TEA LEAF CUTTING MACHINE

PROJECT REFERENCE NO.: 39S_BE_0048

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INTRODUCTION :

India continues to be the largest producer of tea accounting for 32.08 per cent of the global output. In terms of area, it occupies about 20.07 per cent of the world tea area. Although India holds a leading position in production and export, the current position of tea trade reveals that its share in the world production and export has been declining steadily over the past three decades. There are various reasons behind the decline of production rate, one of the major reasons is shortage of laborers and increase in wages, another major reason is the attack of pests. Tea is grown in a monoculture and often subject to attack by insects and other pests; hence pesticide use is not uncommon. Though production rate was increased by the mechanization of tea leaf harvesting, the use of machines caused damage to the tea bushes and was difficult to maintain height and carry all over the tea estate.

OBJECTIVE:

1. To ensure high harvesting efficiency and increase productivity without compromising on crop safety.
2. To reduce plucking cost and maintain uniform plucking table.
3. To provide alternative solution to man power shortage, reduce physical labour and operator exhaustion.
4. To avoid additional cost and also the usage of fossil fuels.
5. To avoid loss of crop due to pests attack or improper application of pesticide.
6. To avoid the health issues caused in laborers while spraying pesticides manually.

METHODOLOGY:

The proposed model is an integrated system having both pesticide sprayer and mechanized harvester. This machine is semi automated and can be controlled by using mobile phone application. The person sitting in a control room can control the machine movement, cutting blades and pesticide sprayer with the help of live video streaming on the android phone. This machine is particularly designed for conditioned farms only.

Working

The block diagram of the proposed model is shown in the Fig 1. The commands given using the cell phone are communicated to the microcontroller with the help of Bluetooth module. When the front command is given the microcontroller sends signal to the motor
driver which rotates the DC motor connected to the wheels and blades. Thus the machine moves forward and cut the leaves.

The cut leaves are sucked using the vacuum pump and stored in the container. Once the container is full, all the operations are stopped and the buzzer buzzes indicating to empty the container. The machine can be called back by giving back command. The motor driver connected to the wheels, drives the machine back making it convenient to empty the storage or refill the pesticides tank. During operation, the machine is solely supported on the wheels moving on the ground. Another feature of this machine is the pesticide sprinkler. When sprinkle command is given, the submersible pump in the pesticide tank is turned on and the pesticide is pumped to sprinkle evenly throughout the bush. Relay acts as a switch for the submersible pump and the buzzer. The blades are designed in such a way that it selectively plucks the tea leaf maintaining its quality without harming the bush. Motor drivers are used to operate the DC motors to provide the sufficient supply. The adjustment of height of the blades is done as per the height of the bush by the up and down commands. The rotation of DC motor connected to the pulleys help in adjustment of height of the machine. The person in the control room can continuously monitor the machine with the help of 360 degree IP camera mounted on the machine.

**CONCLUSION:**

Tea industry contributes large amount to the national income of India, as it is one of the largest exporters of tea in the world. Therefore it is necessary to overcome the problems existing in the tea industry such as shortage of labourers, increase in wages, and decrease in production due to improper application of pesticides. The proposed model is an effort made to increase the production rate by overcoming these challenges. Both the pesticide sprayer and the harvester are integrated in a single machine, which does not compromise on crop safety and the production rate. Tea leaf harvesting machine is more viable, feasible and profitable
than manual harvesting. Battery/solar power operated and extremely environment friendly - a truly green machine in a green environment.

**FUTURE WORK:**

1. To automate tea leaf cutting in unconditioned farms.
2. Employs innovative cutting edge technology with blades made of ferrous metal.
3. Plucking of side shoots.
4. Operate the machine in hilly-terrain areas.