

DESIGN AND FABRICATION OF MULTI FUNCTIONAL AGRO BASED MACHINE

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Abstract: The world's population at 2016 is 7.6 billion and it is expected to be 11.2 billion by 2100. India's population is 1.324 billion at 2016, so there is a need to increase food production. One of the identified problems behind this is lack of advanced agricultural machines. The reason why mechanisation (and other technologies too) is not seen much, apart from tractors mainly in Northern India, is because of four reasons. Firstly, small tracts of land, that get smaller with division at the change of every generation, make it impractical and uneconomical to invest in technology. One could argue that a collective of farmers could jointly invest but that has problems related to trust and the very practical problem of bunds between farms that make use of most mechanisation impractical. Secondly most farmers have small and marginal holding and are dirt poor. They depend on credit from moneylenders to even get through a normal season. There is no way that they would be able to afford new technology, especially machines and the third reason is, the most agriculture is seasonal and dependent on rains. That means at best fields are being used 4 months a year. Investing in mechanisation makes little sense especially if the equipment is to lie idle for most part of the year. And last reason is, the available modern machines are costly to be afforded by farmers. This is the main cause for the lack of usage of modern machines. In order to solve this problem the cost effective agro based machine designed and developed. In addition to the economical problem, the electricity is also setting as a great barrier. By taking this as a criterion this machine is designed to overcome the electricity crisis by generating the power required using solar energy and it can also be used manually. This product is a multifunctional seed (ground nut, corn, peas, sun flowers, etc) sowing machine which can be used for sowing various varieties of seeds at proper position respective of each row, column and depth. The main benefits of this machine are cost effectiveness and eco-friendliness to farmers. This machine is also facilitated for fertilizer spraying during seed sowing which increase the productivity growth.

1. INTRODUCTION:

Agriculture is the backbone of Indian economy. Agriculture sector is changing the socio-economic environment of the population due to globalization. About 75 percent of the people are living in rural area and are still dependant on agriculture. At earlier conventional type agriculture is used for crop yield but conventional method cannot give maximum yield and also agricultural lands are minimized at last 15 years. Due to increase of population need alternative way for crop yield and it is mechanical agriculture. The drawback of mechanization agriculture is costly and machines are not communicated with renewable energy. These drawbacks are negotiated by this project. This project is all about enhancement in seed sowing by using multifunctional seed sowing machine. The main objective of sowing operation is to place seed at proper position respective of other placed seeds in every row at particular depth and to provide a cover of soil on it with fertilizer. As per change in shape and size of different seeds, the parameters like distance between two seeds, depth of seed, planting rate changes. This project is designed to produce multifunctional and efficient seed sowing machine which reduce time of plantation, cost of labour and enhances production and work with renewable energy to dominate sustainable development.

2. MATERIALS:

MATERIAL	PURPOSE
Cast iron	Digger
Wood	Metering disc

Steel	Wheel
Aluminium	Chassis
Steel	Handle
Polymer	Fertilizer box
Steel	Hooper

3. METHOD:

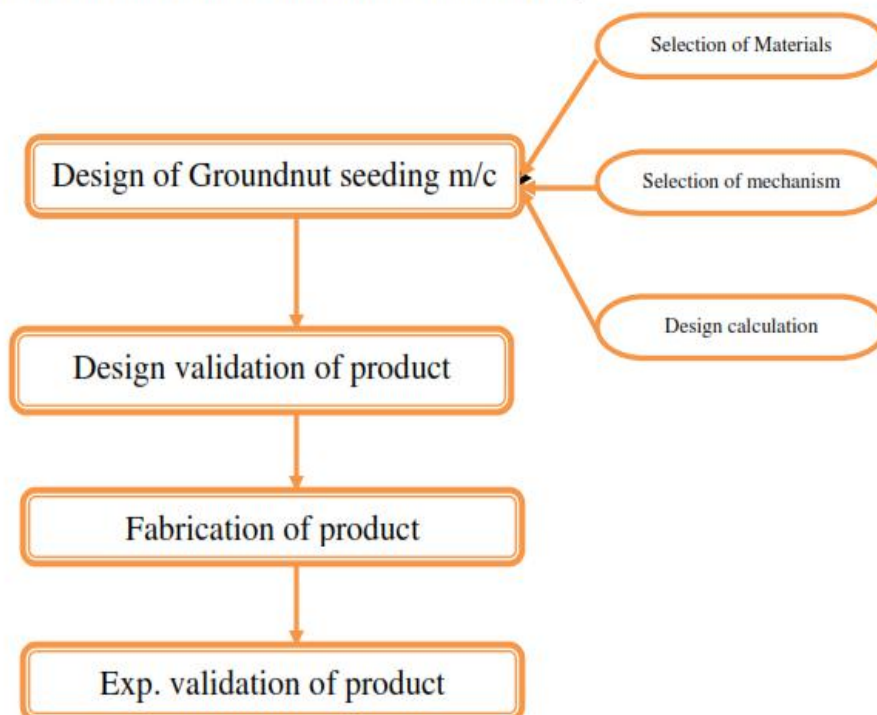
Generally now a day metering disc mechanism is used for seed sowing the main drawback behind this is wastage of seed by damage, this project eliminated these drawbacks. This machine has the innovative modified metering mechanism with feathery surrounding. The New concept of variable depth plough (Digger) by small screw adjustment mechanism is incorporated in this project for various seed sowing at various depths.

The Hooper is used to store the seed and it is directly fed into a metering mechanism by control valve. The modified metering mechanism has the circular disc with spline shaped edges. These spline consist narrow hole as per the type of seed. These splines are removable for various seed sowing.

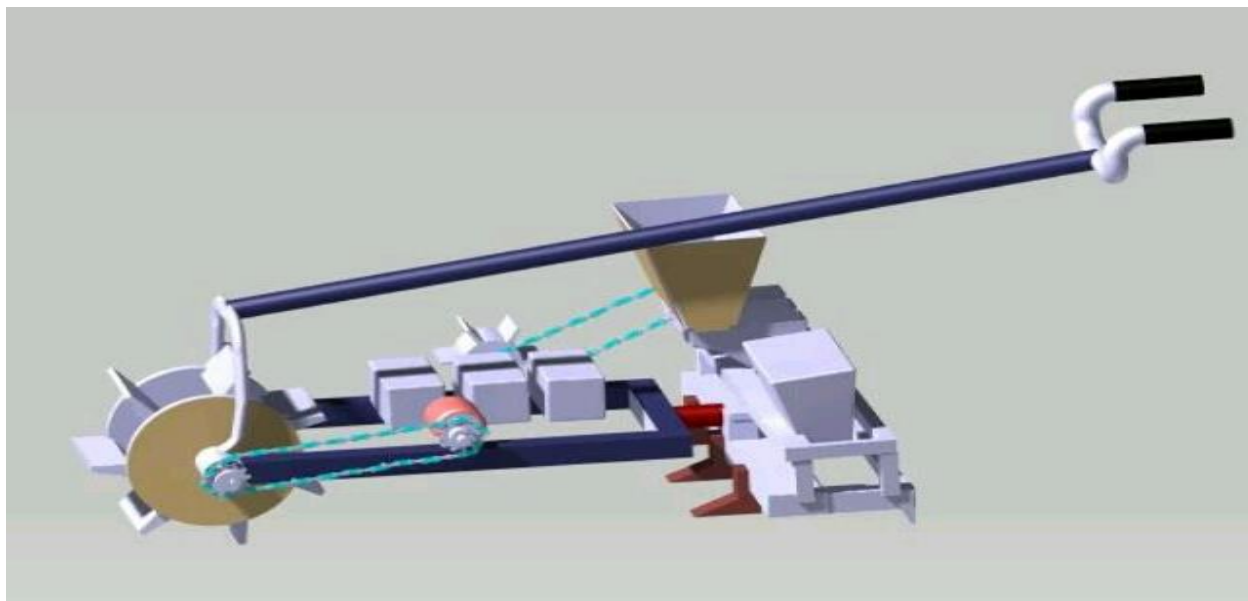
This mechanism is incorporated with feathery surrounding in order to avoid seed damage. This mechanism helps to divide the seeds into one by one .When this is rotated by using chain sprocket, the metering disc take the seed one by one and deliver these with Vansant in travel of time. The seed placing distance is changed by changing of sprocket with various numbers of teeth. This sprocket is rotated by the chain which has contact with wheel. And the wheel is powered by the electric motor. For various seeds spline edge and sprocket is removed and changed. The narrow hole with fine shape on spline edge is used to deliver the seed one by one which reduces the seed required during seed sowing and so cost is reduced.

The small water pump is used for fertilizer spraying and it is powered from the sprocket chain of mechanism. Solar panel with charge controller and battery is used for renewable fuel.

DESIGN AND FABRICATION OF GROUNDNUT SEEDING MACHINE



4. DESIGN:



5. DISCUSSION:

- Improvement in planting efficiency with simple and easy mechanism.
- Due to usage of solar energy it is perfectly suitable for future technology.
- Even less skilled former can operate.
- Since solar panel is used as energy source which is more effective and eco-friendly and also low cost.
- Increase in crop yield and cropping reliability.
- Seed can be placed uniformly in a row with required distance between plants.
- It was made of durable and cheap material affordable for the small scale peasant farmers.
- The seed can be placed at any required depth.
- Provide proper compaction over the seed.

Also used for various seed planting so suitable for multi cropping also

6. ANALYSIS:

Our main aim is to represent our innovative concept, we have taken some useful data from our

Conventional	Tractor	Groundnut seeding machine
Labour cost is high	Maintainance cost is high	Labour and maintainance cost is reduced
Time consumption is more	Time consumption is reduced when compared to conventional seeding	Time consumption is more reduced when compared to Tractor
No need of fuel	Fuel consumption is more	Usage of solar panel reduces fuel consumption
Breakage of seeds may occur	Breakage of seeds	No breakage of seeds due to the usage of metering disc
-	Not suitable for small scale agricultural lands	Suitable for both large and small scale lands

Conceptual model and tried to perform an operation on more than one job at a time. It reduces time in completion of required model. Increase productivity at low cost and in less time.

7. PROCEDURE:

7.1 WORKING :

First of all the machine is started with the help of battery. Solar panel is used to charge the battery and charge controller controls the charging capacity. Then the motor runs which drives the sprocket connected to the wheel. The wheel is attached with sprocket is connected to the chassis. So this wheel drives the metering device which sows the seed at correct distance. The seed sowing distance can be varied by changing the metering disc. Digger digs the soil and seed is placed by metering disc and then sand closer closes the soil. Digger can also dig at variable depth. For this digger is attached with bolt and two nuts to set the various depth. Speed regulator is used to control the speed of motor.

7.2 CIRCUIT :

Since we are using 180 volt motor, so we are using 12v to 180 v DC booster for running the motor. It consists of capacitors and diodes which increases the voltage of battery.

CAPACITOR: 100 nF (63v)

DIODE: 1N4148

IC's: CD 40106B (IC1 to IC3) and IC LP2951 (National semiconductor)

7.3 FERTILIZER:

A disc is connected to the shaft of metering device. So when the shaft rotates disc also rotates which in turn reciprocates the pump. Due to this fertilizer is sprayed after the seed is sown which increases the yield of crop. Fertilizers used for groundnut are 17-17-17 and 16-16-16 cmplx.

7.4 WHEEL:

The wheel is made up of steel to reduce the weight with some projections. These projections helps for the smooth movement of wheel in the agricultural land.

7.5 USE OF 180V MOTOR:

12 v field motor need solar setup worth of RS.20,000 whereas 180 v pmd motor need solar setup worth of RS.5000 only .So the cost is reduced

8. RESULT:

During conventional sowing process farmers has faced many problems like labour cost, time consumption, separate fertilizer mechanism and breakage of seeds etc. As a result, groundnut seeding machine is more useful for farmers as per performance wise and cost wise when compared to conventional seeding process. It also reduces the time consumption and correct sowing distance is obtained.

9. CONCLUSION:

Comparing the different traditional seed sowing methods with the proposed machine and considering its limitations, it is concluded that, seed flow rate can be achieved with maximum crop yield. Row spacing and seed spacing process can be achieved with precision. Seed utilization can be done in proper manner with minimum loss. And renewable energy is used

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