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DESIGN AND FABRICATION OF SOLAR POWER MULTIPURPOSE AGRICULTURAL MACHINE

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ABSTRACT -Agriculture being one of the major occupation in India, Agriculture plays a vital role in the Indian economy. Indian agriculture has registered impressive growth over last few decades. It is very essential to discover and implement new idea in this field, though lot of work has been done in this area. It is unfortunate that, these ideas are not being implemented properly in actual field. This is due to high cost and is complicated for rural people. Multipurpose agriculture or farming machine is basic and major machine involved in agriculture for maximum yielding. The Conventional method of weeding, seed sowing and pesticide spraying is a laborious process and hence for that reason there is a scarcity of labours and basically, many farmers in India also use bullocks, horses and buffalo for farming operation. This will not satisfy need of energy requirement of the farming as compared to other countries in the world.

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, mallot, spade, big sikle etc. These tools are used in land preparation, for sowing of seeds, weeding and harvesting. Modem agricultural techniques and equipments are not used by small land holders because these equipments 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.

1.1 MAJOR CHALLANGES

Production of some of the major staple food crops like rice and wheat has been stagnating for quite some time. This is a situation which is worrying our agricultural scientists, planners and policy makers. If this trend continues, there would be a huge gap between the demand of ever growing population and the production.

1.2 FARM MECHANISATION

Increase in labor productivity using labor saving and drudgery reducing devices besides, being cost effective and eco-friendly. Appropriate machinery have been adapted by farmers for ensuring timely field operations and effective application of various crop production inputs utilizing human, animal and mechanical power

2. LITERATURE SURVEY

2.1 Blackmore S. (2007)

A systems view of agricultural robotics

This research paper presents design and development of Agricultural robotics. In this they present objective of seedlanter machine design, factors affecting seed emergence, some mechanisms. The basic objective of sowing operation is to put the seed and fertilizer in rows at desired depth and seed to seed spacing, cover the seeds with soil and provide proper compaction over the seed. The recommended seed to seed spacing and depth of seed placement vary from crop to

crop and for different agro-climate conditions to achieve optimum yields. From this we know that mechanical factors effects on seed germination like uniformity of depth of placement of seed, uniformity of distribution of seed along rows.

2.2 Srinivasan R.Zanwar, R.D.Kokate (June2012)

This research paper presents design modification in multipurpose sowing machine. In this they present that for sowing purpose we import the machinery which are bulk in size having more cost. To prevent this they design multipurpose sowing machine which consists of hopper, seed metering mechanism, ground wheel, power transmission system, seed distributor, and tiller. In this they design model on PRO-E software. Actually the working is very simple as the tiller rotates it directly transmit motion into ground wheel which directly connected through main shaft. A main shaft has a disc with scoops inside the hopper. When the ground wheel rotates the main shaft also rotates with the help of power transmission system. The scoops collect the seed from hopper and leave it inside the seed distributor.

3. COMPONENTS

Table:1.1- Components

Sl. No	Parts
1.	Chassis frame
2.	Motor
3.	Battery
4.	Solar panel
5.	Sprayer
6.	Lever
7.	Cultivating tool
8.	Hooper
9.	Seed roller
10.	Hub wheel
11.	Chain drive

SOLAR PANEL:

The term solar panel is used colloquially for a photo-voltaic (PV) module. A PV module is an assembly of photo-voltaic cells mounted in a frame work for installation. Photo-voltaic cells use sunlight as a source of energy and generate direct current electricity. A collection of PV modules is called a PV Panel, and a system of Panels is an Array. Arrays of a photovoltaic system supply solar electricity to electrical equipment. The most common application of solar energy collection outside agriculture is solar water heating systems.

Most solar modules are currently produced from crystalline silicon (c-Si) solar cells made of multicrystalline and monocrystalline silicon. In 2013, crystalline silicon accounted for more than 90 percent of worldwide PV production, while the rest of the overall market is made up of thin-film technologies using cadmium telluride, CIGS and amorphous silicon

Fig -1: solar panel

BATTERY

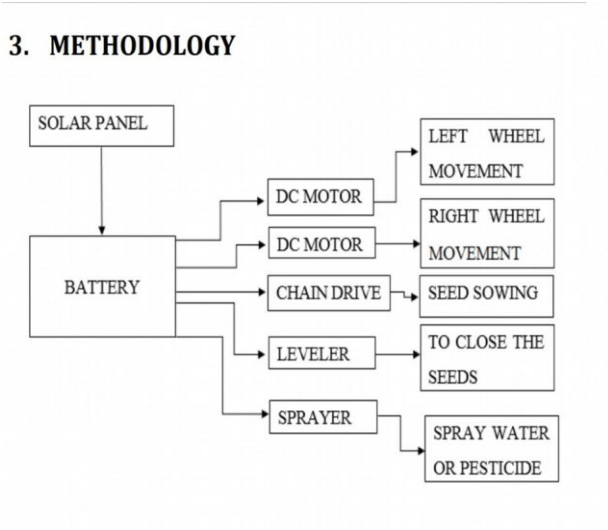
A battery is a device consisting of one or more electrochemical cells with external connections for powering electrical devices such as flashlights, mobile phones, and electric cars. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that will flow through an external electric circuit to the positive terminal.

4. WORKING PRINCIPLE

4.1 WORKING OF MACHINE

India is a country where farming is main occupation and culture then also in India most of farmers attempt suicide reason behind this is machine , as in India 10-20% of farmers are rich but rest of farmers don't have much source to purchase heavy equipment and machines. So we have decided to design a machine which can fulfill basis need of farming and price of machine should be very less as compared for market .Main objective of machine is drilling, fertilizer spraying, seed sowing & cultivating. For solving this purpose we have designed this type of machine

4.2 METHODOLOGY



5. TECHNICAL CHALLENGES

5.1 LACK OF AGRICULTURAL MACHINE

Farm power availability in India is estimated at 2.02 kw/hectare. Mechanisation level in India is about 40-45 percent with states such as UP, Haryana and Punjab having very high mechanisation levels but north-eastern states having negligible mechanisation. Overall industry estimated at approximately US$ 6.5 billion.

5.2 LACK OF MECHANISATION

Agricultural mechanization is an important input to agriculture for performing timely farm operations; reducing the cost of operation; maximizing the utilization efficiency of costly inputs (seeds, fertilizer, plant protection chemicals, water and agricultural machinery); improving the quality of produce; reducing drudgery in farm operations; improving the productivity of land & labour and for improving the dignity of labour. The strategy for mechanization in different regions will be different depending on the conditions and resources of that region.

6. SCOPE AND BENEFITS

6.1 SCOPE OF MULTIPURPOSE MACHINE

The design of multipurpose agro equipment machine will help Indian farmers in rural side and small farm. It will reduce the cost of seed feeding, pesticides sprinkling and crop cutting the field and will help to increase economic standard of an Indian farmer.The main aim of the project is to develop multipurpose agricultural vehicle, for performing major agricultural operations like ploughing, seeding, harvesting. The modification includes fabricating a vehicle which is small, compact in size. The project is about a machine design which makes cultivation much simpler.

6.2 BENEFITS OF MULTIPURPOSE MACHINE

Mechanization raises the efficiency of labour and enhances the farm production per worker. By its nature it reduces the quantum of labour needed to produce a unit of output.

Modern machines can control the efforts of farmers. They reduce the time. Used supply water to the crops. While Machines are useful in sowing the seeds.

Modern farming technology is used to improve wide range of production practices employed by our farmers. It makes use of hybrid seeds of selected variety of a single crop, technologically advanced equipment and lots of energy subsidies in the form of irrigation water, fertilizers and pesticides.

6.3 ADVANTAGE OF MULTIPURPOSE MACHINE

Includes scientific forming techniques. Sequence spacing seed sowing machine has more advantages than regular seed sowing machine.Involves precision forming and fool proofing technology. By using this machine, a single seed can be placed in the desired spacing, so that the wastage of the seeds will be reduced. This will reduce the thinning operation during the germination time.

- Suitable for all types of seed to seed forming.
- Low cost, it‘s the lowest priced multipurpose agricultural equipment ever built. Reduces time consumptions, since it is a three row operated equipment.
- Eco friendly
- Machine can be used to operate small farming land

7. COST ESTIMATION

Sl. No	Name of Materials	Cost
1.	Battery	1800
2.	Motor	1200
3.	Tyre, Rim, Hub	500
4.	Iron, Steel, sheet metal	3500
5.	Hooper	2000
6.	Solar panel	3000
7.	Cultivating tool	1200
8.	Tools purchased	2000
	Total	15,200

8. CONCLUSIIN

After the manufacturing and trail on the "Multipurpose Agricultural Automobile (FarmMachine)" conclusion which we made are as follows:

1. 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.

2. The machine required less man power and less time compared to traditional methods, so if we manufacture it on a large scale its cost getssignificantly reduce and we hope this will satisfy the partial thrust of Indian agriculture.

3. So in this way we solve the labour problem that is the need of today's farming in India.

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