Design and Fabrication of Sugarcane Planting Machine – A Review

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Abstract— In our country the sugarcane usage is very high, so the most of farmer planting the sugarcane in their land. In 2017 India planting the sugarcane in 4.7 million hectares (MH) and 330 million metric tons (MMT) of sugarcane produced. Normally the Sugarcane planting is a very labour intensive job and involves considerable human power. Cost of sugarcane planting is very high, example the sugarcane is plant in one Acer they need to spend almost 10hrs also they gives 3000RS labour cost for planting. The cost of sugarcane planting by mechanized method is less compared to traditional methods. We design roller with hopper and piling equipment for planting the sugarcane to the soil also we provide a land wheel, the speed of land wheel is automatically adjusted with tractor speed while planting. When we use the machine for planting the sugarcane it plant a large amount of sugarcane in minimum time or short period, and also the investment cost is less for planting. So we can design the fabricate the machine for planting the sugarcane.
Key words: Sugarcane

I. INTRODUCTION

Sugarcane planting machine is the agricultural based machine. The olden days the sugarcane planting in the soil is used human power to planting the sugarcane in the farm land. In the method it is difficult to planting because of cost for planting and more labour invested to planting. It well Reduce the profit of the sugar cultivation .and take more time for planting the sugarcane. But usage of sugarcane is increase like

1) *Food product*
- Sugar
- Sugarcane juice
- Paper

2) *Non Food Product*
- Flue gas
- Filter mud
- Production of ethanol

In traditional method of planting sugarcane set are planted in manually furrows, opened manually followed by conveying manually this is then covered manually or by animal operated blankers. Thus, the process is very much time consuming and labour intensive.

Many manually operated sugarcane planter have been developed but the sugarcane planter which are currently available in the market are large in size and operated with the help of two or more human labour used. so they cannot the operated in smaller lands only.

So the INDIAN INSTITUTE OF SUGARCANE RESEARCH research and developed the sugarcane planting machine and introduced to the use in the market ,but they will wanted the human power for feeding the sugarcane in to the machine .so we identify the problem and change the design of machine and introduce it will take the sugarcane automatically through from hopper. Our project is a compact sugarcane planter which can be operated in smaller lands and large lands also by tractor thus reducing the labour cost and speeding up the planting process. This automatically operated sugarcane planter the sugarcane will planted in equal distance.

A. *Introduction of Sugarcane*

1) *Parts of Sugarcane*
Parts of sugarcane shown in fig 2.1
- Node
- Internodes
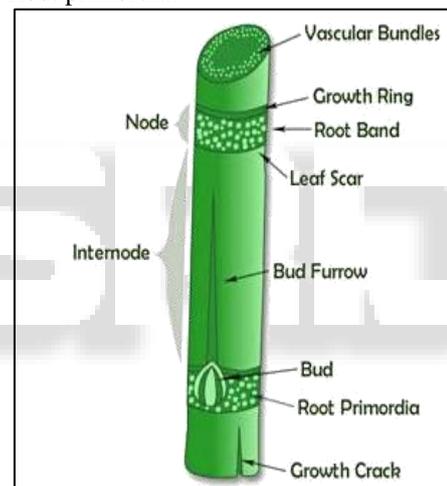- Root band
- Leaf scar
- Bud
- Root primordial

Fig. 2.1: parts of sugarcane

2) *Length of sugarcane for planting*
The length of sugarcane will manually or machine in maximum length of 20cm to 25cm in length or 1 or 2 nodes can be cut in one piece of sugarcane for growth the sugarcane is most important for perfect crop growthing of sugarcane. Show in fig 2.2

Fig. 2.2: cut pieces of sugarcane

3) Planting distance of sugarcane

Then the distance between the one piece to another piece of sugarcane is will having minimum distance of 15cm and the maximum distance of 25cm is enough for perfect planting. It is very important for cultivating high yield and profit for the farmer. Distance of planting is show in fig 2.3
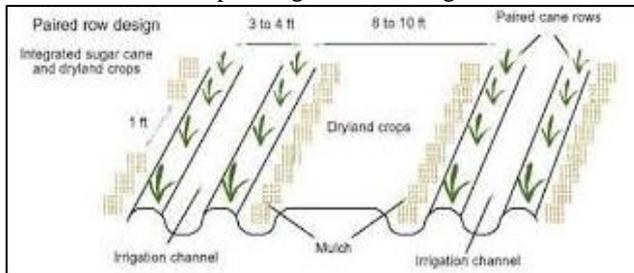

Fig. 2.3: planting distance

B. Conventional Method for Planting

Our project the sugarcane will be planted in automatically with the help of Tractor. The special attachment in introduced for planting the sugarcane in automatically. The hopper having an roller it will operate from the additional attachment of land wheel in the frame it will used to rotate the roller. The sugarcane is automatically through from the hopper into the surface of the soil. In the gap between the one to another sugarcane is equal to all sugarcane piece of sugarcane. Then the multipurpose attachment is attached the machine for mud the soil and piling the soil in continually.

C. Limitation of Traditional Method

– Many labour invested for planting the sugarcane.
– More cost and time for planting.

D. Objectives of Project

1) Sugarcane plantation
– The equipment is mainly used to cultivate sugarcane. Plantation where it can perform 2 workers simultaneously

2) Atomization of plantation
– The sugarcane plantation is done completely atomization

3) Maintaining proper distance along length and width
– According the requirement of the farmer a proper distance can maintained for seed

4) Studying a time required for cultivation process using this equipments and comparing with traditional process with respect to time and cost

E. Sugar Cane Planting

Sugarcane is main crop cultivation in India. They having and many usages in food product and other product raw material.

F. Need for Sugarcane Planting

Mostly using daily wages peoples for planting it required more energy to plant sugarcane from field. Due to planting using daily wages people, wages for planting is accurse more it affect their profit. Existing model is an attachment which attached in tractor it prevents damage of the sugarcane. So we make this machine which plant the crop without damaging the sugarcane. So it help to increase their profit.

G. Sugarcane Planting Technology

The arm goes under the ground at 20 to 25 cm and piling the soil like bed. Then the sugarcane planting equipment through the sugarcane piece in the bed in soil. Then finally the piling arm piling the small amount of soil on the sugarcane for growth.

H. Aim and Scope of Study

To improve the knowledge of small and marginal farmers on package of practices to raise profitability through training and demonstration.

II. PROBLEM IDENTIFICATION

In traditional method of sugarcane cultivation, sugarcane's are mostly collected by human workers by manual planting process. In sugarcane cultivation, labour requirement is expensive during planting the crop. This result in the lesser profit and more time consume from the sugarcane cultivation. The Indian Institute of Sugarcane Research and Developed the sugarcane planting machine and introduced to the market, but in this machine human power is needed for feeding the sugarcane in to the machine. So we can design the machine for plant the sugarcane automatically without human resource .This can be operated with 50 HP tractors. By using this planting we can able to plant 4.87 ha/day in single row planting and 7.71 ha/day in two planting system. Use of this planter save labour, time and money and the cost incurred is Rs.22, 000/- . The overall benefits accruing and associated with the use of the equipment includes:

1) It was faster than the traditional method of sugarcane planting.
2) It can work where there was stone or any obstacle.
3) Less labour needed and it is more economical than human planting.
4) Here do not use any fuel and power, Hence maintenance cost is very less.
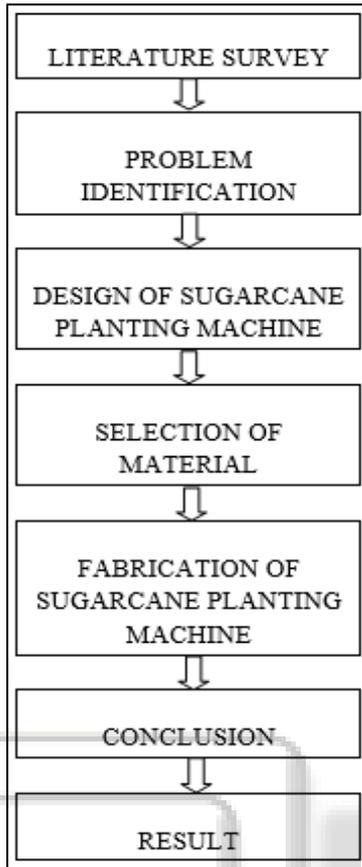
III. METHODOLOGY

Fig. 4.1: Methodology.

IV. EXPERIMENTAL SETUP

Through observation, this work was good for farmers and small scales Agro-base industries that need a better treatment and operations carried out on farms. As show in figure 5.1

- The weight of the frame can be increased by using heavyweight materials put the steel bar for withstand heavy load.
- Since the planter was designed for low cost, the plough was made manually. But it can be placed in bottom side of hopper and the roller is rotated using land wheel.
- The roller was used for throughout the sugarcane from the hopper to the surface of the soil.
- By using some advanced attaching mechanisms, the time required for assembling can be reduced for additional attachments.
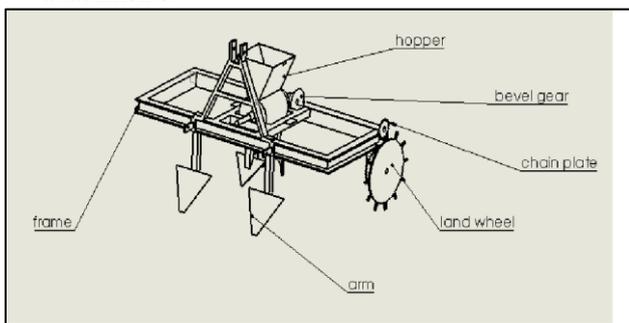

Fig. 5.1: Experimental Setup.

V. CONCLUSION

In this present work, to replace the conventional method of sugarcane planting into semi-automated planting was designed and fabricated. Now a days, labour problem are in the agriculture field, in order to overcome from it, farm equipment are required to fulfil it. The designing of sugarcane planting machine was created by using solid work software. The aim present work is to reduce the plantation time and labour cost. In this work we created the semi-automatic sugarcane plating machine that is attached with backside of the tractor. The sugarcane was loaded into hopper, when land wheel is rotating with help of the power gear, then land gear is connected with belt conveyor through shaft.

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