

Fabrication of Seed Sower and Leveler

G Senthilkumar¹, B.Govindarajan², R.Mukesh Ananth², D.Ramesh²,
M. Thoufeek Ahamed²

¹Associate Professor,
Department of Mechanical Engineering,
Bannari Amman Institute of Technology, Sathyamangalam.
²UG Scholar,
Department of Mechanical Engineering,
Bannari Amman Institute of Technology, Sahtyamangalam.

Abstract: Agriculture plays a significant role in India. Today India is one of the leading country in farm output. In the farming process, most of the farmers are following the conventional method of seed sowing. In this method, more labours are needed to plant the seed in which the availability is more also consumes more time to complete the process. Using this conventional seed sowing method, the production of food in order to meet the demand of people is not satisfied to some extent. To overcome the above, a small project has been fabricated which will reduces the time taken to place the seeds thus increase the rate/ of crop production. This project doesn't affect the soil growth but to increase the crop production. By comparing this project with the conventional method, it needs less labour consumption also minimum wastage of seeds.

Keywords: Agriculture, seed feed rate, seed sowing, crop production, soil growth

1. Introduction

Agriculture is the major occupation of the Indian rural people. Basically agriculture sector is the backbone of India's sustained growth .Mostly, Farmers in India work in an agriculture field manually .Precision seeding reduces wastage of seeds and increase production rate. To increase precision seeding various industries are developing various automatic machines which reduce overall cycle time & cost of labor. 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 basic objective of sowing operation is to put the seed in rows at desired depth, spacing, cover the seeds with soil and provide proper compaction over the seed. As the population of India continues to grow, the demand for produce grows as well. Multiple cropping on the farms and this, in turn, requires efficient and high-capacity machines. Mechanization of the Agricultural industry in India is still in a stage of infancy due to the lack of knowledge and the unavailability of advanced tools and machinery. In traditional methods seed sowing is done by broadcasting manually, opening furrows by a plough and dropping seeds by hand.

2. Literature Review

Marode A et al. [1] states that the three different types of seed with a plough to a series of linear cuts known as furrows. 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.

Olimpia Pandia et al. [2] states that pneumatic equipment for sowing small seeds in cups, highlighting the advantages of this type of equipment with superior parameters obtained from the considered crops.

Cristian IACOMI et al. [3] states that Mechanically driven seed metering devices currently perform their function efficiently and are a good solution to the problem of metering rates as seed is planted, but there are many voids that could be filled with a substantial change to the metering process.

Ramesh D et al. [4] states that 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.

3. Methods and Equipments

3.1 Traditional Methods of Seed Sowing

3.1.1 Dibbling

This method involves making of small holes in the ground for seeds. Seeds are covered in the soil manually. Which prevents the damage of seeds .Dibbling can be done with the help of hand tool or bamboo stick.

3.1.2 Broadcasting

This method involves scattering of seeds randomly with the help of hand. For this method land must be prepared. This land is prepared with the help of plough to a series of linear cuts, which is known as furrows. The crops like wheat, paddy, coriander, fenugreek etc are sown by broadcasting.

3.1.3 Putting Seed Behind Plough

This method involves the use of plough and animals for planting the seed. The plough is driven with the help of animals and seeds are fed manually within furrows created by plough. The crops like wal or gram etc are sown by this method.

3.1.4 Nursery

Now day's nurseries for various types of crops are used. Nursery is the part of agriculture sector. Above methods are not efficient to get proper production in several conditions because seed doesn't get proper environment and there will be wastage of seeds. So to avoid this wastage of seeds, seeds are firstly sown in nursery. After some time plants grown from seeds are used in prepared land.

3.2 .Seed Seeding Equipments

3.2.1 Rotary Diddler

The rotary dibbler is a manually operated push type device for dibbling of medium and bold size seeds. It consists of a rotating dibbling head with penetrating jaws, covering-cum-transport heel, seed hopper with cell type wooden roller and a handle. Except seed roller, which is made of good quality wood, all the other parts are fabricated from mild steel. The number of jaws varies from five to eight among various designs, depending upon seed to seed distance. For its operation, the hopper is filled with seeds and transport-cum covering wheel is drawn to rear side. The dibbler is then pushed forward in the direction of travel with covering cum transport wheel behind the dibbling head. The jaws penetrate into the soil and automatically drop the seeds. It is used for sowing of medium and bold vegetable and cereal seeds.

3.2.2 Manual Seed and Fertilizer Drill

This is a small manually operated single row seed cum fertilizer drill in which fluted roller metering mechanism is provided. A ground wheel is provided to drive the metering rollers. Seed and fertilizer are stored in a small hopper and a long beam is provided by which the implement could be pulled by one operator. Another worker guides the machine. Due to the provision of fluted rollers, it is suited for drilling soybean maize, pigeon pea, sorghum, green gram, Bengal gram, wheat etc. Shoe type furrow openers are provided for easy operation. It is suitable for drilling seeds of soybean, wheat etc along with fertilizer.

3.2.3 Manual Oilseed Drill

The equipment consists of a seed box attached to the main frame of a hand wheel hoe. A fluted roller assembly is provided at the bottom of the seed box. Fluted roller is rotated with the help of chain and sprockets from the ground wheel. The seed rate can be adjusted with the help of a lever provided on the seed box. The fluted roller used for sowing rape seed and mustard has 8 flutes. Each flute is 3 mm wide and 2 mm deep. The diameter of the fluted roller is 50 mm and its length, 32mm. For operation, the machine is pulled by rope attached to the hook of machine by one man and other person steers the machine by holding it by the handle. Manual oilseed drills are used for sowing rapeseed and mustard. By changing the fluted roller Position, other crops like wheat, moong etc. can also be sown. It is also suitable for inter-row sowing.

3.2.4 Animal Drawn Seed Cum Fertilizer Drill

It is a low cost line-sowing device in which the seed and fertilizer -are metered by the operator. The rate of metering depends upon the skill of the operator. Tiphon refers to three row sowing device. The drill consists of a frame made of mild steel box iron sections. The furrow openers, funnels for feeding seed and fertilizer, hoses for connecting funnels with pipes mounted on furrow openers, hitch assembly and handle are mounted on this frame. The distance between the rows can be adjusted by moving the furrow openers. For operation, the seeds and fertilizer are fed by the operator manually in the funnels, which flow to the bottom of the furrow openers and in the boot attached to the rear of shank respectively. Since the drill does not have a separate hopper, seeds have to be carried separately in a bag slung on the shoulder or the back of the operator. It is used for line sowing of cereal and other crops.

4. Fabrication

4.1. Manufacturing Processes Used

No. of Mechanisms

- CAM and Follower
- Chain drive

Manufacturing Process

- Arc Welding
- Cutting Operation

The complete assembly of the model is shown in the following figure 1 and the components are listed below

1. Wheel
2. Shaft
3. CAM
4. Spur Gear
5. Funnel
6. Chain
7. Leveler
8. Plough

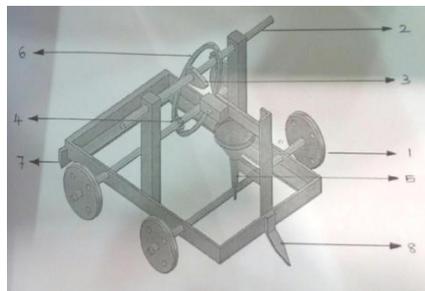


Figure 1: Complete assembly of seed sower

4.2. Components

4.2.1 Wheels

Wheels are used to carry the whole assembly from one place to another place in the field. Wheels are made up of hard plastics. It also transmits the power to cam shaft.

4.2.2 Spur Gear

In this two spur gears were used. One spur gear is attached to the shaft of the wheel and the another spur gear is attached to the cam shaft which is located above from the base. Depends upon the teeth in the gear the chain is selected.

4.2.3 Chain

Chain connects the spur gears from the wheel shaft to the cam shaft. Chain is used to transmit the power produced by the wheel to the cam.

4.2.4 CAM

Cam is used to drop the seeds in a specific interval of time for every one rotation. Depends upon the spacing of seeds the size of the cam may differ.

4.2.5 Funnel and Pipe

Funnel is used to carry the seeds, after every interval of time when the rod gets move upwards the seed gets fall to the land through the pipe.

4.3 Working

The working principle of this machine is very simple and requires only one man to operate it. It is a single row-seeding device suitable for sowing different crops. Seeding is accomplished by just pushing the device in a forward manner. The sowing operation is to put the seed in desired depth and seed to seed spacing, when the machine is pushed, with the help of cam the seeds are feed in to the ground at correct rate and distance. By rotating the cam in clockwise direction and which get a rotating motion with the help of rear wheels connected through chain sprocket, chain and bevel gear assembly. The arrangement made in such a way that we can control the depth of sowing. With the help of this machine the formers can save lot of labor cost.

5. Conclusion

Comparing the different traditional seed sowing methods with the proposed machine and considering its limitations, it is concluded that,

- Seed and fertilizer flow rate can be controlled.
- Row spacing and seed spacing process can be achieved.
- Seed and fertilizer utilization can be done in proper manner with minimum loss.

By using the modern seed sowing equipments the time can be saved for seeding process and also reduces the labour cost. Seeds are placing in a uniform distance with each other.

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Author Profile



G Senthilkumar received the B.E. degree in Mechanical Engineering from Kongu Engineering College, Erode in 1999 and M.E. degree in Production Engineering from Government College of Technology, Coimbatore in 2001. He had completed his Ph.D. in Anna university, Chennai in 2015. Currently he is working as an Associate professor in the department of Mechanical Engineering at Bannari Amman Institute of Technology, Sathyamangalam.



B Govindarajan studied the II year B.E. degree in Mechanical Engineering from Bannari Amman Institute of Technology, Sathyamangalam.



R. Mukesh Ananth Studied the II year B.E. degree in Mechanical Engineering from Bannari Amman Institute of Technology, Sathyamangalam.



D. Ramesh studied the II year B.E. degree in Mechanical Engineering from Bannari Amman Institute of Technology, Sathyamangalam.



M. Thoufeek Ahamed studied the II year B.E. degree in Mechanical Engineering from Bannari Amman Institute of Technology, Sathyamangalam.