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DESIGN AND FABRICATION OF SOLAR POWER WEEDER

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ABSTRACT

Weed is a plant that is considered undesirable in a particular situation, it is basically “a plant in the wrong place”. Weeds are needed to be controlled because it reduces crop quality by contaminating the commodity. Weeds reduce farm productivity. They invade crops, smother pastures and in some cases can be harmful for the livestock. They aggressively compete for water, nutrients and sunlight, resulting in reduced crop yield and poor crop quality. Weed control is one of the most difficult tasks on an agricultural farm. Mechanical weed control is easily adopted by farmers once they get convinced of its advantages. Motorized agriculture weeding machine not only uproots the weeds between the crops rows but also keeps the soil surface loose, ensuring better soil aeration and water intake capacity. Weeding by motorized Weeder reduces the cost of labour and also saves time. In human operated Weeder, muscle power is required and so it cannot be operated for long time. The traditional method of hand weeding is time consuming. In this

Battery drive motorized weeder we use motorized system, which is powered by solar panel. It consists of connector arms to stimulate digging motion in a particular arrangement to automate this task. This system is made up of high-power motor, solar panel, connector arms, mounts and joints, screws, wheels and rods, battery, handles to hold the weeder.

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. 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.

LITERATURE SURVEY

Yadav.R et al., says As an alternative to chemical weed control, mechanical weed control between crop rows can be achieved using standard tools such as field cultivators. This paper addresses the related problem of achieving mechanical intra row weed control in maize. The object was to non-specifically remove weed plants within the row by enabling dual tine carriers to engage the soil whilst circum venting the maize stalks. The maize stalks were distinguished from the weeds and maize leaves by utilizing. The typical vertical quasi-cylindrical stalk of the maize plant.

The limited range of maize stalk diameters, By assuming constant plant spacing. To assess the performance of the machine, a video was taken during field plot experiments. This allowed determination of the number of plants that were "fatally damaged" after inadvertently being pushed over by the implement. This was assumed to cause the plant to die, or "minimally damaged" where the implement merely touched the plant, when the plant was assumed to survive. Experiments were carried out using three arrangements being, Three rows without weeds, Three rows with broad leaf weeds (simulated by planting soybean) ,Three rows with grassy weeds. The percentage of plants that were fatally damaged was 8.8%, 23.7%, and 23.7% in cases 1, 2, 3 respectively. In addition, thepercentage of plants that were minimally damaged was 17.6%, 20%, and 25.9% in cases 1, 2,3 respectively .

Rajashekar .M Says, Modern no till cropping depends on herbicides for weed management; therefore, herbicide applications are an important system input. Unfortunately, herbicide resistance in many weed species is becoming wide spread (Heap, 1997, 2008), and multiple herbicide resistances in several economically important weed species have also been widely reported (Owen et al., 2007). In time, herbicide-resistant weeds may ultimately result in significant yield reduction sand grain contamination. The International Agency for Research on Cancer (IARC), which is part of the World Health Organization (WHO), has also concluded that glyphosate is probably carcinogenic to humans (Guyton et al., 2015). This announcement has generated considerable debate in the media concerning the use of herbicides. Other authors have also highlighted the potential hazard to human health of long-term exposure to herbicides and pesticides (Hernandez et al., 2013; Duke, 2010; Mackic and Ahmetovic, 2011; Peighambarza-deh et al., 2011; Troudi et al., 2012; Wicker ham et al., 2012); therefore, there has been growing interest In non herbicidal control of weeds. The objectives of this chapter are to outline some of the potential technologies, apart from herbicide application, for weed management. These technologies include flaming, steam treatment, electrocution, applying electrostatic fields, microwave weed treatment, applying infrared radiation, applying ultraviolet radiation, using lasers, robotics, and using abrasive weed control techniques.

Laukikraut R Says, Micro-innovations contribute significantly to the production of positive externalities, increasing the added value not only of the single farm but of the entire value-chain. These innovations are strongly place-based and relocate the value generated in the same place that

produced it. As we will argue in the following, micro-innovations require a user centered approach able to highlight the key role of co-design for development. These principles, in turn, require to set inclusive place-based mechanisms able to empower "The capability for voice"of marginal actors and left-behind are as (Rodríguez-Pose, 2017). To this end, after outlining the geographical setting and the analytical frame-work of the research, we shall illustrate the methodology adopted and the needs emerging from our analysis. We shall then describe several machinery concepts, design and proto types, developed by us, in order to validate the design methodology and provide some examples of appropriate technologies for mountain agriculture. In the conclusion, we will summarize the paper with regard to the utility and applicability of the method to the farmers in mountain regions of Italy, as well as its general applicability to co-design for development. The role of mountain agriculture world wide and initalyIn 53 countries of the world, mountainous areas cover more than 50% of the national surface area. In another 46, they cover between 25% and 50%, and in many other countries they play key roles, such as serving as a water re- serve, even though the proportion of the land they cover is much smaller (MountainAgenda,2002). InItaly, mountain areas account for around47.5%ofthe country, and are home to about1/5 of the population (FAO, 2014, FMI (Fondazione Montagne Italia, 2016)). Italy is also emblematic of the enormous variety of climatic, morphological and socio economic conditions that the term "mountain" encompasses. The many mountain area sin Northern, Central and Southern Italy are very different from each other in terms of the problems they present and the resources they offer. Since the Second World War, the major part of Italy's mountain areas in both the Alps and the A pennines have known "perverse spirals" of underdevelopment marked by successive waves of demographic and economic contraction , dwindling services and decaying infra structures

COMPONENTS

HIGH POWER MOTOR
SOLAR PANEL
SCREWS
HANDLE RODS
BATTERY
CULTIVATION BLADE
WHEEL

MATERIAL PROPERTIES.

Young's Modulus
210GPa

Compressive Strength
2.5e+008Pa

Density
7850kgm-3

Coefficient of Thermal Expansion
1.2e-005 C-1

Specific Heat
434Jkg-1C-1

Specifications of flexible solar panel selected

SI No.	PARAMETERS	VALUE
1.	Nominal max. power (Pmax), Wp	20
2.	Optimum operating voltage (Vmp), V	19.60
3.	Optimum operating current (Imp), A	0.59
4.	Open circuit voltage (Voc), V	21.60
5.	Short circuit current (Isc), A	0.65
6.	Conversion efficiency, %	19.0

CONSTRUCTION OF WEEDER MACHINE:

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 & some where by weld.

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

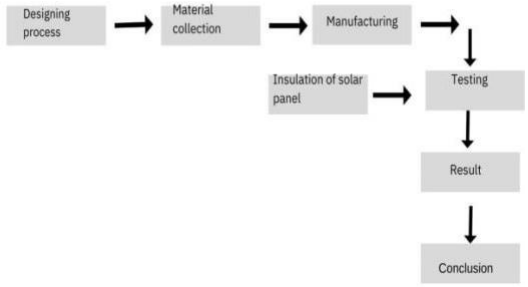
4. Square pipe is used for the handles with required dimensions & switch is fitted on handle & connected to battery by using wire.

5. Switch & electrical connections are made for on/off the engine & Switch is mounted on handle of machine.

WORKING OF WEEDER MACHINE:

1) The main source of energy for developed weeder machine is solar power. This energy are going to be harvested by employing a suitable electrical device.
2) The panel utilized in weeder is 10W Solar module (consists of 36 cells). The solar panels works on the principle of photovoltaic effect.
3) The photovoltaic effect may be a process that generates voltage or current during a cell when it's exposed to sunlight,
4) It's this effect that creates solar panels useful, because it is how the cells within the panel convert sunlight to voltage.
5) The electricity generated by the panel is then transmitted to the batteries for storage purpose.
6) There the batteries ends it to a circuit card which transmits power to different components of the developed weeder machine is less cost.

METHODOLOGY



RESULT

Various type of papers have been reviewed on Solar powered weeder from this we lead to gap analysis that one wheeler solar powered weeder is more satisfying and cheaper than those chemical and other conventional weeders. Thus the problem definition of the project is controlling the weeds in the agriculture field. Also the labour required for weeding is expensivetime consuming and difficult to organize,while the main objective is to built a machine that will overcome the above bottlenecks. In this project we are going to prepare a weed removing machine for agricultural land and to reduce the human effort of weed elimination weed elimination and to create a machine for low cost using

solar energy. design and fabrication will be done.

Calculation Of Forces Acting On Blade

Ze is number of blades on each side of the flange taken

Ne =Number of blades interacting with soil Soil force Ks acting on the sharpened edge of the blade is given by, Ks = Kt Cpi Ze Ne

Where

Cs is the non-reliability factor equal to 1.5 for non-rocky soils and 2 for rocky soils

Nc is the power of the machine taken as 2.7kW for small weeding machine

ɳ is traction efficiency taken as 80% ɳ is coefficient of reservation of power taken as 0.8 is minimum peripheral velocity

taken as 0.5m/s

Cp is coefficient of tangential force taken as 0.8, is numbers of flanges taken as 4Ze is number of blades on each side of the flange taken

2.Ne=Number of blades interacting with soil / Total number of blades Number of blades interacting with soil are 4.

MEASURING WEED HEIGHT

CONCLUSION

- Agricultural development plays important role as a driver of rural poverty reduction.
- The effort require to develop a weeder will meet the demand of farmers.
- The efficiency of weeder should be satisfactory and it is easy to operate.
- It was faster than the traditional method of removing weed. Less labor needed and it is more economical than hand weeding.
- Here do not use any fuel and power, Hence maintenance cost is very less.
- Cost of weeding by this machine comes to only one-third of the corresponding cost by manual laborers.
- The fabrication of Low cost Weeder is done with locally available material.
- The overall performance of the weeder was satisfactory

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