

Agriculture Seed Sowing Equipments: A Review

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ABSTRACT

The present review provides brief information about the various types of innovations done in seed sowing equipments. 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 row to row spacing, seed rate, seed to seed spacing and depth of seed placement vary from crop to crop and for different agro-climatic conditions to achieve optimum yields. Seed sowing devices plays a wide role in agriculture field.

Keywords: Seed sowing equipments, seed metering device, Seed spacing.

1. INTRODUCTION

The agricultural 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. Hence, there is a greater need for multiple cropping in the farms and this in turn requires efficient and time saving machines. The paper discusses different types of seed sowing

machine which will be helpful for the agriculture industry to move towards mechanization.

Traditional Sowing Methods: Traditional methods include broadcasting manually, opening furrows by a country plough and dropping seeds by hand and dropping seeds in the furrow through a bamboo/metal funnel attached to a country plough. For sowing in small areas dibbling i.e., making holes or slits by a stick or tool and dropping seeds by hand, is practiced. Multi row traditional seeding devices with manual metering of seeds are quite popular with experienced farmers. In manual seeding, it is not possible to achieve uniformity in distribution of seeds. A farmer may sow at desired seed rate but inter-row and intra-row distribution of seeds is likely to be uneven resulting in bunching and gaps in field.

Traditional sowing methods have following limitations:

- In manual seeding, it is not possible to achieve uniformity in distribution of seeds.
- A farmer may sow at desired seed rate but inter-row and intra-row distribution of seeds is likely to be uneven resulting in bunching and gaps in field.

- Poor control over depth of seed placement. Labor requirement is high because two persons are required for dropping seed and fertilizer.
- The effect of inaccuracies in seed placement on plant stand is greater in case of crops

2. DIFFERENT TYPES OF SEEDING EQUIPMENTS

ROTARY DIBDLER:



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.

Specifications:

Seed	Metering cell type wooden roller, six cells
Weight (kg)	21.5
Seed placement device	jaw type
Jaw spacing (mm)	225
Capacity (ha/day)	0.6 to 1.0
Labor requirement (man-h/ha)	27

Uses: For sowing of medium and bold vegetable and cereal seeds

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.

Specifications:

Length (mm)	1800
Width (mm)	600
Height (mm)	950
Weight (kg)	17
Metering roller diameter(mm)	147
Operating speed(km/h)	2.6
Labor requirement (man-h/ha)	40

Uses: It is suitable for drilling seeds of soybean, wheat etc along with fertilizer.

MANUAL OILSEED DRILL:



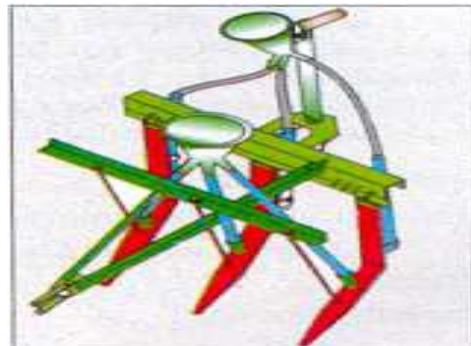
The equipment consists of a seed box attached to the main frame of a hand wheel hoe. A fluted roller assembly is provided at the bottom of the seed box. Fluted roller is rotated with the help of chain and sprockets from the ground wheel. The seed rate can be adjusted with the help of a lever provided 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.

Specifications:

Length(mm)	1270
Width(mm)	520
Height(mm)	1000
Weight (kg)	9.0
Power Transmission	Through chain and sprocket
Seeding mechanism	Fluted roller with narrow flutes
Hooper capacity(kg)	2

Uses: 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.

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. Tiphani 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.

Specifications:

Length× Width× Height (mm)	1180×865×1255
Weight (kg)	17
Capacity(h/day)	0.8-1.0
Weight (kg)	17
Power requirement	A pair of bullocks

Uses: it is used for line sowing of cereal and other crops

ANIMAL DRAWN SINGLE TYNE SEED CUM FERTI DRILL:



It is a single row line-seeding device drawn by a pair of bullocks. The drill consists, of a channel section made from flat iron and bent to the required profile, a shoe type furrow opener having wings under the frame, hitch assembly made of flat iron, handle attached to U section frame, funnels for feeding seeds and fertilizers and steel pipes for connecting the funnel to the shoe. The beam for connecting to the yoke can be adjusted with the help of multiple holes provided in the frame. For operation the seed drill is drawn by a pair of bullock and the

seed and fertilizer are placed by the operator in the respective funnels. Since the drill does not have a separate hopper, seed shave to be carried separately in a bag slung on the shoulder or the back of the operator.

ANIMAL DRAWN TOOL FRAME FOR SEEDING:



It is an attachment made for the bullock drawn CIAE multipurpose tool frame. The seeding attachment is suitable for sowing wheat, gram, pea, soybean, sorghum and pigeon pea. It can apply granular fertilizers like urea, DAP and Grow more. The hopper has compartments for fertilizer and seed and the ground wheel is a floating type thus enabling uniform seed placement even when the soil surface is not properly leveled. Separate side wheels allow accurate adjustment of the seed drill attachment and are also useful for transportation. It saves 73 per cent labor and operating time and 55 per cent on cost of operation compared to conventional method of sowing behind country plough or seeding by broadcasting. It also results in 10 to 18 per cent increase in yield compared to sowing by conventional method.

Specifications:

Length× Width× Height (mm)	4000×1200×1175
Weight (kg)	50(attachment body)

No. of rows	3
Seed metering	Fluted rollers, 4cm dia with 12 flutes
Power transmission	Through chain and sprocket
Furrow opener	Shoe type

Uses: The seeding attachment is suitable for sowing wheat, gram, pea, soybean, pigeon pea. It can apply granular fertilizer like urea.

MULTI PURPOSE SEEDING EQUIPMENT:



This equipment consists of cylindrical shape container in which the seeds can fill. The capacity of this container is up to 10kgs to 12kgs. The container is attached on the four wheeled carrier assembly. The

wheels made up with polymer material, container having a metering plate with easily fasinable with Allen keys, metering plate rotate in container, bottom of the container having a two hole and metering plate has number of holes depend on size of seed. The 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. The working principle of this machine is very simple and requires only one man to operate. It is a double row-seeding device suitable for sowing different crops. Seeding is accomplished by just pushing the device in a pre-established furrow. 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 metering plate the seeds are feed in to the ground at correct rate and distance. Here the metering plate rotates in anticlockwise 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.

Specifications:

Length × Width × Height (mm)	850 × 500 × 500
Weight (kg)	24
No. of rows	2
Seed metering	Rotating plate
Power transmission	Bevel gear, chain and sprocket
Power requirement	One person

Functions of Seed-drills and Planters:

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

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

Mechanical factors which affect the seeds:

- Seed damage during metering.
- Uniformity of depth of placement of seed.
- Uniformity of distribution of seed along rows.
- Transverse displacement of the seed from the row.
- Prevention of loose soil getting under the seed.
- Degree of soil compaction above the seed.

Selection of Sowing and Planting Machines:

Different designs of improved seed drills/planters have been developed for sowing of crops. Basic difference in the design of these seed drills is mainly in the type of seed metering mechanism and furrow openers. Therefore, it is essential to select the machine with a metering unit and furrow opener suitable for the crop and soil conditions.

- For small seeds like rape seed-mustered seed drill or planter with vertical roller with cells,
- Inclined seed plate with cells or small grooved fluted roller metering system is recommended.
- For medium seeds such as wheat, soybean, safflower and lin seed, seed drills with Standard fluted rollers are recommended.

ADVANTAGES SEEDIGN EQUIPMENTS

- With help of innovative seed sowing equipment the seed can feed in to the soil continuously without any restriction while in flowing of seed.
- Most of seed sowing equipments machines mentioned above required only one person to operate. Hence it reduces laborer cost.
- Overall Cost for seed sowing processes will be reduced by using this seed sowing equipments.
- These equipments can also be used for sowing different types of seeds. It is helpful for small and medium scale formers.

CONCLUSION

Innovative Seed sowing equipments has remarkable influence in agriculture. By using innovative seed sowing equipments 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.

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