

# Fabrication of Ginger Harvesting Machine

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**ABSTRACT:** Ginger is a potential agricultural commodity to be developed in India. When the harvest comes, people still use a very simple method for harvesting ginger by using hoes, pick-axe and other farming equipments. The farmers complain for the need of so many work forces for harvesting while the labour cost is getting increased and the time spent for harvesting process long. Although there is an alternative of imported ginger harvesting machines, those machines are not compatible with the farming environment in India, having a high initial and maintenance cost. This machine can be used in any farming condition in India and can be prepared at village level. This machine has three main parts namely, ginger digger, screener and power transmission system. This project is focusing on design and fabrication ginger harvesting machine. The screener will not only separate ginger from soil but also not let the ginger get harmed. The screener also uses, to make this machine need some power transmission system from the engine. This machine needs Auto front petrol engine with rotation speed 20 - 25 rpm approximately with the aid of gear reduction. DC motor is also used to run the ginger harvesting machine. Transmitter board is used to turn either left or right and also move forward or backward direction. This machine is operated and controlled with the help of microcontroller, Arduino UNO.

**KEYWORDS:** Ginger, Harvesting, Labour, Farming Equipment, Farming Environment, Digger, Screener, Power Transmission System and Arduino UNO.

## I. INTRODUCTION

Ginger (*Zingiberofficinale*) is a potential agricultural commodity to be developed in India. Harvesting period of this crop is 210 -240 days. Rhizomes of 6-8 inches apart, 2-4 inches deep, and with the growth buds pointing upward. They can be planted whole or smaller pieces with a couple of growing buds each. Ginger plants will grow upto 2-3 feet tall. Ginger is a potential agricultural commodity to be developed in India. India is a leading producer of ginger in the world and during 2012-13 the country produced 7.45 lacs tones of the spice from an area of 157,839 hectares. Ginger is cultivated in most of the states in India. However, states namely Karnataka, Orissa, Assam, Meghalaya, Arunachal Pradesh and Gujarat together contribute 65 percent to the country's total production. Ginger originated in Asia and now grow in several parts of the world. The root of the plant is harvested for many culinary and medicinal uses. It can be used in many forms and is edible raw as well as cooked. One of the most common uses of ginger is to relieve nausea and other gastric ailments. A flowering plant is actually the root of the ginger plant that is harvested. A single root can have many offshoots aboveground.

## II. LITERATURE REVIEW

IoT Akshay Sawant<sup>1</sup>, Omkar Haldankar<sup>2</sup>, Saurav Pingale<sup>3</sup> (2014). The solar lawn mower is fully automated grass cutting robotic vehicle powered by solar energy, it also avoids obstacles. It is also capable of fully automated grass cutting without the need of any human intervention. The system uses 12v batteries to boost the bot movement motors as well as the grass cutter motor. Battery is charged by solar panel. The cutter and its motors are interfaced to an Arduino Nano that controls the working of all the motors. Ultrasonic sensor is used for object detection. The SoC moves the bot in the forward direction in case no obstacle is detected. On obstacle detection; the ultrasonic sensor monitors it and the SoC thus stops the grass cutter motor to avoid any damage to the object/human/animal whatever it is. In order to know the battery charged and how much power is generated through the solar panel voltage divider circuits are used with the microcontroller and the data is passed to blynk app using Wifi Module. We can also control the robot using blink app or also it can be set on Auto Mode. The L293D9 bi-motor controller/driver is used.



### Relevance to current Research

M.R.Sanjay, G.R.Arptha, L.LaxmanaNaik, B.Yogesh Department of Mechanical Engineering, Malnad College of Engineering, Hassan, India (World Journal of Engineering and Technology, 2015, 3, 320-338) Design and Fabrication of Ginger Harvesting Machine. In this journal the forces required for harvesting the ginger by using this machine are calculated. Also it compares the labour work while using the machine instead of manual harvesting.

### Relevance to current Research

Vishal B. Patil ADCET, Ashta Indrajeet R. Dhokate ADCET, Ashta (2015). The present technology commonly used for cutting the grass is by using the manually handle device. In this project we have automated the machine for cutting the grass. The device consists of blade which is operated with the help of the motor the power supply for the motor is by using battery. The battery can be charge by using solar panel. The battery charging and discharging can be controlled by using the Arduino based charge controller. In case of any obstacles in the path it is sensed by using an IR sensor. In future the automation of the device will play a vital role in world wide.

### Relevance to current Research

Naresh Babu, et.al (2015), describes that the method is based on the manual method of cutting the above crops and removal of rhizome with ginger. All the activities are done by manual method and there is more time consumption with high manpower. The cutting process are done with traditional equipments such as spade, blade etc. There is no any automation for the high production.

### Relevance to current Research

Dr. C.N.Sakhale, Prof. S.N.Waghmare, Rashmi S.Chimote (2016) (Associate Prof., Dept. of Mechanical Engg. Priyadarshini College of Engineering, Nagpur, MH-India) Concept to design a project for small scale farmers. And in one machine multifunctions can be performed with cheap cost as compared to other agriculture machine. For this concept not essential to skilled person. Mechanism of the machine should be very simple. So that for gardening and small scale farming, design this concept.

## III. METHODOLOGY OF PROPOSED SURVEY

Before going to design a harvesting machine, it is necessary to know the force required to dig or penetrate the ginger bed and get ginger. The V blades are similar to pick axe in construction and then fabrication was carried out. The legs i.e., structural support was placed along the bed in such way that the bed has to come exactly at middle of the legs. By using the machine the blades are penetrate the furrow bed and pull out the ginger from the furrow bed. Instead of pick axe like equipment for each ginger plant the blades fitted around the rotating the shaft pulled out continuously from the furrow bed.

The implementation of the project is done with a suitable fiber blades used in the machines for cutting the grass in the garden provided at the front position of the harvesting machine, we can cut the grass portions from the ginger and thus enables the machine to dig out the ginger from the soil very easily. This machines are also concentrates on the medium scale production with minimum human efforts, with affordable price for the farm.

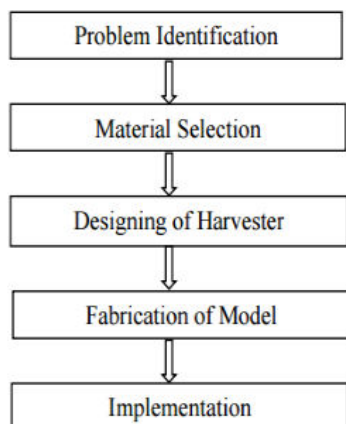


Figure.1 Flow chart

#### IV. RESULTS

For efficiency estimation 30 plants are selected and taken into harvesting purpose. Clearly it shows that the ginger harvesting machine harvests more plants than manual method. By using transmitted board, it is used to turn either left or right and moving forward or reverse direction. This machine takes minimum time to harvest ginger when compared to manual harvesting. Comparing with manual harvesting 50% of harvesting time and 60% of labours are reduced. The cost of harvesting is reduced by 34% when compared to manual harvesting.



Figure.2 Working model of ginger harvesting machine



## V.CONCLUSION AND FUTURE WORK

The idea was to create a machine which is cheap and will reduce the labour required to harvest crops. This machine has the capability and the economic value for fulfilling the needs of farmers having small land holdings. Comparisons are made between manual and machine harvesting. It is quite simple in design and fabrication, so it can be fabricated at village level. By adapting this machine, problems of the labor crises can be reduced, when compared to manual harvesting with only 18% of labors being required. It makes the process faster than manual harvesting and hence reduces most of the harvesting time and labors required to operate the machine; thereby, it reduces the labor cost. The machine can be used by a maximum number of farmers; definitely farmer can overcome the labor crisis problem. The productivity can also be increased.

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