

# Optimization and Fabrication of Sustainable Multi Seed-Drill Machine

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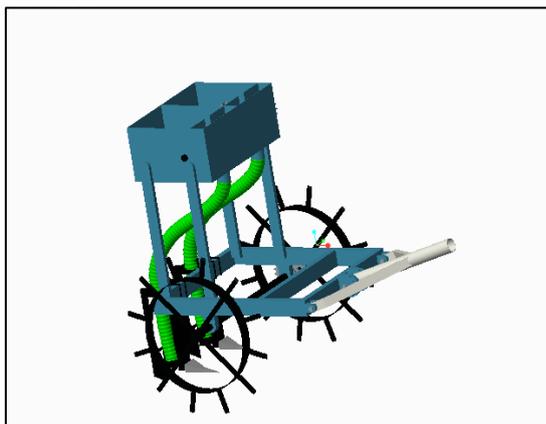
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**Abstract**— Agriculture plays an important role in the life of economy. It is the backbone of our economy system. In this project work focused on seed sowing processes and tried to solve the problem. The basic objective of showing operation is to put the seed in rows at desired depth and seed to seed spacing, cover the seeds with soil and provide proper compaction over the seed. The comparison between the traditional sowing method and the new proposed machine which can perform a number of simultaneous operations and has a number of advantages. As day by day the labor availability becomes the great concern for the farmers and labor cost is more, this machine reduces the efforts and total cost of sowing the seeds.

**Key words:** Multi-Seeding, Multi-Drive, Easy to Operate

## I. INTRODUCTION

The major occupation of the Indian rural people is agriculture and both men and women are equally involved in the process. The agricultural industry has always been the backbone of India's sustained growth. As the population of India continues to grow, the demand for produce grows as well. It has to support almost 17% of world population from 2.3% of world geographical area and 4.2% of world's water resources. The present cropping intensity of 137% has registered an increase of only 26% since 1950-51. Seed sowing machine is a device which helps in the sowing of seeds in the desired position hence assisting the farmers in saving time and money. The paper discusses different aspects of seed sowing machine which will be helpful for the agriculture industry to move towards



## II. HISTORY

While the Babylonians used primitive seed drills around 1500 BCE, the invention never reached Europe. Multi-tube iron seed drills were invented by the Chinese in the 2nd century BCE. In the Indian subcontinent, the seed drill was in widespread use among peasants by the time of the Mughal Empire in the 16th century. The first known European seed drill was attributed to Camillo Torello and patented by the

Venetian Senate in 1566. A seed drill was described in detail by Tadeo Cavalina of Bologna in 1602. However, seed drills of this and successive types were expensive and unreliable, as well as fragile. Early drills were small enough to be pulled by a single horse, and many of these remained in use into the 1930s. The availability of steam, and later gasoline tractors, however, saw the development of larger and more efficient drills that allowed farmers to seed ever larger tracts in a single day. Recent improvements to drills allow seed-drilling without prior tilling. This means that soils subject to erosion or moisture loss are protected until the seed germinates and grows enough to keep the soil in place. This also helps prevent soil loss by avoiding erosion after tilling. The development of the press drill was one of the major innovations in pre-1900 farming technology. Drilling is the term used for the sowing of an agricultural crop. Their many way for seed sowing over the years all the method is traditional. To make a growth in the agricultural field modern method has to be used.



## III. TYPES OF SOWING

The following are the three different types of seed sowing:

### A. Broadcasting:

A field is initially prepared with a plough to a series of linear cuts known as furrows. The field is then seeded by throwing the seeds over the field, a method known as manual broadcasting. The result was a field planted roughly in rows, but having a large number of plants. When the seeds are scattered randomly with the help of hand on the soil, the method is called broadcasting.

### B. Drilling:

Drill sowing and dribbling (making small holes in the ground for seeds) are better method of sowing the seeds. Once the seeds are put in the holes, they are then covered with the soil. This saves time and labor and prevents the damage of seeds by birds

Another method of sowing the seeds is with the help of a simple device consisting of bamboo tube with a funnel on it attached to a plough. As the plough moves over the field the tube attached to it leaves the seeds kept in the funnel at proper spacing and depth. The plough keeps making furrows in the soil in which the seeds are dropped by the seed drill.

#### IV. OBJECTIVE

- 1) To manufacture seed sowing machine which can be operated by the single operator.
- 2) To level the ground in small extent
- 3) To enable the machine for the sowing of several of seed like wheat, potato, beans etc
- 4) To maintain the same distance between two seeds at the time of sowing process.

#### V. SCOPE

Seed sowing machine is a device which helps in the sowing of seeds in the desired position hence assisting the farmers in saving time and money. So considering these points related to spraying and seed sowing an attempt is made to design and fabricate such equipment which will able to perform operations more efficiently and also will result in low cost. Decrease the operational cost by using new mechanism.

- 1) Work reliably under different working conditions
- 2) Decrease the cost of the machine.
- 3) Decrease labor cost by advancing the spraying method.
- 4) The machine can be operated in the small farming land (1 acre).

#### VI. FACTORS AFFECTING SEED EMERGENCE

- 1) Mechanical factors, which affect seed
- 2) Germination and emergence are:
- 3) Uniformity of depth of placement of seed.
- 4) Uniformity of distribution of seed along rows.
- 5) Transverse displacement of seed from the row.
- 6) Prevention of loose soil getting under the seed.
- 7) Uniformity of soil covers over the seed.

To achieve the best performance from a seed drill or planter, the above factors are to be optimized by proper design and selection of the components required on the machine to suit the needs of the crops. The seed drill or planter can play an important role in manipulating the physical environment. The metering system selected for the seed should not damage the seed while in operation.

#### VII. FUNCTIONS OF SEED-DRILLS AND PLANTERS

The functions of a well-designed seed drill or planter are as follows:

- 1) Meter seeds of different sizes and shapes;
- 2) Place the seed in the acceptable pattern of distribution in the field;
- 3) Place the seed accurately and uniformly at the desired depth in the soil; and
- 4) Cover the seed and compact soil around it to enhance the germination emergence

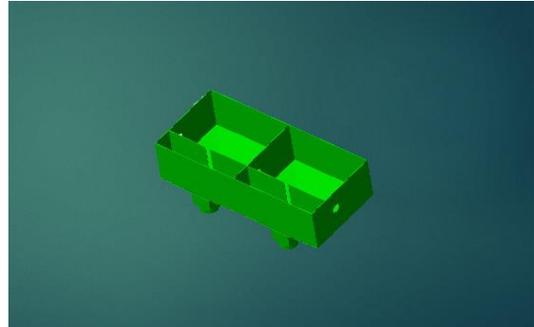
#### VIII. DEVELOPMENT OF SEED DRILL MACHINE

##### A. Drum

A storage container used to collect granular materials designed to easily dispense these materials through the use of chute to restrict flow and gravity.

Length - 50cm

Width - 40 cm



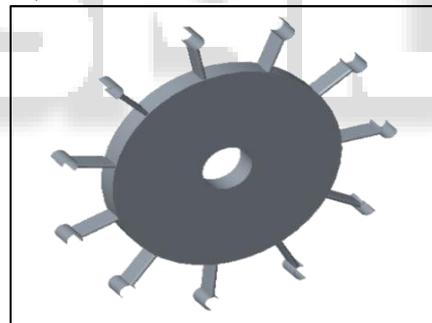
##### B. Seed Meter Mechanism:

Seed metering are those system that meter the seed from the seed box and deposit it into the delivery system (plunger) that conveys the seed for placement.

Here we use plate for metering system .there are three different type of plate for different purpose of use

##### 1) Plate 1

It is also called small plate because it is used for small size of seed of size between (0.2-0.7cm) like wheat or grain. Plate is connected with 7 spoons for small seed like peanut, wheat, soybeans etc,

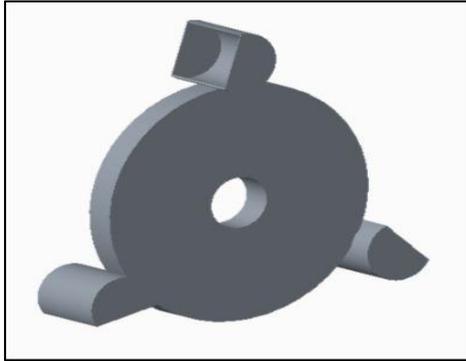


Seed's that can be used in this plate are

Name of seeds	Distance	Depth
Soybean	10-15	2.5-4cm
Corn	15-20	2.5-3cm
Pea	15-20	2.5-3 cm
Gram	10-15	2-2.5cm
Peanut	15-20	2.5-4cm
Wheat	15-20	4-5 cm
Mung bean	10-15	2.5-4 cm
Udatbean	10-15	2.5-4 cm
Jowar	10-15	

##### 2) Plate 2

It is also known as bigger plat because it is used only for potato size between (4-5cm) Plate is connected with 3 spoons for the potato seed.



It's only for potato size between (5 -6cm)

Diameter of plate – 25cm

Hole size – 4 cm

Spoon size – 5 cm

3) *Calculation of seed metering system*

Diameter of plate : 12cm.

Circumference of plate: 37cm.

Required space between two seed is: 5cm.

So, Required number of spoon in plate :

**Circumference of plate**

**Required space between two seed** : 37/5

: 7.4 say 7.

Angle between two spoons is :

**Angle of circular plate**

**Required number of spoon in plate** : 360/7

: 51.4 say 52.

So, to maintain the distance between two seed

Which is 5cm. Angle between two spoon should be 52.

– For one rotation of plate 7gm of seed (Wheat) is required.

In one rotation of plate it covers : 37cm

:  $\frac{700}{37}$

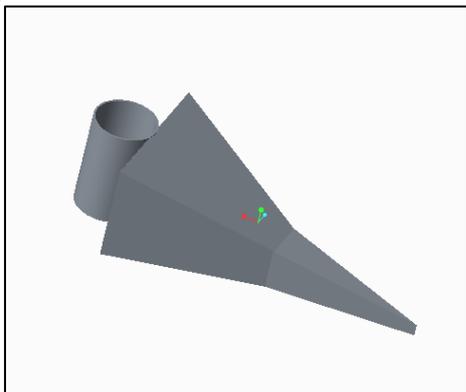
: 18gm

So, there is two plate in machine = 18x2

36gm of Wheat required in 1m field.

*C. Plunger Mechanism:*

Plunger mechanism is used for digging and seeding. Can be arranged according to the required length of the field. Different type of seed have different depth requirement. It has a sliding mechanism.



*D. Wheel and axle*

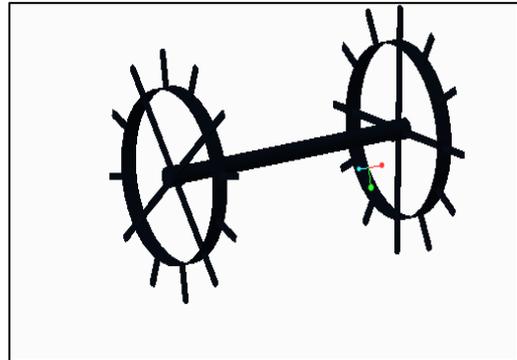
Main power of machine is comes from power wheel. Once person push machine, power wheel rotates according to speed of machine.

Diameter – 50 cm.

Number of sticks in the wheel = 4.

Number of gripping sticks in the wheel = 12.

Length of axle shaft = 100 cm.



## IX. CONCLUSIONS

During each complete revolution of wheel. When the seed fall from the drum and plantation process take place without wastage of time .This manual seed machine is greatly increases productivity. Proper control of the seed distribution with less loss of seed and less wastage of time. Proper utilization of seed across the field. Increases the rate of work and decreases the obstacle while planting the seed. By using innovative seed sowing method we can save more time required for seeding process. And also it reduces lot of laborer cost. It is very helpful for small scale formers. And it result in as less costly.

As engineers we appreciate how does technology affect our life in a positive way, since the technology and mechanical engineering has changes our world and we are living in the speed, where time is important everyone everywhere are looking forward to do their business with less effort and short time.

## X. FUTURE SCOPE

- 1) We can also use it for fertilizing.
- 2) Electric alarm can be implanted in the drum for any problem occurs.
- 3) Indicator can be acquired in Hopper for limit indication.
- 4) While any obstacle alarm can alert

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