

# A Review on Seed Sowing Method and Alternative Method for Small Farmers

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**Abstract:** The majority of Indian Population is dependent on agriculture and contributes about 17-18% of India's GDP. Sowing seed is the first major process in agriculture. Manually sowing seed is not effective as the uniform spacing between consecutive rows and plants cannot be maintained. Tractor aided seed drill is an effective way of sowing but is costly, not affordable, and requires high maintenance. This paper deals with the introduction of a seed sowing machine, which is easy to operate and can sow seeds in uniform spacing. It is made from scrap materials, so it is cheap and available for small farms. The primary purpose of this paper is to study traditional ways of sowing seed and suggest a machine to overcome limitations that we face in a traditional way of sowing seed. The available technique for seed sowing is of high cost, and seed and fertilizer rate can't be controlled in these machines. The price of the available methods is high, small farmers can't afford them, so there is a need to introduce a system that is lower at cost, easy to maintain and operate, and uniform spacing between plants and rows can be achieved. This machine reduces time consumption and labor requirement.

**Keywords:** BBF System, Affordable, Seed Sowing, uniform spacing between plants.

## 1. Introduction

The Majority of the Indian population depends on agriculture for livelihood. Agriculture is the backbone of Indian economy. The seed drill is a seed sowing machine that is used for sowing seeds and fertilizer at a particular depth and uniform distance and then covers them with soil.

Methods of seed sowing

1. Broadcasting sowing: In this method field area is prepared with plough into straight cuts called furrows, and then the seed is spread/thrown over field manually. This method requires 15-25% more seeds proper depth and uniform spacing can't be achieved.
2. Precision planting: In this method, a single seed was placed into soil at an equal distance. Wastage of seed was the least.
3. Dribbling sowing: In this method, Small holes are made in the soil, seeds are placed, and then seeds are covered with soil.
4. Drilling: In this method, seeds are dropped in-furrow lines in continuous flow and then covered by soil.
5. Seed dropping behind plough: It is a traditional and most common method used in the village. In this

method, Seeds are dropped using a bamboo tube placed behind the plough. It requires time and manpower.

6. Transplanting: In this method, small seed lines are made in the nursery, and this is planted in fields.

A few years back, the use of tractor aided seed drills has grown rapidly. It is an effective way of sowing, requires less time, but cost and maintenance is high. Farmers having less agricultural land could not afford such high prices. So it becomes crucial to develop an alternative method of seed sowing.

The manually operated seed drill is such development. This mechanism helps in sowing seeds and fertilizers with not much requirement of manpower. The need for effective seed sowing can be achieved. Seeds can be placed in the soil at perfect depth, and uniform spacing between seeds can be done. This mechanism should be lightweight, as it is pull type of seed drill. An average person could be able to pull it.

Seeds sowed in seedbox focus on rotating plates having grooves. Grooves are at a different distance to achieve row spacing. Plates can be changed as different seeds are of different diameter and different row spacing. The motive to make such a seed sowing mechanism is to make seed drills at affordable prices, which is effective and requires less maintenance.

A new technique called Broad Bed and Furrow (BBF) system has developed in recent years. In this method, 13 inches beds are formed having four rows of crops. It allows reducing seed rate (about 20-25%) while sowing and allows water to percolate into the ground and maintain the moisture of soil, which provides better conditions for the growth of the crop. In a condition of heavy rainfall; furrow allows draining excess water from the field which enables crops to be in maintained condition and in the condition of less rainfall it retains proper moisture in the soil for the growth of the crop. This technique allows farmers to implement various farm applications like weeding, spraying, fertilizer application, intercultural operation, irrigation, etc., and crop get proper aeration and sunlight. About 25-30% of water is saved by the implementation of this process. It has been proven that this is a time-saving process that increases the productivity of crops by 5-10%.

## 2. Literature survey

1) Shahzad Ahmed et al. [1] focused on solving the problems faced by the majority of Indian farmers which are poverty, illiteracy, low income, poor health, low productivity and adverse conditions of work. A machine named Seed Sowing Cart was developed, which was economical, affordable, multitasking, and user-friendly. The machine had width control (displacement along X-axis), depth control (displacement along Y-axis), and control of the linear distance between the seeds (displacement along Z-axis) so that these parameters can be altered according to different seeds by changing the diameter of the gear.

Conclusion: This Research paper presents a seed sowing Cart, which is a seed sowing machine. The main objective given was a need of a sowing machine to contribute towards the field of farming and ease problems of farmers. This machine was mainly used for sowing of wheat and soya bean in farms. This machine was designed to sow seeds and fertilizers in rows at desired depth and spacing, cover the seed with soil and provide proper compaction over the seed. They researched and found that higher yield can be obtained by using row spacing of 22.5cm as compared normal sowing width of 15cm. So the need for different spacings is necessary according to need which can be achieved with this machine. Special features in this machine ensure accurate seed rate control. When the machine is pulled base wheel is rotating the chain sprocket arrangement and seed were sowed using fluted roller seed metering device. Three wheels were used which provides better traction in wet fields. This gives us an idea that lightweight and more wheels are beneficial for wet farms.

2) Kalay Khan et al. [2] found that manual method of seed planting resulted in low seed placement, spacing efficiencies and severe backache for farmers which limit the size of the field that can be planted. So they focused on the design and fabrication of a manually operated planter sowing for different crop seed that is cheap, easily affordable by the rural farmers, easy to maintain, and less challenging to use. Their multi-crop planter has the capability of delivering the seeds precisely with uniform depth in the furrow, and also with consistent spacing between the seeds. Mild steel was used for most of the fabrication except for seed metering mechanism and the seed funnel and tube which was made from suitable quality nylon and rubber material respectively.

Conclusion: This research paper intended to introduce a planter machine to hand the farmer with the benefits of agricultural mechanization. A single row multi-crop planter machine was designed and fabricated, which was cheap, easily affordable, easy to maintain, and was less difficult to use. Adjustable handles of this planter helped to adjust the height of handles according to their height. This was useful to reduce drudgery. Limitations of single crop planter were eliminated, and different requirements for seed planting of different crops were fulfilled.

3) Tahir Iqbal et al. [3] focused on decreasing the costs of

production of agricultural machinery. The land holdings of farmers were found to be less than 5 hectares. For such small lands owning expensive agricultural machinery is not possible even though they increase the yield gigantically. They introduced a self-propelled multi-crop seed drill for wheat, soybean, and cotton. Seeds can be sowed at required depths and required spacing's and of different diameters. This self-propelled multi-crop seed drill is economically feasible for the adoption of small landholders. A power source of the 5.5hp engine was used for pulling so that minimal effort was required. The speed was matched with human walking speed so that only the necessary amount of fuel was burnt and the time of operation was minimized.

Conclusion: This paper aimed towards developing and testing an appropriate self-propelled multi-crop seed drill. To sow the seeds for a medium-sized farm, they used a power source which reduced the fatigue and increases productivity. Seeds were placed in the hopper and were placed at required depths and spacing's. The machine had less operational cost.

4) Thorat Swapnil V et al. [4] mainly covered the basic requirements of sowing machine which are sowing machine should be suitable to all farms, all types of crops, robust construction, also it should be reliable. Since long ago, the traditional method is used in India for farming. This method was found to be troublesome for large scale farms. So they designed a four-wheel robot system on which seed tank, sowing mechanism, and the metering device are installed to turn it into an automated operated vehicle. This machine had a little cost and was simple enough to be handled by an unskilled farmer. This article focused on the use of the advanced system for improving the agricultural processes such as cultivation on ploughed land, based on robotic assistance.

Conclusion: This paper is to introduce robotic assistance for carrying out seed sowing process. DC motors and circuits and sensors help the four-wheel robot to complete given tasks and avoid errors. Needs for reducing wastage of seeds is achieved by allowing the definite seed to fall in the hopper and smooth functioning of the sowing process.

5) Abdulrahman et al. [5] focused on automating the seed sowing process with the help of microcontrollers and making use of a robot. The success of crop production depends on timely seeding of these crops with reduced dull work of farm labor. The ultimate objective of seed planting using improve sowing equipment is to achieve precise seed distribution within the row. This microcontroller based system helped in on-farm operations like seeding and fertilizing at pre-designated distance and depths. The distance between the two seeds is controlled and varied by using a microcontroller. In this machine drilling process is done with DC motor and seed dropping in the land is done with the help of a two-port solenoid valve. All this process are displayed on LCD.

Conclusion: This Seed Sowing Robot makes use of electronic sensors and controllers to provide very precise sowing of seeds. Also, the spacing between the crops and seed

rate is controlled with the help of sensors, which increases yield and reduces wastage. Furthermore, operations performed were displayed on the LCD to monitor the robot. This automation may be used to improve the yield of farms.

6) Uday Veer Singh et al. [6] presented that farm mechanization is an essential element of agriculture. Mechanization helped in improving the utilization efficiency of other inputs, safety, and comfort of the agricultural worker, improvement in the quality and value addition of the produce. The primary objective of sowing operation is to put the seed in rows at desired depth and seed to seed spacing, cover the seed 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. Here in this study efforts are taken to design and develop a manually operated seed planting machine which is suitable for marginal land holdings and plant the seed at a specific distance with specific quantity and reduce the requirement of seed per unit area and with suitable furrow covering device.

Conclusion: This paper gives us the benefits of mechanization and the need for multi-crop machines which are efficient and time-saving. The use of traditional methods results in uneven distribution of seeds in inter-row and intra-row creating gaps in field and bunching. Different types of drill, such as manual seed and fertilizer drill, manual oilseed drill, single row manually operated multi-crop planter and low-cost maize planter, are discussed.

7) Suraj V Upadhyaya et al. [7] focused on implementing the new techniques which will not affect the soil texture but will increase the overall crop production. The intention was to solve problems such as dependency on ox driven machines, Musculoskeletal disorders, high cost of buying and maintenance, and handling of equipment due to excess weight. The growth of weeds was reduced by keeping the land between the row spacings undisturbed. The move from a conventional to a direct seeding system improved access to nutrients, competition with weeds, access to available moisture, and use of sunlight.

Conclusion: In this paper, traditional methods of sowing seeds are discussed, and the need for proper row spacings is specified. For maintaining row spacings, agricultural machinery has to be adopted. Suitable row spacings resulted in better absorption of resources and lesser growth of weeds. Uniformity in depth, distribution of seeds along rows, transverse displacement and soil coverage on the seed is necessary.

### 3. Alternative method for small farmers

A machine for small farms can be made which is a single or multiple row seed sowing machine that can operate by pushing/pulling the machine into farms. It should work with

cattle's also. It needs to be a small and robust machine. It should sow seeds of different diameter and to varying depths as per requirement. Seeds could be loaded in the hopper. The hopper can have grooved rollers attached to a horizontal shaft. This shaft can be attached to a ground wheel with a chain sprocket arrangement. This wheel should roll on the ground and rotate the grooved rollers which should pick the seed in the groove and throw seeds in pipes located in front. Furrow openers can be used to open furrows at required spacing's. The seeds should then travel through the tube and sowed at the desired depth. Then a strip attached at the end of this machine should cover the seeds with soil so that the seeds are protected from birds and heavy rain. Fertilizers can also be sowed alongside seeds. Adjustable handles can be attached to adjust the height as per height required by the operator.

### 4. Conclusion

Use of the proposed method above results in uniform spreading of seed over the field. Seed can be sown at uniform depth with uniform spacing between consecutive crop plants. Use of this method minimizes the wastage of seeds and fertilizers. Seed rate can be controlled by sowing. A single machine can be used for planting of different seeds having a different diameter. This machine increases productivity and is easy to operate and can be maintained by taking some precautions. This seed drill is more effective than traditionally used methods for seed sowing.

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