

# AUTOMATIC SEED DRILL MACHINE TO AVOID SOIL BLOCKAGE

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## Abstract

Today's era is marching towards the rapid growth of all sectors including the agricultural sector. To meet the future food demands, the farmers have to implement the new techniques which will not affect the soil texture but will increase the overall crop production. This Paper deals with the various sowing methods used in India for seed sowing and fertilizer placement. The comparison between the traditional sowing method and the new proposed machine which can perform a number of simultaneous operations and has 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 and fertilizer placement.

Keywords-

1) Seed sowing 2) fertilizer 3) agriculture 4) demands 5) simultaneous operation

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## 1. INTRODUCTION

Agriculture has been the backbone of the Indian economy and it will continue to remain so for a long time. It has to support almost 17 percent of world population from 2.3 percent of world geographical area and 4.2 percent of world's water resources. The present cropping intensity of 137 percent has registered an increase of only 26 percent since 1950-51. The net sown area is 142 Mha. The basic objective of sowing operation is to put the seed and fertilizer in rows at desired depth and spacing, cover the seeds with soil and provide proper compaction over the seed. The recommended row to row spacing, seed rate, seed to seed spacing and depth of seed placement vary from crop to crop and for different agricultural and climatic conditions to achieve optimum yields and an efficient sowing machine should attempt to fulfill these requirements. In addition, saving in cost of operation time, labor and energy are other advantages to be derived from use of improved machinery for such operations. A traditional method of seed sowing has many disadvantages. This paper is about the different types of methods of seed sowing and fertilizer placement in the soil and developing a multifunctional seed sowing machine which can perform simultaneous operations

### 1.1 Need of Project

So there is the need to make a machine which can perform the following operations,

1. Seed bed preparation
2. Seed sowing
3. Fertilizer placement
4. Leveling of soil

## 2 LITERATURE REVIEW

Kyada A et al. [1]:

This research paper presents design and development of manually operated seed planter machine. In this they present objective of seed planter machine design, factors affecting seed emergence, some mechanisms. The basic objective of sowing operation is to put the seed and fertilizer in rows at desired depth and seed to seed spacing, cover the seeds with soil and provide proper compaction over the seed. The recommended seed to seed spacing and

depth of seed placement vary from crop to crop and for different agro-climate conditions to achieve optimum yields. From this we know that mechanical factors effects on seed germination like uniformity of depth of placement of seed, uniformity of distribution of seed along rows. In this power transmission mechanism, seed meter mechanisms, plunger mechanism etc. mechanisms" are used. The working as machine is pushed; power wheel is rotating which transmit power to plunger through chain and sprocket mechanism. Now cam is mounted on sprocket shaft which push plunger towards downward direction. Once plunger is penetrate in soil and during backward stroke flapper is opened so seed get separated from plunger and inserted in dig. From this we get idea that if we use the belt having small holes with defined thickness then it is beneficial for our project. As our automatic seed feeder is only for small seeds then using of conveyor belt with motor is useful.

**Ramesh D et al. [2]:**

This research paper present "Agriculture Seed Sowing Equipment: A Review". The present review provides brief information about the various types of innovations done in seed sowing equipment. The basic objective of sowing operation is to put the seed and fertilizer in rows at desired depth and seed to seed spacing, cover the seeds with soil and provide proper compaction over the seed. In this multipurpose seeding machine equipment consists of cylindrical shape container in which the seeds can fill. The container is attached on the four wheeled carrier assembly. It consists of metering plate bevel gear mechanism and two holes at the bottom depending on seed size. The working as plate will rotate in container when the bottom holes of container and meter plate hole coincide seeds will flow through pipe to soil. Here the metering plate gets rotating motion by bevel gear assembly and the bevel gears get the motion by rear wheels with the help chain and sprocket assembly.

**Marode A et al. [3]:**

This research paper represents "Design & Implementation of Multi Seed Sowing Machine" .In this paper gives types sowing machine. The following are the three different types of seed sowing are 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. Dribbling: 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.

**2.1 PROBLEM DEFINITION**

- 1) In manual seeding, it is not possible to achieve uniformity in distribution of seeds.
- 2)The effect of inaccuracies in seed placement on plant stand is greater in case of crops the above problems can be overcome by used of the block less Automatic Seed Drilling.
- 3)The presence or absence of plant roots that directly resist penetration.

**2.2 OBJECTIVE**

1. To achieve proper distance in two seed in seeding mechanism for proper nutrition and growth of plants.
2. To make this machine which operate manually for small farmer .
3. To provide this machine in lowest cost and light in weight.
4. To adjust proper depth in variable soil in any whether condition.

### 3 Methodologies

#### 3.1 SELECTION OF MECHANISM

**3.1.1 Mechanism:** - As we know, any machine consists of structure (frame) and mechanism. In our project, mechanism is required to convert the rotary motion of main wheels into the oscillating motion or reciprocating motion. The mechanism which converts rotary motion to reciprocating motion is the “slider crank mechanism”. Taking into consideration our project concept requirement, this will provide the required output motion.

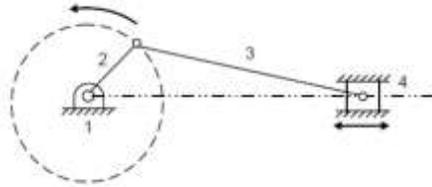


Fig 2.1 Slider crank mechanism

#### 3.2 WORKING

Now a day the farmer mostly drill the seed in the farm by using automatic seed drilling machine because of that using the automatic seed drilling machine the human effort and accuracy problem is reduced. But, while using this machine some another problem i.e. blocking of seeds. It means when you are going to drilling the seed, the property of soil is effect on drilling process and out of that soil moisture it is the most important property of soil due to this the soil is stick on the pipe while seed drilling and blocking of seed is occurs and it directly effect on the farmer productivity.

When operation are being done and if there will any obstruction of uneven soil surface are come in path and soil sticks on the pipe opener and flow of seeds stop due to this the distance between two seeds in row increases and gap created. The problem of blocking is can be detect when the pipes fill of seed at particular level. This problem of blocking is solved by the mechanism as working below. When end wheel are rotates and transmit the rotary motion of it to the crank. Due to the rotation of crank the connecting rod transmit this motion and convert it into sliding motion of outer pipes.

Outer pipes has square rod attached inside it, that also reciprocate in slot of inner pipe and soil and other particle stick on pipes opener is removed and pipe will be free to flow the seed



Fig 3.1 Working

### 3.3 Components

- **Inner pipes and outer pipes:-**

In this mechanism to pipes are connected by web having a drilled hole. The web provided between pipes is also support the total load acted on the wheel. This pipes are stationary, on the upper side of this pipe two flexible fiber pipe with narrow opening are attached to provide flow of seeds. the three slots on each pipes at  $120^\circ$  are cut at the bottom side of the pipes axially for providing the way to reciprocate square rods which removes the stick soil.

Two outer are connected by webs having rods to connect the connecting rod. This pipes are reciprocates on the inner pipes and square rods which is welded inside it in  $120^\circ$  axially also reciprocate inside the slots on the inside pipes. The diameter of outer pipe is more than inner pipe to provide clearance for reduce friction between pipes.



Fig.4.1 Inner and Outer pipes

- **Crank**

A crank is an arm attached at right angles to a rotating shaft by which reciprocating motion is imparted to or received from the shaft. It is used to convert circular motion into reciprocating motion, or vice versa. The arm may be a bent portion of the shaft, or a separate arm or disk attached to it. Attached to the end of the crank by a pivot is a rod, usually called a connecting rod. The end of the rod attached to the crank moves in a circular motion, while the other end is usually constrained to move in a linear sliding motion



Fig 4.2 Crank

- **Ground Wheel**

Ground wheel is the power generation device. It is attached with tiller. It has a circular disc. Teeth's are provided on the periphery of the disc. It is provided to make a fine grip with the land. When the tractor is moved ground wheel also rotated. This motion can be transferred to the main shaft through power transmission system.



Fig 4.3 Ground wheel

- **Connecting rod**

Connecting rods may also convert rotating motion into reciprocating motion. Historically, before the development of engines, they were first used in this way. As a connecting rod is rigid, it may transmit either a push or a pull and so the rod may rotate the crank through both halves of a revolution, i.e. pipes pushing and pipes pulling. Earlier mechanisms, such as chains, could only pull.



Fig. 4.4 Connecting rod

### 3.4) ADVANTAGES

- 1) This mechanism reduces effort of person to avoiding the blockage of seed and fertilizer pipe of seed drilling machine.
- 2) This mechanism can be easily implemented on various types of seed drilling machine.
- 3) The empty space produce due to uneven seed feeding is minimize by this mechanism.
- 4) The seed placement is uniform over the entire period of time.
- 5) During khariffseason placement of seed or distribution of seed at uneven depth may result in poor seed and fertilizer drilling so this mechanism avoids it.
- 6) Increases the productivity of farm.

### 3.5) DISADVANTAGES

- 1) Due to greater soil moisture and density, then difficulties occurs in mechanism.
- 2) Due to implement this mechanism the power requirement is increases.
- 3) More Maintenance is required.

### 4) Result and Discussion

In earlier seed sowing machine the blockage of seed occurs while sowing is mostly arise and due to that seed is not properly sowing and empty space occur because of these problem the productivity decrease loss of seed is high. We know that the cost of seed is very high due to this problem the effect is directly faced by farmer.

After applying this mechanism on seed sowing machine the problem of empty space in a row and blocking of seed is eliminated and also gives more productivity.

## 5) CONCLUSION

From the trial taken of fabricated mechanism we come to conclusion that the seed drilling machine can work efficiently with the help of our mechanism by using this mechanism the seed distribution is uniform and the problem of the empty space in row and blocking of seed and fertilizer pipe are eliminated. Hence after comparing different method of removing soil sticking problem on opener manual and limitation of soil sticking is eliminate; it is concluded that mechanism for seed drilling machine can assure.

- 1) Productivity of seed is increases.
- 2) Problem of blockage is solved by the mechanism.
- 3) Empty space produced due to uneven seed feeding is minimize by the mechanism.
- 4) If the uneven seed is then again we have to done sowing this have take so much time and efficiency due to this mechanism this problem is minimizes.

## 5.3) ACKNOWLEDGMENT

It gives us immense pleasure to present paper titled “Literature Review on Automatic seed sowing machine to avoid soil blockage”. We are highly thankful to our honorable guide Prof. N. G. Metange, Department of Mechanical Engg., STC SERT Khangon for his help and encouragement. We are highly obliged to him for his invaluable guidance and contribution to the project.

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