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Design and Fabrication of Cassava Planting Machine

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Abstract: ***In ordinary days the plantation of cassava is done through manpower that is very complicated and time taking. This problem is sort out by using of cassava Planter. The principle of cassava Planter machine is to convert rotary motion of the power wheel into the reciprocating motion of cutter. Cutter is used to cut the cassava into predetermined size and there is ridge plough mounted over the machine for creating furrow in field. The cassavas fill in that furrows. There is also soil covering plate is provided which is used cover the cassava in the furrows through the soil. This will eliminate the human power as it is one of crisis in the planting of cassava and also this work reduces the time consumption of the farmers.***
Keywords: cassava planter, plough, cutter

I. INTRODUCTION

Cassava also known commonly as Tapioca continues to be a crop of food security for the millions of people especially in the developing countries of the globe. It is an important alternate source of energy to meet the demands of increasing population. The crop has been cultivated in India for more than a century. Cassava was introduced into India by the Portuguese when they landed in the Malabar region, presently part of Kerala state during the 17th century, from Brazil. This crop has the potential to produce more food per unit area, capacity to withstand adverse biotic and abiotic stresses and adaptability to the conditions of drought and marginal lands. There are three different planting methods usually used in the field. It may be planted uprightly in a vertical position, uprightly at an angle (slant) or horizontally beneath the soil. Tuber yield was higher in the vertical and inclined plantings compared to horizontal method. Planting method did not have significant effect on growth and yield of cassava. Cassava planting time usually takes place at the late of the rainy season starting from October to November, and root yield can be harvested after being grown for 8 - 12 months. The method of planting plays an important role in the production of cassava. There are three methods of planting, vertical, horizontal and inclined to some angle (say 45^{o}) from the ground. The horizontal method produces more cassava tubers and the inclined method produces the tubers in one side only. In this work we have designed the vertical planter that is most suited for both planting and harvesting. The stem of the cassava that is to be planted is of about 20-30 cm in length. This work cuts the stem of 30 cm in length and the distance between the two adjacent plants is of about 1m.In this work we used the rotational energy from the shaft of the power up the blades that is used to cut the stakes. Therefore there is no need of using the additional source to power up the blades. The cassava sets are placed manually and then covered by animal operated plough or manually Wheels are used to move the whole machine and transmit the power to the cutting blade. Bearings are used to hold the shaft and provide smooth rotation. Our project is a compact cassava Planter which can be operated in smaller lands by 2-3 labors, thus reducing the labor cost and speeding up the plantation process. This manually operated cassava planter will cut the cassava into equal parts and will plant them at equal distance.

II. LITRATURE REVIEW

A. *Planting machine (Javed Ali, college of technology, GBPUA&T, Pantnagar, Uttarkhand- 263145)*

Cassava crop machinery has been developed, however the adoption of these implements and machinery have not been up to the desired level. Thus there is a considerable mechanization gap, especially in the area of planting, inter culture, and harvesting and ratoon management. Therefore it is necessary that concentrated efforts be made for adoption, development and popularization of machinery for various cultural operations. In this paper the mechanization of different cultural operations for cultivation is discussed.

B. *WestAfrican agricultural productivity programmer (wasp), Ghana Joel Sam and Harrisondata*

The National Soil Fertility Management Action Plan (1998) clearly states that 'Increased demographic pressure, inappropriate land management practices, reduced or absence of fallow periods have caused a rapid decline in soil fertility in Ghana, lowering agricultural productivity and increased food insecurity by the development and popularization of machinery for various cultural operations

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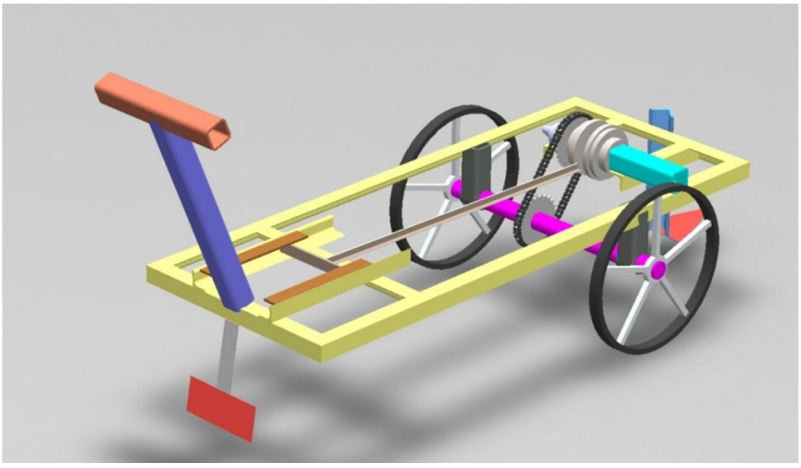
III. CONSTRUCTION

A shaft is a rotating machine element, usually circular in cross section, which is used to transmit power from one part to another, or from a machine which produces power to a machine which absorbs power . Wheels are connected with a shaft which in turn rotates the crank shaft by using the gears. While the rotates simultaneously the crank shaft rotates and transmit the motion to the connecting rod. A knife is a tool with a cutting edge or blade, hand-held or otherwise, with most having a handle. Plough blade is a tool used in farming for initial cultivation of soil in preparation of sowing seed or planting to loosen or turn the soil.

IV. WORKING

When the handle of the planting machine moves manually , handle gives the movement to the wheels of the planting machine. wheel' s axle is connected to the crank through chain drive by means of sprocket. The crank is directly connected to the blade of the planting machine. Wheels has a rotary motion to rotates the chain drive .the chain drive is connected to the crank. Then ,the crank produces a rotary motion .in cutter, the rotary motion is converted into reciprocating motion with the help of connecting rod .so, cassava stem is feed to the blade . it cuts the cassava stem and sends to the ground . infront of planting machine ,it consists of the plough which is used to drill the ground .then, the backside of planting machine consists of the lever blade which is used to close the drilled layer in the soil, the cassava stem is feed to the drilled ground and lever plate closes the drilled layer on the soil. Then, the planting machine work on the mechanism of rotary motion is converted into reciprocating motion.



A. Advantages

1) Low manpower
2) Cutting and planting can be done at same time
3) No power consumptions
4) Design is simple
5) Easy fabrication
6) It occupies the low area
7) Net weight is low, when compared to other planting machines
8) Maintenance cost is less
9) Smoother operation
10) It can be used for various soil preparation
11) By further modification the driver or movement can be made automatic

B. Application

1) Planting purpose
2) Various roots can be planted
3) various Land can be moderate
4) Large scale plantation

Table: comparison of human and machine farming cost estimation

HUMAN FARMING	MACHINE FARMING
Farming time are more above 16 hours 1 hectares (most of the seeding)	Farming time are Less than below 9 hours for 1 hectares
Number of farmers is high	Only one farmer
Operating cost are high	Operating cost are low
Initial cost are low	Initial cost are high
Does not save time	Saving the time
Difficult for farming works	Easier for farming works
More human effort	Less human effort

SI.NO	COMPONENTS	COST
1	Vehicle frame	700
2	Furrower	350
3	Shaft	550
4	Wheels	700
5	Crank and connecting rod	500
6	Gears	300
7	Labour and welding cost	2000
	Total	5100

V. CONCLUSION

Thus we designed the planter which is very useful to the farmers, so that it reduces the time consumption and man power. Additionally there is no need for energy so that the energy consumption is reduced. This technology is very simple so that even a lay man can also operate easily. We designed to plant in a single row in the field but in future, it is also possible to plant three rows simultaneously and the length of the stem to be planted can also be varied by varying the blade's height with respect to the ground. In our work, one man is needed compulsorily; in future it may be done by using remote control.

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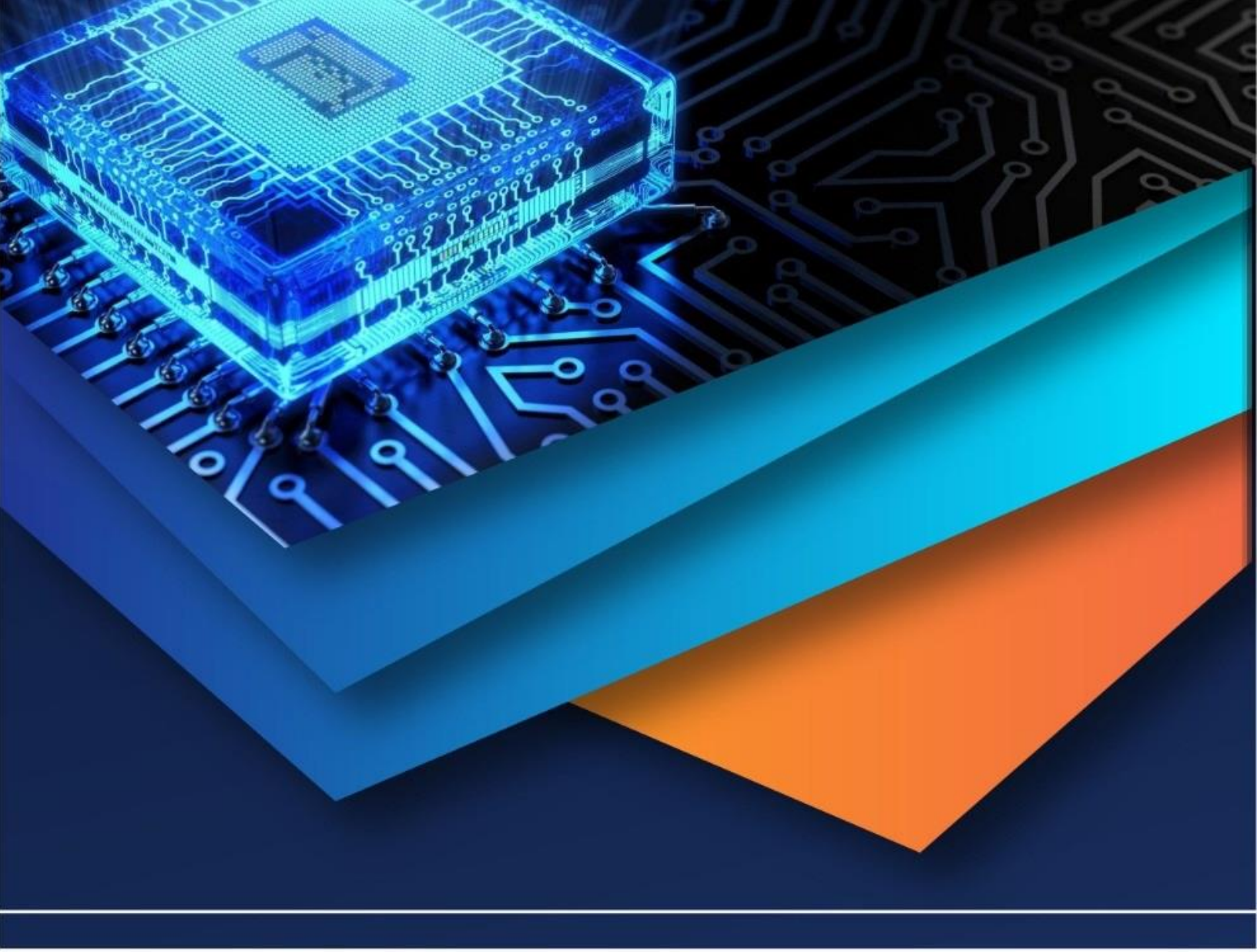

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