FABRICATION OF MULTI-SOURCE MULTI-FUNCTIONAL FARMING EQUIPMENT

A Project Work submitted to

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

in partial fulfilment of the requirements
for the award of degree of

BACHELOR OF ENGINEERING
in
MECHANICAL ENGINEERING

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CERTIFICATE

This is to certify that the project work entitled **"FABRICATION OF MULTI-SOURCE MULTI-FUNCTIONAL FARMING EQUIPMENT"** *is a Bonafede work carried out by*

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in partial fulfilment for the award of ***Bachelor of Engineering*** *in* ***Mechanical Engineering*** *of* ***Visvesvaraya Technological University, Belagavi,*** *during the year 2022-2023. It is certified that all the suggestions indicated during internal assessment have been incorporated in the report and this report satisfies the academic requirement with respect to* ***Project Work 18MEP83*** *prescribed for the degree.*

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*the students of **BE VIII Semester (Mechanical Engineering)** declare that the project entitled* **"FABRICATION OF MULTI-SOURCE MULTI-FUNCTIONAL FARMING EQUIPMENT"** *is carried out by us as a partial fulfilment of academic requirement of degree under **Visvesvaraya Technological University.** The content in the report are original and are free from plagiarism and other academic dishonesty and are not submitted to any other University either partially or wholly for the award of any other degree.*

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ABSTRACT

Agriculture has been the backbone of the economy and it will continue to remain. Farming has undergone a great evolution in last 50 years. During initial days there was only hand spraying people use to do. Then slowly there has been development of various methods to spray out chemicals and dusts. Generally, cultivation of any crop involves various steps like ploughing, harvesting, sowing etc. Farmer has to use various agricultural equipment's and labours for caring out these steps. One of the biggest issues facing the agricultural sector in India is low yield: India's farm yield is 30-50% lower than that of developed nations.

Average farm size, poor infrastructure, low use of farm technologies and best farming techniques, decrease of soil fertility due to over fertilization and sustained pesticide use, are leading contributors to low agricultural productivity. Indian farms are small (70% are less than 1 hectare, the national average is less than 2 hectares) and therefore have limited access to resources such as financial services, credit (or lenders), support expertise, educational services or irrigation solutions. In the short term, yield directly impacts a farmer's cash flow and the ability to respond to fluctuations in the market. Long-term, yield limits a farmer's ability to invest into their farm's future to increase productivity and decrease risks associated with their crops (via inputs such as seeds, fertilizer, crop insurance, market/weather info, livestock health support, etc.) but also to invest into their families in areas such as education, healthcare, training, etc.

Multi source multi-functional agricultural machine mainly focuses on the basic problems faced by fellow farmers. i.e., Ploughing, seeding, water spraying, pesticide spraying all this can be done in this same machine. Our purpose is to combine all the individual tools to provide farmers with multipurpose equipment which implements all the scientific farming techniques and specifications, suitable for all type of seed-to-seed cultivation with minimum cost as possible. Ploughing, seeding, water spraying, pesticide spraying all this can be done in this same machine. We are looking this project as revolution in small farms, which is most uncovered area in this sector, is cost and more efficient way. The multipurpose agriculture vehicle is designed for small farmers in future.

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GLOSSARY (Nomenclature)

1.	M	Mass of the body, kg
2.	F	Force, N
3.	W	Watts
4.	v	Linear velocity
5.	rpm	Revolutions per minute
6.	d	Diameter
7.	r	Radius
8.	π	Pi
9.	mm	Millimeter
10.	mm^2	Millimeter per square
11.	l	Length
12.	m	Meter
13.	sec	Seconds
14.	t	Time
15.	u	Initial velocity
16.	Ah	Ampere-Hours
17.	Kg	Kilograms
18.	s	Height of the fall
19.	G	Grams
20.	V	Volts

Chapter 1

INTRODUCTION

1.1 Importance of Agriculture in India

Population of India is mostly dependent on agriculture as shown in fig 1.1; the performance of this sectorhas a considerable effect on the economy. Agriculture contributes around 17-18% in the GDP as shown in fig 1.2.Agricultural production has a significant impact on the economy. Agriculture supports more than 50 percent of the Indian population directly. Hence the employment scenario is controlledby the agricultural production in India to that extent. In addition to working in the farms, sectorslike animal husbandry and agricultural machinery which are connected to the performance of the agricultural sector since they provide support to this sector offer employment. India has hada past of famines and droughts that led to mass starving.

Fig 1.1: - Farming

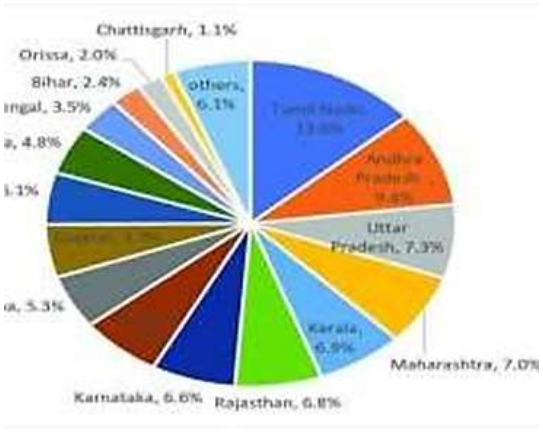

Fig 1.2: -Pie Chart

Agriculture has been a focus sector since independence to avoid tragedy. India has come a very long way since then and has a highstock of food to suffice the entire population in time of need. It is also a source of self- employment. There are a lot of people in India who feed their families by selling various kinds of crops to other people. Agriculture has offered India food independence. Due to the immensehard work of farmers, we Indians don't have to rely on other countries to consume various kinds of vegetables and grains. When it comes to fitness, people who are in the agricultural field are always fitter than people in any other field because they perform much harder duties than anyone else in this world. Since agriculture has been given an important status in the economy, the Green Revolution has been a success, and the story has been replicated for other

Grains. India is now a net exporter of agricultural products and fetches the much-needed foreign exchange**.** Indian culture is ingrained in agriculture, where the traditional music, folklore and folk dances all revolve around This was even the case in films until a couple of decades ago and recent ones like Lagaan. Indian literature highly revolved around agriculture with authors like Munshi Prachanda basing their books like Godan and others on a rural and particularly agricultural background. Agriculturists provide various kinds of raw materials to various industries and sectors due to which other sectors of India are doing quite well as well. Many of the Indian festivals are primarily established around the agricultural activities particularly Makar Sankranti, Lodhi, Baisakhi, Vishnu, Onam are among them. The much talked of the rural urban divide is partly because of the agriculture and dependent If agriculture develops, sufficiently this divide will narrow down.

1.2 Motivation

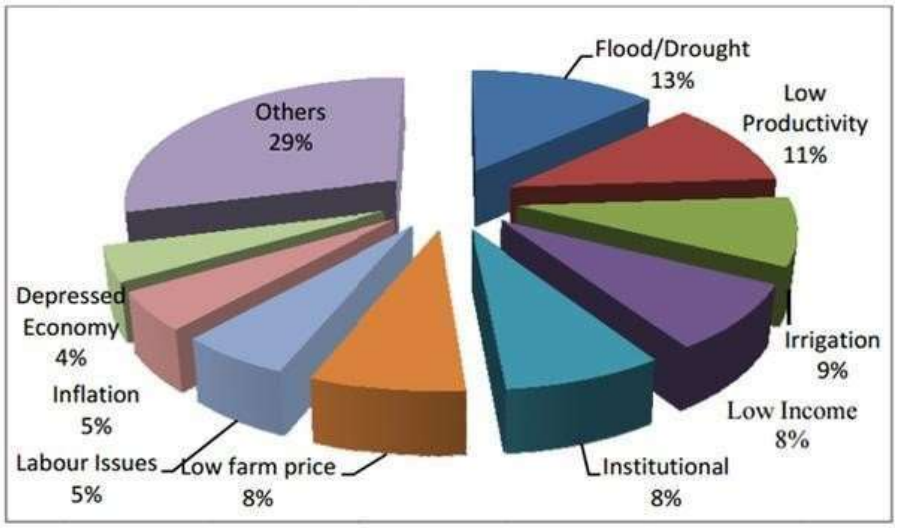

Fig 1.3: -Pie chart of classification of agricultural lands in India

One of the biggest issues facing the agricultural sector in India is low yield fig 1.3: India's farm yieldis 30-50% lower than that of developed nations. Average farm size, poor infrastructure, low use of farm technologies and best farming techniques, decrease of soil fertility due to over fertilization and sustained pesticide use, are leading contributors to low agricultural productivity. Indian farms are small (70% are less than 1 hectare, the national average is less than 2 hectares) and therefore have limited access to resources such as financial services, credit

(or lenders), support expertise, educational services or irrigation solutions. In the shortterm, yield directly impacts a farmer's cash flow and the ability to respond to fluctuations in the market. Long-term, yield limits a farmer's ability to invest into their farm's future to increase productivity and decrease risks associated with their crops (via inputs such as seeds, fertilizer, crop insurance, market/weather info, livestock health support, etc.) but also to invest into their families in areas such as education, healthcare, training, etc.

In 2016, harvest and post-harvest loss of India's major agricultural produce was estimated at Rs 92,651 crore ($13 billion) - almost three times as high as the 2016-17 budget for the agriculture sector. About 16 percent of fruits of vegetables, valued at Rs 40,811 crore ($6 billion), were lost between 2012 and 2014. Poor access to reliable and timely market information for the farmers, absence of supply & demand forecasting, poorly structured and inefficient supply chains, inadequate cold storage facilities and shortage of proper food processing units, large intermediation between the farmers and the consumers are some of the major causes for the losses.

1.3 Agricultural Equipment's Available in The Market and Their Drawbacks

1.Plows

Fig 1.4: -Plows

Plow, also spelled plough as shown in fig 1.4, most important agricultural implement since the beginning of history, used to turn and break up soil, to bury crop residues, and to help control weeds.

2. Movers

A lawn mower as shown in fig 1.5 is a machine used to mow grass or plants. This machine is commonly used to tidy up the garden and also to clear the fields from grass or other types of grass. The commonlyused lawn mowers are made of thin, hard and very sharp iron plates, so

they can easily mow the grass.

Fig 1.5: -Movers

3.Wagon

Fig 1.6: -Wagon

Farm wagons as shown in fig 1.6 are built for general multi-purpose usage in an agricultural or rural setting. Theseinclude gathering hay, crops and wood, and delivering them to the farmstead or market. Wagons can also be pulled with tractors for easy transportation of those materials.

4. Cultivator

Fig 1.7: -Cultivator

Talking about cultivator use in agriculture as shown in fig 1.7, this machine helps diminish the number of weeds that grow around the plants. A tractor cultivator works in two ways, stirring and pulverizing the soil, either before planting work or to remove grasses and to aerate and release the soil afterthe crop is harvested.

Drawbacks

The most common drawbacks of the above mentioned equipment are they are very expensive to buy, up front, and they must have fuel and they need regular maintenance and some repairs. As they are mechanical, they can break down; you must have access to repair parts, tools, and knowledge on how to repair. They also require routine maintenance and clean fuel.Most of them burn fossil fuels (some engines may run ok on biodiesel) and causes air pollutionand waste products such as used oil and filters that must be properly disposed of to avoid contaminating ground water.

1.4 Need for our Project or Project design and advantage

Multi source multi-functional agricultural machine mainly focuses on the basic problems faced by fellow farmers. I.e. Ploughing, seeding, water spraying, and pesticide spraying all this can be done in this same machine. We are looking this project as revolution in small farms, which is most uncovered area in this sector, is cost and more efficient way. The multipurpose agriculturevehicle is designed for small farmers in future.

Chapter 2

LITERATURE REVIEW

Earlier many have designed and fabricated various farming equipment's to minimize the efforts of farmer, increase the efficiency by reducing the cost. Following are farming equipment's deigned and fabricated, each equipment's advantages & disadvantages are discussed in the following paragraphs.

Dhatchanamoorthy [1] designed and fabricated Multipurpose Agriculture Vehicle as shown in the fig 2.1. The machine is a walk behind type of harvester which can be used for harvesting crops especially fodder crops such wheat, bajra etc. There are two cutter blades; one is moving and another is stationary. The slider crank mechanism was used to convert rotary motion to linear sliding motion. Scissoring action is obtained due to reciprocating movement of cutter blade over stationery blade was used to cut the crops. The frame of the harvester with the dimensions

Fig 2.1: Multi-Purpose Mini Combine Harvester

760 X 560 X620 (l X b X h) mm was fabricated. The mild steel angle section was used to build the frame. Mild steel angle was used because they are light weighted and can be easily welded. The frame was fitted with 2 pair of wheels. Front pair is smaller in size whereas other one is bigger in size. Two pair of wheels was used for easy movement of harvester in the field. Two handles were provided at the end of the frame for pushing the harvester forward. Motor of 1440 rpm was used Cutter assembly consists of two cutter blade plates. One of the cutter plates is

stationary and other is sliding in nature. The cutters used are of triangular shape. In sliding cutter plate, cutter blade was riveted on 3mm plate and in stationary cutter plate; cutter blade was riveted on 5mm plate. The stationary cutter plate was directly welded and fixed on frame.

Sliding cutter blade was provided with 2 slots of 80mm on its ends; it allowed sliding motion to be in straight line. The bottom of the sliding cutter plate was connected to the slider crank mechanism. The height of cutting blade is 10 mm and has a base of 560 mm. The blades were made up of Mild steel. But the drawbacks of this equipment are

i. Petroleum product such as diesel as a fuel is required to operate.
ii. More initial cost.

Abin Johns [2] fabricated Multi-Purpose Farming Machine. In which scotch yoke mechanism is used in the harvester design as shown in the fig 2.2. It is also known as slotted link mechanism. It converts rotational motion into linear motion. The reciprocation part is directly coupled with the sliding yoke. The components in the harvester are frame plate, scotch, yoke, supporting rods and blades. One blade is fixed stationary and the other one is fixed to the moving rod.

Fig 2.2: Multi-Purpose Farming Machine

The Scotch yoke mechanism is a reciprocating motion mechanism, converting the linear motion of a slider into rotational motion, or vice versa. The piston or other reciprocating part is directly coupled to a sliding yoke with a slot that engages a pin on the rotating part. In many internal combustion engines, linear motion is converted into rotational motion by means of a crankshaft, a piston and a rod that connects them. The Scotch yoke is considered to be a more efficient means of producing the rotational motion as it spends more time at the high point of its rotation than a piston and it has fewer parts. But the drawbacks of this equipment are

i. Only two operations can be done
ii. More initial cost

Bhoopathi [3] development manually Operated Multipurpose Agriculture Machine. This machine as shown in the fig 2.3 is manually operated and the energy used to operate this machineis converted into the desired work. On pushing the machine, the ploughing rods get in contactwith the surface of the agriculture land and it ploughs the land. When this process takes place,simultaneously the chain drive makes the seed sowing unit to function and the seeds are loadedinto the mini conveyers and then pushed into the rods which then finally fall on the ploughed field. The leveler then covers the seeds and then pushes away excess soil and unwanted stuff off the field. Finally, with the help of a crank mechanism, water is sprayed. The added advantage is that multiple seeds can be sown at the same time which makes the tiring work simpler and more economical.

Fig 2.3: Multi-Purpose Agriculture Machine

This multipurpose agriculture machine has several advantages like, Affordable machine for small scale farmers, User friendly and easy to operate, Man and animal power is reduced. Multiple operations are performed simultaneously, Unwanted and extra soil can be removed using the leveler. Multiple seeds can be sowed at the same time, since a water sprayer is used, less water is consumed during the process. But the drawbacks of this equipment is Pushing the vehicle is more difficult to perform.

Sakhale[4] fabricated Multipurpose farm machine as shown in fig 2.4 , this machine 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.

Fig 2.4: Multi-Purpose Farming Machine

When engine is started the auger bit drill tool will activated to drill hole for seed sowing after that operator press lever for drop a seed from hopper then the digging and sowing operation will be completed. The sowing operation can be done by semi manual. Cultivating tool can be easilyassembled and disassemble. This operation is done by the manual force. For spraying operation motor, battery and switch is given. When switch is on, fertilizer pump from the motor and enterto the sprayer nozzle then it sprays with high velocity to the crops. Drawback of this machine is it needs more human effort

Asit Dhawale [5] developed a Multipurpose Agricultural machine, as shown in fig 2.5. The product was designed and developed on existing engine operated sweeper weeder machine, implementing the 4-wheeler arrangement. The spraying unit, the cultivator cum seed Sower arrangements is also provided. The device is made such that can be easily operated in field. The vehicle power is provided by two stroke petrol engines, and controls are given at handles and foot rest. The steering mechanism is easier to operate and simple. Equipment controls are handy and easily accessible. The control switch is provided for spraying operations. This device is designed for ergonomically considerations only to push in the forward direction such a way that machine drag cultivator or sweeper blade or machine can transport the nozzle to cover the farm area. Thus, this fabrication is value for money

Fig 2.5: Multi-Purpose Farming Machine

But this machine has drawback like it needs Petroleum product such as diesel as a fuel is required to operate and high initial cost.

Borde Pramod [6] developed farming machine as shown in the fig 2.6 which performs multiple function. Generally, cultivation of any crop involves various steps like speed selection field preparation, fertilizing, sowing, irrigation, germination, thinning and filling, weed removal, vegetative stage, flowering stage, pesticide spraying, fruit or pod formation stage, harvesting and threshing. Farmer has to use various agricultural equipment and labors for caring out those steps, our purpose is to combine all the individual tools to from multipurpose equipment which reduce the overall equipment cost and labor cost and also increases the yield of the crop by implementing scientific farming method.

Fig 2.6: Multi-Purpose Farming Machine

Initially plough is connected to the beam using fasteners and tilling of the soil is performed, later during sowing seeds drill is attached to the beam along with leveler for leveling of soil for sowing and fertilizing, the seed and fertilizer are stored in the primary seed and fertilizer box. The seeds and fertilizer are provided to secondary seed box to maintain the level of seeds in the box and disc picks up the seeds from the seed hopper and fertilizer hopper and drop them to the furrow through the seed tube. When the seed is dropped at the specific distance then seed covering device covers soil over the seed and after germination of seed takes place, weeds are also developed in the field. By replacing the seed drill by wedding tools for the same beam arrangement can be used for wedding purpose. Wedding blade is attached in inclined position such that it uproots the weeds and simultaneously weedicide is applied on the field by the weedicide container attachment. But this machine needs more human efforts.

Anola [7] fabricated multipurpose agriculture machine as seen in fig2.7. The machine is designedto 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

Fig 2.7: Multi-Purpose Agriculture Machine

When engine is started the auger bit drill tool will activated to drill hole for seed sowing after that operator press lever for drop a seed from hopper then the digging and sowing operation will be completed. The sowing operation can be done by semi manual. • Cultivating tool is easily assembled and dissemble. This operation is done by the manual force. For spraying operation motor, battery and switch is given. When switch is on, fertilizer pump from the motor and enter to the sprayer nozzle then it sprays with high velocity to the crops. Cultivating tool is detachable component of machine which can be attached at the end part of machine when cultivating has to be done. Machine has 2 wheels as to move machine is y direction for drilling purpose. But has drawbacks i.e. Petroleum product such as diesel as a fuel is required to operate and high initial cost

Pratik Kumar[8] designed multipurpose agriculture equipment as shown in fig 2.8 **.** The components required for building the multipurpose agricultural equipment has been designed as planned. MAE is single system which can perform multi operations like Sowing, fertilizer Chemical sprayer, Weeding and inter cultivation.

Fig 2.8: Multi-Purpose Agriculture Machine

It can also be used for local transportation purpose as a bicycle. MAE will reduce external

charges like fuels; electricity etc. and this will be helpful for poor farmers. MAE is a single system which contains multi attachments and can be easily assembled and dismantled comfortably. All the fasteners used in the equipment are of the same size. The equipment weight is around 8 to 10 kg (Excluding bicycle attachment) thus it can be carried easily in farmland. The equipment can do the work of 4 labors a day which reduces the labor cost of the farmer.

Ramesh Kumar [9] designed and fabricated Multipurpose Agriculture Vehicle**.** The machine as shown in fig 2.9 works on the chain and sprocket mechanism and it receives the power form internal combustion engine. Here engine is placed on the rear side of the vehicle; output shaft from the engine is connected to the rear axle of the vehicle and required speed of the vehicle achieved by accelerator. Simultaneously another stepper motor is used to sowing the seed from bucket to the surface of the bed. Here stepper motor connected to the shaft below the seed sower equipment and its used to maintain the same speed to provide the rotational effect as that of rear axle rotates.

Fig 2.9: Multi-Purpose Agriculture Vehicle

As this shaft consists of two circular plates and made a slot at specified distance to easily pick the seeds from the hopper as the rear axle wheels turns due to power transmission from the engine, seed are dropped by the circular plate and the circular plates are turned in clockwise direction and seed is dropped into the ground. We are maintaining the speed of the machine very low so it produces maximum amount of torque. Hence the model can be run smoothly on agricultural land. As per deign of our project it not only does seed sowing but also does the multiple operations to make the seed sowing process more efficiently and also to get good nutrition crops. These operations would solve the problem faced by earlier methods. These operations done by the model only after the agricultural land is processed by tractors. But drawbacks are Petroleum product such as diesel as a fuel is required to operate and high initial cost.

2.1 GAP

- The Equipment available in market are costly
- High maintenance cost
- Air Pollution
- Works with Fuel or electrical energy as power source
- Can perform only 2 to 3 functions

To overcome the above stated problem, our project aims in fabricating low-cost multi-source multi-functional farming equipment that can be operated with the help of renewable energy source i.e., solar energy and can performs 5 functions i.e., ploughing, seeding, covering. water sprinkling, cutting.

2.2 AIM

To fabricate low-cost Multi-Source Multi-Functional Farming Equipment

2.3 OBJECTIVES

1. A detailed review is carried out to find various Multi-Source Multi-purpose agriculture equipment which uses different components and different working mechanism.
2. Design Multi Source - multifunctional farming Equipment
3. Fabrication of Multi Source - multifunctional farming Equipment as per the design.
4. Calculations of power requirement & energizing the model.
5. Testing & Evaluation

2.4 METHODOLOGY

1. A detailed research paper review is carried out to find various Multi-Source Multi-purpose agriculture equipment which uses different components and different working mechanism.

a) Collection of data.

b) Conduct a survey on various Multi-Source Multi-purpose agriculture equipment available

c) Study the different methods of functioning

↓

2. Designing the Farming Equipment model using Catia Software

a) Designing of model using software

↓

3. Fabrication of model.

a) To design a 3d model of multi-source and multi-functional agriculture machine using catia software and fabricating the model with different components.

b) Assembling of all the components using different fabrication techniques.

↓

4. Calculations of power requirement & Energizing the model.

a) The multi-purpose multi-functional agriculture machine will be installed based on power requirements.

↓

5. Testing & Evaluation.

The fabricated machine will be tested for its efficiency.

Chapter 3

DESIGN

1. Mechanical design plays a crucial role in helping design the framework of a product andthe structure of components to achieve the desired objectives.
2. In our project we designed the farming equipment using AutoCAD as shown in fig 3.1 and 3.2. AutoCAD is a 3DCAD, parametric feature and synchronous technology solid modelling software.

3.1 Model

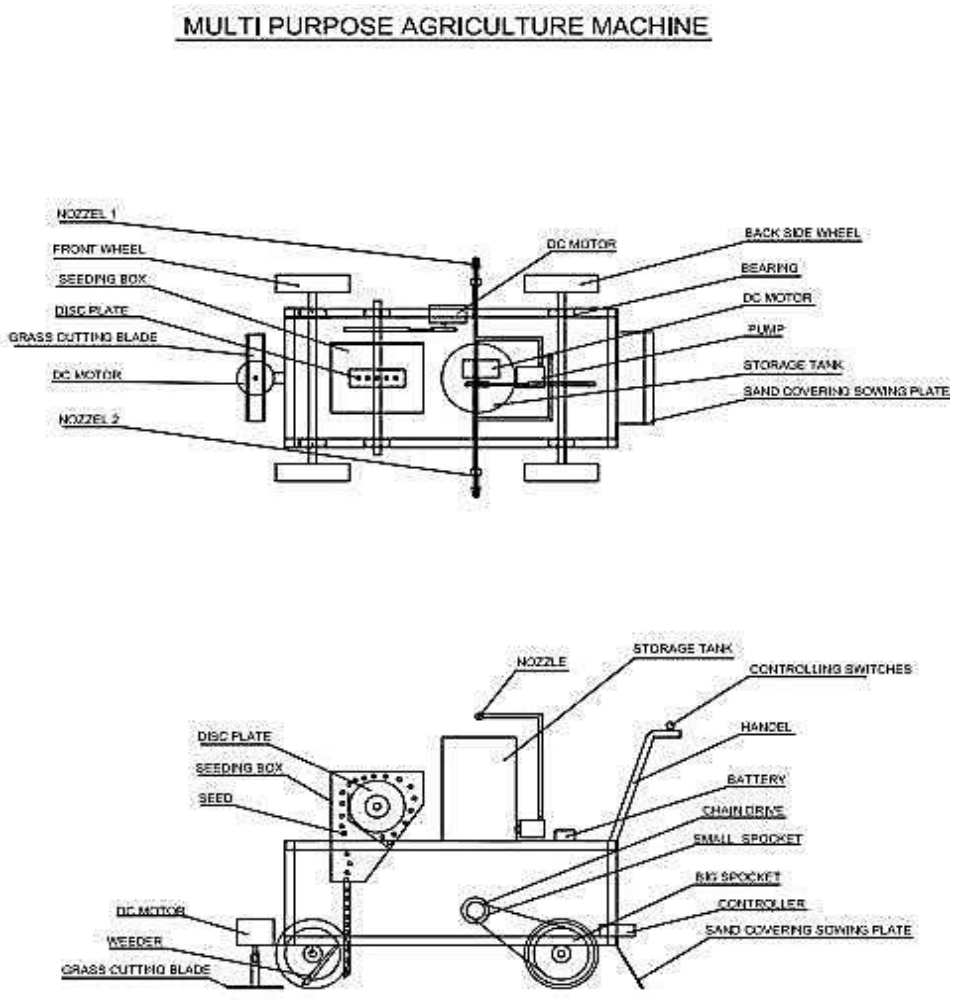

FIG 3.1:- 2D Design of Multi-source Multi-Functional Farming Equipment.

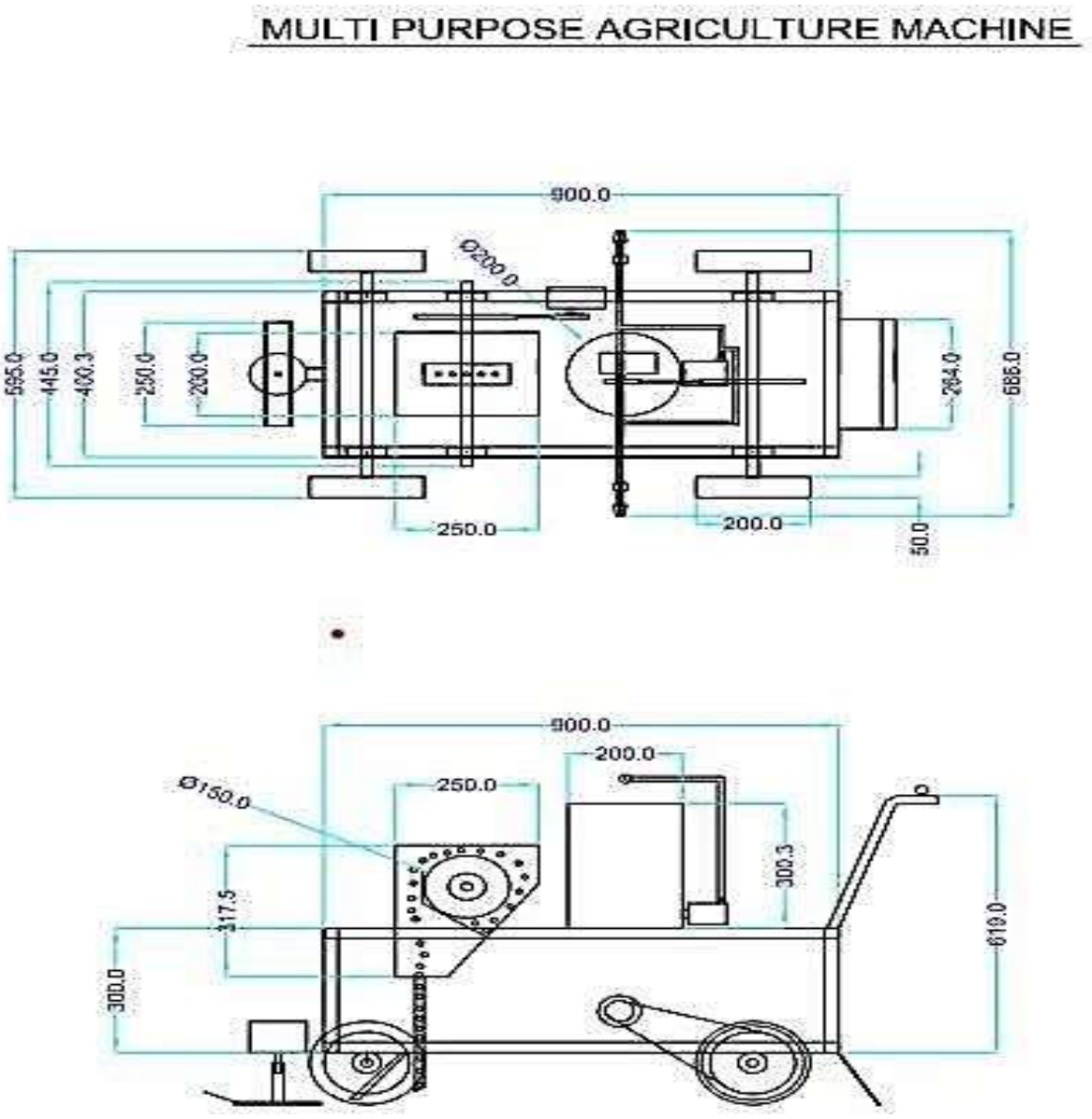

FIG 3.2:- 2D Design of Multi-source Multi-Functional Farming Equipment with measurements

EXPLANATION

The above image i.e. fig 3.1 and fig 3.2 shows us the 2d design of the equipment and its measurements. In the front we have the cutter next we have the ploughing tool, seeder and covering plate in a straight line. On top of the equipment, we have water or pesticide storage tank and front to it we have seed storage tank which consists of seed sowing disk inside. The seed sowing disk, cutter, wheels and water sprayer is connected to dc motor. The dc motor is connected to a 12V,7amps battery which is in turn connected to a 150W solar panel. Hence the battery can be charged electrically or through solar energy. The equipment has buttons for cutter, seed sowing disk, water or pesticide sprayer and for the equipment to move forward and backward

Chapter 4

EXPERIMENTAL DETAILS

In this section we are mainly focusing on the Materials used, Bill of materials,Assembly & fabrication works which we used in our project

4.1 Materials Used

1.Dc Motor

Fig 4.1:- DC Motor

A DC motor as shown in fig 4.1 rated at 12V and 7 amps is an electrical motor that is designed to be powered by a direct current (DC) power source with a voltage rating of 12V and a maximum current draw of 7 amps. Such motors can be found in a wide range of applications, including in farming machines.

In a multi-source and multi-functional farming machine, this type of motor may be used to power the seed sowing disc and the battery-powered rotating wheels. The seed sowing disc is a key component of the machine that is responsible for planting seeds in the soil, while the battery-powered rotating wheels can be used to move the machine around the field.

It's important to ensure that the motor is properly rated for the voltage and current requirements of the machine, as well as the load that it will be powering. This will help to ensure that the motor operates efficiently and reliably over the lifetime of the machine.

2. Battery powered rotating Wheels

Fig 4.2:- Battery powered rotating Wheels

Rotating wheels as shown in fig 4.2 are an essential component of multi-source multi-functional farming equipment that performs ploughing, seeding, cutting, covering, and pesticide spraying. Here are some of the ways in which rotating wheels are used in such equipment:

Mobility: Rotating wheels provide mobility to the farming equipment, allowing it to be moved easily around the field. This is particularly important for equipment used for ploughing, seeding, and cutting, as it enables farmers to cover large areas of land efficiently.

Traction: Rotating wheels provide the necessary traction for the farming equipment to operate effectively in various soil conditions. The wheels are designed to grip the soil, preventing slippage and ensuring that the equipment can move forward with minimal resistance.

Depth Control: The depth of ploughing, seeding, cutting, and covering is critical to ensure that crops are planted or harvested correctly. Rotating wheels can be adjusted to provide precise depth control, ensuring that the equipment operates at the correct depth for optimal results.

Power Transmission: Rotating wheels are also used to transmit power to various components of the farming equipment. For example, the wheels may be connected to the plough or the seeder, which is then rotated by the power provided by the wheels.

Overall, rotating wheels are a key component of multi-source multi-functional farming equipment used for ploughing, seeding, cutting, covering, and pesticide spraying. They provide mobility, traction, depth control, and power transmission, enabling farmers to work efficiently and effectively in the field.

3.Seed Storage Tank

Fig 4.3:- Seed Storage Tank

A seed storage tank as shown in fig 4.3 is a critical component of multi-source multi-functional farming equipment used for planting and seeding operations. As the name suggests, the seed storage tank is used to store seeds that are to be planted. The tank can be filled with seeds of various sizes and types, providing a convenient and efficient way to store and transport them to the field.

4.Seed Sowing Disc

Fig 4.4:- Seed Sowing Disc

A plastic seed sowing disc as shown in fig 4.4 is a specific type of seed sowing disc made from plastic material. Plastic seed sowing discs are commonly used in multi-source multi-functional

farming equipment for planting seeds in a precise and efficient manner. Here are some features and functions of plastic seed sowing discs:

Material: Plastic seed sowing discs are made of durable, high-quality plastic that is designed to withstand the rigors of farming and last for multiple planting seasons.

Disc design: The plastic seed sowing disc has a series of small holes or openings in it that allow seeds to be released from the disc and planted in the soil. The size and spacing of these openings can be adjusted to ensure that the seeds are planted at the correct spacing for optimal growth.

Compatibility: Plastic seed sowing discs are often designed to be compatible with various types of agricultural machines, including tractors and cultivators. This allows farmers to use the same tool with different machines, reducing the need for multiple tools and improving efficiency.

Precision planting: By using a plastic seed sowing disc, farmers can achieve precise planting of seeds, ensuring that each seed is planted at the correct depth and spacing. This can help to improve crop yields and reduce waste.

Lightweight: Compared to metal seed sowing discs, plastic seed sowing discs are often lighter in weight, making them easier to handle and transport.

In multi-source multi-functional farming equipment, plastic seed sowing discs are typically used in combination with other tools, such as a ploughing tool or a soil cultivator, to prepare the soil for planting. Once the soil has been prepared, the plastic seed sowing disc is used to plant seeds in a precise and efficient manner. By using this tool, farmers can save time and improve crop yields, ultimately leading to a more profitable and sustainable farming operation

5.Ploughing Or Weeder Tool

Fig 4.5:- Ploughing Or Weeder Tool

A single blade ploughing tool as shown in fig 4.5 is a specific type of ploughing tool that is often used in multi-source multi-functional farming equipment for soil preparation. Here are some of the features and functions of a single blade ploughing tool and how it might be used in a project involving such equipment:

Blade Design: A single blade ploughing tool typically has a long, curved blade that is designed to cut through the soil and turn it over in a single pass. The blade may be made of steel or other materials, and is often designed to be self-sharpening to maintain its cutting edge.

Depth Control: The depth of the single blade ploughing tool can be adjusted to ensure that the soil is turned over at the desired depth. This is important for planting and seeding operations, as it allows the seeds to be placed at the correct depth for optimal growth.

Compatibility: Single blade ploughing tools are often designed to be compatible with various types of agricultural machines, including tractors and cultivators. This allows farmers to use the same tool with different machines, reducing the need for multiple tools and improving efficiency.

Soil Preparation: The single blade ploughing tool is used for soil preparation, including breaking up the soil, turning it over, and creating furrows for planting. This helps to promote

healthy plant growth and improve crop yields.

In a project involving multi-source multi-functional farming equipment, a single blade ploughing tool could be used in combination with other tools such as seed storage tanks, rotating wheels, and cutting and spraying equipment to create a comprehensive system for soil preparation and planting. By using the single blade ploughing tool to break up and turn over the soil, farmers can create a suitable environment for planting and seed growth, while also improving soil structure and health

6.Sand Covering Plate

Fig 4.6:- Sand Covering Plate

A sand covering plate as shown in fig 4.6 is a component of multi-source multi-functional farming equipment that is used for covering seeds with sand or soil after they have been planted. Here are some features and functions of a sand covering plate:

Design: A sand covering plate is typically a flat metal plate with small holes or slots on its surface. The holes or slots allow sand or soil to be distributed evenly over the planted seeds.

Function: After seeds have been planted with a seed sowing disc or another planting tool, the sand covering plate is used to cover the seeds with a layer of sand or soil. This helps to protect the seeds and promote healthy growth by providing them with the necessary nutrients, moisture, and protection from the elements.

Compatibility: Sand covering plates are designed to be compatible with various types of agricultural machines, including tractors and cultivators. This allows farmers to use the same tool with different machines, reducing the need for multiple tools and improving efficiency.

Efficiency: By using a sand covering plate, farmers can cover large areas of land quickly and efficiently, which can save time and reduce labor costs.

Adjustable settings: The amount of sand or soil that is distributed by the sand covering plate can be adjusted to suit different soil types and planting conditions. This allows farmers to achieve the optimal amount of coverage for their specific crop and soil type.

In multi-source multi-functional farming equipment, the sand covering plate is typically used in combination with other tools, such as a seed sowing disc or a ploughing tool, to prepare the soil for planting and cover the seeds with sand or soil. By using this tool, farmers can improve crop yields and ensure healthy growth of their crops.

7.Battery

Fig 4.7:- RB7-12 Rechargeable Battery

The rechargeable RB7-12 battery as shown in fig 4.7 is a type of sealed lead-acid battery commonly used in multi source multi-functional farming equipment. This battery is designed to provide a reliable and long-lasting source of power to the equipment.

The RB7-12 battery typically has a capacity of 7.2 Ah (ampere-hours) and a voltage of 12 volts. It is rechargeable, which means that it can be connected to an external power source to recharge when the battery is depleted.

In multi-functional farming equipment, RB7-12 batteries are commonly used to power various components such as electric motors, lights, and control systems. They are especially useful in equipment that is used in remote or off-grid locations where access to a mains power supply is limited.

The use of RB7-12 batteries in multi-functional farming equipment provides several benefits. For example, they are reliable, durable, and have a long service life. Additionally, they can be recharged quickly, allowing the equipment to be used continuously without interruption. They are also relatively low cost and readily available.

However, it is important to note that RB7-12 batteries contain lead-acid, which can be hazardous if not handled properly. Operators of multi-functional farming equipment should take appropriate precautions when handling, charging, and disposing of these batteries to minimize the risk of exposure to lead and acid.

8.Pestiside Storage Tank

Fig 4.8:- Pesticide Storage Tank

A pesticides storage tank as shown in fig 4.8 in a multi source multi-functional farming

equipment refers to a container designed to hold pesticides and other chemicals that are used for pest control in farming. These tanks are commonly used in conjunction with spraying equipment that is used to apply pesticides to crops.

The pesticides storage tank is an important component of this farming equipment as it provides a convenient and safe way to store and transport pesticides to the field. The tank can be filled with various types of pesticides, including insecticides, herbicides, and fungicides, depending on the specific pest control needs of the crop.

The size and design of the pesticides storage tank may vary depending on the size of the farming equipment and the amount of pesticides required for the crop. Generally, these tanks are made of materials that are compatible with the pesticides being stored, such as plastic or stainless steel.

It is important to note that the use of pesticides in farming comes with potential risks to human health and the environment. Farmers and operators of multi-functional farming equipment should take appropriate precautions when handling, storing, and applying pesticides to minimize the risk of exposure. This includes proper labeling, storage, and disposal of pesticides, as well as the use of protective equipment such as gloves and masks

4.2 Fabrication

1.Battery powered rotating Wheels:-

The rotating wheels are designed also it has fabricated rib parts so it helps to give grip during the seed planting, so that user can easily pull the whole assembly as per required direction. The both wheels are powered by battery and DC motor is inbuilt fitted in these wheels. The motor specifications are , DC power, 12V, 7amp current.

2. Seed storage Tank:-

This is one of the stationary components which are mounted on the main frame. Inside this drum we can pour the seed for planting / sowing operation. Bottom of this seed tank there is seed sowing disc arrangement.

3. Seed sowing disc and seed bucket:-

In each complete rotation of rotating wheel there is seeds falls from this seed drum and seed plantation process taken place smoothly and without wastage of seeds. These seed buckets are fitted on the seed sowing disc with the help of screws. The buckets are designed in such a way that they can select the size of bucket as per seed type, size and shape. Also these buckets fit on the seed sowing disc in such a way that the distance between two seed during the plantation we can adjust and set according to requirement.

4. Seed chamber, Plough and sand cover arrangement:-

In the drawing the seed chamber, Plough and sand cover arrangement is shown. The seed sowing disc is rotate in the seed chamber. The seeds are falls in the seed chamber through seed storage tank and the seed buckets are collect the seeds from the chamber and it sows in the ground as required depth with the help of plough. The distance between two rows we can adjust with the help of ploughs. After seed fallen in the ground the sand cover will pull the sand on the seed.

This is one of the stationary components which is mounted on the main frame. Inside this drum it can pour the seed for planting / sowing operation. Bottom of this seed tank there is seed sowing disc arrangement round as required depth with the help of plough. The distance between two rows we can adjust with the help of ploughs. After seed fallen in the ground the sand cover will pull the sand on the seed.

5. Battery 7.2 ah

Fig 4.9:- RB7-12 Rechargeable Battery

Batteries as shown in fig 4.9 convert chemical energy directly to electrical energy. Abattery consists of some number of voltaic cells. These voltaic cells consist of certain chemical compositions where the chemical reactions takes places.Each cell consists of two half cells conneted by a conductive electrolyte containing anions and cations. One half-cell includes electrolyte and the negative electrode, the electrode to which anions (negatively charged ions) migrate; the other half-cell includes electrolyte and the positive electrode to which cations (positively charged ions) migrate. Redox reactions power the battery. Cations are reduced (electrons are added) at the cathode during charging, while anions are oxidized (electrons are removed) at the anode during charging. During discharge, the process is reversed. The electrodes do not touch each other, but are electrically connected by the electrolyte

6. Solar panel:-

Solar panel as shown in fig 4.10 works by allowing photons, or particles of light, to knock electrons free from atoms, generating a flow of electricity. Solar panels actually comprise many, smaller units called photovoltaic cells. The function of solar panels is to gather that energy and convert it to electricity to bring power to the machine. The function of solar panels occurs because of the components of what makes up a solar power system. Among all the benefits of solar panels, the most important thing is that solar energy is a truly renewable energy source. It can be harnessed in all areas of the world and is available every day. We cannot run out of solar energy, unlike some of the other sources of energy. Solar energy will be accessible

as long as we have the sun; therefore, sunlight will be available to us for at least 5 billion years when according to scientists the sun is going to die. Since meeting most of the energy needs with the electricity by which solar system has generated, energy bills will drop.

Fig 4.10:- 150W solar panel

How much you save on your bill will be dependent on the size of the solar system and your electricity or heat usage. Moreover, not only will you be saving on the electricity bill, there is also a possibility to receive payments for the surplus energy that you export back to the grid. If you generate more electricity than you use (considering that your solar panel system is connected to the grid). Using a battery and invertor we can easily convert the solar energy into usable electricity. The purpose of battery is to store the energy and use it efficiently throughout the process. The invertor on the other hand makes sure that the electricity flow is kept constant without any variations in its flow.

7. Chain Drive.

A chain drive in multi source multi-functional farming equipment is a mechanical power transmission system that uses a chain to transfer power from the engine or motor to the wheels or other moving components of the equipment.

The chain drive system consists of a chain, sprockets, and tensioner. The sprockets are gears with teeth that mesh with the chain, and the tensioner keeps the chain tight. When the engine or motor rotates the drive sprocket, the chain transfers power to the driven sprocket, which rotates the wheels or other moving components of the equipment.

Chain drives are commonly used in multi-functional farming equipment because they are reliable, durable, and efficient at transferring power. They can also be easily adjusted to provide different gear ratios, allowing for optimal performance in different farming operations.

In farming equipment, chain drives are often used in machinery such as tillers, cultivators, and planters, as well as in some types of harvesting equipment. They can also be found in vehicles such as tractors and combines.

Overall, the use of chain drives in multi-functional farming equipment helps ensure that the equipment can operate efficiently and reliably, even in tough farming conditions.

8. BEARINGS

Bearing is a machine element, which supports another machine element. It permits a relative motion between the contact surfaces, while carrying the load. In this automobile gearbox roller bearings are adopted. The ball or roller bearing consists of an inner race, which is mounted on the shaft or journal, and the outer race, which is carried by the housing or casing. In between the inner and outer race there are balls or rollers. A No. of balls or rollers is used and these are helped at proper distance by retainers so that they do not touch each other. The retainers are this strip and usually in two parts, which are assembled after the ball bearings are used for light loads and roller bearings, are used for heavier loads

9. Seed Box and Seed Cup

Fig 4.11:- Seed Cup

The seed box as shown in fig 4.11 is made of HR sheet 2 mm thick. The box is designed on the basis of area of land. The box was located above the base frame supporting the furrow openers and transport cum depth control beam

• The seeds and fertilizers will get placed in the furrows through the guide pipes.

• In this way the seeds and fertilizers are placed in the furrows at proper distance and this machine maintains the proper row spacing.

4.3 Bill of Materials

Budget	Amount
Materials/Consumables • Metal frame • Sprocket • Chain • Plastic Can • Wheels • Motor • Cutter • Battery • Covering Plate • Weeder	RS 16000
Total	**RS 16000**

Table 4.4 Bill of Materials

Chapter 5

Result & Discussion

The development of a multi-purpose farming equipment that can perform five functions - ploughing, seeding, covering, cutting, and pesticide spraying - using a rechargeable RB7-12 battery and solar power is a significant achievement. This equipment offers a sustainable and eco-friendly solution to modern agriculture, where farmers can reduce their carbon footprint and improve their productivity.

The use of a rechargeable battery allows the equipment to be portable and eliminates the need for a constant connection to a power source. The 12V 7amp DC motor is also an efficient power source that reduces energy consumption. The solar panel, with a capacity of 150W, provides additional power to the equipment, ensuring that it can operate even in areas with limited access to the grid.

The RB7-12 rechargeable battery has a capacity of 7 Ah (ampere-hours) and can provide 12 volts of power. The battery life or the number of hours it can last will depend on the amount of power the agriculture machine uses, which can vary depending on factors such as the machine's size, weight, and operating conditions.

If a battery-powered rotating wheel uses DC power, 12V, and 7A current, the power consumption can be calculated as follows:

Power (in watts) = Voltage (in volts) x Current (in amperes)
Power = 12V x 7A = 84 watts

So the power consumed by the rotating wheel in this scenario is 84 watts.

To estimate the battery life, we can divide the battery's capacity of 7 Ah by the current draw of the motor, which in this case is 7 amperes:

Battery life (in hours) = Capacity (in Ah) / Current draw (in A)

Battery life = 7 Ah / 7 A = 1 hour

It's important to note that these calculations are estimates, and the actual power consumption and battery life will depend on several factors, including the efficiency of the motor, the weight and size of the rotating wheel, and the operating conditions. Also, it's worth mentioning that discharging the battery completely may cause damage to the battery and reduce its overall lifespan. Therefore, it is recommended to avoid discharging the battery below 50% of its capacity and to follow the manufacturer's instructions for charging and using the battery to optimize its performance and prolong its life.

The time it takes to charge a rechargeable RB7-12 battery from a 150-watt solar panel will depend on several factors, such as the capacity of the battery, the amount of energy stored in the battery, the efficiency of the charge controller, and the weather conditions.

Assuming a fully depleted 7 Ah RB7-12 battery, we can estimate the charging time from a 150-watt solar panel as follows:

Step 1: Calculate the energy generated by the solar panel per hour
Energy = Power x Time
Energy = 150 watts x 1 hour
Energy = 150 watt-hours

Step 2: Calculate the energy required to fully charge the battery
Energy required = Battery capacity x Battery voltage
Energy required = 7 Ah x 12 volts
Energy required = 84 watt-hours

Step 3: Calculate the charging time
Charging time = Energy required / Energy generated
Charging time = 84 watt-hours / 150 watt-hours
Charging time = 0.56 hours or approximately 34 minutes

This calculation assumes ideal conditions, and the actual charging time may be longer due to losses in the system and variations in weather conditions. It's also worth noting that overcharging a battery can reduce its lifespan, so it's essential to use a charge controller to prevent overcharging

A 150W solar panel has a power rating of 150 watts, which means it is capable of generating up to 150 watts of power under optimal conditions. However, the actual power output of the solar panel will depend on several factors, such as the location, the time of day, the angle and orientation of the panel, and weather conditions.

To estimate the power generated by a 150W solar panel, we need to know the amount of sunlight that falls on the panel. The power generated by a solar panel is directly proportional to the amount of sunlight it receives. In practice, the power output of a solar panel will be less than the rated power output due to losses in the system, such as wiring and conversion inefficiencies. Additionally, the amount of power generated will vary depending on the location and conditions.

Overall, a 150W solar panel is capable of generating up to 150 watts of power under optimal conditions, but the actual power output will depend on several factors and can range from zero on a cloudy day to several kilowatts on a sunny day with optimal conditions.

The equipment's ability to perform five functions reduces the need for separate machines, saving farmers time, space, and money. This multi-purpose functionality can help small-scale farmers increase their productivity and crop yield, contributing to food security.

The equipment's ability to spray pesticides can be particularly beneficial, as it reduces the amount of chemicals needed for farming, making it a more sustainable option. Additionally, the equipment's cutting function can be useful for pruning crops, reducing labor and increasing efficiency.

Overall, the development of a multi-purpose multi-functional farming equipment that can perform five functions using rechargeable batteries and solar power is a step towards a more

sustainable and eco-friendly agriculture system. Its potential to reduce energy consumption, increase productivity, and reduce the use of

chemicals makes it an attractive option for small-scale farmers. Further research and development of this equipment could lead to more efficient and sustainable farming practices.

Fig 5.1:- Multi-Source Multi-Functional Farming Equipment

Fig 5.2:- TEAM 2 with Multi-Source Multi-Functional Farming Equipment

Chapter 6

CONCLUSION

- Literature review is carried out. The following short-comings were found.
- This farming equipment designed and to be fabricated reduces human efforts and also the same consumed for post-harvest operation.
- The energy consumed here is electrical energy and solar energy where solar energy is renewable and abundantly available, where maintenance is inexpensive and also pollution free.
- We are trying our best to solve the issues faced by famers in farming through this equipment.

BIBLIOGRAPHY

1. Dhatchanamoorthy.N, Arunkumar.J, Dinesh Kumar.P. Jagadeesh.K, Madhavan.P. "Design and Fabrication of Multipurpose Agriculture Vehicle", International Journal of Engineering Research and Technology, Vol. 6, Issue 9, 2017, pp. 78-82.

2. Abin Johns Thomas, Mebin C Mathew, Thomas John, Allen Easo Mathew, Anu Nair P. "Multi-Purpose Farming Machine", International Journal of Applied Engineering Research, Vol. 14, Issue 14, 2019, pp. 322-326.

3. Bhoopathi R, Jagathiskumar U, Shiva Ganesh R, Sanjay T, Muralidharan R. "Development of Manually Operated Multipurpose Agriculture Machine", International Journal of Advanced Research in Engineering and Technology, Vol. 6, Issue 7, 2015, pp. 238-242.

4. Dilip Radkar, Goraksh Choughule, Abhijeet Desai, Prathamesh Gawand, Pradip Bade, Yogesh Chaudhari. "Multipurpose Agriculture Machine", International Journal of Innovative Research in Science, Engineering and Technology, Vol. 5, Issue 3, 2016, pp. 3763-3766.

5. Asit Dhawale, Akash Jadhao, Sanket Hendve, Kirti Fadnvis, Sumit Hande, Ashutosh Gadling. "Review of Multipurpose Agriculture Machine", International Journal of Engineering Development and Research, Vol. 6, Issue 2, 2018, pp. 132-138.

6. Kare Kailash M, Borde Pramod S, Khomane Swapnil K, Landge Reshma R, Salunkhe Chaitanya A. "A Review on Multipurpose Agriculture Machine", International Journal of Engineering and Management Research, Vol. 8, Issue 4, 2018, pp. 74-77.

7. Anola Ku Panda, Anil Hembram, Anil Ku mallick, Soumyadip Panda, Alok Mohapatra. "MULTIPURPOSE AGRICULTURE MACHINE APPLICATIONS AND USES", International Journal of Innovative Science and Research Technology, Vol. 3, Issue 11, 2018, pp. 426-431.

8. Pratikkumar V. Patel, Mukesh Ahuja. "RESEARCH AND DESIGN OF MULTIPURPOSE AGRICULTURE EQUIPMENT", International Journal of Emerging Trends in Engineering Research, Vol. 3, Issue 8, 2015, pp. 268-271.

9. Rakeshkumar H. R, Chandankumar H. S, Harish J. S, Nagaraju. R, Krishnaprasad. S. "Design and Fabrication of Multipurpose Agriculture Vehicle", International Journal of Applied Engineering Research, Vol. 10, Issue 22, 2015, pp. 43090-43093.

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