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Cotton Picker by Using Solar Panel

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ABSTRACT: Cotton picking is manual and mechanization in India. Cotton is the most abundantly produced natural fibre in the world. This machine will help small scale farmers for harvesting cotton. Nowadays there are machines available in market which is very costlier, which small scale farmers can't afford. Cost of cotton picking has increased substantially due to increasing labour costs. Project proposes a solar panel used to picking the cotton from plant which will increase the rate of cotton pickup per day compared to manual and other machine picking. This work also proposes a new smart processing of the cotton plant to extract the features. Machine is consist of hand control subsystem and cotton picking blower used.Scope to design the high high results providing and efficient cotton collecting machine by using the air vacuum. In their motion control subsystem uses a degree of freedom arm. Farmers can also be benefited with higher profit level. This machine picks only the cotton ball. Results demonstrate that the cotton boll picks and improve the efficiency of cotton picking. This machine is fully solar power and vacuum used to operated and save the costs of small farmers which they spends on labour for harvesting.

KEY WORDS: Solar panel, battery, cotton picker, cotton collection trolley, efficiency of picking, save the costs.

I.INTRODUCTION

Cotton (Gossypium hirsutum) is one of the most important economic crops in China and also the second biggest crop production of the world. Agriculture prevails to be the backbone of our nation since many years. Agriculture is a long-term process that follows many steps like crop selection, land preparation, seed selection, seed sowing, irrigation, crop growth, fertilizing and at last it ends up with harvesting. Each variety of crop takes different time to reach the process of cultivation stage. One such time taking crop is cotton. cotton is the most important fibre crop not only in India but of the entire world.Cotton crop contributes about 14 – 16% to the total agro-crop. India has the largest area under cotton (9 million hectares)in the world constituting 26% of total world cotton area. India presently produces 4.59 million tons (27 million bales) which constitutes 18% of the world cotton production .60 million people including 4.5 million farmers inIndia depend on cotton for their livelihood. The Textile industry provides direct employment to 35 million persons and1/3rd of total exports. Cotton constitutes about 14% of industrial production and about 5% of GDP.Cotton is picked 4 to 7 times during the month of October to February. Cotton is produced in three zones, the Northern zone comprising thestates of Punjab, Haryana and Rajasthan, the Central zone comprising the states of Maharashtra, Madhya Pradesh andGujarat and the Southern zone comprising the states of Andhra Pradesh, Karnataka and Tamil Nadu. The domestic textile industry is one of the largest industry in the country and has witnessed a phenomenal growth in the last two decades in terms of installed spindlage and yarn production. Indian cotton sector and the impact of mechanization on cotton cultivation are needed to assess India's competitive position in international markets. The significant features of this growth include installation of open-end rotors and setting up of export-oriented units. Technology-wise, Indian spinning industry has been able to keep pace with the international technology trends. India has become one of the largest consumer of cotton i.e, about 23% of World Cotton Consumption.

II.LITERATURE REVIEW

Matchanov Rafik Doschanovich, Rizaev Anvar Abdullaevich, Yuldashev Abdurakhim Temirovich, Kuldoshev Davronbek Abdullajonovich, Akhmedov Sherzod Anvarkhon Ugli (2020) "Pneumatic Transport System of a Cotton Picker"[1].A design of pneumatic transport system of domestic cotton-picking machine is harvesting of raw cotton transport by passing air from machine. Calculations, based on these results, were performed to ensure the smooth operation of pneumatic transport of raw cotton with an estimate of cotton-air mixture concentration. At the same time, the main recommendations are aimed at ensuring the least damage to the cottonseeds. In this machine is larger in size and not comfortable for small scale farming land. So we implement pneumatic or vacuum used to collect the cotton.

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Relevance to current Research

Kadeghe G. Fue , Wesley M. Porter, Edward M. Barnes and Glen C. Rains (2020) "An Extensive Review of Mobile Agricultural Roboticsfor Field Operations Focus on Cotton Harvesting"[2]. In this review, we examine opportunities and challenges for 21st-century robotic agriculturalcotton harvesting research and commercial development. The paper reviews opportunities present inthe agricultural robotics industry, and a detailed analysis is conducted for the cotton harvesting robotindustry. The review is divided into four sections are general agricultural robotic operations, wherewe check the current robotic technologies in agriculture, opportunities and advances in relatedrobotic harvesting fields, which is focused on investigating robotic harvesting technologies, statusand progress in cotton harvesting robot research, which concentrates on the current research andtechnology development in cotton harvesting robots and challenges in commercial deploymentof agricultural robots, where challenges to commercializing and using these robots are reviewed.Conclusions are drawn about cotton harvesting robot research and the potential of multipurposerobotic operations in general. The development of multipurpose robots that can do multiple operationson different crops to increase the value of the robots is discussed. In each of the sections except theconclusion, the analysis is divided into four robotic system categories; mobility and steering, sensingand localization, path planning, and robotic manipulation. From this literature, we take some ideas for future harvesting of cotton and others crops related to above review.

Relevance to current Research

Prof. S. Rahinj, Nagare Dnyandev, Bhosale Rushikesh, Bandgar Bajirao, Salunkhe Ajit(2019)"Cotton Collection Machine"[3]. This work will give a new technology in the field of cotton boll picking mechanism and to develop machine which is low weight ergonomically which could be used to pick cotton bolls. In India entire cotton is handpick by labor, internationally available machine for cotton boll picking is costlier and its shows that due to spindle type cotton picking machine, percentage of short fiber content increases result in poor quality of cotton fiber strength. Suction type cotton boll picking machine will give new technology in the field of agriculture, which is helpful for Indian farmer, it is not costly and easy to handle. Farmer can easily use suction type cotton-picking machine. We use the vacuum pump for sucking the cotton and 200 liter cast iron strong tank for store the cotton. This all assembly is mounted on the wheel trolley and we can collect the cotton at one location.

Relevance to current Research

Bautista, Brittany N., Guillermo F. Diaz Lankenau, Steven P. Guitron,Brandon D. Jennings, Astera S. Tang, MatthewR. Tucker (2017)"Design of an Integrated CottonPicking System for Small-Scale Indian Agriculture"[4]. Farms are incapable of large-scale mechanization due tosmall farm size and irregular farm shape. A previous teamdeveloped a handheld, roller-based picking device thatdemonstrated increased performance over similar products.However, a significant improvement in productivity requiresincreasing picking speed through mechanization as well asincreasing worker cotton carrying capacity. We present asystem that utilizes the roller-based picking device in tandemwith a compressive storage bag and an efficient carrier.Through modeling and initial testing, the system demonstratesa two times improvement in worker productivity overcurrent methods. This paper characterizes the cotton pickingprocess, details the modules of the integrated system, andsuggests further procedural improvements for greaterincreases in worker productivity.

Relevance to current Research

AniketS Deshmukh,Dr.Akash Mohanty (2016) "Cottonmechanizationin Indiaandacrossglobe"[5]. Cotton Harvesters has proven to be a promising approach for cotton harvesting in India and developing countries.However challenges still remain in its implementation in India though considerable progress has been made in recentyears. Developed countries have 100% mechanized cotton picking. With increasing labor charges and its unavailability,mechanization has gained pace in Indian agriculture sector. This review paper provides an overview of cotton harvestersand its various types. It also covers the anatomy of cotton plant, production, and its importance in Indian economy.Based on the above study, we can decide the mechanism best suitable for global and particularly for Indian conditions arediscussed as follows are the use of stripper type

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cotton picker does not favor the Indian type of cultivation as farmers go for multiple pickingand stripper destroys the crop during picking. Though in future when improved varieties of seed are developed and usedit can find use in India also. Pneumatic type machines are highly efficient but as Indian farmers don't go for defoliation a lot of trash is collected along with cotton and measured its quality, also portable pneumatic machine can be heavier to carry

III.METHODOLOGY OF PROPOSED SURVEY

One man operated cotton picking by using solar panel and air blower. This machine is equipped with solar panel to battery power transmission. The advantages are that it is cost effective labor and time saving device which increases the productivity almost compared to manual picking.In 1850 the first cotton harvesting machine was patented. Then over the next century over 1800 patents were issued for cotton harvesting schemes.

Some early prototypes tried to harvest with pneumatic mechanisms, some tried to adopt threshing machine, others tried static electricity or mechanical fingers. Spindle type harvesters and later days small level farmers cannot used for above machines to harvesting of cotton.

Cotton picking gun is small in size but battery working time is less so we overcoming for this type of picking. Cotton picking method has lot of types to picking the cotton like pneumatic cotton picking is well suited for our knowledge so we select that cotton picking machine modification. We are selecting the method of cotton picking is pneumatic or vacuum with solar energy using to collection of cotton bolls from plants. It will less expensive and manual picking of cotton is compared to more affordable of our project.

Cotton harvesting process is required the machine for picking of the cotton bolls by using solar powered cotton picking machine. This machine has selected for some components to constructed and working conditions. The components are solar panel, battery, cotton collection trolley, cotton picker, switch, power transmit cable, and other some components used in this machine.

After the components selection, other methodology is components assembling. Components assemble is the fitting the parts of the machine and so many process under this method. Solar panel connect to battery with switch and power transmit cable connect to cotton picker in this machine.

Components assembled the machine completely constructed then check the working and output test. Working of machine is solar panel using charge the battery then power transmit to the picker the suction of cotton bolls inside of picker and store the cotton collection trolley. This machine output is less power consumes and low number of labors using for this machine.

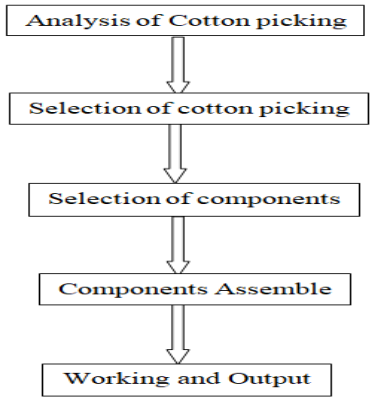

Figure.1 Flow Chart of Methodology

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Solar Panel

Photovoltaic solar panels absorb sunlight as a source of energy to generate electricity. A photovoltaic (PV) module is a packaged connected assembly of typically 6x10 photovoltaic solar cells. Photovoltaic modules constitute the photovoltaic array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications. The most common application of solar energy collection outside agriculture is solar water heating systems.

Smart Modules

Several companies have begun embedding electronics into PV modules. This enables performing maximum power point tracking (MPPT) for each module individually and the measurement of performance data for monitoring and fault detection at module level.Some of these solutions make use of power optimizer a DC-to-DC converter technology developed to maximize the power harvest from solar photovoltaic systems. As of about 2010 such electronics can also compensate for shading effects wherein a shadow falling across a section of a module causes the electrical output of one or more strings of cells in the module to fall to zero but not having the output of the entire module fall to zero.

Lead - Acid Battery

Where high values of load current are necessary the lead-acid cell is the type most commonly used. The electrolyte is a dilute solution of sulfuric acid (H_2SO_4). In the application of battery power to start the engine in an auto mobile for example the load current to the starter motor is typically 200 to 400A. One cell has a nominal output of 2.1V but lead-acid cells are often used in a series combination of three for a 6-V battery and six for a 12-V battery. The lead acid cell type is a secondary cell or storage cell which can be recharged.

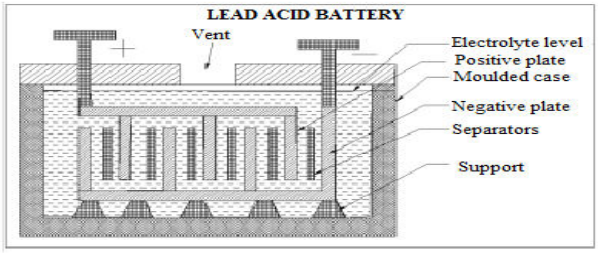

Figure.2Lead acid cell

The charge and discharge cycle can be repeated many times to restore the output voltage as long as the cell is in good physical condition. However heat with excessive charge and discharge currents shortens the useful life to about 3 to 5 years for an automobile battery. Of the different types of secondary cells the lead-acid type has the highest output voltage which allows fewer cells for a specified battery voltage.

IV.CONCLUSION AND FUTURE WORK

From the result, we conclude the cotton-picking machine can improve cotton harvesting efficiency defoliation and less number of labors are required. The efficiency is also increased compared to manual picking with explained briefly in result. This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding planning, purchasing, assembling and machining while doing this project work.

We are proud that we have completed the work with the limited time successfully. The “COTTON PICKING BY USING SOLAR PANEL”is working with satisfactory condition. We are able to understand the difficulties in maintaining the tolerance and also quality. We have done to our ability and skill making maximum use of available facilities.

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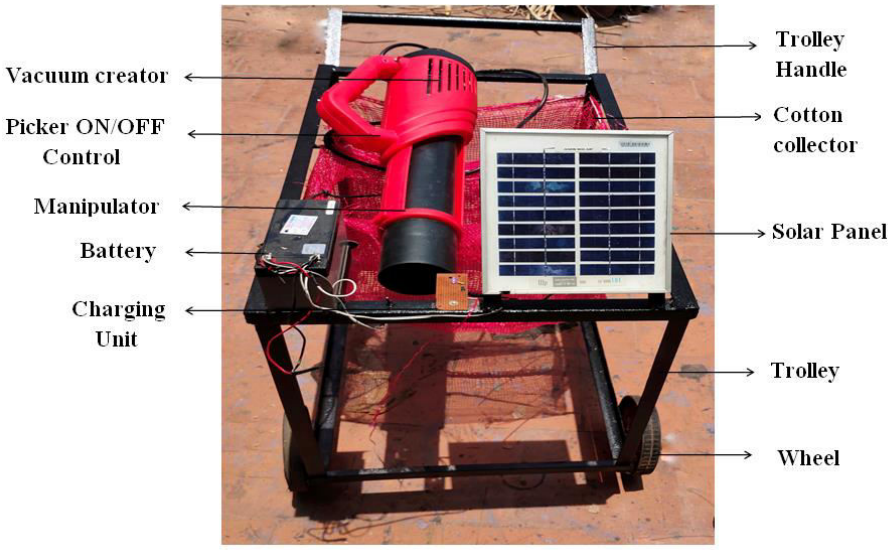

Figure.3 Working principle of Cotton Picking by using Solar Panel

REFERENCES

[1] Adebija J. A. and Jackson B. A. "Performance evaluation of a manually operated cotton picker" in 2013.
[2] Aditya Dhokne, Manoj Zingare, Akshay Mahure, Prof. Sandeep Lutade "Design and fabrrication of cotton boll picker machine" in 2017.
[3] Ambati Ravinder Raju, Gautam Majumdar (2012) "Evaluation of Portable Cotton Picker" in 2012.
[4] Aniket S Deshmukh, Dr. Akash Mohanty (2016) "Cotton mechanization in India and across globe" in 2016.
[5] Bautista, Brittany N., Guillermo F. Diaz Lankenau, Steven P. Guitron, Brandon D. Jennings, Astera S. Tang, Matthew R. Tucker "Design of an Integrated Cotton Picking System for Small-Scale Indian Agriculture" in 2017
[6] Bulent Coskun,Tarim Bilmleri Dergisi "Determination of Variety Effect of a Simple Cotton Picking Machine on Design Parameters" in 2003.
[7] Dixit, G. S. Manes, A. Singh, A. Prakash & J. S. Mahal "Ergonomic Evaluation of Battery Powered Portable Cotton Picker" in 2012.
[8] Durgesh Gupta, Jayesh Teli, Paras Badhe, Suraj Banhatti "Design and Development of Pneumatic Cotton Picker" in 2017.
[9] Erdal OZ, Tezer Karayo, Bulgarian Journal of Agricultural Science "Performance Evaluation of a Tractor Mounted Mechanical Cotton Picker" in 2014.
[10] Jay S.Patel, Jigar S. Patel, Himanshu D. Patel, Vishv S. Patel "Design evaluation and analysis of harvesting cotton bolls mechanism in moist and uneven condition" in 2019.
[11] John McL. Bennett, Nathan P. Woodhouse, Thomas Keller, Troy A. Jensen, and Diogenes L. Antille "Advances in Cotton Harvesting Technology: A Review and Implications for the John Deere Round Baler Cotton Picker" in 2015.
[12] Kadeghe G. Fue , Wesley M. Porter, Edward M. Barnes and Glen C. Rains "An Extensive Review of Mobile Agricultural Robotics for Field Operations Focus on Cotton Harvesting" in 2020.