

**An Innovative Model For Multipurpose Agricultural Use.**Ahuja Jayesh<sup>1</sup>, Bhoite Aakash<sup>2</sup>, Patil Mayur<sup>3</sup>, Tinwala Ensiya<sup>4</sup>, Kumar Sham<sup>5</sup><sup>1,2,3,4,5</sup> Mechanical Engineering, PKTC, CHAKAN.

**Abstract**—This paper represents an innovative multipurpose machine for carrying out different farming activities efficiently with less effort and in less time. Different farming operations proposed to be carried out by this machine are seeding, digging and spraying. It is an ecofriendly device working on solar energy. For this purpose, we are using solar panel as power supplying device which convert solar energy into electrical energy. This electrical energy further converted into mechanical energy by motor. This model introduce term “Autonomous Agriculture” which means we can perform agricultural operations in required time and in required area which is prespecified by the operator. The advantages in agricultural production to increase productivity improve application accuracy and enhance handling safety.

**Keywords**-Solar Panel, Motor Drive, Battery, Toggle Switch, D.C Motor.

**I. INTRODUCTION**

As one of the trends of development on automation and intelligence of agricultural machinery in the 21st century, all kinds of agricultural robots have been researched and developed to implement several agricultural productions in many countries, such as picking, harvesting, weeding, pruning, planting, grafting, digging, sowing, pesticide spraying, agricultural classification, etc. And they gradually appear advantages in agricultural production to increase productivity, improve application accuracy and enhance handling safety.

A vision-based row guidance method is presented to guide a robot platform which is designed independently to drive through the row crops in a field according to the design concept of open architecture. Then, the offset and heading angle of the robot platform are detected in real time to guide the platform based on recognition of a crop row using machine vision. This project is basically developed to implement several agricultural productions such as Digging, Sowing, and Spraying. In India, there are 70% people dependent on agriculture. So, we need to study on improving agricultural equipment. Innovative idea of our project is to automate the process of digging and seed sowing crops such as sunflower, baby corn, groundnut and vegetables like beans, lady's finger, pumpkin and pulses like black gram, green gram etc. and to reduce the human effort. Since we have lack of man power in our country, it is very difficult to do digging and sowing operation on time, Automation saves a lot of manual work and speed up the cultivation activity. The energy required for this robotic machine is less as compared with other machines like tractors or any agriculture instrument, also this energy is generated from the solar energy which is found abundantly in nature. Pollution is also a big problem which is eliminated by using solar plate.

**II. PROBLEM STATEMENT**

The Problem is to design & manufacture a machine which will perform different operations in single machine with the help of solar energy.

**III. OBJECTIVE**

To design and manufacture multipurpose machine which will be

- To reduce farmer efforts with fast speed,
- To reduce amount of time for operation,
- Helpful to reduce pollution,
- Economical
- Increase the efficiency as it runs on battery.
- The technique of sowing and fertilization is automatic.
- It is purely non-conventional.

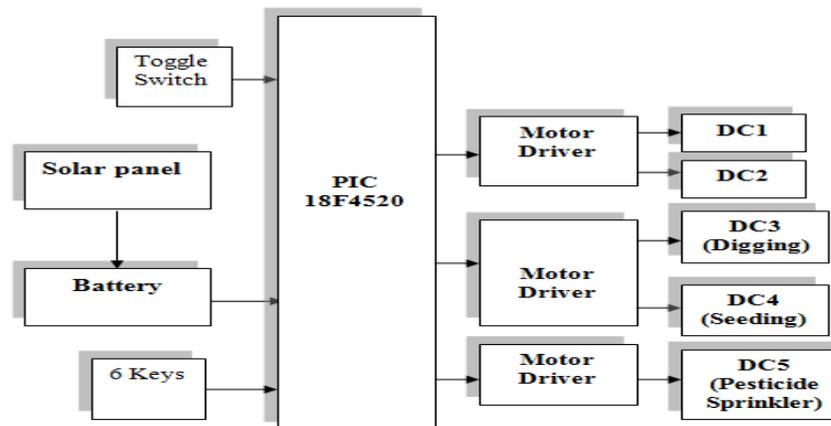
**IV. SCOPE**

- Can be made into fully automated with the use of sensors which can detect obstacles, crops and weeds.
- It can also be made to operate under remote control. Few more operations like grass cutting with the addition of rotating cutting blades, pesticide sprayers with the attachment of sprayer, seed sowing with the respective attachments to the equipment, can also be performed.

- The size of the model can be suitably reduced to the optimum size which can be used for the weeding in between the crops like ground nut, sun flower and other vegetable cultivation.
- Advancement in model which can be made to perform various operations to multi rows at the same time to save time.

## V. METHODOLOGY

The following system design is achieved depending upon the requirements. The block diagram of model end and control section given below. The controller used here is "PIC Microcontroller". The microcontroller is brain of the system which can dedicate the order of suggestion receive all networks. The model mechanism played by their internal motors and motor drivers that drive motor drives in desired direction.



*Figure 1. Block Diagram*

## VI. LITERATURE REVIEW

### *A. Mahesh R. Pundkar [1]:*

Theseed 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. The basic function of sowing operation is to sow the seed and fertilizer in rows at required depth and to maintain the distance between the seeds and provide proper compaction over the seed. A sowing machine is a device that plants or sows the crops, it digs a furrow places the seed or seeds into the furrow and covers it. Seed sowing machine ensures uniformity in seed broadcasting and saves time and money.

### *B. Abhishek Jivrag<sup>1</sup>, Vinayak Chawre<sup>2</sup>, Aditya Bhagwat<sup>3</sup> [2]:*

The invention and operation of multiple granulated pesticides duster with the use of solar energy. The concoction is accomplished using solar panel, impeller type centrifugal blower, gear reduction mechanism, dispensers, D.C motors and batteries. In addition, the duster has been equipped with a facility to operate on an electric supply, which serves beneficial in the absence of sunlight. The device essentially works for disbursing solid granulated (powder) form of pesticide. The operator controls the rate and discharge of different pesticides by means of push buttons and toggle switches. The technical specifications of the device are worked and examined in a way to minimize the weight of the device and deplete the feeder unit dispenser in a span of three hours. The duster is portable, low cost device and emerges a boon for small scale agriculture, nursery, horticulture, and community services including farms.

### *C.M. Priyadarshini<sup>1</sup>, Mrs.L. Sheela<sup>2</sup> [3]:*

The concepts of autonomous agricultural robots are an alternative to the tractors found on fields today. Cultivation tasks like seeding, spraying, fertilizing and harvesting may be performed by fleets of autonomous agricultural robots in the future. Today agricultural robots can be classified into several groups: harvesting or picking, planting, weeding, pest control, or maintenance. The common practice for digging the fields are by using bull or by tractor and the method of sowing the seeds are by hand. Later, the seeds are sowed in the furrow through a bamboo funnel attached to a country plough. For example, sowing seeds in small areas they employ dibbling method i.e., making holes or slits by a stick or tool and dropping seeds by hand is practiced. Later, the multi row traditional seeding devices with manual metering of seeds are quite popular with experienced farmers. It is a large time consuming approach. Besides being wasteful, planting was very imprecise and lead to a poor distribution of seeds. The sensor guided rover is developed which is used to automate the process of digging and sowing crops such as sunflower, baby corn, groundnut and

vegetables like beans, lady's finger, pumpkin and pulses like black gram, green gram etc. & to reduce the human effort and to increase the yield. All these processes are advanced by modifying the mechanism in farming which is self-guided by giving commands in PC or mobile and sending through a wireless module. The obstacle detector and sowing control sensor are also used.

**D.Pandurang Lad<sup>1</sup>, VirendraPatil<sup>2</sup>, Prashant Patil<sup>3</sup>, TusharPatil<sup>4</sup>[4]:**

A Solar Operated Pesticide Sprayer which is a pump running on electricity generated by photovoltaic panels or the thermal energy available from collected sunlight as opposed to grid electricity or diesel run water pumps. The operation of solar powered pumps is more economical mainly due to the lower operation and maintenance costs and has less environmental impact than pumps powered by an internal combustion engine (ICE). Solar pumps are useful where grid electricity is unavailable and alternative sources (wind) do not provide sufficient energy. The solar panels make up most (up to 80%) of the systems cost. The size of the PV-system is directly dependent on the size of the pump, the amount of water that is required (m<sup>3</sup>/d) and the solar irradiance available. The solar sprayer has many advantages. Besides reducing the cost of spraying, there is a saving on fuel/petrol. Also, the transportation cost for buying petrol is saved. The solar sprayer maintenance is simple. There is less vibration as compared to the petrol sprayer. The farmer can do the spraying operation by himself without engaging labour, thus increasing spraying efficiency.

**E. Nithin P V<sup>1</sup>, Shivaprakash S<sup>2</sup>[5]:**

This paper illustrated the design, development and the fabrication of the robot which can dig the soil, put the seeds, leveller to close the mud and sprayer to spray water, these whole systems of the robot works with the battery and the solar power. More than 40% of the population in the world chooses agriculture as the primary occupation, in recent years the development of the autonomous vehicles in the agriculture has experienced increased interest. The vehicle is controlled by Relay switch through IR sensor input. The language input allows a user to interact with the robot which is familiar to most of the people. The advantages of these robots are hands-free and fast data input operations. In the field of agricultural autonomous vehicle, a concept is being developed to investigate if multiple small autonomous machine could be more efficient than traditional large tractors and human forces. Keeping the above ideology in mind, a unit with the following feature is designed:

Ploughing is one of the first steps in farming. During this process, we till the land and make it ready for the seed sowing. By tilling we mean that a plough will be used which will have teeth's like structure at the end and will be able to turn the top layer of soil down and vice-versa. Seed sowing comes next where the seeds need to be put in ground at regular intervals and these needs to be controlled automatically. Limiting the flow of seeds from the seeds chamber is typically doing this. Mud leveller is fitted to close the seeds to the soil and to level the ground. Water pump sprayer is used to spray the water.

## VII.CONCLUSION

We had concluded from the review of the papers that there is need of innovation of sowing, digging and others such machines for the enhancement of farmers. due to the rapid growth in industries is influencing the labors who are situating in the villages to migrate to the cities. This will create the labor problem for the agriculture. The wages for the labor is also more. As the prices of commodities such as food grains, fuels, cloths and other essentials of daily life is increasing rapidly the labors demand for the more wages from the owners. These factors influencing the farmers who are interested in agricultural activity to leave their land uncultivated. By implementing this project in the field of agriculture we can help the farmers in the initial stage of agriculture i.e. during the seeding and fertilizing.

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