

A Review Paper on Agriculture Crop Cutter Machine

Ranjit S.Nayakodi¹ Makrand M.Kulkarni² Riyaj N.Nadaph³ Nilesh k.Chavan⁴ Prof. N.M. Patil⁵

^{1,2,3,4}B.Tech. Student ⁵Head of Department

^{1,2,3,4,5}Department of Mechanical Engineering

^{1,2,3,4,5}Adarsh Institute of Technology & Research Centre, Vita, Sangli, Maharashtra, India

Abstract— India is an agriculture based country which takes various types of crops. Similarly in Maharashtra millet, jowar, wheat, paddy and maize are the main crops. Nowadays various agricultural machines are available which are very costly. Due to this it is not suitable for poor farmers. And all farmers remove crops by hand which is a very time consuming process. Sometimes cutting or removing crops by hand results in damage due to blisters on hands. Because of this the labours are not available for work, in order to overcome this situation we introduce a new simple but more efficient machine for farmers. This machine targets the small scale farmers who have land area of less than 2 or 3 acres. This machine is compact and can cut up to two rows of wheat, millet, jowar crops. It has cutting blades which cut the crop in a scissoring type of motion. It runs on petrol engines, this power from the engine is provided through shaft, pulley and belt drive arrangement to the cutting blades. This compact crop Cutter is manufactured using locally available spare parts and thus, it is easily maintainable. This crop Cutter might be the solution to the problems faced by a small scale farmer regarding cost and labour implementation.

Keywords: Crop Cutter, Jowar, Millet, Blister, Harvesting, Reaper

I. INTRODUCTION

The history of agriculture in India dates back to the Rig-Veda, written about 1100 BC. Today India ranks second worldwide in farm output. The agriculture sector is one of the most important industries in the Indian economy, which means it is also a huge employer. Approximately 60 percent of the Indian population works in the industry, contributing about 18 percent to India's GDP. Agriculture and allied structures like forestry and fisheries accounted for 18 % of the GDP (Gross Domestic Product) in 2020-21, about 75% of the total workforce. The economic contribution of agriculture to India's GDP is steadily declining with the country 'broad-based economic growth. Still, agriculture is demographically the broadest economic sector and plays a significant role in the overall socio-economic fabric of India. India ranked within the world's second largest producers of over 80% of agricultural produce items. India is currently the world's second largest producer of several dry fruits, agriculture-based textile raw materials, roots and tuber crops, pulses, farmed fish, eggs, coconut, sugarcane and numerous vegetables. India was ranked under the world's five largest producers of over 80% of agricultural produce, including many cash crops such as coffee and cotton, in 2010. India is one of the world's five largest producers of livestock and poultry meat, with one of the fastest growth rates, as of 2011 one report from 2008 claimed that India's population is growing faster than its ability to produce rice and wheat. While other recent studies claim that India can easily feed its growing population, plus produce wheat and rice for global exports, if it can reduce food staple spoilage/wastage,

improve its infrastructure and raise its farm productivity like those achieved by other developing countries such as Brazil and China. And these process of harvesting is conventional that consumes more efforts and cost of crop cutting. In the recent years we have seen a shortage of skilled labour available for agriculture, hence due to this shortage the farmers have transitioned to using crop Cutters. These Cutters are available for purchase but they are not affordable because of their high costs. Considering the Indian market, it has been noted that small holding farm owners having land less than two acres generally do not require the full-featured crop Cutter. Due to financial or transportation reasons these crop Cutters are not available in all parts of rural areas. Thus there is a need for a smaller and efficient crop Cutter which would be considerably cheaper and more accessible. The mission is to create a portable, low cost crop Cutter and user friendly.

II. REVIEW:

In recent days a lot of research has been taken up by various people on the concept of the agriculture crop Cutter. Works taken up by the following people are significant in connection with the present work.

IJPRET [1] presented a paper titled, "A Literature Review on Design and Development of Maize Thresher". The small scale farmers who have land area of less than 2 acres this machine will be beneficial for them. This machine is compact and auto multi crops at a time. It has cutting blades which cut the crop in a scissoring type of motion. It runs on an electric motor of 1.5 HP, this power from the engine, is provided through pulley and gear box arrangement to the Cutter. A collecting mechanism is provided for the collection of crops to one side of it after cutting. The pulley arrangement is to provide power to this mechanism. It is easily maintainable as this Compare investor is manufactured using locally available spare parts. This title presents the concept for design and analysis of crop cutter. The crop cutting is important stage in agriculture field. Currently in India former used conventional method for the crop cutting i.e. the conventional method for crop cutting is as manually cutting using labor but this method is lengthy and time consuming. This project aim is to design and analysis of small field crop cutter machine for small height crop. To analysis cutting roller and horizontal cutting blade by using Pro-e and anises software. The machine consists of petrol engine to operate cutting roller and blade. When compare to manual crop cutting by and this machine has a capacity to cut the crop in faster. This machine to helpful for both the small as well as big farm.

GHRCE [2] presented a paper titled, 'Design, Development and Fabrication of a Compact Harvester'. This machine targets the small scale farmers who have land area of less than 2 acres. This machine is compact and can cut up to two rows of soybean plants. It has cutting blades which cut the crop in a scissoring type of motion. It runs on a diesel

engine of 3HP, this power from the engine is provided through pulley and gear box arrangement to the Cutter. A collecting mechanism is provided for the collection of crops to one side after cutting. This mechanism is also powered by pulley arrangement. This compact harvester is manufactured using locally available spare parts and thus, it is easily maintainable. This harvester might be the solution to the problems faced by a small scale farmer regarding cost and labour implementation. After testing this machine on the farm it is found that the cost of harvesting using this harvester is considerably less as compared to manual harvesting. The Combined reaper and collecting machine is built to be compact and efficient to cut the crops. The machine was tested on a field to check its cutting capability and efficiency. The test results were successful as the machine performed flawlessly. It can be concluded that the machine is comparatively compact and easy to handle. This machine is able to run of field effortlessly and the efforts of farmers are reduced. The cost of harvesting using this machine is considerably less as compare to manual harvesting. The harvesters available in market are suitable for large farms, so this can be the best machine for the farmers with small land. The success of this machine depends on how the farmers receive this machine as their ally. There are some changes that need to be done on the machine and a final product is to be taken out for sell.

IRJET [3] presented a paper titled, "Design and development of a cutting head for portable reaper used in harvesting operations". The main purpose of our Project is to help all parts of rural areas to face small scale farmers who have land area less than 5 or transportation on acres by designing small scale harvester machines to harvest grains very efficiently. Our project work will focus on ease of harvesting operation to the small scale farmers for harvesting varieties of grain in less time and or low cost by considering different factors such as cost of equipment, ease of operation, time of operation and climate conditions. This machine has cutting blades which cut crops in scissoring type of operation and can cut up to two rows of crops. India is an agriculture based country which takes various types of crops. Similarly in Maharashtra millet, jowar, wheat, paddy and maize are the main crops. Now days various agricultural machines are available which are very costly .due to this it is not suitable for poor farmers. And all farmers remove crops by hands which has very effort is fully and time consuming process. Some times while cutting or removing crops by hand results into damage due to blisters on hands. Because of this the labours are not available for work, in order to overcome this situation we introduce a new simple but more efficient machine for a farmers.

Ganesh C. Bora and Gunner K. Hansen, et al. [4] presented a paper titled, "Low cost mechanical aid for rice harvesting". A small engine-powered harvesting aid for small area rice farmers was developed. The machine was modified with a brush Cutter. The original Cutter blade was replaced by a 25 cm diameter circular saw blade. A metal plate and rubber guard assembly was fitted behind the blade on the handle to guide the cut stalk to the left side. The machine performed well in the field conditions with field capacity of 0.51 ha day consuming 0.25 l of fuel in an hour. It was 7.8 times faster than manual harvesting though the field loss was

around 2.3% as against 1% in manual harvesting. India is not only limited to growing of crops but is also associated with the economic growth of farmers and labours. Small scale farmers frequently face the problem of labour shortage or are unable to afford the wages to be paid. These problems prevent the fiscal growth of farmers and ultimately hamper the development of their farmland and family. Efficient, effective, cheap and productive techniques are needed to strengthen the farming community. This project is focused on developing a machine which addresses labour problems faced by small scale farmers. The newly developed mini paddy harvester, can harvest up to two rows of paddy at a time. The components of the machine comprise of a petrol engine of 2hp, pulley, a belt drive, a collecting mechanism and a cutter. The crop is being harvested by a scissoring type of motion. The power from the engine is provided to the cutter through slider crank mechanism and driven by a pulley arrangement a collecting mechanism is provided to the cutter to collect the harvested crop. The assembled mini paddy harvester has been tested for its working and found to be working satisfactorily. It makes the harvesting process faster and safer, hence reduces the time required to harvest. This newly designed mini paddy harvester will ultimately reduce the cost of harvesting by 53.33%.

G Maruthi Prasad Yadav [5] presented a paper titled, "Fabrication and performance test of an Ultraportable Crop Cutter". This title presents the concept for design and analysis of crop Cutters. The crop cutting is an important stage in the agriculture field. Currently in India formerly used conventional methods for the crop cutting i.e. the conventional method for crop cutting is as manually cutting using labor but this method is lengthy and time consuming. This project aims to design and analyze a small field crop Cutter machine for small height crop. To analyze cutting roller and horizontal cutting blade by using Pro-e and ANISES software. The machine consists of a petrol engine to operate a cutting roller and blade. When compared to manual crop cutting by and this machine has a capacity to cut the crop in faster. This machine is helpful for both the small as well as big farm.

III. CONCLUSION

The conclusion is formed by taking review on paper given in reference .It is concluded that the blasé assembly best suited for the function is reciprocating blade type. Experiments carried on soya-bean crop strength gives the mechanical properties like density shear strength coefficient of friction. The synthesis of mechanism gives the basic idea for frame selection and development of model to serve the purpose. Design optimization techniques have been overlooked which shows that the derivative approach and matrix iteration with mathematical modeling gives the best result for design optimization. The crop cutting machine to develop is just concept. It innovative three stage crop cutting machine ling the like as cutting the crop, Reaping, and winnowing. In this paper to design and analysis different cutting equipment like as roller crop cutting and cutting blade. The machine can be run on petrol engine .the machine operated by single labor. The machine will eliminate the labor problem in peak session for crop cutting period. This machine is helpful for the both

the small as well as big farm. It is also concluded that the cost of harvesting using this machine is considerably less as compare to manual harvesting. The harvesters available in market are suitable for large farms, so this can be the best machine for the farmers with small land. The success of this machine depends on how the farmers receive this machine as their ally. There are some changes that need to be done on the machine and a final product is to be taken out for sell

IV. FUTURE SCOPE:

“The crop Cutter machine” provides wide range for future advancements. Some of these are as follows:

- 1) By just changing the teeth size we can use the crop Cutter as lawn mover. We can make the crop Cutter to work under the different crops as per the loads
- 2) By providing the curved collectors at sides of crop Cutter to collect the cutting crops and also the bunch of crops is get tying together by using automation. And throw at backside of Cutter.
- 3) In case to use the machine in case of sugarcane application we can provide more power at prime mover one spring in parallel, let us say 4 parallel springs can be used to increase the capacity.

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