



Sugarcane Plantation: A Review Study

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Abstract

The objective of this document is to review on sugarcane sowing. The planting of sugarcane in traditional culture is highly tedious method which require more quantity of labour for the plantation. This is the factors that increases the input cost and makes unstable economic efficiency, while the tractor operated sugarcane sowing planter has the higher planting rate and at the same time multiple operation can be done on tractor operated sugarcane planter. But this sugarcane sowing planter are not affordable and lucrative for individual former. In this review paper, the review on current existing method for sugarcane sowing is done so as to know to reduce the manual work and increase the planting rate.

Keywords: Agriculture; Machines; Labours; Low cost.

1. INTRODUCTION

Agriculture is one of the most significant sectors of the Indian economy. Agriculture is the only means of living for almost two thirds of the workers in India. The agriculture sector of India has occupied 43% of India's geographical area, and is contributing 16.1% of India's GDP. India is one of the largest countries for the production and consumption of sugar from sugarcane. India has become the second biggest country for sugarcane production after Brazil. In agriculture sector, sugarcane shared is about 7% of the total value of agriculture. Agriculture is the backbone of India. Today's world required faster productivity in less time. In India agriculture has facing serious challenges like scarcity of agriculture labour, not only in peak working seasons but also in normal time. Sugarcane is the world's largest crop 2010 food agriculture organisation (FAO) estimates it was cultivated on about 23.8 million hectares in more than 90 countries. Also the sugarcane plating machine should be suitable to Indian condition and it should enhance the productivity of sugarcane by introduction of

mechanization with uniformity in planting without wastage of planting canes.

2. LITERATURE REVIEW

2.1 Economic importance

Sugarcane (*Saccharum officinarum*) is amongst the world's economically important crops which is cultivated on 20. 42 million ha across the world with an estimated total production of 1333 million metric tons. Sugarcane was originated in New Guinea about 6000 BC. Its cultivation extended progressively with migration of human to India, Southeast Asia, East and Pacific since 1000 BC. Sugarcane plant is an important cash crop which besides serving as food also fulfils requirement of energy and feedstock for industry (Martin et al., 2002). Chemically it consists of 70% water, 14% fibre, 2-7% soluble soluble impurities. Juice is extracted after washing and crushing the sugarcane which is then clarified by removing mud, evaporated to prepare syrup and further processed by sugar industry for the production of edible sugar. Sugarcane contributes significantly to the



sugar production as 60% or more of the world's sugar is prepared by using raw material derived from sugarcane (Almazan et al., 1998). After extracting the juice from cane, the solid residue left is termed as bagasse. Chemically bagasse is composed of 25% each of hemi cellulose and lignin while the other half contains cellulose. It is mostly used in production of steam and electricity to fulfill the requirements for the cane industry but traditionally the bagasse has been burnt as fuel in some boilers to produce energy and minimize disposal problems. Some particular characteristics of bagasse i.e. rich in carbohydrate, less lignin and excessive availability due to industrial waste etc; have made it an ideal substrate for ethanol production.

2.2 Traditional Method

Traditional method is also known as conventional method. Traditionally the planting of sugarcane is done manually. The most common method of hand planting is where whole seed cane stalks are dumped in the field and then placed manually into pre-ridged planting furrows. Manual sugarcane planting involves following steps while doing plantation; Farmers prepare the field very well by using disc harrows and cultivators. Tractor drawn ridger are used to open furrows. Furrow to furrow spacing of 75 cm is most common. Labours are employed to cut the sugarcane into 3 budded pieces, which is called stems. Fifty to sixty quintals of cane is required to meet the stems (seeds) requirement for one ha. The huge amount of stems are transported to field and then manually dropped in the furrows. Normally 2-3cm overlapping is maintained. Fertiliser and insecticide are also dispensed in the furrows, manually. Then stems are covered with soil either manually or by des ploughs. Planking is done to conserve soil and stems moisture. Besides land preparation, all others operations require 50-60 man-days and 4-5 tractor hours. A farmer has to spend Rs4000-Rs4500/- for planting of sugarcane in one ha. Cost of land preparation, seed, fertilizer and insecticide are excluded.



Fig. Traditional Method

2.3 Tractor Operated Sugarcane Sowing Planting:

VSI developed sugarcane cutter planter (PTO operated) is operated by tractor of 50 HP or more and is mounted on three-point linkage. The planter covers six operations at a time. It has two ridgers for making two furrows at a time, canes are cut into setts, sprayed with insecticide and fungicide, setts are placed in the furrows and also at the same time fertilizers are applied to the soil and setts are covered with the soil. The planter is attached to the tractor through 3-point hydraulic linkage. The systems of the planter are operated by PTO shaft of the tractor through universal shaft. It has a mainframe designed in MS pipe with two separate cabins for placing the seed canes in the planter.

Two seats are provided for sitting labours for feeding the seed canes in the planter. The whole cane is fed to the feeding unit through the openings by two labours. Planter needs PTO power for three different systems viz., feeding system, cutting system and fertilizer metering system. The power of PTO is given firstly to main-shaft and then from main-shaft the power is transmitted to cutting and feeding unit simultaneously. Feeding unit operates fertilizer-metering system. Feeding system holds the canes and rotating knife of cutting unit cuts the cane into setts of desired length by selection of proper sprockets. The setts are conveyed to soil through guard. The two ridgers make two furrows for planting the canes. A solution of insecticide and fungicide is stored in the tank and sprayed on the setts under the guard cover. Fertilizers are kept in the boxes and are conveyed through conveyor and dropped into the furrows through pipes. The planted setts of the canes are covered with the soil by tynes, which are attached to the mainframe at the rear through spring. The planter requires total six persons for the planting. One tractor driver, two persons for feeding the canes and three persons for transportation of canes up to the machine and loading them into the cabins are required. The planter is suitable for maintaining proper/desired spacing between two adjacent furrows i.e. 90 cm or 120 cm or 150 cm. The length of sugarcane setts is adjustable from 22 to 33 cm. The spacing between two adjacent setts is adjustable from end-to-end to 75 cm by replacing the sprockets.



Fig. VSI Sugarcane Planter

This is a tractor mounted machine and can be drawn by any tractor of 35 hp. This can be lifted or lowered by the hydraulic system of the tractor.

Cane planting includes

- Planting of sugarcanes in two rows.
- Opening of furrows at a spacing of 75 cm.
- Cutting of cane into 37 cm. long setts.
- Placement of setts in the furrows
- Dropping of fertilizer below the setts.
- Dispensing the insecticide solution over the setts
- Covering the setts with soil and providing light compaction to minimise sett and soil moisture loss.

Advantages:

Irrigation water saving:20- 30%

Seed Saving:40%

Fertilizer Saving:40%

Full yield of Wheat and sugarcane is obtained.

3.Costing

In the Indian scenario, India world second largest sugarcane producer after Brazil. So that the sugarcane farming is in the large hectare in India and for the planting of sugarcane the required things are very expensive like labour required manual planting gives physical tiredness to the human. The cost of sugarcane plantation is now a days increase due to manual attitude and shortage, that's why the portable mechanism should be needed to reduced the cost of manual sugarcane plantation.

The cost increase in the manual plantation because of lack of labour available on the time then extra charges pay, a contract given to the labour for plantation and all this problems are very expensive and makes the farmer in loss.

That can be reduced by the used of portable mechanism, as if the portable mechanism made then problem of labour and labour charges will be reduced. Then contracts given to the labour will reduce, and money saves by farmer.

If the portable mechanism buys by the farmer then all the expenses related to the labour will be reduced because all the operation performs by the manual that can be also done by portable mechanism itself. The labour required for the extra operation like spreading the pesticide required a extra labor it can also be reduced by incorporating this operation in the portable mechanism hence, save the money and time so if all the above cost reduced by the used of portable mechanism which is a single time investment that will gives lot of benefits and profit to the farmer..

RESULT

The purpose of developing this paper is to develop machine to reduce cost and time required for sugarcane planting by using this planting machine and advance techniques, we can increase the production in minimum cost and time. We can also solve the problem of labour shortage.

Advantages of tractor operated sugarcane sowing machine over traditional method

- It may be reduce the labour cost.
- Rate of production will increase than traditional method.
- Our project may be totally ecofriendly.

CONCLUSION:

It is conclude that tractor operated machine for sugarcane plantation will reduce the cost of plantation as numbers of labour required will be less.

The cost of planting with sugarcane planting machine would be reduce to one third of the existing rates of manual planting.

Depth of planting can be adjusted in mechanical device in accordance with the soil condition.

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