Fabrication of Portable Cotton Harvester

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Abstract- *Cotton today is one of the major crops in India. Huge population in this world depend on cotton for their livelihood directly or indirectly. Cotton production over the years have increased tremendously, but the cotton farmers in the developing countries are facing large problems like high labour wages, unavailability of labour with low market price to cotton. Most of the cotton picking is done manually in India. Cotton picking manually is time consuming with large wastage during picking. An attempt has been made to mechanise cotton picking in this project. A portable hand held light weight cotton harvester was designed to suit Indian farmers of different farm categories as it can save time and can be cost effective. Current labour wages which constitute about 35% of the total cost of cultivation can be reduced to about 10% with the use of cotton picker over a period of time. Also, problems like child labour and bleeding of fingers by burs can be prevented.*

Keywords- cotton, cotton collection method, cotton collector, design machine for cotton collecting, easy method for cotton collecting, remove cotton, portable cottoncollector.

I. INTRODUCTION

Manual Picking: Starting from the early 1920s, cotton was still picked by hand and caused a lot of manual labour; people would go day by day picking the flowers from the plants placing them in bags continuing the traditional cotton picking which was in place.

Mechanized Picking: In the late 90's,as shown in Fig, the six row cotton picker had been introduced with a large basket on the back this new picker made cotton picking much faster and easier as the cotton was just tipped into a module builder where it was pressed.

II. IMPLEMENTATION

In our machine main parts are roller, belt (with nail), body, motors. Two rollers are connected to each other with the help of belt. when motor starts rotating then both rollers are rotated in one direction. So that cotton is sucked inside with the help of roller and belt. At body's end we connected vacuum inlet pipe. And outlet pipe is connected withthe collector.

III. OBJECTIVES

- To harvest the cotton from the plantation by consuming less time.
- To harvest the cotton using less effort.
- To provide labourers with good working conditions.
- To save the cost by eliminating hand picking of cotton.

IV. DESIGN AND WORKING

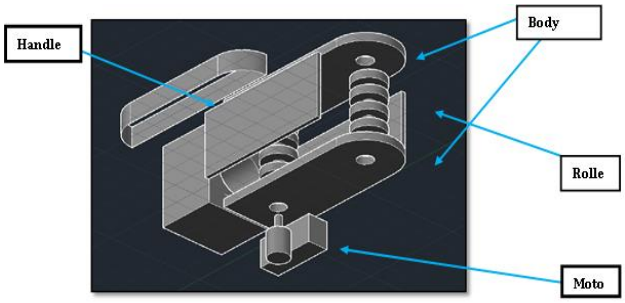

Figure: CAD Design of the Cotton Harvester

Table: Motor Specifications

Max rpm	1000-1200
Min rpm	300-400
Motor type	9V DC Motor

The harvester arm is made of 2 aluminium rollers enclosed between 2 aluminium plates. There are 3 belts wound on the rollers. Belts have nails in them that can easily pull cotton from the plant. The collected cotton escapes the arm from the face plate and goes to the collector with the help of vacuum**.**

The vacuum pump used also acts as a collector that collects the cotton and it works on 12V DC supply via a portable and rechargeable battery.

Figure: Portable Cotton Harvester

V. PERFORMANCE ANALYSIS

Cotton can be doffed off into the front loaded cotton harvesting bag tied to the waist of cotton harvester through a wider cotton pipe type conveyor. Battery along with power cables are also tied to the waist of cotton harvester by a belt. Unless adequate care is not taken in directing the machine for a small fraction of time every possibility of entering cotton dried bur/ leaves into the machine, which needs to be reversed to take them out. There is no special advantage as the machine targets a single boll for harvesting similar to manual harvesting and advantage is speed and precision, if trained properly can reduce physical injuries to fingers, drudgery and trash content. As the machine needs a weight of 2.0 kg battery and frontloaded bag also obstructs movement of cotton harvesting labour in the field.

The performance of the portable cotton harvester varies greatly with different test conditions and depends majorly on the skills of the operator. Skilled operators equipped with the device can outperform manual pickers.

The situation changes when the unskilled labour is made to use the cotton harvester and results in less cultivation compared to their manual picking counterparts.

VI. CONCLUSIONS

Portable cotton picker can improve cotton harvesting efficiency without defoliation. They were more suitable for family labour in cotton harvesting with lower trash content**.**

VII. FUTURE SCOPE

- Ergonomics of the harvester can be improved.
- Storage Capacity can be enhanced.
- Brushless motors can be used for efficient &quiter operation.
- User comfort can be increased by reducing the weight of the machine
- A seperater can be integrated that can separate cotton seeds from the fibres.
- Battery capacity and efficiency can be increased for longer use.

REFERENCES

[1] Anonymous (2006).Climatic Parameters of Nagpur. India Meteorological Department Regional Meteorological Centre, Nagpur. Archived from the original on 13 July2006.

[2] Anonymous (2009). Revolution in Indian cotton. Ed. N. B. Singh, Ag. Comissioner, Directorate of Cotton Development, Mumbai.

[3] Bal, S.K. and S. Sharma (2012). Ergonomic assessment of cotton harvesting activity with conventional and mechanical methods. APP- 28 16th Punjab Science Congress, Feb 7-9th 2013. Punjab Academy of Sciences, Patiala. Baba Farid University of Health Sciences Faridkot 151203(Punjab)India.

[4] Narenderjit Kaur (2006). Ergonomic study of cotton-harvesting activity performed by rural women of Punjab. Available:http://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Narinderjit+Kaur%22

[5] Padgilwar (2013). PadgilwarAgro Industries Delta Cotton Picker ; Easy Operation; Battery Operated; Rechargeble Battery; High-Tech mechanism but simple to use. Available: http://padagro.com/product_1.html

[6] Rajkumar (2013). Rajkumar cotton harvesting machine - New Model (Battery Operated) 20% Faster than old cotton picker Cotton Picker Weight Reduced by 30%. Available: www.tradeindia.com/fp889144/Rajkumar-Cotton-Harvesting- Machine-New-Model-Battery-

[7] Chaudhry MR, Harvesting and Ginning of Cotton in the World, International Cotton Advisory Committee, Washington D.C, Technical Information Section, 2015.

[8] Dhar M. Krishna VP, and Roy S, Manual on Better Management Practices for Cotton Cultivation, 2010, 1-3.

[9] Limbasiya YG and Maheta DJP, Mechanism Design of Cotton Picking Gripper, International Journal of Advance Research in Engineering, Science & Technology, 2 (5), 2015, 47-52.