ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 6, Issue 5, May 2019

Mechanization of Manually Operated Seed Sowing Machine for small farming land

Kiran K. Jadhao[1], Avdhoot S.Narote[2], Pavan U.Shelke[3], Vishal N.Alladwar[4], Akshay S.Dhuldhule[5]
Associate Professor, Mechanical Engineering, B.N.C.O.E, Pusad, India1
UG Student, Mechanical Engineering, B.N.C.O.E, Pusad, India[2]
UG Student, Mechanical Engineering, B.N.C.O.E, Pusad, India [3]
UG Student, Mechanical Engineering, B.N.C.O.E, Pusad, India [4]
UG Student, Mechanical Engineering, B.N.C.O.E, Pusad, India[5]

Abstract: Cropping is important activity for any farmer and for large scale this activity is so lengthy also it needs more workers. In manual method of seed planting, we get results such as low seed placement, less spacing efficiencies and serious back ache for the farmer. Hence, for achieving best performance from a seed planter, need to make proper design of the agriculture machine and also selection of the components is also required on the machine to suit the needs of crops. The main objective of sowing operation is to place seed at proper position respective of other placed seeds in every row at particular depth. As per change in shape and size of different seeds the parameters like distance between two seed, depth of seed, planting rate chances. . This paper is attempt to produce highly efficient seed sowing machine which will reduce time of plantation, cost of labour, and enhances production.

Keywords: seed sowing machine, seed spacing, low cost, small land

I. INTRODUCTION

Indian economy is based on agriculture. Cropping is important and tedious activity for any farmer, and for large scale this activity is so lengthy also it needs more workers. Thus agriculture machines were developed to simplify the human efforts. In manual method of seed planting, we get results such as low seed placement, less spacing efficiencies and serious back ache for the farmer. This also limited the size of field that can be planted. Hence for achieving best performance from a seed planter, the above limits should be optimized. Thus need to make proper design of the agriculture machine and also selection of the components is also required on the machine to suit the needs of crops.Development in agriculture leads to raise economic status of country. In India farmers are facing problems due to unavailability of labours, traditional way of farming using non efficient farming equipment which takes lot of time and also increases labour cost. This is all about enhancement in seed sowing and fertilizer like farming operations by using manual operated seed sowing machine. The main objective of sowing operation is to place seed at proper position respective of other placed seeds in every row at particular depth. As per change in shape and size of different seeds the parameters like distance between two seed, depth of seed, planting rate chances. This project is attempted to produce highly efficient seed sowing machine which will reduce cost of labour. Traditional method of seed sowing based on assumptions of seed to seed spacing and depth of placement which is not at all efficient and beside this it requires lot of time and efforts too.

II. LITERATURE SURVEY

Seed feed rate is more but the time required for the total operation is more and the total cost is increased due to labour, hiring of equipment. The manual operated seed sowing machine is less efficient, time consuming. 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. New proposed machine which can perform operation has number of advantages.

1) Seed flow rate can be controlled.
2) Row spacing and seed spacing process can be achieved.
3) Seed utilization can be done in proper manner with minimum loss.
4) It will not affect the soil texture.

III. OBJECTIVES

- To manufacture a machine for a farmer who cannot afford the tractor and having small land.
- To design and manufacture seed sowing machine.

IV. METHODOLOGY

Proposed work started with the problem identification in agriculture process of planting of different type of seeds. By collecting available information and specification further solution finding approached. It is found that Quality and productivity play important role in today's farming market. Seed sowing machine is

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 6, Issue 5, May 2019

the cheapest and most efficient way to improve the productivity and reducing labour cost.

V. TYPES OF 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.
The effect of inaccuracies in seed placement on plant stand is greater in case of crops the following are the different types of seed sowing:

1. **Hand Sowing:** (planting) is the process of casting handfuls of seed over prepared ground, or broadcasting .Usually, a drag or harrow is employed to incorporate the seed into the soil. Though labour-intensive for any but small areas, this method is still used in some situations. Practice is required to sow evenly and at the desired rate. A hand seeder can be used for sowing.Hand sowing may be combined with pre-sowing in seed trays. This allows the plants to come to strength indoors during cold periods.

2. **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 labour and prevents the damage of seeds by birds.

3. **Putting Seeds Behind The Plough:** It is dropping of seeds behind the plough in the furrow with the help of manual labour by hand. This method is followed for crops like wal or gram.

Figure 1(a): Existing Machine while working

6.1 PROBLEM JUSTIFICATION

As an existing machine has heavy weight it will be unlevel the soil and also damage the so condition. Normal seed storage has a single metering mechanism instead of number of mechanisms in the existing machine. If it is removed design is going to be simple and easy to fabricate. The size of the machine, production cost, transportation, everything will be reduced.

VI. PROBLEMS OF EXISTING SOWING MACHINES

Traditional sowing methods have following limitations:

- In manual seeding, it is not possible to achieve uniformity in distribution of seeds.
- Poor control over depth of seed placement. Labour requirement is high because two persons are required for dropping seed and fertilizer.
- No control over the depth of seed placement.
- No uniformity in the distribution of seed placement.
- Loss of seeds.
- No proper germination of seeds.
- Placement of seeds at uneven depth may result in poor emergence because subsequent rains bring additional soil cover over the seed and affect plant emergence. More labour requirement. Time required for sowing is more.

The existing seed sowing machine is too cost. It has a complex to design parts. Every seed distributor has the individual seed storage place. Hence, it leads to increase the cost of the machine. It is not compact in size. Its weight is so high. Hence, it is difficult to transportation from one place to another place.

The existing sowing machine is shown in figure 1(a) and 1(b) to understand the pictorial parts of the machines and. In the existing sowing machine every seed distributor needs separate seed storage place and seed metering mechanism. It leads to add the weight of the machine, increases cost of the machine.

Figure 1(b): Existing Machine

6.2 FACTORS AFFECTING SEED EMERGENCE

Mechanical factors, which affect seed emergence, are:

- Soil is covered uniformly over the seed.
- Its depth should be uniform with regard to placement of seed
- Its transverse displacement with regard to row also considered It should be distributed uniformly along the rows. .

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 6, Issue 5, May 2019

- Loose soil getting is also prevented.

By fulfilling above factors we get best performance of the seed planter. To improve the performance we need to optimize the above factors also so that we get desired efficiency from the system in economical way.

VII. MAJOR COMPONENTS IN THE PROPOSED SOWING MACHINE

The seed sowing machine consists of various components such as, Hopper, Adjustable furrow opener, and frame of machine detailed is given below.

7.1 Hopper

It is an arrangement to store the seeds. Hopper capacity varies a from 2kg to 6kg. Due to the concentrated hopper very low quantity of seeds can also be sown. Here our hopper is like semicircular in shaped so the wastage of seeds can be avoided. Here hopper is made up of M.S sheets it reduces the weight of the hopper. Hence the weight and cost of sowing machine can be reduced.

7.2 Main Frame

The main frame is the skeletal structure of the seed sowing machine on which all other components are mounted. The two design factors considered in the determination of the material required for the frame are the weight and strength. In this, mild steel rectangular bar were used to give the required rigidity.

7.3 Adjustable Furrow Opener

The design of furrow openers of seed planters varies to suit the soil conditions of particular region. Most seed planters are provided with pointed tool to form a narrow slit in the soil for seed deposition. The adjustable furrow opener permits planting at each variety ideal ground depth. The type used for this work is the pointed bar type. These types of furrow openers are used for forming narrow slit under heavy soils for placement of seeds at medium depths.

The Furrow opener made of mild steel square pipe. Nut and both were used to fasten the device to the frame through a hole drilled on the frame for adjusting sowing depth according to crop.

VII. FABRICATION

For proposed machine main componentsare required like, hopper, frame, furrow, ground, shaft, wheel, Seeder. The machine consist of hopper having two section which is separated by a plate in one section will store the seed and other is empty where in other section there is hole in lower side and seed pipe is attached to discharge the seed in soil. All parts of the planter were fabricated from mild steel material. The seed metering mechanism used for this work was the wooden wheel type. For this design, the drive shaft directly controls the seed metering mechanism which eliminates completely attachments power transmission system thereby eliminating complexities which increase cost, and increasing efficiency at a highly reduced cost. Handle is attached to front side of frame for pulling purpose. It can be adjust as per furrows height. Adjustable furrow are mounted on frame with nut and bolt. It can be adjusted as per human comfortable. Furrows are point type.

Seeder disc have 6 numbers of slots where while rotating of disc seeds are came in that slot from one section where seeds are store and discharge the seed in other section and seed are discharge to soil with help of seeder pipe. The schematic seed sowing machine is shown in Figure 2.

Fig 2.Seed Filled in Hopper

VIII. WORKING

First seed in the one section of hopper with manually. Height of handle is adjusted with help of adjustable furrow .While working furrow are penetrated in soil. System that will made, uses the manual pull force to run mechanism. Rotary motion of ground wheels provided to the main shaft. When a labour pulls the machine, the motion is transmitted from ground wheels to shaft and then metering disc rotates. Seeds are came in slots of disc and due to rotation it came in other section where lower hole in hopper and seed discharge to soil with the help of seeder pipe. The seeds will get placed in the furrows through the pipes.

The point type furrow openers open the soil. In this way the seeds are placed in the soil at proper distance and this machine maintains the proper row spacing. The seed rate is maintained through the slots that seed disc have and hence the seed are placed at proper distance. And so wastage of seed is eliminated. Weight of machine so less so it can be operated by single person only

Since after taking complete observation of seed we get higher yielding as compare to conventional seed sowing machine. Approximate sowing capacity of the machine is found to be 1Kg/20min. However, it may vary as per efficiency of person.

XI. ADVANTAGES

Following are the advantages of manual seed planter machine are:

a. Only one person can operated.
b. Low maintained cost is required.
c. Improved efficiency in planting.
d. Increased yielding and reliability in crop. Increased cropping frequency.
e. Increased speed of seed planting.
f. Seed planting accuracy.
g. Durable and cheap as low cost materials are used.
h. Dependency on labour also decreased. Also it saves time of sowing.

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 6, Issue 5, May 2019

i. Uniform placement of seeds in row with required distance.

X. OBSERVATION TABLE

Take, Type of seed:-Gram, Capacity of hopper to carry Gram is 2
Kg, for gram, 10m=500 gram seeds.
Seed required for one acre land is 20 to 30 kg Time required for one acre is between 2 to 3 hrs.The Approximate time required for sowing operation for **one acre land is T_{avg}=2.30 hour.**

Table.10.1 Observation Table

Sr. No.	Distance travelled (m)	Time (sec)	Distance between adjacent seed (cm).
01.	1	2	2 to 4
02.	2	7	2 to 4
03.	3	15	2 to 4
04.	4	25	2 to 4
05.	5	33	2 to 4
06.	6	40	2 to 4
07.	7	47	2 to 4
08.	8	51	2 to 4
09.	9	57	2 to 4
10.	10	63	2 to 4

Since after taking complete observation of seed we get higher yielding as compare to conventional seed sowing machine. Approximate sowing capacity of the machine is found to be 1Kg/20min. It may vary as per efficiency of person.

XII. DISADVANTAGES

a. Initial cost is high.
b. Suitable for small Farms Only.
c. Difficult to operate in moist condition.
d. Seed Sowing for Cotton is Difficult.

j. Proper compaction over the seeds is provided.

XIII. CONCLUSION

ProposedSeed sowing machie will be fulfilled need of a poor and small land farmer. They can easily and effectively plants their seed in the field by these planters. But due to different crops have different requirement for the seed planting in the field. So the usefulness of the single seed planter is limited. Hence, the requirement of the manually operated multi-seed planter is very high. In this, design and fabrication of a manually operated seed sowing machine is done. It is found that fabricated machine is cheap, easily affordable, easy to maintain and less laborious to use. The machine will go a long way in making farming more attractive and increasing agricultural output.

REFERENCES

[1]. Roshan V Marode, Gajanan P Tayade1 And Swapnil K Agrawal, "Design And Implementation Of Multi Seed Sowing Machine".International Jouranl of Mechanica Engineering and Robotics Research.ISSN2278-0149 Vol.2,No.4,October 2013 Pp.422-429.

[2]. Vaibhav Thorat, Badal Autade, Tushar Jagtap, Krishna Abhale, Kishor Kumbharde "Study Of Multiple Seed Planting Machine". International Research Journal of Engineering and Technology (IRJET) E-ISSN: 2395-0056 Volume: 05 Issue: 01 | Jan-2018 Pp.1146-1149.

[3]. Senthilnathan N, Shivangi Gupta, Keshav Pureha and Shreya Verma. "FABRICATION AND AUTOMATION OF SEED SOWING MACHINE USING IOT"International Journal Of Mechanical Engineering And Technology (IJMET) Volume 9, Issue 4, April 2018, Article ID: IJMET_09_04_103 Pp. 903–912.

[4]. Raut Madhuri, Prof. P.S.Gorane, Pawar Ganesh, Patil Shubham4, Patil Nikhil, "Multipurpose Seed Sowing Machine". International Journal of Advanced Technology in Engineering and Science Volume, No.4 Issue No.12 December 2016 Pp521-529.

[5]. D.Ramesh, H.P. Girishkumar, "Agriculture Seed Sowing Equipments: A Review" International Journal Of Science,Engineering And Technology Research (Ijsetr), Volume 3, Issue 7, July 2014 Pp .1987-1992.

[6]. M.W. Andure, Rajiv Indani, Nikesh Jadhav, Vaibhav Kawde, Rahul Khamankar. "Design And Fabrication Of Manual Seed Sowing Machine With Fertilizer". International Journal For Research In Applied Science & Engineering Technology (Ijraset) Issn: 2321-9653; Ic Value: 45.98; Sj Impact Factor: 6.887 Volume 6 Issue Ii, February 2018 Pp.515-519.