procedure of expulsion of these weeds from crops is called weeding. Weeder's are mechanical machines which are utilized for weed evacuation. The paper examines about plan create and advance weeding machine. It is the most broadly utilized weed control technique. The utilization of mechanical weeder will diminish drudgery and guarantee an agreeable stance of the rancher or administrator during weeding. This will resultant increment generation.

#### J. Savvy weeding

Patil Digvijay Pandurang et al (2016) The conservative development of any nation is separated in different areas of the business contributing for the advancement of the nation. Indian economy is enormously subject to the agrarian part. The horticultural culture includes the different exercises and weed expulsion is one of the significant amongst other yield creation activities. The traditional strategies are less successful because of manual tasks and subsequently there was the need of delivering the weeding machine. The weeding machines have been created by the scientist's long back yet the issue is with the cost viability of the machines. The savvy weeding will help the ranchers of the nations like us. The machines for weeding will help for the compelling working and diminishes the endeavors of the laborers for the assignment. Creators have displayed the plan and advancement of the mechanical weeding machines and its exhibition from the point of view of usage in Indian conditions.

#### K. Weeder cycle

Mane Deshmukh Vijay et al (2017) In this work our group make horticultural hardware which is helpful for rancher, this gear is known as weeder cycle. In India the majority of individuals are rancher. For doing hands on work most extreme human force is utilized, however some present year's needs of laborers are fundamental yet accessibility of laborers is less for field work. So, we will make rotor modification cycle. These weeder cycle is configuration by utilizing rearrange err programming. These weeder cycles will expel grass between two line. It will expel various grasses in less time, so work will increasingly entangle in less time. Accordingly, less laborers are required for expel grass.

#### L. Traditional techniques

Anurag Dwivedi et al (2018) This paper centers around the different procedures utilized for weeding reason for rural inserts which have a degree to be utilized in future. The inserts utilized in traditional techniques have some symptoms. The successful properties of sun powered fueled weeding machine is reasonable for weeding reason and have no side effects. It keeps away from the utilization of any synthetic compounds and thus keeps the yields from synthetics.

#### M. Weeds rival crops

Manish Chavan et al (2016) Weeds are one of the significant reasons for loss of agrarian produce. Weeds rival crops for basic supplements. In farming, it's an extremely troublesome errand to get rid of undesirable plants physically just as utilizing bullock worked gear's which may additionally prompt harm of fundamental yields. In excess of 33 percent of the expense brought about in development is redirected to weeding tasks there by diminishing the benefit portion of ranchers. So they can barely manage the cost of costlier tractors. In this manner, the weeder ought to turn into a helpful machine in the interior cleaning of yields which having little separation between them

like groundnuts, sugarcane, soya container crops, development of paddy, specifically, and different harvests when all is said in done for the littler ranchers. Primary target of weeder is to lessen the labor as in today works are extremely elusive just as working time is progressively Rotary tillers power is straightforwardly transmitted to the culturing cutting edges, so the force transmission effectiveness in rotating tillers is high. Thus, there is a need to improve the structure of edge through geometrical alterations so will decrease the cutting-edge cost just as land arrangement cost.

#### N. Conventional weeding machine

Charulata S Mali et al (2016) In India, Agriculture has an enormous market and the biggest conservative division. All things considered, the cultivating forms utilize the traditional practices. Weeding and planting are one of the significant undertakings that require enormous number of laborers. To correct the cultivating activities which are finished by utilizing huge human force, here in this paper a model is planned and exhibited which is playing out the undertaking of weeding and seed sowing. The conventional weeding machine should be pushed be an individual which requires huge force and is badly designed. The arrangement to eradicate this need here is working the wheel utilizing engine. The machine incorporates a planting system which plays out the seed planting. So as to process the seed planting action appropriately that is with proper separation and in great proportion. The epic methodology makes the entire component basic and smooth, in order to make it accessible to ranchers with strong cost and light weight.

#### O. Multipurpose cutting machine

Lohit Lopes et al (2017) Today, farming particularly in India need to gather in certain perspectives, for example, how to build the profitability and benefit, how to decrease the expense and how to take care of the issue of laborers. At the point when yields are prepared and no labor is accessible or no mechanical collector is accessible and if accessible, no force supply. To defeat these, another sunlight based fueled engine shaper is created exceptionally for cutting different yield assortments during the hour of reaping and in this we are making the shaper keeping in perspective on Paddy. It very well may be utilized for multipurpose yield cutting likewise if shaper type is changed.

#### P. Business cultivating

Sarang A. Bhongade et al (2019) By and by in India, weeding with straightforward devices, for example, cutlass, scraper and so forth is work escalated and serious and tedious. Along these lines, there is a requirement for the plan of physically worked weeder for concentrated and business cultivating framework in India. One of the issues in harvests and vegetables creation is poor weed control; thus, there is need of mechanical weeder to build the generation of these items. The expense for utilizing a Labor power when utilizing straightforward apparatuses is high

in business cultivating framework. This can be diminished utilizing mechanical weeder. The point of the paper is to configuration, develop and test manual weeder, to give the best chance to the yield to build up itself subsequent to planting and to become enthusiastically up to the hour of gathering.

#### Q. Weeder machine

NIKIL et al (2015) India is a horticultural nation. However, customary cultivating strategies are being supplanted by present day systems which utilize propelled machines in basic way. Weeding machine (weeder) is additionally one of them. The weeder is utilized for expelling weeds in vegetable nurseries, bowls of plantation trees and Vineyard estates. Other than manual, power weeders are getting well known now-a-days for their convenience include. As a rule, diesel motors are utilized in them. Likewise, there are assortment of connections accessible in the market for the weeder making it a multi-intentional machine.

#### R. Weed control machine

SIRMOUR et al (2017) Weed control is one of the most troublesome errands on a rural ranch. Weeding by mechanical gadgets decreases the expense of work and furthermore spares time. So as to survey the probability of motorization of the weeding activity, a force worked single column dynamic weeder are structured and created in the Faculty of Agricultural Engineering, IGKV, Raipur. From the structure perspective force source (motor), cutting sharp edges shaft were the significant segments of single column power weeder for rice. Normal working velocity of activity was found as 45 km hr<sup>-1</sup>. The normal fuel utilization of intensity weeder was found as 0.55 l hr-The greatest field limit was discovered 0.054 ha hr<sup>-1</sup>. The working width of the created machine might be customization between 140 mm to 250 mm. The weeding effectiveness was seen as 88.62 percent under single column dynamic force weeder. The sparing in cost of weeding was 60 percent and sparing in time was 65 percent contrasted with manual weeding.

#### S. Paddy cutting machine

Vinay D R et al (2017) In this cutting, edge period investigate in the agrarian field is going on. Step by step the number of inhabitants in India is expanding and to satisfy the need of nourishment, modernization of farming areas is significant. Automation gives higher efficiency in least info. Ranchers are utilizing same conventional strategies. Paddy is one of the significant harvests developed in India. The issues in paddy development are accessibility of works, low efficiency rate and increasingly manual endeavors required for compost bolstering and weeding. For paddy development, additional time is required in light of compost nourishing and weeding forms. For diminishing these issues plan and creation of paddy weeder with compost feeder is finished. This is a rural hardware which is valuable for rancher, this gear is known as weeder with compost feeder. This machine is planned first in strong edge

and afterward created. The weeder will evacuate weeds between two columns.

#### T. Harvesting machine

Krishnaraj et al (2018) Argo tech a developing field which is essential for agriculture. Casuarina Equinoctial is a widely grown species used for the production of paper and firewood. Casuarina grows up to 12 feet in height in a span of 3 to 4 years. They are rigid and hard. This makes harvesting of Casuarina difficult. It consumes more time, money and manpower. Our harvesting machine reduces all of these. Our machine is equipped with two chainsaw blades at the front sides which are run by a 2 HP motor. It provides high rpm for effective cutting of trees. The dual blade enables cutting of two trees at same time. It is equipped with a front shield for protecting the driver. Overall an acre of Casuarina can be harvested in a few hours thus saving time, money and manpower. Our machine can also be used to harvest crops like sugarcane and bamboo by adjusting the position of the blades by simple alteration mechanism in order to produce a low-cost harvesting machine for the farmers.

### 3. Conclusion

The multi-crop cutter has been designed, fabricated. This project was an attempt to achieve three main objectives. Our objective is to make an economic and efficient crop cutter. Second objective is to reduce the cost involved in maintenance and the third objective is to overcome the lack of availability of skilled laborers. The multi-crop cutter is designed, fabricated and tested. The machine does not employ any use of power equipment's such as D.C. motors, engines, and it is fully human operated. The use of this machine makes harvesting process faster, hence reduces most of the cutting time and labour required to operate the machine is also less. This machine is very helpful for farmers having small farm land.

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