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Groundnut harvester

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ABSTRACT

World is mostly concentrating on new inventions and running with latest technology. Farmers are backbone for every country in the world without farmer's livelihood is difficult. Groundnuts are grown on a small scale by farmers. In the beginning days, the peanuts were harvest by the workers. It was a long time process. The time consumption can be reduced by implementing the Groundnut Harvester. The proposed system is mainly about to plucking the plants from the soil and separating the nuts from the plant roots. With the help of groundnut harvester machine the time gap reduces from removing of groundnut from plant and the requirement of labour also reduces. The proposed system makes the farmer to work easy and can save more time and labour cost. It is more efficient and available to all at minimum cost. Groundnuts are collected in a single place.

Keywords: Groundnuts, Seeds, Labour cost.

INTRODUCTION

Agriculture is the one which gives human an identity of their own life. In India agriculture has been considered as the backbone of our economy. Besides knowing about the ethics of agriculture, we should be aware of the modern agriculture. Newer technologies and researches in the field of agriculture provide the best yield and sustainable development. Farmers are cultivating vegetables, fruits, oilseeds and

non-food items like cotton, tea, coffee, rubber, jute, etc.,

Peanut or groundnut (*Arachis hypogaea*), is a category in the legume or "bean" family. Annual production of Indian groundnuts and Indian groundnut oil are around 5-8million tons. It is ledger for around 25% of the total oilseed production of the country. It is used in many applications such as paints, lubrication oil, vanish, and leather dressing and furniture polish. Tamil Nadu is the fourth largest producer of groundnuts in India.

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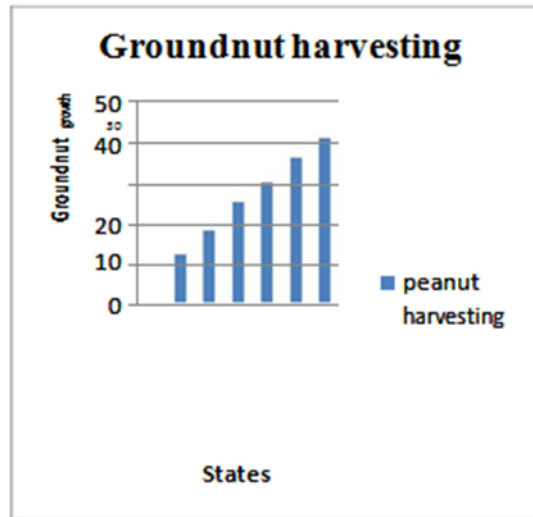


Figure 1 Groundnut Growing States in India

Groundnut harvesting

Groundnut growing states in India shows in Figure 1. But due to high manpower, groundnut harvesting is an arduous one.



Figure 2 Conventional Groundnut Harvesting Technique

The conventional groundnut harvesting method represented in Figure 2. In this proposed work, the

machine designed to pluck the plants from the soil and separating the nuts from the plant roots.

SYSTEM DESCRIPTION

Groundnut Harvester

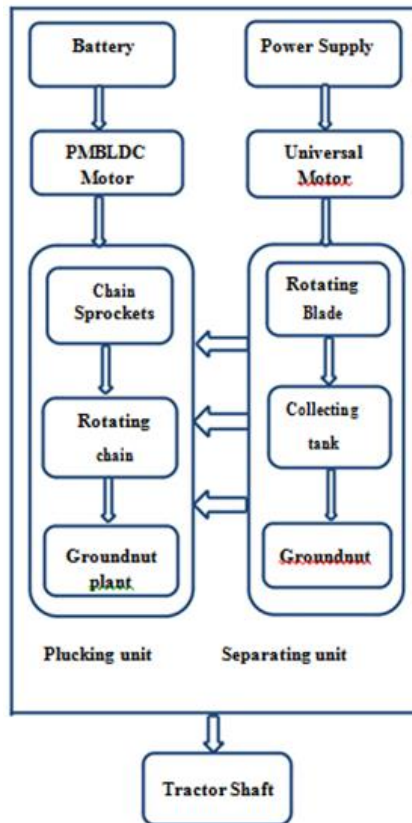


Figure 3 Block Diagram of groundnut harvester

The Figure 3 represents the functional block diagram of a groundnut harvesting machine. It consist of PMBLDC motor, Universal Motor, chain sprockets, Battery, rotating chain, power supply, collecting tank and seed separator. Plucking unit is controlled by the PMBLDC Motor is driven by the battery. Separating unit is controlled by the Universal motor driven by the power supply. The Groundnut harvester is driven by the tractor. It is the easiest way to harvest the groundnuts and the nuts are

collected in a single place. Each of the motors may perform a different operation at the same time. The PMBLDC motor is used to rotate the chain sprockets and chains (Rotating Mechanism) which pluck groundnut plants from the soil with the help of plant lifting tool. The Universal Motor is used to rotate the seed separator. The seed separator separates peanuts from the plant root. The separated peanuts are collected in the collecting tank. The plants are ejected in the back of the machine.

Ground Survey

Time period for growing and harvesting



Figure 4 Growth of groundnut

Depending on the seed sowing depth and the soil moisture the seedlings emerge in 5-10 days. Growth of the root can reach 12 inches by 10 days after sowing. The plant usually grows slowly until about 40 days after planting. Figure 4 represents the growth of groundnut plant. Groundnut plants start flowering after 25-40 days after planting depending on moisture availability and temperature.

The flowers are borne mostly near the base of the plant. It is a self-pollinated crop. The pegs

penetrate the soil up to a depth of 7cm and then grow horizontally when the ovary starts developing as a pod containing seeds. By 60 days, root can extend 35 to 40 inches deep. Growth is more rapid between 40-100 days. For pod development it takes 60-80 days, from flowering to maturation. After maturation the inside portions of the pod become brown to black and the immature pods remain a fresh and white.



Figure 5 Seed sowing of groundnut plants.

Vegetative development declines during pod filling. All pods are not mature at the same time, it is best to wait. Figure 5 represents the seed sowing mechanism of groundnut plants for the machine Harvesting.

The cellular layer is just spreading on the outer layer of the pod has undergone several colour changes during the maturation period. This cellular layer is called the mesocarp.

This colour distinction can be used to estimate crop maturity. This type of the pod is known as the saddle. The colour of the pod can be changed with the help of the moisture content. To get an exact representation of the field, collect three nearby plants (about 1 foot of row) from three to five locations in the field. As with all field assessments (soil and plant tissue testing, insect and disease scouting, etc.), the results are only as good as the collection procedure, so collect a sufficient sample.

When the plant leaves turn yellow in late summer or early fall, it is safe to dig up the plant by the root from the soil. After that remove the pods from the plant and dry them for a week.

RESULT AND DISCUSSION

Calculations made for hectare:

Diesel consumption for operating the tractor/hour = 5litre

Diesel Cost for 5 litre = Rs.350

Labour charge for a person/day = Rs.350

Number of labours required for machine harvesting = 3 Persons

Total labour cost for the proposed system (3*350) = Rs.1050

- Battery charging and universal motor power consumption cost/ hour = Rs.50 Total cost for machine harvesting/ acre/day = Rs.1450
- But the conventional harvesting cost/acre/day = Rs.3000 (approx.)
- Time consumption for manual harvesting/ acre = 16 hrs(10 Persons for digging and separating).
- Time consumption for machine harvesting/ acre = 7 hrs(For digging and separating).
- From the above calculation, the cost of the labour charge in the proposed system is less than the conventional system.

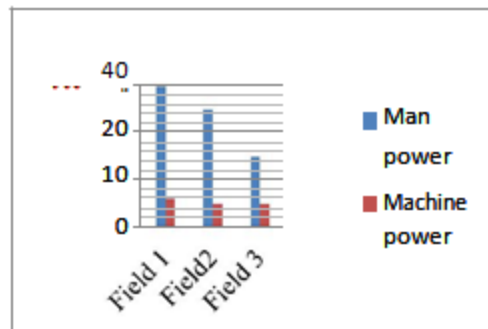


Figure 6 Labour requirement

The Figure 6 represents the labour requirement for machine and manual harvesting.

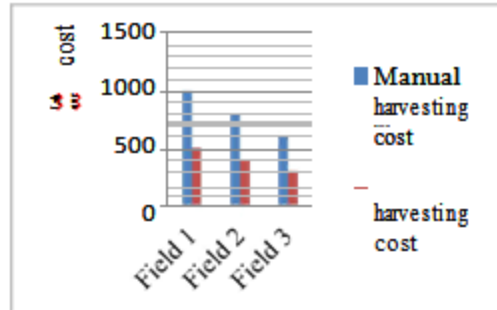


Figure 7 Harvesting cost

The Figure 7 represents the cost required for machine and manual harvesting. From the above

comparisons are results that machine harvesting is better than the manual harvesting.

Field Layout

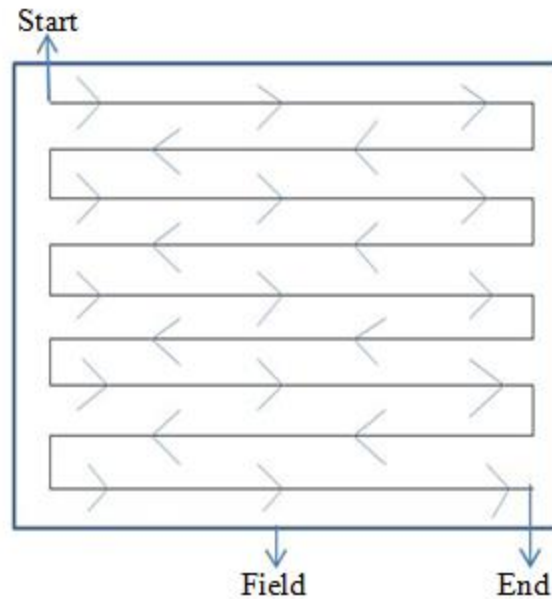


Figure 8 field Layout

The field layout for the machine harvesting is shown in Figure 8.

Advantage

Now a day the groundnut harvesting is a difficult one because of the manpower and high labour charge.. Even in a small field having a lot of work to pluck and separate the nuts from the plant roots. To overcome the demerits, the groundnut harvesting machine implemented. It reduces the manpower which leads to decrease the

labour charges. It is driven by the tractor which reduces the necessity of large manpower. Harvesting machine perform dual jobs (plucking and separating the groundnut). It is the easiest way to harvest the groundnuts compare to conventional method.

CONCLUSION

Groundnut is an important rotational cash crop. The harvester was developed and evaluated its performance on the flat land. The plant lifting tool and the conveying mechanism had impressive

performances. The machine can be used to harvest groundnuts and collected in a single place. The drudgery of the field work will be reduced and labour shortage problem in the field will be overcome by the machine.

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Link

- https://youtu.be/z_BkXti8AM
- <https://youtu.be/Lo9mtEpOrRE>
- <https://youtu.be/tOOjj8q79w8>
- <https://youtu.be/WF6eydU7gxE>