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# Experimental & Analysis of Automatic Seed Sowing Machine using IOT

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**ABSTRACT:** Agriculture is the major sector in the world that plays a vital role in developing the economy of a nation. Agro technology is the process of implementing the recent technologies to develop the crops that are being produced. The use of agro technology not only helps in improving the efficiency of the crop that are being produced but also helps in developing devices that are suitable for doing mechanical works in This results in minimization of the total cost of production, saving of time and reduction in the effort involved in the process. The new technology should also be economically feasible and hence the behavior of the technology and its role in the society is an important consideration before developing a new product or process. In this work a seed sowing machine has been developed that help the farmers in harvesting the best crop with least efforts. A mechanical device that helps in sowing operation and controlled using IoT (Internet of Things) has been developed.

## I. INTRODUCTION

In current world, every process is getting automated and people are getting used to adopt smart techniques to get their work done. It can be seen that with flow of time, how seed sowing techniques and equipment's have kept on progressing [1]. Proper seed sowing is very important part of agricultural process and for the same purpose hand operated seed sowing machine have been designed and developed ]. Despite agriculture being one of the most [4 important fields for determining the growth of a country, it is working. One of the biggest irony is agriculture being the main occupation in many countries still lagging in terms of smart lags in using the smart techniques in this field. If technology is introduced in farming it techniques there are chances that ever growing populating in the coming future might be fed adequately. To suffice such a large amount, agricultural yield must also be increased rapidly. Due to poor seed quality & inefficient farming practices, and lack of cold storage and harvest spoilage, nearly 30% of e is wasted. Not in just theory practically we can the farmer's produc see how automation helps in increasing output of farming, in US, where automation techniques in agricultural farming has already been implemented the cereal yield is nearly 6600 Kg/Hectare which is three times more than in India whose cereal yield is just 2600 Kg/Hectare approximately. These figures clearly shows that there is great need of introducing automation techniques in every small and big agricultural farming because, if appropriate measures are not taken at the right time, even though currently many countries has adequate stock of food to suffice its population, a time may come when same will not be able to feed its entire population. As a result of it the development of such countries will severely be affected and they may not be able to become a developed nation. Automation in seed sowing will help in proper use of available sources. To implement automation in the process of sowing seeds in agricultural re farming, the machines that are already being used can be improved in design or new machines or attachments can be developed to do the necessary operations. But these machines or attachments should be cost effective and be affordable to the farmers. Hence a less expensive, distinct machine or attachment has to be designed and developed so that it can be used for different crops and in different seasons.. For an agriculture sector to be successful one needs to add the booming technologies as input and take care of the processes and at the same time knowing the behavior of the technology and the major role that . In the it is going to play in the sector of one's interest present growing aspect the need to utilize the available technologies has become necessity in order to gain the best result. Roshan et al [1] discussed about sowing the seeds and composting them in a line at a desired depth, so that appropriate cover of soil is provided to the seeds. The developments in the seed sowing equipment were highlighted and distinctive sorts of seeding hardware's examined by Ramesh et al [2]. During the years, the machine is subjected to different design modifications with the focus on mechanical system design, to realize the objective of improving the performance in the fields -7]. The automation [8-10]. With all these information and thoughts, automation of seed sowing machine using ESP8266 wifi module, relay and step down module has been developed in this research work. The fabricated machine is very convenient and the technology used to feed command to machine is IoT which lets the user to command the machine from anywhere. This will reduce the human effort and time taken to sow same area with better and constant spacing between seeds.

## II. LITERATURE SURVEY

[1] **Mahesh R. Pundkar** This study states that the seed sowing machine is a key component of agriculture field. high precision pneumatic planters have been developed for many varieties of crops, for a wide range of seed sizes, resulting to uniform seeds distribution along the travel path, in seed spacing. This method allows you to plant more seeds in less space by concentrating watering, weeding, and fertilizing in a smaller area.

[2] **P.P. Shelke** This study revealed that by using a seed drill for wheat crop there was an increase in yield by 13.025 percent when compared with the conventional method, it also revealed that by using a seed drill for wheat crop, a saving of 69.96 per cent in man-hours and 55.17 percent in hulioc hours was achieved when compared, with the conventional method. When the plough moves over the field, the tube attached to it leaves the seeds and kept in the funnel at proper depth as well as spacing. The plough keeps making furrows in the soil in which the seeds are dropped by the seed drill. Drawbacks of this system are no proper germination of seeds. Wastage of seeds. No control over the depth of seed placement.

## III. MATERIALS AND METHODS

### 3.1 PROBLEM DEFINITION

Growing the crop means ploughing the field and sowing the seeds into it. Three steps are mainly taken to sow the seed; Spreading the seeds over the soil, separate germination of seeds, and sowing the seeds into the soil. The two latter processes take more time and labour to complete the work. It being the area of concern needs to be looked upon. Hence, an idea to implement the automation in the process seed sowing raised. Therefore the aim was to design and develop a less expensive, of distinct attachment to the machine so that it can be used in a easy way. For the fabrication, components were decided based on the material, factor of safety and the calculations were done to find out the speed of the machine at various output of the motor to be used to match the requirements. The design parts were modeled using solidworks software and the assembly was done to finalize the best position of the components. At the manufacturing end, the chassis was fabricated to form the skeleton for the hardware. The belt and pulley drive was installed with the wiper motor for proper functioning of the prototype. For better transmission, the angle of contact of belt and pulley is kept near 180 degrees. The automation part was done after the fabrication was completed. The code was generated and the connections were made and testing performed successful for the finally manufactured y prototype.

### 3.2 COMPONENTS OF SEED SOWING MACHINE

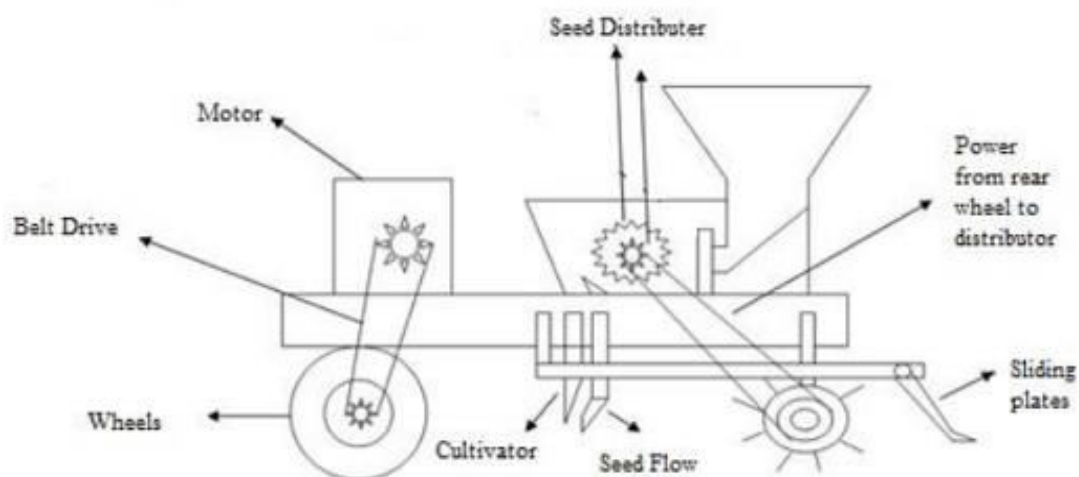


Figure 1 Schematic diagram of a seed sowing machine





### 3.2.1 Basic Components

A Seed sowing machine is constructed using the following components: D.C. Motors It is used in the model to drive the front wheels which further drives the distributor. Hoppers Seed Distributor Cultivator Belt and pulley drive It stores the seeds to be sown in the soil. Higher the capacity less the need to refill the hopper during process. It consist of fluted rollers which are driven by rear wheel with the help of belt and pulley. The work of the cultivator is to tilt the soil to the required depth so the distributor mechanism can sow the seed. For transmission of power from motor to wheels belt and pulley drive is used in the machine and also to drive seed distributor. The material used in fabrication of the machine is mild steel grade (MS). MS are used for manufacturing of truck-trailers, crane , ship building, boilers, agricultural equipment and es many more fabrication and engineering industries.

## IV. WORKING OF THE MACHINE

The block diagram of the circuit for automation is presented in figure 4 The battery positive . is connected to stepper positive input terminal and negative terminal of battery to negative input terminal of stepper. The stepper steps down the voltage from 12 V to 5 V. This 5V is received at the output terminal of stepper. The positive of stepper is connected to 3.3V pin while the negative output terminal of stepper is connected to Gnd pin of the wifi module. As the microprocessor works on 5V, step down module is used to lower the 12V supply to 5V. Other 3.3V and Gnd pins of microprocessor provides input to relay through Vcc and Gnd pins of relay respectively. GP01 pin of ESP8266 is connected to IP pin of relay and provides input as on or off. The negative of the battery is connected to motor's negative and positive of battery is connected to com port of relay. The positive of motor is connected to NO (normally open) port of the relay. The circuit is now complete and is online. The codes are uploaded to the microprocessor ESP8266 and then it is connected to mobile hotspot which is going to act as the controller of the machine. As the on command is given through controller, the motor switches on and the motion is transmitted to front wheel through belt and pulley. For transmission, V belt and pulley system is used to have a positive drive. As the vehicle moves, the rear wheel transmits motion to seed distributor which leads to sowing of seed into soil.

## V. CONCLUSIONS

The seed sowing machine has been designed and fabricated and the process of seed sowing is automated using T in order to minimize the human effort. The modification in the selection Io of the micro-processor is done to achieve wireless connectivity between machine and the controller. ESP8266 has been used in order to host an application from another application processor. Relay is used to control a high- voltage circuit using a safe low-voltage circuit. As all connections are made and as soon as the circuit is closed, the electricity flows through the circuit and machine comes online to receive command from the controller which is android phone or laptop. With the command the machine operates in the forward direction. The cultivators tilts the soil as machine moves forward and the seeds are dropped at regular intervals into th soil through distributor mechanism which consist of hopper and seed flow e system. Thus, the model fabrication and its automation have been done to overcome the difficulties of farmers by achieving regular distance between rows and consecutive seeds.

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