

Automatic Seed Sowing Machine

Sanjay Belkar¹, Rushikesh Nikam², Rahul Mistari³, Kunal Deokate⁴
^{1,2,3,4}Department of Electronics Engineering, PREC Loni, India

Abstract- Currently, labour bulls are primarily used for field preparation by smallscale farmers. Any crop must generally go through several stages of cultivation, including seed selection, field preparation, fertilising, planting, irrigation, germination, thinning and filling, weed removal, vegetative stage, blooming stage, pesticide spraying, fruit or pod development stage, harvesting, and threshing. In order to provide farmers with automatic seed sowing equipment that implements all scientific farming techniques and specifications and is suitable for all types of seed to seed cultivation at the lowest possible cost, we have combined all the separate tools. Farmers currently have to use a variety of agricultural equipment and labour to carry out those steps. The design and construction of automatic seed-sowing machinery utilised for levelling, sowing, and field preparation are the main goals of this project. The agricultural machinery for autonomous seed sowing is very easy to operate, allows for simple changes, and requires no maintenance.

Keywords: levelling, soil digger, seed sowing, solar power, and agricultural machinery.

1. INTRODUCTION

Agriculture has been the backbone of the Indian economy and it will continue to remain so for a long time. —A man without food for three days will quarrel, for a week will fight and for a month or so will die. Agriculture is a branch of applied science. Agriculture is the science and art of farming including cultivating the soil, producing crops and raising livestock. It is the most important enterprise in the world. Over the years, agricultural practices have been carried out by small-holders cultivating between 2 to 3 hectare, using human labor and traditional tools such as wooden plough, yoke, leveler, harrow, mallet, spade, big sickle etc. These tools are used in land preparation, for sowing of seeds, weeding and harvesting. Modern agricultural techniques and equipment's are not used by small land holders because these equipment's are too expensive and difficult to acquire. By adopting scientific farming methods we can get maximum yield and good quality crops which can save a farmer from going bankrupt but majority of farmers still uses primitive method of farming techniques due to lack of knowledge or lack of investment for utilizing modern equipment. The use

of hand tools for land cultivation is still predominant in India because tractors require resources that many Indian farmers do not have easy access to. The need for agricultural mechanization in India must therefore be assessed with a deeper understanding of the small holder farmer's activities. There is huge gap in technology adoption and Implement used with small and marginal farmers.

Sustainable improvement in the livelihoods of poor farmers in developing countries depends largely on the adoption of improved resource conserving cropping systems. While most of the necessary components already exist, information on the availability and performance of equipment is lacking and effective communication between farmers and agricultural research and development department is unsuccessful. Farming has undergone a great evolution in last 50 years. Though these devices were highly efficient, there is a need to have certain changes. [2] Agricultural machinery is machinery used in farming or other agriculture. Mechanized agriculture is a process of using agricultural machinery to mechanize the work of agriculture, greatly increasing farm worker productivity. In modern times, powered machinery has replaced many farm jobs formerly carried out by manual labour or by working animals such as oxen, horses, and mules. The entire history of agriculture contains many examples of the use of tools, such as the hoe and the plough. But the on-going integration of machines since the Industrial Revolution has allowed farming to become much less labour intensive. The biggest profit of automation is that it saves the labour. However, it also saves energy and materials and to improve the quality, accuracy, and precision. The seed feeding is the important stages in the agriculture field. The design of automatic seed sowing agro equipment machine will help Indian farmers in rural side and small farm. It will reduce the cost of seed feeding

2. LITERATURE REVIEW

Review of Papers:

M.V. Achutha, Sharath Chandra. N, Nataraj. G.K, [1] They have done the work on, Design and Analysis of Multipurpose Farm Equipment, according to his work, all trades of village artisanship in black-smith carpentry, stone etc. contributed to the design of development of farm tools through artisan's ingenuity. Carpentry made the counterpoise to lift the water from wells to irrigate crops. Big size of earthenware was made by potters to store grains for month to be safe from insects and pest's cobblers used whole skins of animals to carry water to irrigate horticultural crops besides entering dust roads. Farming is the backbone of Indian economy. In this agriculture sector there is a lot of field work, such as weeding, reaping, sowing etc. Apart from these operations, spraying is also an important operation to be performed by the farmer to protect the cultivated crops from insects, pests, fungi and diseases for which various insecticides, pesticides, fungicides and nutrients are sprayed on crops for protection. As agriculture was the mainstay of the population, farmer required hand tools to do work, improve labour productivity and quality of work, therefore the results in poor productivity and obtain low yield MAE (Multipurpose Agriculture Equipment) was developed. We have developed agriculture needs to find new ways to improve efficiency. One approach is to utilize available information technologies in the form of more intelligent machines to reduce and target energy inputs in more effective ways than in the past. The advent of new concept gives the opportunity to develop a completely new range of agricultural equipment based on small smart machines that can do the right thing, in the right place, at the right time in the right way.

Nitin Kumar Mishra, Shashwat Khare, Sumit Singh, Mithun Dabur, [2] They have done the work on, Multi-Purpose Agriculture Machine, according to his work, Finding solutions, to meet the "Energy - demand" is the great challenge for Social Scientist, Engineers, Entrepreneurs and Industrialist of our Country. Applications of Nonconventional energy are the only alternate solution for conventional energy demand. Like other development activities, agriculture sector is one of the major areas, which finds number applications of making it work using non-conventional sources. Solar energy plays an important role in agriculture products and for irrigation purpose for pumping the well water in remote villages without electricity. Mechanization involves the use of a hybrid

device between the power source and the work. The paper deals with multi-purpose agriculture machine for seed feeding, spraying pesticides, fungicides, and fertilizers and cutting. Thus paving way for a more economical and multi-usable equipment for farmer which is also easy to clean and maintain, easy to handle and do not require fuel, hence cost gets reduced and helping farmers to a great extent in their fields. The top concentration of our design is the cost and operational ease in case of small farm units. This multipurpose agro equipment is thus designed to reduce the cost of harvesting, spraying and seed feeding. In the development of multipurpose agro equipment we utilize the past data and techniques. In this way the design of multipurpose agro equipment is safe. Such human powered machine systems will

help to a great extent in improving the production per acre and increase profitability of small and middle class farmers. A new type of multipurpose mechanism is fabricated which is different from other machines and will work on non-conventional energy source which is purely human operated. Such systems are of much importance in Asian countries, as almost all Asian countries are facing electricity and power scarcity which results in twelve to fourteen hours load shedding in rural areas especially in India. Therefore, there is the need to develop a locally, fabricated multiple multipurpose agro equipments.

Kyada, A. R, Patel, D. B., [3] They have done the work on, Design And Development Of Manually Operated Seed Planter Machine, according to his work, The basic requirements for small scale cropping machines are, they should be suitable for small farms, simple in design and technology and versatile for use in different farm operations. A manually operated template row planter was designed and developed to improve planting efficiency and reduce drudgery involved in manual planting method. Seed planting is also possible for different size of seed at variable depth and space between two seed. Also it increased seed planting, seed/fertilizer placement accuracies and it was made of durable and cheap material affordable for the small scale peasant farmers. The operating, adjusting and maintaining principles were made simple for effective handling by unskilled operators (farmers). This manual seed planter machine has considerable potential to greatly increase productivity. Other countries of the world where the two wheel tractor is the main traction unit in farming. The main task now

is to promote this technology and have available to farmers at an affordable price. The manual Seed

Planter machine can be readily made from local components in workshops. The only specialized items required are the seed meters plunger which can be sourced at an inexpensive price from local promoter and plunger is easily manufactured. By using of this machine, achievement of flexibility of distance and depth variation for different seed plantation is possible.

Gare N. B., Devkar G. R., Deshmukh M. B., Garud Y. R., Prof. Baviskar A. C., Prof. Bhane A. B., [4] They have done the work on, Three-In-One Agricultural Vehicle System, according to his work, The paper deals with utilization of solar energy and it is converted into the chemical energy, which is used to drive the different units of the system. In this paper we had tried to explain how the different agriculture equipments are combined and work together efficiently with reducing the manufacturing cost which will be in affordable beget. In this way we conclude that, the different operation can be performed at a time without polluting the environment and by using the non convectional power source with high efficiency.

Dr. C.N.Sakhale, Prof. S.N.Waghmare, Rashmi S.Chimote, [5] They have done the work on, multipurpose farm machine, according to his work, India is an agriculture based country in which, 70% of people depends on the outcome of farming. But if we observe that with increase in population the farm gets distributed among the family and because of this, farmer in India held averagely only two acre farm. Also economically, farmers are very poor due to which they are unable to purchase tractors and other costly equipments hence they use traditional method of farming. Basically, many farmers in India also use bullocks, horses and he-buffalo for farming operation. This will not satisfy need of energy requirement of the farming as compared to other countries in the world. Human and animal efforts can be replaced by some advance mechanization which will be suitable for small scale farmer from economical and effort point of view. So we are developing this equipment which will satisfy all this need and to solve labour problem. In this equipment We used 24cc engine for digging operation. And for spraying used motor with 12V battery. Next two operations are manual base which is cultivation

and sowing . This machine perform four farming operation (digging, sowing, cultivation, spraying) which is used small scale farming .By using above attachments one may perform various farming operations in less time and economically. After the manufacturing and trail on the “Multipurpose Agricultural Automobile (Farm Machine)” conclusion which we made are as follows: Based on the overall performance of the machine we can definitely say that the project will satisfy the need of small scale farmer, because they are not able to purchase costly agricultural equipment. The machine required less man power and less time compared to traditional methods, so if we manufacture it on a large scale its cost gets. Significantly reduce and we hope this will satisfy the partial thrust of Indian agriculture. So in this way we solve the labour problem that is the need of today’s farming in India.

Bhogade P.S, Mandlik A .V, Shinde S. S., Thorat K. A. , Godse S.P, [6] They have done the work on, Multipurpose Three In One Agriculture Automation System, according to his work, This agriculture is most important economic activity , providing the food , feed , fiber and fuel necessary for the survival . as the global population is increasing rapidly, agriculture production must double if it is to meet the increasing demands for food and bio energy . automation can play a significant role in society meeting agriculture production needs. For six decades robots and automation have played a fundamental role in increasing the efficiency and reducing the cost industrial production and product. So by considering same approach we have developed a Multipurpose Agriculture Automation System which will do 3 task in one go that is we can cut grass, spray liquid insecticide and sowing machine at the same time using single system.

Swetabh, Manish Kashyap, Yash Yadav, Ashutosh Singh, Dhruv Kumar, [7] They have done the work on, multi-tasking agricultural machine tool, according to his work, multi-purpose agriculture machine tool for spraying pesticides, fertilizers, water, plugging and cutting purpose. Thus paving way for a more economical and multi-usable equipment for farmer which is also easy to clean and maintain, easy to handle and do not require fuel, hence cost gets reduced and helping farmers to a great extent in their fields. The top concentration of our design is the cost and

operational ease in case of small farm units. This multipurpose agro equipment is thus designed to reduce the cost of harvesting, spraying and seed feeding. In the development of multipurpose agro equipment we utilize the past data and techniques. In this way the design of multipurpose agro equipment is safe. Such human powered machine systems will help to a great extent in improving the production per acre and increase profitability of small and middle class farmers. A new type of multipurpose mechanism is proposed which is different from other machines and will work on non-conventional energy source which is purely human operated.

3. MATERIALS AND METHODS

3.1. Frame: The main function of frame is to carry whole assembly on it so it has to be strong enough to hold it. The frame is made of square pipe and it is formed out of mild steel.

3.2. Wheels:



Fig. Wheel

Wheel is used to carry the whole assembly and move machine from one place to another by rotary motion of it. A bicycle wheel is a wheel, most commonly a wire wheel, designed for a bicycle. Bicycle wheel is designed to fit into the frame and fork via drop outs, and hold bicycle tire. A typical modern wheel has a metal hub, wire tension spokes and a metal or carbon fibre rim which holds a pneumatic rubber tire. We use a tubeless tire wheel.

3.3. Ball bearings:



Fig. Ball bearing

This type of bearing consists brass bush split into two halves called “brasses”, and iii) a cast iron cap and two mild steel bolts. The detailed drawing of a bearing is shown in image below. The rotation of the bush inside the bearing housing is arrested by a snug at the bottom of the lower brass. The cap is tightened on the block by means of bolts and nuts. The detailed part drawings of another block with slightly different dimensions are also shown in image below.

3.4. Shaft:



Fig. Shaft

Shaft is a common and important machine element. It is a rotating member, in general, has a circular cross-section and is used to transmit power. The shaft may be hollow or solid. The shaft is supported on bearings and it rotates a set of gears or pulleys for the purpose of power transmission. Material for Shafts: The ferrous, non-ferrous materials and non-metals are used as shaft material depending on the application.

3.5. Washer:



Fig. Washer.

A washer is a thin plate (typically disk-shaped) with a hole (typically in the middle) that is normally used to distribute the load of a threaded fastener such as a screw or nut. Other uses are as a spacer, spring (wave washer), wear pad, preload indicating device, locking device, and to reduce vibration (rubber washer). Washers usually have an outer diameter (OD) about twice the width of their inner diameter (ID). Washers are usually metal or plastic. High quality bolted joints require hardened steel washers to prevent the loss of pre-load due to Brinelling after the torque is applied. Rubber or fiber gaskets used in taps (or faucets, or valves) to stop the flow of water are sometimes referred to colloquially as washers; but, while they may look similar, washers and gaskets are usually designed for different functions and made differently. Washers are also important for preventing galvanic corrosion, particularly by insulating steel screws from aluminium surfaces.

3.6. Nut and Bolt:



Fig. Nut and Bolt

As nuts and bolts are not perfectly rigid, but stretch slightly under load, the distribution of stress on the threads is not uniform. In fact, on a theoretically infinitely long bolt, the first thread takes a third of the load, the first three threads take three-quarters of the load, and the first six threads take essentially the whole load. Beyond the first six threads, the remaining threads are under essentially no load at all. Therefore, a nut or bolt with six threads acts very much like an infinitely long nut or bolt.

3.7. Battery:



Fig. Battery

An electric battery is a device consisting of one or more electrochemical cells that convert stored chemical energy into electrical energy. Each cell contains a positive terminal, or cathode, and a negative terminal, or anode. Electrolytes allow ions to move between the electrodes and terminals, which allows current to flow out of the battery to perform work.

3.8. Solar Panel:



Fig. Solar panel

The photo-voltaic effect can be observed in nature in a variety of materials that have shown that the best performance in sunlight is the semiconductors as stated above. When photons from the sun are absorbed in a semiconductor, that create free electrons with higher energies than the created there must be an electric field to induce these higher energy electrons to flow out of the semi-conductor to do useful work. A junction of materials, which have different electrical properties, provides the electric field in most solar cells for the photon interaction in a semiconductor. A solar cell consists of,

1. Semi-conductor in which electron hole pairs are created by the absorption of incident solar radiation.
2. Region containing a drift field for charge separation.
3. Charge collecting front and back electrodes.

3.9. Solar charger:



Fig. Solar charger circuit

The power charge regulator is also known as charge controller, voltage regulator, charge-discharge controller or charge-discharge and load controller. The regulator sits between the array of panels, the batteries, and the equipment or loads. By monitoring the voltage

of battery, the regulator prevents overcharging or over discharging. Regulators used in solar applications should be connected in series: they disconnect the array of panels from the battery to avoid overcharging, and they disconnect the battery from the load to avoid over discharging. The connection and disconnection is done by means of switches which can be of two types: electromechanical (relays) or solid state (bipolar transistor). Solar chargers should never be connected in parallel. In order to protect the battery from gasification, the switch opens the charging circuit when the voltage in the battery reaches its high voltage disconnects (HVD) or cut-off set point. The low voltage disconnects (LVD) prevents the battery from over discharging by disconnecting the load.

3.10. DC Motors:

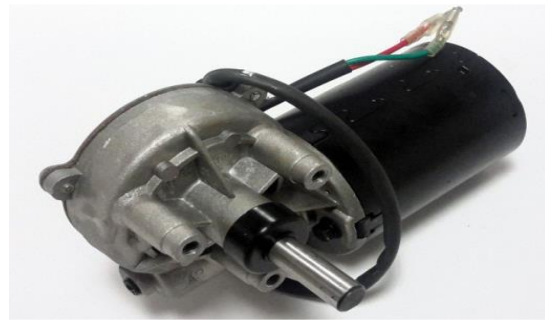


Fig. DC Motor

Specification:

DC supply: 12V

RPM: 60 at 12V

Shaft diameter: 6mm

A DC motor is a mechanically commutated electric motor powered from direct current (DC). The stator is stationary in space by definition and therefore so is its current. The current in the rotor is switched by the commutator to also be stationary in space. This is how the relative angle between the stator and rotor magnetic flux is maintained near 90 degrees, which generates the maximum torque. DC motors have a rotating armature winding (winding in which a voltage is induced) but non-rotating armature magnetic field and a static field winding (winding that produce the main magnetic flux) or permanent magnet. Different connections of the field and armature winding provide different inherent speed/torque regulation characteristics. The speed of a DC motor can be controlled by changing the voltage applied to the armature or by changing the field current. The

introduction of variable resistance in the armature circuit or field circuit allowed speed control. Modern DC motors are often controlled by power electronics systems called DC drives.

3.11. Chain, Pinion & Sprocket Wheel:



Fig. Chain, Pinion & Sprocket Wheel

In chain drive Sprocket Wheel is rotating machine part which is used to change speed and torque of the system. Set of Sprocket Wheel is used to transmit the power of the device.

4.RESULTS AND DISCUSSION



Automatic seed sowing machine consists of soil digger blades at front end & leveller tool at rear end. Seed metering devices are those devices that meter the seed from the seed box and deposit it into the delivery system (plunger) that conveys the seed for placement. Seed to seed spacing and depth of seed placement vary from crop to crop for different agro-climate conditions. As machine will pushed or power to wheel

is rotating which transmit power to disc through chain mechanism. Now disc is mounted on shaft which rotates the disc to seeding in soil. Construction of automatic seed sowing machine is consist of 12 Volt batteries, on off switch, & power transmitting wire. When we ON the switch at that time the power is given to the DC motor for propel the machine & seed sowing mechanism. We can use this automatic seed sowing machine will work on battery & solar charging unit as per requirement in the farm field.

5. CONCLUSION

While concluding this report, we feel quite fulfil in having completed the project assignment well on time, we had enormous practical experience on fulfilment of the manufacturing schedules of the working project model. We are therefore, happy to state that the in calculation of mechanical aptitude proved to be a very useful purpose. Although the design criterions imposed challenging problems which, however were overcome by us due to availability of good reference books. The selection of choice raw materials helped us in machining of the various components to very close tolerance and thereby minimizing the level of balancing problem. Needless to emphasis here that we had lift no stone unturned in our potential efforts during machining, fabrication and assembly work of the project model to our entire satisfaction to solve the problem in agricultural field for social welfare.

This manual machine has considerable potential to greatly increase productivity. The main task now is to promote this technology and have available to farmers at an affordable price. The manual machine can be readily made from local components in workshops. The only specialized items required which can be sourced at an inexpensive price from local promoter can easily manufactured. By using of this machine, achievement of flexibility of distance and depth variation for different machine in farming is possible. In this way we conclude that, the different operation can be performed at a time without polluting the environment and by using the non-convectonal power source with high efficiency Hence, we selected the topic "AUTOMATIC SEED

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