

A Review on “Design And Fabrication of Seed Sowing Shovel”

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Abstract- Cropping is important activity for any farmer and for large scale or small scale. In Automatic method of seed planting the machines are bigger in size, farmer who have small fields and can't afford machines for seed sowing can use small manual tools. This tool does not required much time. Hence, for achieving best performance from affordable manual tools, need to make proper design of the agriculture tool and also selection of the components is also required on the tool to suit the needs of farmer. The main objective of sowing operation is to place different seed in different rows as per our need while mixed-cropping, at proper position respective of other placed seeds in every row at particular depth. While in automatic seed sowing machine we can't achieve this objective. As per change in shape and size of various seeds the parameters like spacing between two seed, depth of seed, planting rate chances. This project is attempt to produce seed sowing tools which will reduce the cost of machine, cost of labour.

Keywords- Farming, farming tools, seed dispenser tool, small area farming, sowing

I. INTRODUCTION

Indian economy is based on agriculture. Cropping is important and tiresome activity for all farmers, and for large scale this is a long process, also it needs more workers[1]. Thus farming tool were developed to simplify the human efforts. In manual method of seed sowing, we get results such as less spacing efficiencies, low seed placement and serious back ache for the farmer. Hence for achieving best result from a seed planter, above limits should be optimized[2]. Thus we need to make proper design of the farming tool and also selection of the components which is required for the tool to suit the needs of crops. Agriculture is India's backbone. And for sustainable growth of India's development of agriculture plays important role. Due to India's growing population, demand of food is increasing rapidly. In agriculture we saw various tools. Also there traditional methods are there. Since long ago traditional method are used in India and India has huge man power. This manual planting methods are popular in villages of India. But for large scale farming this method is

very troublesome and time consuming. Thus more man power is required to complete the task within specified time which is expensive. Hence, there is need of developing such tool which will help the farmer to reduce his efforts while sowing.

Sowing tool should be suitable for all farms, all types of crops, robust construction, also it should be reliable, this is basic requirement of sowing tool. Thus we made sowing tool which is operated manually and reduces the efforts of farmers, thus increases the efficiency of sowing[3], and solved the problems encountered in manual seed sowing. With this tool we can plant seed which needs more spacing while planting. This increases planting efficiency. Raw materials are used to make it cost effective. We have simplified the design of tool so that untrained farmers can operate it effectively. Also this tool needs less maintenance.

1.1 Farming:-

Farming is growing crops by people for livelihood. It is a part of agriculture. Agriculture is being practiced from thousands of year, but no one knows exactly how old it is.[4] The development of farming gave rise to the Neolithic Revolution.

Agriculture and domestication probably first started in the fertile crescent (The Levant and Mesopotamia, The Nile valley)[5].

1.2 Sowing method used.

Dibbling:-Sowing procedure with dibbling. Dibbling is the process in which the seeds are placed in the holes at equal predetermined distances and depths. This procedure is usually done by dibble, planter or manually.[6]

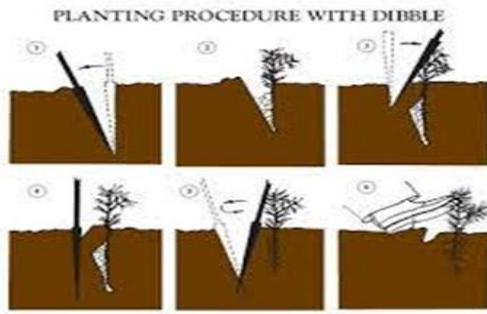


Fig.1 Dibbling method [7]

Drilling:-Drilling is a process of dropping seeds in rows and furrows. Rows and furrows of predetermined dimensions are made, seeds are dropped at a defined depth and distance, covered with soil.

1.3 Factors Affecting Seed Emergence.

Mechanical factors, that affect seed germination and emergence, are as follows:

- The depth of seed should be uniform with respect to placement of seed.
- The distribution should be done uniformly along the rows.
- Loose soil getting is also prevented.
- Soil is covered uniformly over the seed.

By following above factors we get best result of the seed sowing tool. To improve the performance we need to enhance the above factors so that we can get desired efficiency from the system in inexpensive way. The design is simplified and components are made from raw materials to make overall cost less. The dispenser used also serves the seed so that seed won't be damaged while working.[8]

1.4 Problem definition.

Planting the seeds means ploughing the field and sowing the seeds in it. Three steps are taken to sow the seed; spreading the seeds over the soil, and sowing the seeds into the soil, separate germination of seeds. This process takes more time and labour to complete the work. It being the area of required to be looked into. Therefore the aim was to design and develop a less expensive, so that it can be used in a easy way. The designing of parts were modeled using AutoCAD software and the assembly was done to finalize the proper spot of the components.

1.5 Methodology

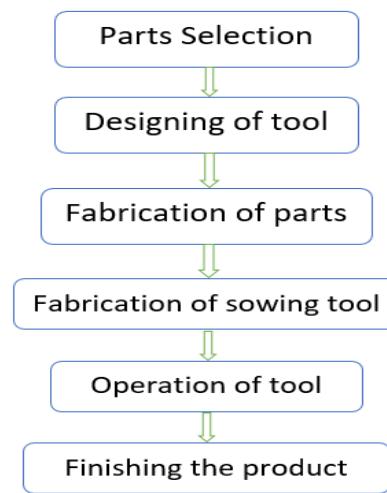


Fig.2 Methodology

II. OBJECTIVES

In short the objective is: -

1. The basic objective of sowing operation is to put the seed and fertilizer in rows at desired depth and seed to seed spacing.
2. Cover the seeds with soil and provide proper compaction over the seed.
3. To make a seed sowing tool which can be used for small farming area.
4. To make product budget friendly.

Overall, the focus of this project is to manufacture sowing tool from scrap, which reduces the overall cost.

III. LITERATURE REVIEW

Table no.1 Various reviews

Author	Content
Dr. C.N.SAKHALE, IRJET Volume: 03 Issue: 09 Sep-2016	Manufacturing "Multipurpose Agricultural Automobile (Farm Machine)" for small scale farms, less costing and using attachments one may perform various farming operations.
Thorat Swapnil V, IRJET Volume: 04 Issue: 09 Sep - 2017	Made sowing machine suitable to all farms, effective handling of the machine by any farmer. metering device and sensors is used, metering device and sensors.
Kiran K. Jadhao, IJARJET Vol. 6, Issue 5, May 2019	In this, design and fabrication of manually operated multiseed planter. This paper is attempt to produce highly efficient seed sowing machine which will reduce time of plantation, cost of labour, and enhances production.
R.Kathirava, IRJET Volume: 06 Issue: 06 June 2019	The Purpose is to maintain row spacing and control seed rate, control the seed depth and proper utilization of seeds.
Kiran K. Jadhao, IRJET Volume: 06 Issue: 04 April 2019	The proposed machine is fabricated to cost reduction, easy to maintain as well as reduces labour cost. Hence by using this machine we can flexible the distance and control depth variation for seed.
Kyada, A. R, AIMTDR December 12th–14th, 2014.	By using of this machine, achievement of flexibility of distance and depth variation for different seed plantation is possible.

A detailed review of the literature survey illustrate that the Seed sowing tool have a lot of potential in numerous diverse sectors of agriculture.

IV. COMPONENTS AND METHODOLOGY

Below we will see the details of components used and methodologies adopted during fabrication.

Table no.2 Specification of components.

Sr.no.	Components	Specification
1.	Shovel	135*1005 mm
2.	Dispenser	Diameter = 85mm, Height = 235 mm
3.	Bowden Cable	Length = 620 mm
4.	Hollow Tube	Diameter = 8 mm Length = 190 mm

4.1 Design

The models for each of the component were created in AutoCAD 2021 software. The shovel and dispenser were modeled as individual parts and then brought together as an assembly. To create the shovel/dispenser interface, the shovel was edited in the context of the assembly. This was done so the exact shovel/dispenser model could be created.

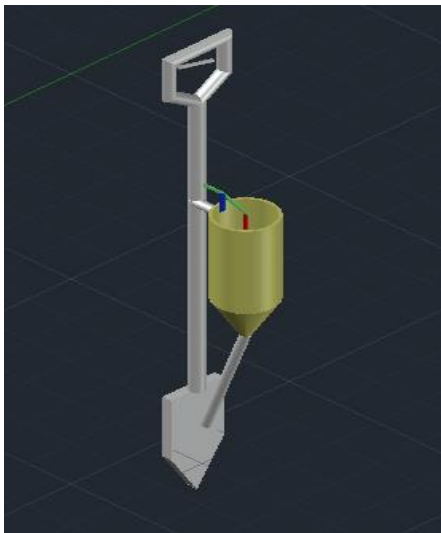


Fig.3 Proposed design

4.2 Construction:-

Firstly, shovel is used. A lever is attached to the handle of shovel which is connected to dispenser for open and close mechanism by bowden cable. Seed dispenser is mounted at the back of shovel to store the seeds. A hollow tube is connected to outlet of dispenser and the other end is free, from where the seeds get dispersed in the soil.



Fig.4 Fabricated product



Fig.5 Fabricated dispenser

4.3 Working:-

Insert the shovel in the soil from above, as per the required depth of seed respectively. Then push the shovel in forward direction so that it will create a space, press the lever, so that the open close mechanism will be operated and certain amount of seed will be dispersed, then release the lever. When the seed is dispersed, hollow tube which is connected to dispenser outlet will carry the seed as per given path. Once the

seed is dropped, remove the shovel so that the soil will cover up the seed.

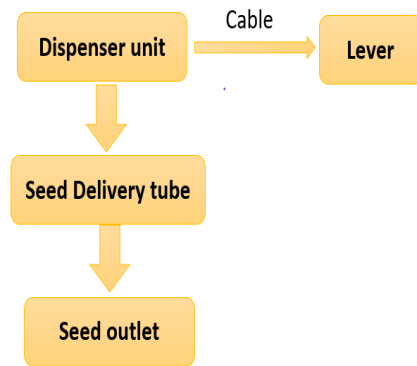


Fig.2 Block diagram of working

V. ADVANTAGES

Planting in rows at desired depth and seed spacing, covers the seed with soil and give proper compaction over the seed.

- Effective and time saving.
- Low in budget.
- Low maintenance.
- Easy to carry.
- Durable with low cost materials
- Proper compaction over the seeds is provided.

VI. APPLICATIONS

- It is used in farm for sowing seeds.
- It can be also used as a shovel.
- It can be used for gardening purpose.

VII. SUMMARY

The proposed design of machine is economical to fabricate and have greater design simplicity than its counterpart with proper seed placement at desired depth. Distance between rows with special featured to alter liner distance between seed. The fabrication and production of this design will lead to fulfillment of desired aims and objectives of a local farmers.

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