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Design and Fabrication of Cost-Effective Agriculture Machine

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Abstract: ***Mulching has long been used to conserve soil moisture, manage weeds, modify soil temperature, and create a microclimate for plants. There are a variety of strategies for improving crop growing conditions, including increasing productivity and reducing the amount of water necessary to grow the crops. However, mulching paper, also known as agricultural film, is one of the most effective ways to cover the soil and keep the crop in the right environment This mulching paper comes in a varietyof varieties, but because plastic mulching is well-known for requiring less effort, we've chosen to work on an automatic mulching paper laying machine that also includes a drip laying attachment. Moisture in the soil is critical for crop survival in arid environments. Mulching with plastic paper film around theroot area of plants prevents weed growth while also storing water and preventing soil dehydration, however this method takes a lot of money and time. So the 'Mulching paper laying machine with hole punching' will save money and time because it will handle both chores at once, laying mulching paper and punching holes in the ground. A body, a mainframe with hoeing blades, hole punching wheels, drip role holder, and punching mechanism make up the plastic mulch laying machine. The mulch was laid on the prepared plantation bed by the machine in conjunction with the drip pipe. This will lay mulch onthe bed without destroying it, as well as punch the holes to the desired dimensions. The product might be used in agriculture to grow tomatoes, watermelons, muskmelons, and other hybrid varieties of crops. Bylowering the capital cost and time of laying the mulching paper using the most convenient way, as well as installing the drip irrigation pipe in one pass of the machine, it will be simple for the farmer.***
(Key words: agriculture, mulching paper, weed control)

I. INTRODUCTION

A. Agriculture in Indian Economy

Agriculture structures the main source of income to nearly 50% of Indian population. The commitment of agribusiness in the national income in India is all the more, subsequently, it is said that agriculture in Indiais a backbone for Indian Economy. The contribution of agriculture in the initial two decades towards the total national output is between 48% and 60%. In the year 2001-2002, this contribution declined to just around 26%. The aggregate Share of Agriculture and Allied Sectors, Including agribusiness, domesticatedanimals, and ranger service and fishery sub segments as far as rate of GDP is 15.4 percent during 2007. Agricultural exports constitute a fifth of the total exports of the country. In perspective of the overwhelmingposition of the Agricultural Sector, gathering and support of Agricultural Statistics expect incredible significance

Like any other sector, agriculture too has its own set of challenges, some of which are very critical and impeding. Let’s take a look at some of the major problems that India faces in relation to agriculture and their possible solutions.

B. Plastic Mulch

Plastic mulch is a product used, in a similar fashion to mulch, to suppress weeds and conserve water in crop production and landscaping. Certain plastic mulches also barrier to keep methyl bromide, both a powerful fumigant and ozone deplete , in the soil. Crops grow through slits or holes in thin plastic sheeting. Plastic mulch is often used in conjunction with drip irrigation. Some research has been done using different colors of mulch to affect crop growth. This method is predominant in large-scale vegetable growing, with millions of acres cultivated under plastic mulch worldwide each year. Disposal of plastic mulch is cited as an environmental problem; however, technologies exist to provide for the recycling of used/disposed plastic mulch into viable plastic resins for re-use in the plastics manufacturing industry.

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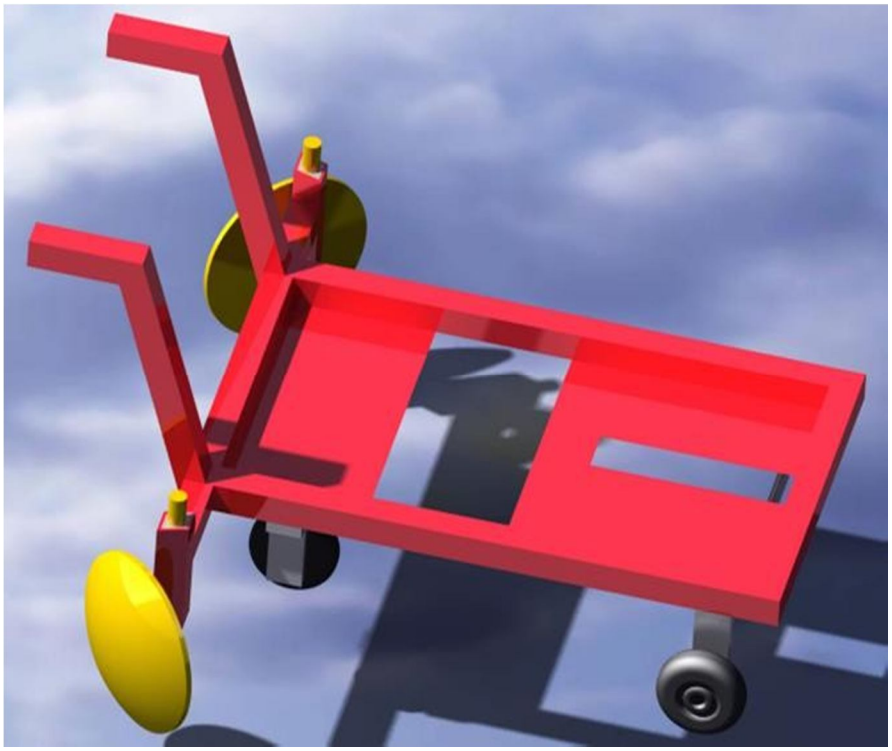
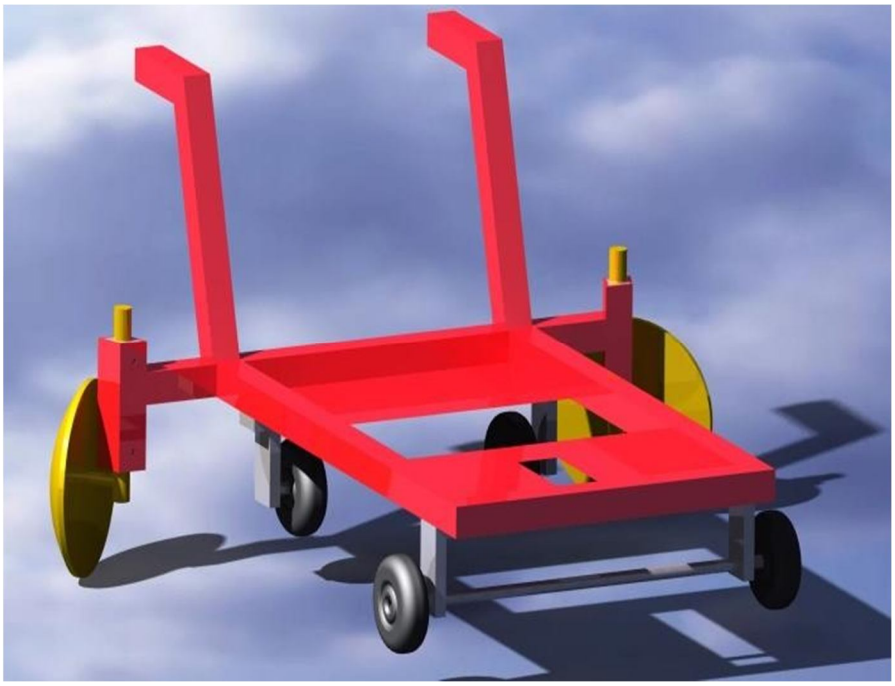
II. METHODOLOGY

A. 3D Modelling

The design of mulching paper laying machine is completed using CATIA V5 software, the CATIA V5 software is a mechanical design application in this the designers are able to sketch their innovative ideas, do the experiment with different dimensions, and produce the models and detailed drawings. in which we can save the model with different format like .cat, igs,. solid etc for this paper further we need to analyze this model in ANSYS software.





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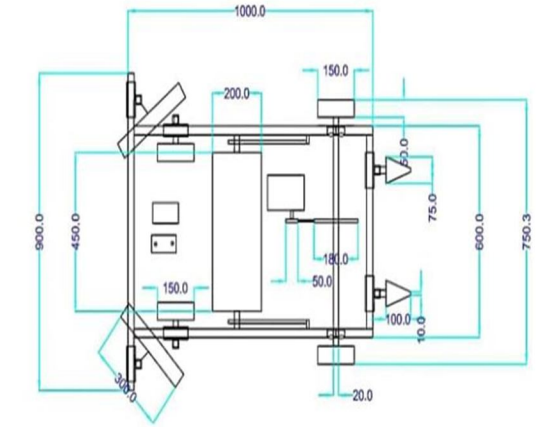
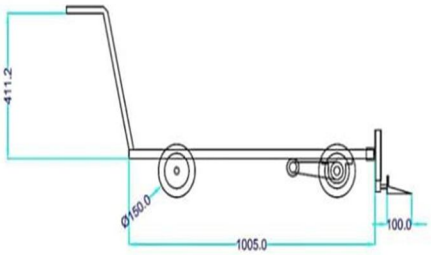
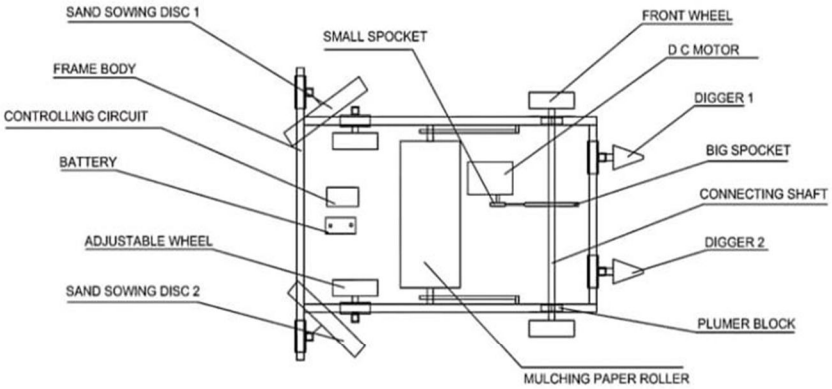
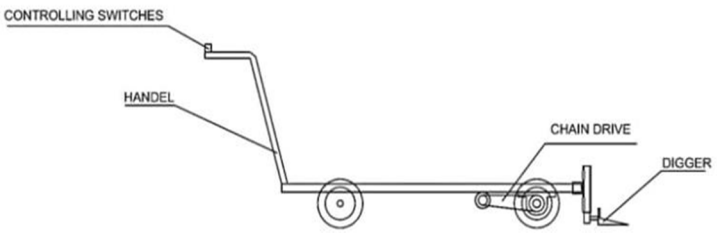
B. Dimensions





C. Components Of Mulching Paper Laying Machine





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Components Used

COMPONENTS
❖ Mild steel rectangular bar
❖ Battery 12V 7Ah
❖ Wheel
❖ DC Gear box motor 2nd hand
❖ Sprocket Chain
❖ Miscellaneous
TOTAL COST

III. CALCULATION

1) *Motor Power:* 1Hp = 0.7457 KWP = 2πNT 60
∴Torque = 284.836 N/mm

2) *Sprocket*
Teeth (Drive):- 14
Pitch:-12.7 mm Sprocket Dia.(Drive):- 42 mm Teeth (Driven):- 27 Sprocket Dia. (Driven):- 109 mm Speed Ratio (I) = Z2/Z1 = 27/14 = 1.92 3)

3) *AXLE*
0.3 = 0.3*650
- 195 N/mm2τ = T

∴ τ = 284.836×10 3 × 12.5 ×254 32
∴τ= 92.84 N/ 2

Length of Chain: - 902 mmMotor Speed: -40 rpm
Tire speed: - 25 rpm

Final Fabricated Model

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IV. CONCLUSIONS

A. The mulching machine series has been created, developed, and updated to provide the greatest possible andeffective relief to farmers.

B. This machine is user-friendly, with a high-quality finish and simple operation.

C. It's made out of high-quality raw ingredients that are both dependable and readily available.

D. The mulching machine is designed to fulfil the rising demands of farmers who want to use it to increase theprofitability of their farming operations

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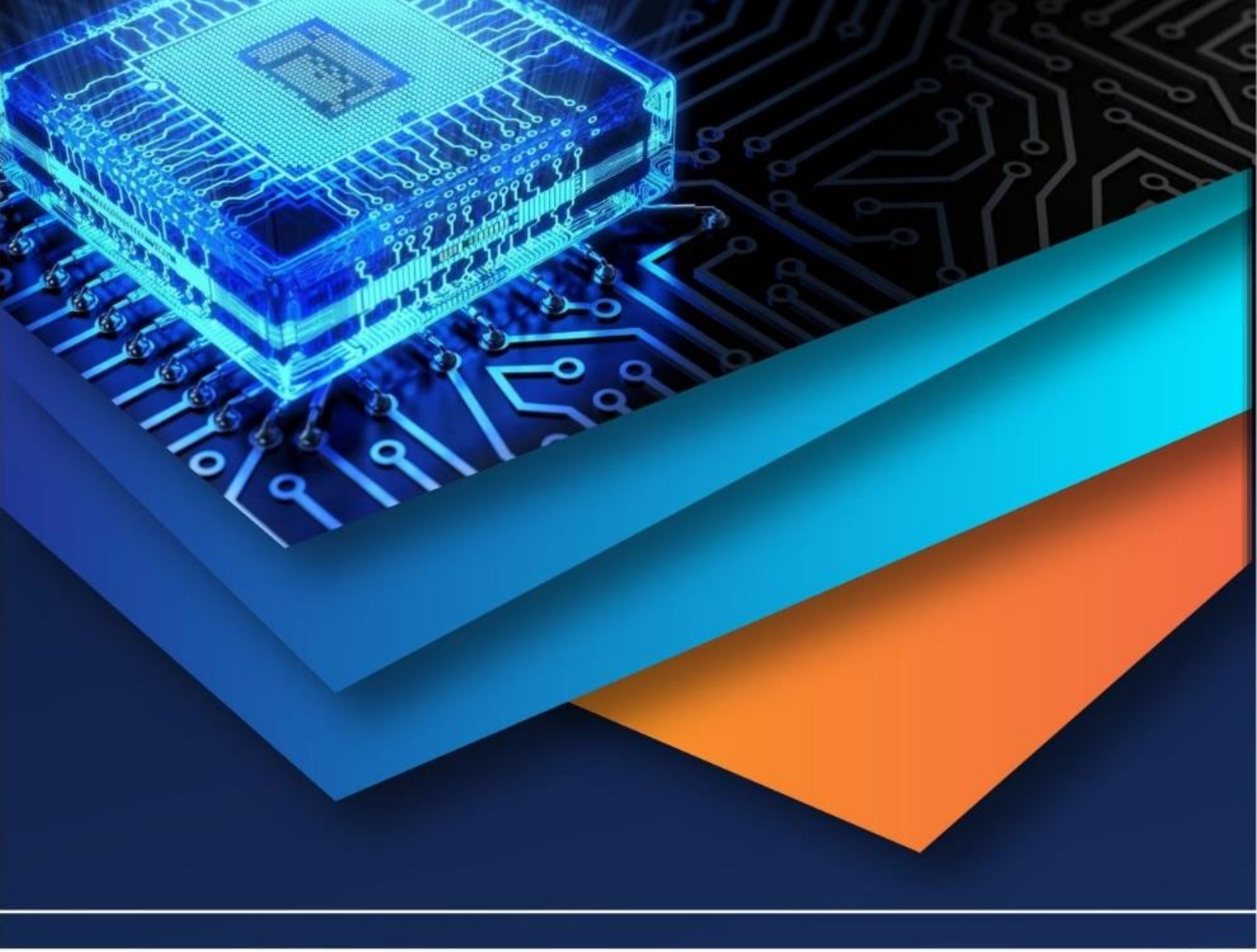

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