



Multi Purpose Agro Machine

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Abstract: More than 60% of Indians are depended on agriculture and State Government for development of agricultural sector has accorded high priority to elevate and boost rural economy. Multipurpose agro machine being important input to agriculture, endless efforts are being made to assure availability of quality foods grains to farmers in order to sustain the agricultural development and best vegetables to consumer end. In the present situation, the demand of quality multipurpose agro machine is very high and here in this paper proposed planting machine will be more helpful to this industry. In view of above, the work has been carried out with the objective to produce quality sugar through scientific methods and adopting suitable processing methods through development of multipurpose planting machine. The paper presents theoretical aspects regarding the kinematics and dynamics of the planting machine and characteristics are implemented all that is required to sowing and planting of multipurpose, which includes tilling, planting, fertilizing and ditching of soil all process in a single operation. The outlook and prediction of high growth of crop of cultivators are very high because intensive soil cultivation requires consistency and reliability. In the meanwhile, cultivators are also expected to work smoothly and cultivate large areas. IN this paper design competes with all these expectations to aid cultivators. They intensively tilt the soil while destroying annoying clods. The soil thus becomes loose and can be used for crease forming and create the basis for a harvest with a higher yield. The prototype model can be converted to full width cultivators with a few manual actions to planting.

Index Terms – Agro Machines, Cane sugar.

I. Introduction

Indian agriculture is facing serious challenges like scarcity of agricultural labour, not only in peak working seasons but also in normal time. This is mainly for increased nonfarm job opportunities having higher wage, migration of labour force to cities and low status of agricultural labours in the society. Sugarcane is the world's largest crop 2010 Food Agricultural Organization (FAO) estimates it was cultivated on about 23.8 million hectares in more than 90 countries, with a worldwide harvest of 1.69 billion tons. India is the world's largest producer of sugarcane. Sugarcane planting is an agricultural machinery use to plant and process sugarcane. Sugarcane is a hardy crop that is cultivated in tropical and sub-tropical regions for its sucrose content and by-products such as molasses and bagasse (the waste fibrous residue). The sugarcane grows in clumps of cylindrical stalks having 1.25 to 7.25 cm in diameter and reaching 6 to 7 m in height. The cane stalks grow straight upward until the stalk becomes too heavy to hold itself up. It then lies on its side and continues to grow upward. This results in a mature cane field lying on top of itself in a mesh pattern. The sugarcane stalks contain a sap from which sugar is processed. Sugarcane is grown throughout the Caribbean, Central and South America, India, the Pacific Islands, Australia, Central and South Africa, Mauritius and the southern United States. Under favourable conditions and the appropriate use of pesticides and fertilizers, cane grows rapidly. To ensure the maximum sugar content of 1 to 17% of total weight, the cane must be harvested immediately after it reaches its final growth period. In world the usage of agriculture equipment is increasing. In the usage of agriculture equipment's, India contributes only 10%. In areas where hand sowing prevails, many of the injuries are machete related. These injuries can range from minor cuts to the severing of body parts. Also, the machete is the tool that is most commonly used by the less skilled workers on the farm or plantation. Keeping the machete sharp aids in reducing injuries, since with a sharp machete the worker does not have to swing as hardened can maintain better control over the machete. Working with cane also can very easily produce injuries and cuts to the eyes. Since cane is grown in tropical and sub-tropical locations, workers also need to be concerned about heat-related health problems. This can be exacerbated due to use of the necessary protective clothing. These regions are also areas of high levels of sun exposure, which can result in various types of skin cancer conditions. Precautions need to be taken to limit or protect against sun exposure. Pesticides and other chemicals may involve toxic risks that can lead to poisoning through skin absorption or inhalation.

II. Main Features of Indian Agriculture

- I. Source of livelihood: Agriculture is the main occupation. It provides employment to nearly 61% persons of total population. It contributes 25% to national income.
- II. (ii) Dependence on monsoon: Agriculture in India mainly depends on monsoon. If monsoon is good, the production will be more and if monsoon is less than average then the crops fail. As irrigation facilities are quite inadequate, the agriculture depends on monsoon.
- III. (iii) Labour intensive cultivation: Due to increase in population the pressure on land holding increased. Land holdings get fragmented and subdivided and become uneconomical. Machinery and equipment cannot be used on such farms.
- IV. Under employment: Due to inadequate irrigation facilities and uncertain rainfall, the production of agriculture is less; farmers find work a few months in the year. Their capacity of work cannot be properly utilized. In agriculture there is under employment as well as disguised unemployment.
- V. Small size of holdings: Due to large scale sub-division and fragmentation of holdings, land holding size is quite small. Average size of land holding was 2 to 3 hectares in India while in Australia it was 1993 hectares and in USA it was 158 hectares.
- VI. Traditional methods of production: In India methods of production of crops along with equipment are traditional. It is due to poverty and illiteracy of people. Traditional technology is the main cause of low production.
- VII. Low Agricultural production: Agricultural production is low in India. India produces 27 Qtls Wheat per hectare. France produces 71.2 Qtls per hectare and Britain 80 Qtls per hectare. Average annual productivity of agricultural labour is 162 dollars in India, 973 dollars in Norway and 2408 dollars in USA.
- VIII. Dominance of food crops: 75% of the cultivated area is under food crops like Wheat, Rice and Bajra, while 25% of cultivated area is under commercial crops. This pattern is cause of backward agriculture.

III. Objectives of the proposed concept

- I. The purpose of this concept is to provide farmer with specified purpose equipment.
- II. To implement all the scientific farming specifications and technology to get maximum yield.
- III. Good quality crops by reducing investment and number of labour.
- IV. Flexibility in defining the depth of plantation/sowing.
- V. The Successful implement of scientific farming with our equipment will lead to higher productivity.
- VI. To complete large amount of work in less time.

IV. Working of proposed concept

Multipurpose planting machine consists of mainly digger, container storage, two sets of roller chain drive mechanisms then a leveller. First it is attached to the tractor. Farmer sits on the seat. When tractor is started it pulls the machine in same direction. Digger splits the soil in 2 parts.

Horizontal Chain Drive

- Wheels of machine also rotate. This rotates the horizontal chain.
- The motion of chain is vertical clock.
- Seeds/Urea is put in container (bucket).
- There are pores inside container through which seeds/urea comes to agitator plate.
- Motion of agitator plate is due to bevel gear located below it.

Vertical Chain Drive

- Wheels of machine also rotate. This rotates the vertical chain.
- Vertical chain consists of semi-circular cups/semi-hollow cylindrical cups.
- The bucket with plants or seeds can be attached to the pedal steel bearing.
- Farmer put the plant one-by-one on the cups.
- Due to rotation of chain the cup which is at top goes at bottom and plants the plant into the soil.
- After this leveller levels the soil.

Horizontal & vertical chain rotates simultaneously so we can do 4 processes ploughing, planting, urea spreading & levelling of soil at a time



V. Advantages & Disadvantages

Advantages

- It is easy to operate hence skilled labour is not required.
- It is suitable for large scale as well as small scale farming.
- Low cost and less maintenance

Disadvantages

- Sugarcane/potato is not cut in machine we have to separately cut it.
- We have to manually put the sugarcane/potato in cups.

Outcomes

- Significant reduction in numbers of labour (skilled/unskilled).
- Gradual decrease in time consumed.
- Very economical as compared to conventional methods.
- Flexibility in defining the depth of plantation/sowing.
- Avoiding human efforts in spraying of chemical fertilizers

VI. Conclusion

Sugarcane is an important cash crop grown in India. Sugarcane cultivation and development of sugar industry runs parallel to the growth of human civilization and is as old as agriculture. The importance and use of sugarcane and sugar in the country's socioeconomic milieu is deep rooted and immense in the current day rural economy set up sugarcane cultivation and sugar industry has been focal point for socio-economic development in rural areas by mobilizing rural resources generating employment and higher income, transportation and communication facilities. India is one of the largest sugarcane producers in the world. The sugarcane growing may be broadly classified into two agro climatic regions tropical and sub-tropical. The sub-tropical zone includes four States, i.e. 1) Uttar Pradesh (2) Bihar (3) Punjab (4) Haryana. The tropical zone includes five States, i.e. (1) Maharashtra (2) Andhra Pradesh (3) Tamil Nadu (4) Gujarat and (5) Karnataka. The small scale sugarcane planting machine is designed and fabricated. The cost of the machine is about Rupees 12000 and if the farmer buys this machine, farmer can recover the invested money back by harvesting two and half acre. By using this machine problem of the labour crises can be reduced. Comparing with manual planting only 18% of labours is required. It makes the process faster hence reduces most of the harvesting time and labour required to operate the machine is also less, it reduces the labour cost. The machine if issued by maximum number of farmers definitely farmer can overcome the labour crisis problem. This reduces the labour cost and process become faster and easy. The productivity is also increased.

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