

Human Powered Sugarcane Bud Chipping Machine

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ABSTRACT

Abstract— Sugarcane is a major crop in the field of agriculture in India. As per survey, sugar output dropped to about 2.2 million tons in fiscal year 2016. As per the ministry of agriculture the production rate from 2014-2015 to fiscal year 2016 has decreased tremendously. Percentage wise it varies 10-15% of overall production in India. India produces 11 to 12 % of sugarcane in the world. Sugar, jiggery etc. are the by products made from sugarcane. A part of sugarcane production is used for the plantation of sugarcane and rest of sugarcane is used for the various purposes. The part of sugarcane used for plantation of sugarcane is known as 'bud' or 'eye of sugarcane'. Sometime it becomes difficult for the people in rural areas to cater to the need of buds for plantation of sugarcane because the bud removal from sugarcane involves difficulties like, more no. of cuts to remove the bud, time required is more, productivity is less, effort required is more as most of the machines available are hand operated and poses various muscular problems in human beings. With a view to overcome all this problems this research aims at developing Human Powered Sugarcane Bud Chipping Machine which will not only improve the productivity but also saves time and effort required for bud removal.

Keyword: *---two way cutter,pedal operated,sugarcane bud chipping machine*

1. INTRODUCTION

Over the world, India is biggest producer. in India sugarcane production is to between 11 to 12% of overall production in the world .With the help of sugarcane part of the sugarcane used for plantation and remaining part uses for the products like sugar, jiggery, fibre , sucrose, fuel and chemical, fodder for animal etc. Most of sugarcane production belonging to rural areas , where the employment of the people plays a vital role. In such areasthere is no dwell developed machine used now a days. They uses traditional hand operated machine which is very time

consuming as well as effort required is more as machine operated by hand it creates problem like muscle pain, cramps etc. also in traditional bud cutting equipment's there is possibility at slippage of sugarcane during cutting operation due to this the proper bud not cut for an sugarcane and at some extent the wastage of sugarcane is possible.

To overcome all these problems faced by the people in the rural areas we suggest the development and modification of the existing machine in which we use two sides chipping tool mounted on tool post which is able to cut the sugarcane bud at a single cutting operation which is operated by foot. According to ergonomics aspects to reduce the human effort, we suggest the machine which is peddle operated. Because of this arrangement the production rate increases as well as manual effort is reduced. As the installation of clamping to hold the sugarcane in proper position, so there is no slippages will occur while bud cut in proper shape and reduce the injuries. As the productivity increases per hector, the economy will increase and the employment will boost in rural areas which will help for farmer to survive with their families.

2. LITERATURE SURVEY

In sugarcane bud chipping operation what is the advantage and limitation in existing machine. An exhaustive literature review has been done to consume basic idea about what actually done.

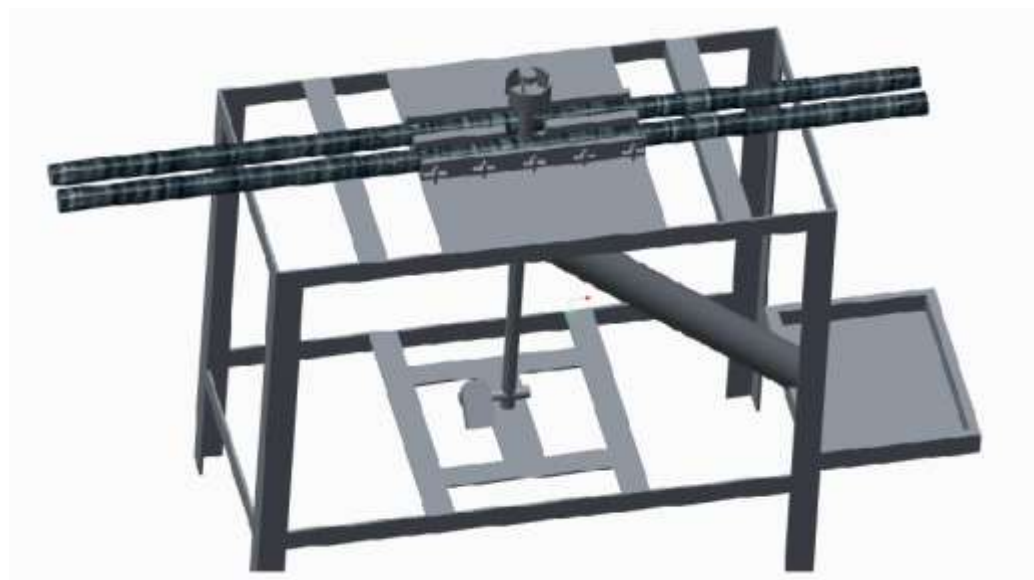
According to Ningappa H. Kuri[1], in existing machine people use traditional process in which hand operated lever is installed to cut the bud from sugarcane and there is setting arrangement there is chance of occurring the muscle pain, cramps etc. the injuries while operation performed is also occurs. So to overcome these problems, we proposed the peddle operated machine which deals to reduced manual effort require is less and no muscle pain and cramps is occurred during operation and it can be prevent from the injuries while performing operation.

As we install pedal instead of hand lever, according to ergonomics aspects the effort gets reduced. As the hand take much more effort compared with the foot. By using two side cutting tool, two buds cut at same time. The effort requires for cutting operation is reduced. So the time consuming related to cutting operation is also reduced. The machine made by suraj s. magdum [2] there is one disadvantage, we found that tool gets blunt after taking continuous cutting operation. So to overcome this problem we used three alternative tool as per the various size of sugarcane. As alternative tool is used the production may not hamper.

According to Sanjay Patil [3], In another traditional machine there is only single cutting tool is used known as "scooping tool". Though the single scooping tool is used in existing machine slippage occurs and due to that there is possibility to damage and wastage of sugarcane while cutting. To avoid this, we implement clamping device while cutting sugarcane to hold properly. Because of proper holding, the bud is cut in proper shape and size and reduce the wastage of sugarcane. As implementation of holding device leads to reduced injuries. Also we proposed the length of the table. We increase the length of table that support the sugarcane from bending and avoid slippage. Because of this proper shape and size of bud can be cutted from the sugarcane.

In another research paper we found that the traditional machine made by the Roshanlal Vishvakarma[4] a former of small village in Madhya Pradesh. in which he used single cutting tool. as the single cutting tool is used productivity of cutting bud of the machine is reduced. in our proposed machine we installed two side chipper tool which is able to cut two bud pieces at a same time from sugarcane at a single notch, that's why the productivity increases by cutting two buds at same time.

3. DESIGN SKETCH



4. METHODOLOGY

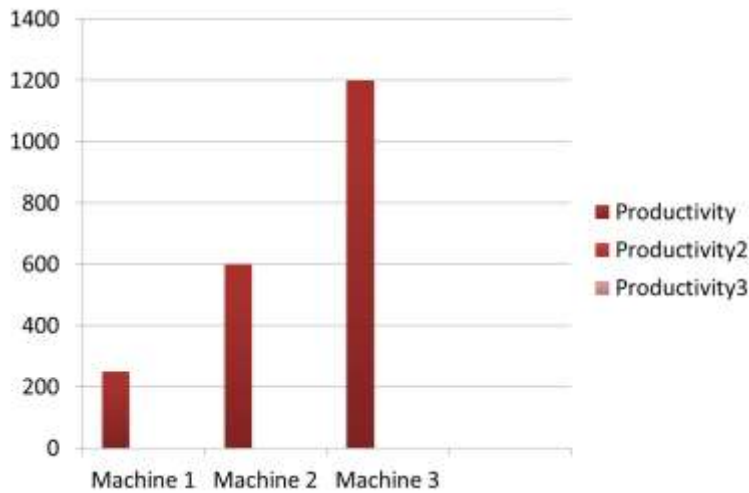
From the exhaustive literature review, we identified the research gap and proposed the following methodology to overcome the problem.

1. The machine contains the parts which are lever, spring; bud chipper cutter, foot pedal; frame and a hollow rod.
2. Place the sugarcane in hollow rod and then move to the final position where the bud is exactly below the multiple chip holder.
3. By applying pressure on the pedal the punch moves downwards and cut the bud of sugarcane.
4. This is done due to sharpness of the cutter and the force applied on it which is enough to cut the bud.
5. Then due to spring action the lever goes to its initial position. This process is continued and successive bud cutting is done.

5.CALCULATION

ACTIVITY	MACHINE 1(SEC)	MACHINE 2(SEC)	PROPOSED MACHINE (SEC)
LOADING	5	8	8
FIXING	5	6	3
PROCESSING	3	3	3
REALESE	4	5	3
TRANSFER	4	8	8
UNLOADING	4	7	10
TOTAL CYCLE TIME	25	37	36
NO. OF BUD PER CYCLE	1	1	2
BUDS PER HOURS	250	600	1200

6. GRAPHICAL REPRESENTATION



7. CONCLUSIONS

We implement the human powered sugarcane bud chipping machine to overcome all this problems faced by people in rural areas we suggest the development and modification of existing machine. We reduced the problems related to chipping operation like wastage of sugarcane, effort required is more, time consumed is more and production rate is less. All these problems are being eliminated and this machine can be successfully implemented for the increase in the production rate of the bud, since two buds are being cut in single cycle hence time required for cutting each bud will be reduced. Also sugarcane wastage is reduced because of proper installation of clamping to hold the sugarcane.

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