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Fabrication of Black Gram Harvesting Machine

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Abstract: ***Currently in India former used conventional method for the harvesting black gram plants i.e. the conventional method for harvesting is as manually cutting using labor but in this method is lengthy and time consuming. This project aim is to fabrication black gram harvesting machine useful to former. The machine consists of electric motor to operate a cutting blade, conveyor roller and reel. Black gram plants cutting by using horizontal band saw blade. After plants are pass through conveyor than plants are collecting by drum. Its compare to manual black gram harvesting by and this machine highly capacity to cut the black gram plants in faster. This machine to helpful for both the small as well as big farm.***
Keyword: Manual method, Conventional method, Horizontal cutting blade and Black gram plants cutting,

I. INTRODUCTION

In India, especially southern part of the country, agriculture becomes the new focus which can give many advantages and benefits especially to our economy and society. Black gram,red gram ,Green grams is one of the new focuses in farming where still very little analysts and fabricators have shown interest. After market study, there were a few issues that emerged, for example, how to expand the benefit, how to build efficiency and how to decrease the expense. One of the imperative exercises in black gram is harvesting. On the black gram, half percent of the speculation goes to gathering the yield and its transportation because of increase in wages of the workers and lesser accessibility of workers prompting the appeal of the work. So, with the idea to reduce the dependency on workers in harvesting, this project comes to solve all these problems where the new invention for machinery in harvesting will be able to reduce the dependency on workers. By using the tools like machinery, the dependency on the worker can be reduced, productivity can be increased, the cost can be reduced and the profit can be increased. From that, the main objective for this project was to fabricate of black gram harvesting machine a horizontal cutting blade used to harvest black gram for commercial use. In crops like black gram, red gram and green gram, the plants are harvesting is difficult to harvest by manual. According to Bureau of Indian Standards, the harvesting ought not to be more than two for every penny. The reaping of yields is customarily done by manual strategies. All these conventional strategies include drudgery and expend long time. Timeliness of harvest is of prime significance. Amid gathering season, frequently rains and tempests happen creating impressive harm to standing yields. Quick reap encourages additional days for area arrangement and prior planting of the following product. In this way, the utilization of machines can gather at legitimate phase of harvest development and lessen drudgery and operation time. The objectives of this project were to make the review about other research and study relevance to the title, design the prototype of motorized cutter for harvesting black gram using some criteria such as it minimizes cost of harvest, takes less time to harvest the black gram, make harvesting process less laborious and use cheap machinery and thus, select suitable principle method for the fabrication and select the suitable material, components and parts for this new invention. For the fulfillment of this aim, it was decided to follow certain steps which were Interviewing the local farmers who had small scale land holding and enquire about the harvesting practices and the black gram produced and emerging trends in black gram harvesting, Interviewing agricultural equipment manufacturers to get information about various equipment that are available and are in demand, Refer various international papers in small scale harvesters produced earlier and finally, designing of harvester.

II. LITERATURE SURVEY

Hassan and Larson (1978) reported the combine capacitive performance data gathered in time studies of sorghum harvesting. They recorded the activities using time study board and stop watches on harvesting, turning, emptying tank, travel to and from trailer, cleaning, minor maintenance and adjustment of machine and operator personal time. These data were used to compute effective field capacities and field efficiencies. The time studies revealed average effective field capacity and field efficiency were 1.42 ha h-1 and 72%, respectively. The average forward speed and machine width were 4.04 km h-1 and 5.69 m, respectively.

1) *Hassena, (2000)* This study describes wheat harvesting and threshing technologies in Arsi Region, southeastern Ethiopia, and assesses their profitability compared to that of alternative wheat harvesting technologies.
2) *Chiansuwan et al. (2002)* showed that the off-season rice harvesting losses up to 85% losses were mainly caused during the screening and cleaning process, whereas very smallm losses occurred during harvesting and threshing process.

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3) *El-Khateeb (2005)* tested multi-purpose combine harvester (Yanmar model CA-760) for harvest rice crop, and found that the maximum value of actual field capacity was 2.90 fed/h at forward speed of 3.0 km/h and grain moisture content of 18 %.
4) *Mahrouf, et al. (2010)* showed by a socio-economic in Sri Lanka, the usage of combine harvesters makes bad impact on agricultural labourers, especially female labours who are involving in manual farm operations as the replacement rate is considerably high. They also showed that use of harvester for harvesting of paddy replaced labour by about 80-85%.

III. PROPOSED SYSTEM

A. Field Survey

Present method of black gram plants cutting is important stage in agriculture field. Currently Indian former used conventional method.

Manual methods of black gram harvesting

B. Manual method (conventional method)

Now a day mostly used to manually harvesting black gram by using saw. Need for number of labor and highly effort the human. So, more time consuming and cost is high for harvesting black gram, green gram and red gram.

IV. DESIGN DIAGRAM

A. 3D View

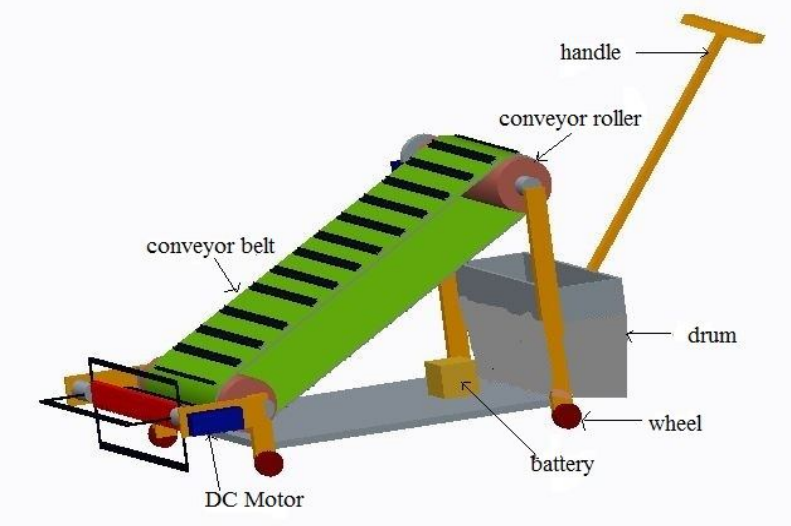


Fig-4.1 Design diagram

V. WORKING PRINCIPLE

A. Black gram harvesting machine working procedure is 12v battery is used to storage a electric power. Electric power supplied to three motor and power supply is control by using switch. This harvesting machine consists horizontal cutting blade, roller, conveyor roller, motors and ect, and trimmer mechanism used to operate a horizontal cutting blade. Blade is consists of v-shape and two blade is used in this harvesting machine one is moving blade and another one is nonmoving blade.
B. Horizontal cutting blade is used to cutting a black gram plants by using trimmer mechanism. Horizontal cutting blade is operate by using electric motor. Motor is operate using electric power.
C. Cutting blade (roller) is used to convey the black gram plants to conveyor and roller mounted two side using ball bearing. Roller shaft is connected to motor spindle so roller is rotate clock wise direction.
D. Conveyor roller shaft is connected to motor shaft. . Two roller used one is shaft fixed and another one is rotate the shaft .Roller is rotate counter clock wise direction. Conveyor belt tightly fixed in conveyor roller so belt is rotate bottom to upward direction.
E. Wheels used to moving a harvesting machine one place to another place. Handle used to control the direction of harvesting machine.
F. Plants are pass through a conveyor belt so plants convey to collecting drum, plants are stored by collecting drum. After black gram plants carried out further process.

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VI. PARTS USED IN HARVESTING MACHINE

Table-1: Part list (harvesting machine)

S.NO	PART	QTY
1	DC motor	3
2	L shape channel	10m
3	Rectangular shape channel	3m
4	G.I Sheet metal	100x100cm
5	Ball bearing	4
6	Conveyor belt	2m
7	Conveyor roller	2
8	Cutting blade	2
9	Bolts & nuts	6
10	Wheel	4
11	M.S Shaft	3

VII. SPECIFICATIONS OF COMPONENT

A. Length of cutting blade - 700mm
B. Conveyor roller diameter -35mm
C. DC motor capacity -12v
D. Length of conveyor belt -2m
E. Battery -12v
F. Bearing diameter -15mm
G. Diameter of wheel - 60mm
H. Thickness of frame - 5mm
I. Sheet metal thickness - 2mm
J. Diameter of shaft - 25mm
K. Length of machine - 1350mm
L. Width of machine -700mm

VIII. HARVESTING MACHINE IMAGE



Fig-8.1 Photography

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IX. OBJECTIVE

A. Reduce the human effort
B. Harvesting time very less
C. Cost of machine is less
D. Simple construction
E. Easy to operate the machine
F. Harvesting is very accurate
G. Time saving
H. Help to medium level farmer

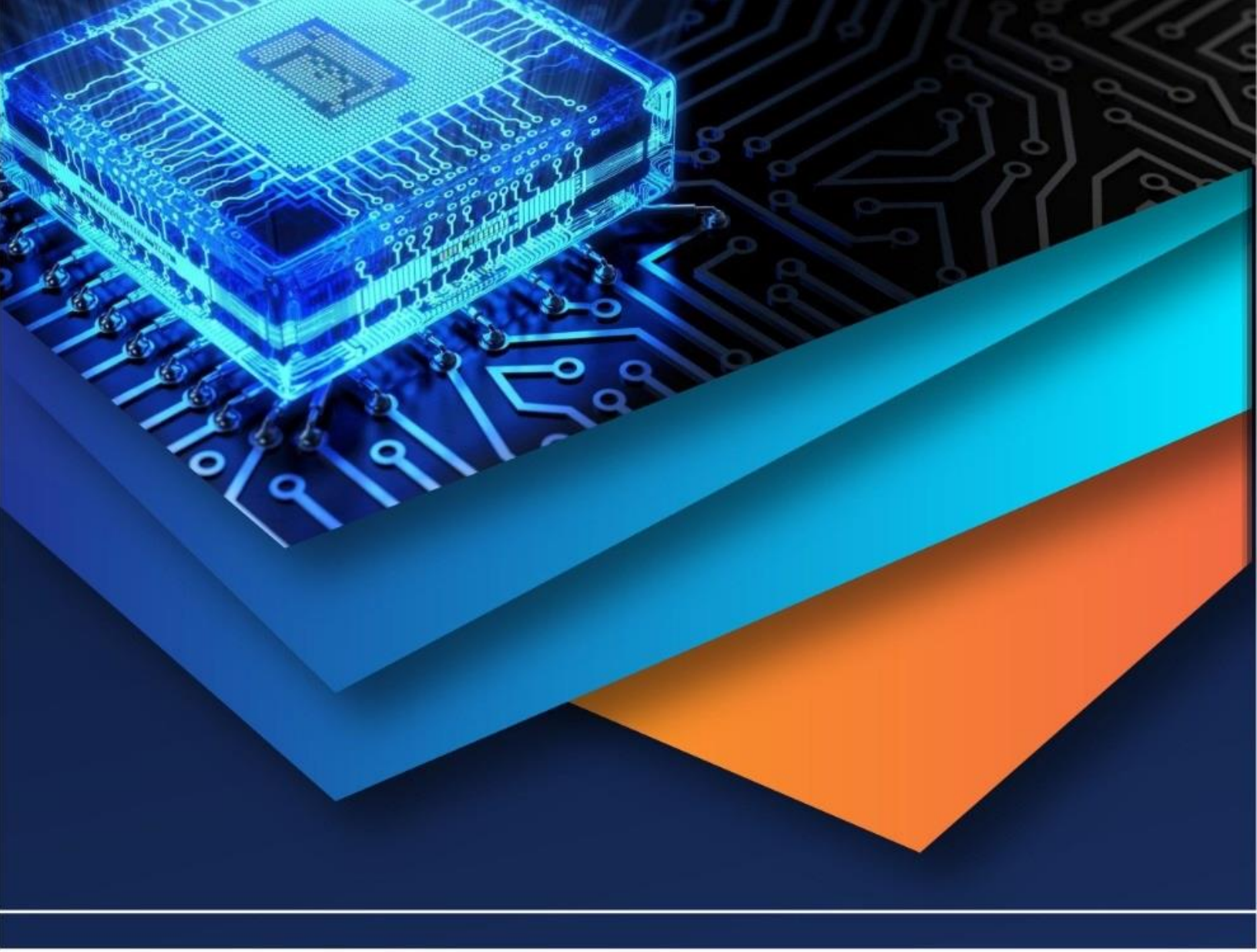
X. CONCLUSION

The black gram harvesting machine to fabricate. It is harvesting machine cutting various plants like as black gram, red gram, green gram. In this project to design and fabricate different equipment like as conveyor roller, reel and cutting blade. The machine can be run on electric motor. The machine operated by single labor. The machine will eliminate the labor problem in peak session for black gram cutting harvesting period.
This machine is helpful for the both the small as well as big far.

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