THINK INDIA JOURNAL

ISSN: 0971-1260
Vol-22-Issue-17-September-2019

Development of Mechanized Seed Dispersion Methodology For Agriculture Purposes

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Abstract-

The Indian agriculture sectors facing the challenges to improve the income, utilization of agriculture land effectively as farmers lacks in more cultivated land. This drives the researchers to find the new avenues to improve current scenario in agriculture sector. This leads to the advancement in new technology and equipment's for cutting, cropping and sowing seen growing in last few years. This research article focuses on development of novel apparatus for planting seeds through hopper which ensure uniform and consistent seed plating at regular interval.it consist of hopper through which seeds are continuously supplied, a seed sowing disc which act as pick and escapement device to ensure distribution of single seed during its rotation. A plough is attached at front to facilitate plowing action followed by plating of seed at equidistance.

Key words- Seed sowing, agriculture, seed planting

1. Introduction

The agriculture sector in today's context are facing challenges to improve the income, utilization of land effectively and crop yielding. Agriculture sector in India are mostly affected by instability in monsoon, cropping patterns, lack of sufficient agriculture land, fragmentation of holding, indebtness of the farmers evident to significant decline in GDP from agriculture and volatile output from it [1]. Farmers are more reliant on manual oriented task such as plowing, planting the seeds, cropping, cutting, and harvesting etc. owing to which fulfilling the on growing demands became a challenge which leads to further slowdown the economic development. Fig 1 shows volatility in agriculture growth in Indian context over the last past decade.

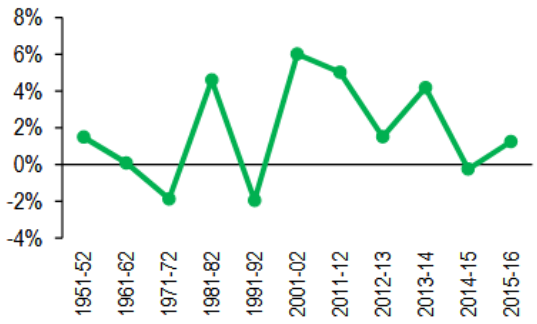

Fig 1:Agricultural Statistics at a Glance, 2015; PRS.[1]

ISSN: 0971-1260
Vol-22-Issue-17-September-2019

Agriculture is the back bone of Indian economy and it will be act forever for a long time. Therefore, there is need to improve and implement advanced technology to cater the agriculture sector. Progressively farm technology has been developing into various stages namely farm machine, animal production, plant production, land use and food and fiber processing technology. Automatic seed sowing plays an important role in effectively utilizing the land and reduce the manual effort [2]. Many attempts have been made by various researchers to improve the existing methodology. Baker et al [3] invented seed sowing apparatus which includes cutting discs, seeds and fertilizer dispenser. Swetha and Shreeharsha [4] developed the solar operated seed sowing machine wherein the robot is used for digging, sowing and watering purpose.Sambare, and Belsare [5] developed the robot operated automatic seed sowing machine to reduce the manual effort.Steffen, D. E [6] patented automatically controlled seed planter which takes the input signal corresponding to the desired seed spacing.Arnold et al [7] invented the optical operated seed sowing machine which is capable of handling wide variety of seed types, shape, size and its weights. There are existing method used for seed sowing such as broadcasting, dibbling etc as shown in fig 2. In literature we have find the advanced controlling elements to make the system automated and hence required considerable amount of power source. Hence, we have proposed the simple automated seed sowing machine with seed sowing disc which act as pick and escapement device to ensure distribution of single seed during its rotation. This will help to reduce the electronic power consumption and complicated devices to automate the seed sowing

Fig 2 A) broadcasting, B) dibbling tool

2. Methodology

Steps followed to execute the proposed work

- Identifying the current situation facing the farmer by vising the agriculture farm
- Identification of existing methodology
- Brain storming session to find the possible design solution
- Modeling of design and suitable mechanism.
- Prototype fabrication
- Implementation

ISSN: 0971-1260
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3. Design and components of seed sowing machine

3.1 FRAME
3.2 DC MOTOR
3.3 SEED TANK
3.4 SEED SOWING DISC
3.5 PLOUGH

Fig 3 shows the CAD model of proposed design. It has been designed as per the space requirement for effective seed sowing. The seed sowing disc is resembled to the designed proposed [8]

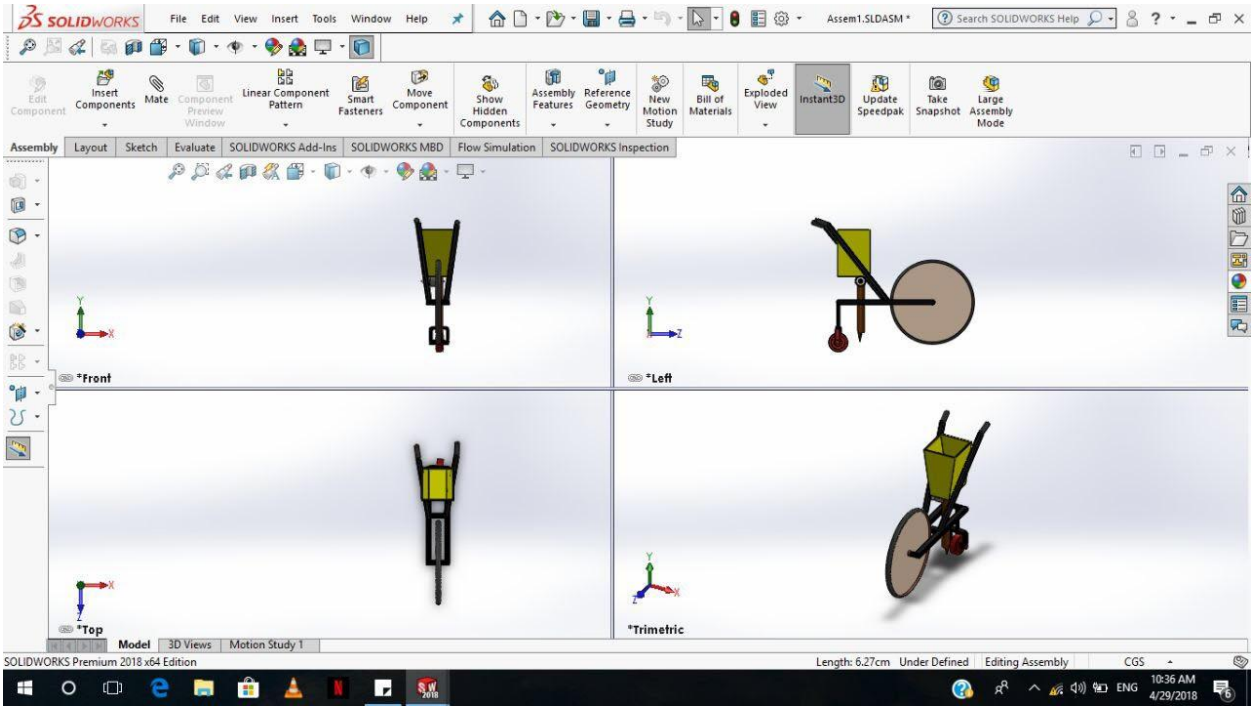

Fig 3: CAD model of automated seed sowing equipment

3.1 FRAME

The L angle frame as shown in fig 4 is used in this project. It is made up of mild steel. It is the main structural element of seed sowing equipment. All the parts are mounted on this frame. Box type frame is used as a handle. The frames are joined by means of Arc welding process. Cross members are added to increases the strength of the structure.

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Fig 4 L type frame

3.2 DC motor

12 V DC motor with replacement brush is used to drive the wheel. The construction of wheel supports the gripping during plowing and seed planting.

Fig 5 DC motor

3.3 Seedtank

The seed storage tank is mounted on the main frame to hold enough seed and supply it during working. It is made of steel sheet. It is rectangle in shape as seen in CAD model above with reduced narrow bottom to facilitate the seed to enter to seed sowing disc beneath to it.

3.4 Seed sowing disc

The seed sowing disc is work in synchronized with wheel. After each rotation of wheel seed get caught into the seed sowing disc and move progressively through pipe arrangement into the digging site. This facilitate the engagement and escapement of seed at desired location which maintained the regular interval between sowing.

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Fig 6 Seed sowing

3.6 Plough

Plough is made of iron which curve shape at bottom to increase the strength during ploughing action as shown in fig 7. The blade is curved with ridge at center to facilitate easy removal of soil aside during its working.

Fig 7 Plough

Conclusion

This equipment helps farmers to reduced tedious and fatigue manual work of seed sowing. It helps to maintain the equal spacing between the crops in their growth period.This work helps for planting seeds through hopper which ensure uniform and consistent seed plating at regular interval.it consist of hopper through which seeds are continuously supplied, a seed sowing disc which act as pick and escapement device to ensure distribution of single seed during its rotation

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