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# Automated Pesticide Sprayer for Arecanut

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**Abstract –** *Arecanut is one of the foremost commercial crops of India. The objective of this project is to design and fabricate a machine which can climb the Arecanut tree and spray pesticide. This project aims at the design and developing a sensible chemical sprayer for Arecanut where not creating any variety of scratches on the tree. The up and down movement of the smart sprayer on the tree and can carry the sprayer nozzle are totally controlled by a remote control unit. The pesticide sprayer is built by using an Arduino circuit. The Arecant pesticide sprayer consists of square frame with four wheels. The up and down movement is performed by using dc motors with gears. Arecanut pesticide sprayer carry tank with it and two spraying unit are used which provide 180 degree rotation to arm by dc motor. In essence, the smart pesticide sprayer for Arecanut, which avoids the risk of tree climbing, is a promising tool for areca nut farmers and the residents.*

## INTRODUCTION

Areca nut is a tropical crop, is popularly known as betel nut in India. It is one of the most important commercial crop in South-East Asia in general and India in particular. As per FAO statistics for 2017, India is the largest producer of areca nut accounting for 54.07% of the world output. In India, as of 2013-2014 Karnataka is the largest producer of Areca nut in India resulting in 62.69 percent of the country's output. The plant grows in well drained, deep clay loamy soil; laterite, red loam and alluvial soils are considered most suitable. Areca nut farming, to achieve good yield, needs large application of organic manures and chemical fertilizers. The gestation period for the areca nut tree to yield fruits varies from four to eight years. Its life span is up to 60 years and in some cases even 100 years. The Arecanut tree grows to a height of 60 feet to 70 feet and measures 15 cm in diameter.

Researchers all around the world work on developing climbing machines, most of these climbing machines are capable of climbing regular structures like poles, walls etc. But a very few are capable of climbing trees, main reason being irregular surface and variation of diameter with length. It also requires greater agility and high maneuverability to be used as a product. Many trees like coconut tree, Arecanut tree, and palm trees are so tall that climbing them becomes risky. Hence harvesting fruits and nuts and maintaining them becomes difficult, So, development of a unique tree climbing mechanism is necessary which may be used for maintaining and harvesting applications.

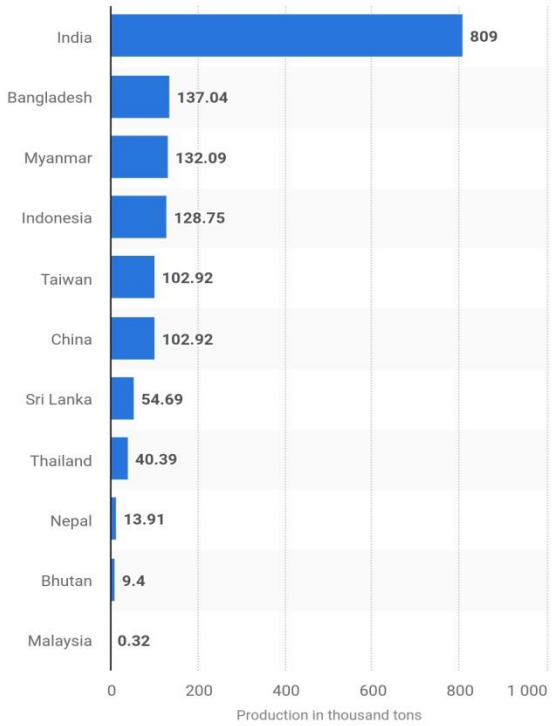


**Chart-1:** Statistical representation of area and production of Arecanut in world in 2018.

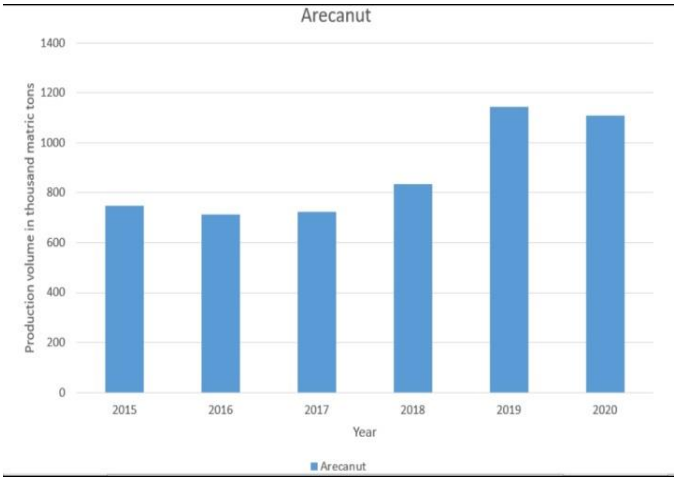


**Chart-2**: Graphical representation of production of Arecanut in India, in 2020.

## DISEASE AND CONTROL

[1] Colletrotrichum gloeosporioides

In dry season (February-March) Areca nut tree affected by Colletotrichum gloeosporioides. It is one kind of fungus which directly affects flowers of Areca nut. For controlling these it is necessary to spray COC 0.25% or Mancozeb 0.2%. The disease shown in fig.1

**Fig.1** Colletrotrichum Gloeosporioides

[2] Arecanut Mahali / kolerogo: Phytophthora arecae

In this disease nuts shows large vacuoles and dark brown radial strands. Very often the top of the affected trees dries up resulting in the withering of leaves and bunches. Affected nuts fall off and show white mycelial growth of fungus.

This is controlled by spaying Bordeaux mixture 1% before on the set of the monsoon amd second spray after 40-45.

**Fig.2** Mahali, Kolerogo

[3] Nut splitting:

In this disease nut will split and fall from tree due to improper drainage.

This can be controlled by potash fertilizers and spraying of Borax 0.2% in early stage reduces the splitting.

**Fig.3** Nut Splitting

## CONVETIONAL METHOD OF SPRAYING PESTICIDES

**Fig.4** Conventional Method of Spraying Pesticides

## BLOCK DIAGRAM

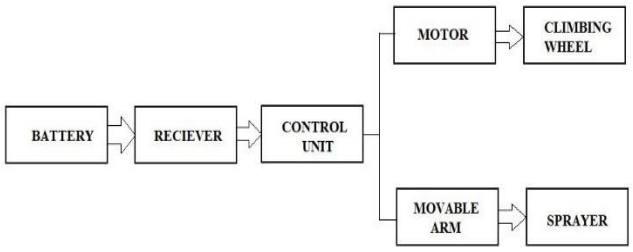


**Fig.5** Block Diagram

In this block diagram, 12V 42AH battery will be use, which supplies power to the control circuit and the motor. Receiver receive the signal from the transmitting circuit. Arduino will be use to control the motor and nozzle, 12V high torque dc motor will be use to climb the tree, climbing wheel are conical in shape and are in contact with the tree, it covered by rubber for purpose of grip movable arm will be attached to motor for spray

## WORKING PRINCIPLE

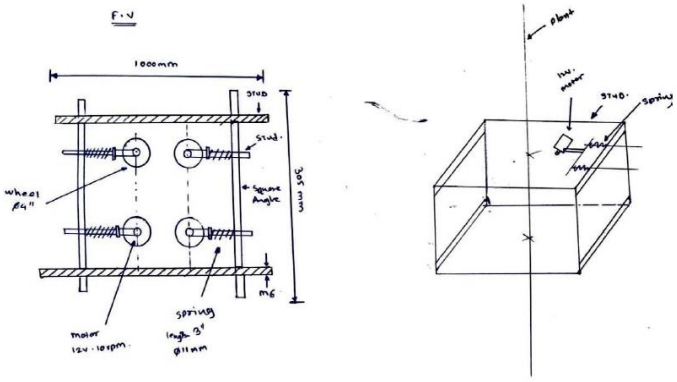

**Fig.6** Design and Fabrication

When the power is switched ON, the motor rotates the roller due to friction between the roll and tree the robot ascends along the length of the tree without causing any damage to the tree. When robot reaches at required height, it stay there without slipping once the robot reaches at required height, the robot stopped by mobile app and then nozzle sprays pesticides, after pesticide is completed the robot decent down by the rotating roller in opposite direction and after robot reaches the ground, it removed from that and attached to another tree for spraying.

## EQUIPMENT

| Sr no. | Description | Qty |
|---|---|---|
| **1** | Frame | 1 |
| **2** | Stud | 4 |
| **3** | Motor | 4 |
| **4** | Pump | 2 |
| **5** | Pump motor | 1 |
| **6** | Water tank | 1 |
| **7** | Circuit | 1 |
| **8** | Motor holder | 4 |
| **9** | Spring | 8 |
| **10** | Battery | 1 |

## CONCLUSION

Upon exploring the situation from multiple perspectives, we can say that introducing technology for productivity in agricultural industry was a great thought. The main purpose of this project is to reduces the workload of labours and low cost assembly. Firstly we roughly studied on the design of the machine and then after making it sure to work properly in required conditions fabrication work was actuated. According to the study this device gives 100% accuracy. It is safe, efficient, easy to use and low maintenance. On the other side it stimulates to reduces the working load of manpower to the minimum. In this modern world the probability of labours is unelevated where it also sums up a plus point of reducing the risk for labours. Especially this will help areca nut cultivators to boost the agriculture field work and encourage people to prefer technology over hard work.

## REFERENCES

[1] C.K. Shenoy, "Remote Controlled Tree Climbing Machine for Arecanut Tree", Canara Engineering Benjanpadavu

[2] V.Pandey,"Design of Climbing Mechanism for a Tree Robot", International Journal of Mechanical Engineering, vol.3 pp.647-654, 3013

[3] Steve Johnson (2003), Tree Climbing Apparatus, US Patent 4730702

[4] J Sharana Basavarja Nagaraja Design and Development of Areca Tree Climber in International Journal of Research in Mechanical and Automobile

[5] Ahemed Salih Mahdi- Semi Automated Tree Climber in International Journal of Agriculture & Research (IJAR) Vol 7 July 2013