

Development of Multi-tasking, Multi-powered Machine for Agriculture Purpose

Kadole Pavan Prabhakar, Bharath Raj H K, D Yogeshwar Naidu, G Tharun Sai, Manjunath R

UG Scholar, Department of Mechanical Engineering, New Horizon College of Engineering, Bangalore, India

ABSTRACT

Article Info

Volume 8, Issue 4

Page Number : 284-293

Publication Issue :

July-August-2021

Article History

Accepted : 20 July 2021

Published: 30 July 2021

At present farmers pay a lot of money on machines that work with them decline work and increment yield of harvests. The Multipurpose machine is accustomed to planting the seeds and manure shower into land and seed planting for making heaps of plant creation in rural field. It is a mechanical gadget here no electrical or other force source is not needed. The expense of this machine is low and simple to work straightforward in development. As there is huge advancement in the field of designing the current situation makes us to discover answer for serious issues looked by the farming field. The agrarian business is behind elective reciprocal ventures in exploitation robots because of the sort of occupations worried in agribusiness are no and burrow. The fundamental target of this task is to improve the current method of cultivating by presenting multipurpose gear. The greater part of the Farmers in India is affordable frail because of which they cannot buy work vehicles and other expensive hardware's subsequently they utilize conventional strategy for cultivating. This will not fulfill need of energy necessity of the cultivating when contrasted with different nations on the planet. So, work has been completed to plan and manufacture a multipurpose agribusiness vehicle, to perform rural tasks like furrowing, seed planting and showering of pesticides or water utilizing the sun-oriented energy. Likewise in the place of human and animal endeavors can be supplanted by this component of machine which will be reasonable for limited scope rancher from efficient and exertion perspective. So, we are fostering this gear which will fulfill this need and to tackle work issues.

Keywords - Multipurpose, agricultural, equipment, labor, mechanization Ploughing, seed sowing, spraying, hybrid vehicle, solar and engine, powered.

I. INTRODUCTION

We agriculture is the basis of the Indian economy. " A man who can achieve for three days short of nourishment for three days will argument, for seven days will fight and for a month or somewhere in the

neighborhood will pass on". Horticulture is the piece of science and strength of developing which fuses development the earth, formation of harvests and raising the economy. It is the fundamental region in the world. For quite a while, cultivating has been done in a little arrive at creating between 2 to 3

hectares, with the help of human work and ordinary instruments like wooden wrinkle, trouble, leveler, harrow, hammer, spade, gigantic sickle, etc. These are used in land arranging, planting of seeds, weeding and gathering. As referenced before horticulture assumes a crucial part in India's economy. More than 58% of the country families rely upon horticulture for their endurance. Horticulture meant 17.4 of India's GDP in 2015-16. India stands second in farming yield.

The utilization of hand instruments for land development is as yet transcendent in India since work vehicles require assets that numerous Indian farmers don't have simple admittance to. The requirement for agrarian automation in India should hence be surveyed with a more profound comprehension of the little holder farmer's exercises. There is colossal hole in innovation appropriation and implement utilized with little and peripheral ranchers. Economic improvement in the jobs of helpless farmers in non-industrial nations depends to a great extent on the reception of improved asset monitoring trimming frameworks.

Solar energy is the age of power from daylight. it is the change of daylight to power. Daylight is a spotless, sustainable wellspring of energy. It is a practical asset, which means it doesn't run out, yet can be kept up with. Petroleum products, coal and gas are not supportable or non-sustainable wellspring of energy whenever they are gone, there is zero remaining. Daylight can be changed over straightforwardly into power utilizing photograph voltaic (PV), or in a roundabout way with concentrating sun-based force framework (CSPS), where daylight is engaged with mirrors to make an extreme focus heat source to deliver steam or mechanical ability to run a generator that makes power. Photovoltaic (PV) solar cells straightforwardly convert daylight into power.

1.1 INTRODUCTION TO SOLAR PANELS

Solar energy technologies have attracted significant attention of researchers all over the world. Solar energy has attractive characteristics, solar energy is clean, abundant, widespread, and renewable. This energy can be harnessed with lowest damaging effects on the environment. The solar energy is the most abundant permanent source of energy available at free cost. Solar energy is the free from pollution and it does not require highly sophisticated technology for its wide spread utilization. Solar energy is free, inexhaustible, non-polluting and devoid of political control. The sun is the primary source for most forms found on earth. Solar energy is hygienic, abundant, extensive, and renewable. These include solar thermal as well as photovoltaic technologies while the latter represents direct conversion solar energy into electricity, out of non-conventional energy is most promising one. The energy available for conversion is several times more than world energy requirements.



Figure 1.1 : SOLARPANEL

1.2 INTRODUCTION TO ENGINE

The internal combustion engines are the engines in which the ignition of fuel takes place inside the engine cylinder. The I.C. engines use both petrol or diesel as their fuel. In petrol engines (also called spark ignition engines), the correct amount of air and petrol is mixed in the carburetor and fed to engine cylinder where it is ignited by means of a spark created at the spark plug. In diesel engines (also called compression ignition engines), only air is supplied to the engine cylinder during suction stroke and it is compressed high pressure, thereby rising its temperature from

600°C to 1000°C. The preferred quantity of fuel (diesel) is now injected into the engine cylinder in the form of a very well spray and gets ignited when comes in contact with hot air. Piston is an important factor of reciprocating engine. It is the moving component that is controlled by a cylinder and is made gas-tight through piston rings.



Figure 1.2 : ENGINE

1.3 INTRODUCTION TO D C MOTORS

An Electric DC motor is a machine which converts electric energy into mechanical energy. The working of DC motor is based on the principle that when a current-carrying conductor is placed in a magnetic field, it experiences a mechanical force. The direction of mechanical force is given by Fleming's Left-hand Rule and its magnitude is given by $F = BIl$ Newton. There is no basic difference in the construction of a DC generator and a DC motor. In fact, the same dc. machine can be used interchangeably as a generator or as a motor.

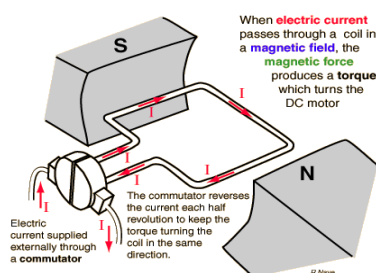


Figure 1.3: Working principle of dc motor

1.4 INTRODUCTION TO BATTERY

A battery is a device consisting of one or more electrochemical cells that convert stored chemical energy into electrical energy by reversible chemical reactions and that may be recharged by passing a

current through it in the direction opposite to that of its discharge, called also storage cell A battery is a device that converts chemical energy directly to electrical energy.

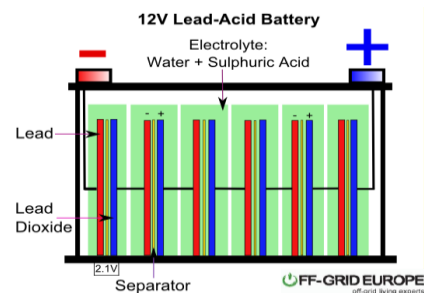


Figure 1.3 : LEAD ACID BATTERY

1.5 INTRODUCTION TO GEARS

Gears are defined as toothed wheels or multi lobbed cams, which transmits power and motion from one shaft to another by means of successive engagement of teeth. Gear drives offer the following advantage compared with chain and belt drives. It is a positive transmission drive. Its velocity ratio remains constant. The center distance between the shafts is relatively small, which results in the compact construction. It can transmit very large power, which is not possible with the belt drives. The efficiency of gear drives is very high even up to 99% in case of spur gears. A provision can be made in the gearbox for gear shifting; thus, velocity ratio can be changed over a wide range. Gear drives however can only be used for small center distances, and their maintenance cost is also higher.

II. LITERATURE SURVEY

[1] Vishal S G., et al., [1], [2018].

India is an agricultural developing nation with a greater number of ground nuts, corns, oats and so on in the country. The accessible programmed machines are imported from different country. The imported machines are more in size and also high in cost for the purchase. In this project we designed and fabricated a multipurpose Agricultural machine for small farmers

at cost not more than 15000 rupees. The multipurpose agricultural machine which performs different operations like sowing, seed spraying, pesticides spraying, grass cutting, weeding in which to increase the efficiency and to reduce the cost and man handling. By this project we can reduce both human effort and Animal effort by developing an Advance machine for the small farmers in the Economic point of view.

[2] M d. Aqib Naque., et al., [2013]

The majority of farmers having small scale land, in which soil tiller and weeder are the major operations done in the farm. This project is mainly working on Engine and chain sprocket mechanism which moves tiller or the cutter. By this we can save enough time and expenses on the field operations. Developing a high-capacity engine with combination of multipurpose agricultural tools, thus increases the labor productivity and time, reduces cost.

[3] Abin Johns Thomas., et al., [2019]

At the present situation farmers invest plenty of amount on the machines which minimizes the labor work and increases the yield crop. There are many numbers of machines which performs operations like, Tilling, pesticides spraying, weeding, ploughing etc. Before separate machines were performing separate operations, so that the returns from the crop was less and time consumption was more. So, in order to improve the quality of time and productivity we designed and fabricated a multipurpose agricultural machine which works on the Scotch yoke mechanism. The two operations including grass cutting and ploughing were included in this mechanism which was able to perform farming with less time and economically.

[4] Ashwin Chandran., et al., [2020]

In the agricultural field, Multipurpose machine works different operations like sowing, seed spraying, soil covering etc. The design and fabrication of a multi-purpose machine is majorly operating mechanically.

There is tremendous development in an agricultural field, in which the major problems have a better solution. The major objective of this project is to help the farmers by developing a multi-purpose machine. The machine is mainly operated with solar power, which makes the machine eco-friendly with the environment. The operations like weeding, spraying and seeding can be controlled by microcontroller which makes it efficient and easier to work.

[5] Dr. C. N. Sakhale., et al., [2016]

In India, 70% if people depend upon the outcome of the farming so India is known as Agriculturally based country. Most of the farmers are Economically poor due to which they cannot purchase the tractors or any other Agricultural Equipment. Hence most of them follow traditional method of farming. This will not provide a potential need of energy required for the farming. The project is design and fabrication of multipurpose machine which reduces both human effort as well as Animal effort by replacing a advance machine which is suitable for poor farmers for their economic and labor point of view. In this mechanism we use 24cc engine for digging operation and for sprayer used 12 v motor battery. Sowing and cultivation are done manually. By using all the Attachments, we perform many operations with less time, effectively and economically.

III. METHODOLOGY

Proposed work starts with the problem identification in agricultural operations like ploughing, seeding, fertilizing etc. Literature survey was carried out for arriving at the area of proposed work. More insights into the possible solutions for the design and

fabrication of the machine will be arrived at, once the literature review is complete. The geometric modelling and design will be accomplished with the help of CAD software's like CATIA v5/Solid Works. Once the design is complete (Including material selection and BOM), various mechanisms will be considered for motion transfer and some among them will be selected based on the feasibility in implementation. The fabrication of the machine will be started once the design is finalized. Henceforth, the real-time testing of the machine will be initiated for various operating conditions and ultimately the result will be established based on careful observations.

IV. DESIGN (GEOMERTRIC MODELLING USING SOLID WORKS) 3D VEIW OF MACHINE

V.

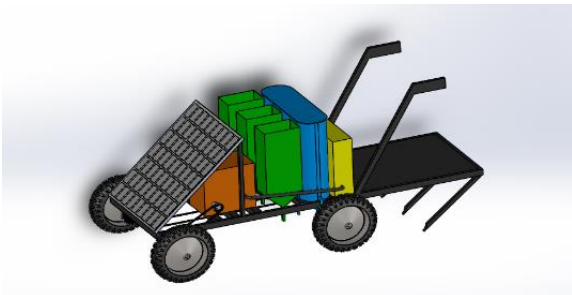


Figure 4.1: Isometric view of 3d model

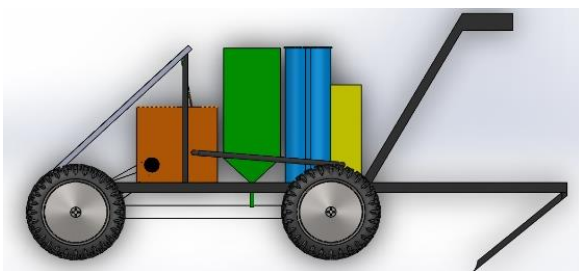


Figure 4.2: Right side view of 3d model

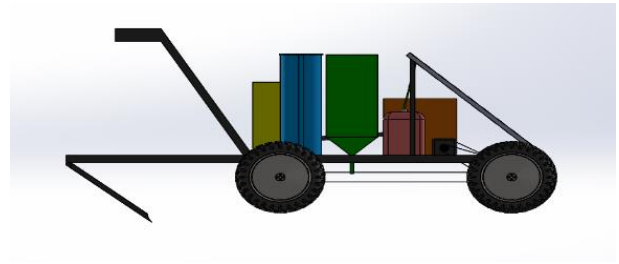


Figure 4.3: Left side view of 3d model

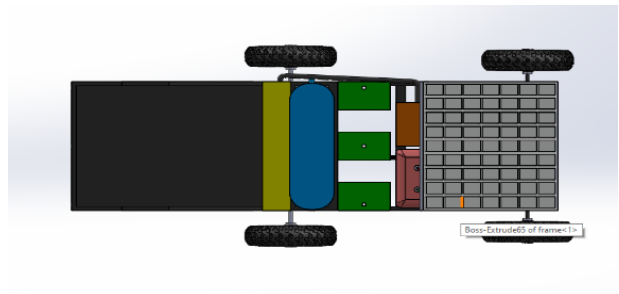


Figure 4.4: Top view of 3d model

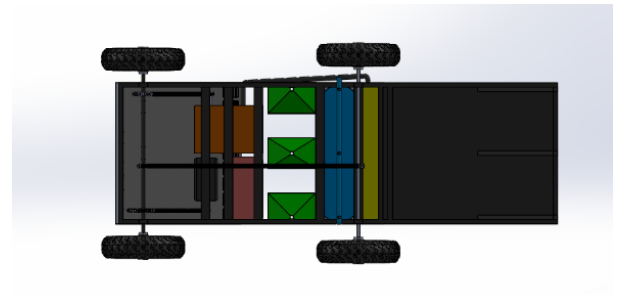


Figure 4.5: Bottom view of 3d model

The Drawing Mode is utilized for the enumerating of any made part or get together. All the itemizing or documentation is done in 2D arrangement in this mode. The documentation comprises of various attracting sees and the refinements the drawing sees. You can detail every one of the perspectives by basically moving parts or gatherings that you made in Part Mode or Assembly Mode. As this property guarantees that any adjustment of the elements of a section in the attracting perspective will prompt the adjustment of the plan of part in the part just as in the gathering mode, and the other way around.

2D VEIUV OF MODEL

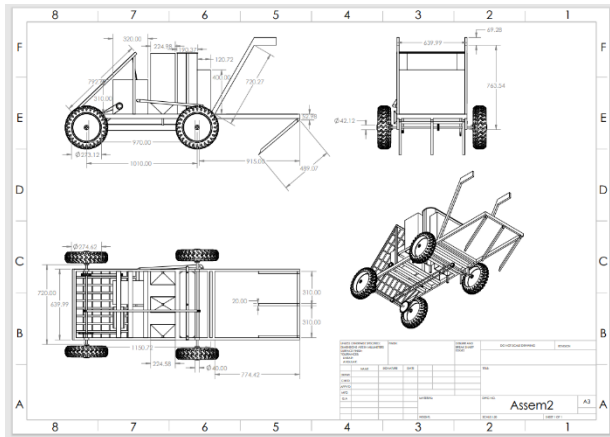


Figure 4.6: Drawing of model

VI. SPECIFICATION OF MACHINE PARTS

□ Engine specifications:

- Type: Air cooled, 2 Stroke engine
- Bore: 51.7mm
- Stroke: 52.4mm
- No. of cylinders: one
- Displacement: 99cc
- Max Engine output: 5.3kw@5500 rpm
- Max Engine output: 7.2bhp @5500 rpm
- Max Torque: 9.4 @ 4500 rpm

□ Design specifications:

- Base Frame:18/20
- Solar panel: 5W(power),15/7 (dimension)
- Ground clearance: 6
- PVC Wheel: 6
- Lead screw: 2mm pitch, 18mm diameter (For ploughing)
- M.S square pipe for base: 1, 18 gauge
- M.S flat plate:1, 3mm thickness

□ Solar panel:

- Output:12 V DC
- Size:12/24

- Power:50 W

□ Battery:

- Output:12 V
- Current:18 AH

□ Shaft:

- Diameter:12mm
- Length:600mm

□ Wheel:

- For Rear wheel,
Rim: 430 mm
Tire: 700 mm
- For front wheel,
Rim: 350 mm
Tire: 510 mm

VII. MECHANISM INVOLVED IN MACHINE

SCOTCH AND YOKE MECHANISM

The scotch yoke mechanism is used in the harvester design. 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. 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. The location of the piston versus time is a

sine wave of constant amplitude, and constant frequency given a constant rotational speed.

The reciprocating motion as discussed in construction part above. The power is supplied to the Dc motor, shaft and crank attached to the shaft start rotating. As the crank rotates the pin slides inside the yoke and also moves the yoke forward. When the crank rotates through in clockwise direction the yoke will get a displacement in the forward direction. The maximum displacement will be equal to the length of the crank. When the crank completes the next of rotation the yoke comes back to its initial position. For the next of rotation, yoke moves in the backward direction. When the crank completes a full rotation, the yoke moves back to the initial position. For a complete rotation of crank the yoke moves through a length equal to double the length of the crank. The displacement of the yoke can be controlled by varying the length of the crank.

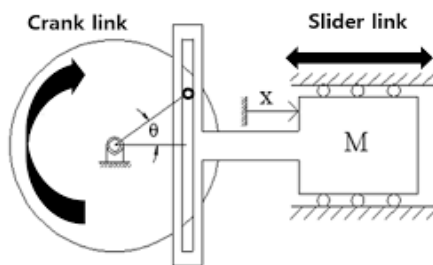


Figure 6.1: Scotch and yoke mechanism

VIII. OPERATION PERFORMED BY MACHINE

7.1. PLOUGHING

The primary purpose of ploughing is to turn over the upper layer of the soil, bringing fresh nutrients to the surface. It also digs the soil, allows it to hold moisture better and provides a seed-free medium for planting an alternate crop

The material used for this mechanism is mild steel. It consists of an outer frame to which roller is attached and at the top surface blades are connected. It has a

three-side ploughing tool so that it can plough in every quarter cycle. Blades are of 3-inch size and are rectangular with triangular tip. The entire roller is connected to two geared dc motors which are in turn connected to battery. As the power is supplied the roller rotates with 100 rpm and simultaneously ploughs the field. Ploughing helps in the following ways:

1. Ploughing breaks the large lumps of clay into smaller particles.
2. Roots of plants can penetrate the loose soil easily.
3. It leads to aeration of the soil.
4. Ploughing uproots the unwanted plants already growing in the field.
5. Ploughing facilitates uniform mixing of fertilizers with soil.

7.2. SEED SOWING

The material used for this mechanism is mild steel. It consists of two hooper. The first hooper is used to control the flow of seed and is connected to a second hooper which has lever and seed tubes attached. The entire hooper arrangement is connected to a dc motor, which in turn is connected to a battery. When power is supplied to a dc motor, the dc motor rotates which in turn moves the lever and allows the seeds to fall through the seed tube.

Seed rate depends on the size of seed, percentage of germination, viability, time and method of sowing and crop rotation. As a standard procedure 100kg of seed per hectare is sufficient if the seed viability is around 85%. In case of bold seeded varieties like in late sowing the seed rate is increased to 125kg per hectare. The seed rate as mentioned above is for net area sown but in case of terrace field the net area is usually 50 to 70% of the gross area and hence the seed rate has to be decreased based on percentage net area available.

It is dropping of seeds behind the plough in the furrow with the help of manual labor by hand. This

method is followed for crops like wall or gram in some areas for better utilization of soil moisture. The seeds are covered by successive furrow opened by the plough. This method is not commonly followed for sowing of the crops. After the preparation of field seeds are dropped in furrows behind the country plough by hand. Sometime a funnel is attached with an iron pipe in the hand of plough and the seeds dropped at desired depth and spacing for obtaining satisfactory germination. Under rainfed condition after sowing, the furrows are left open where as in irrigated condition the furrows are covered with wooden plank.

The crop requires a well pulverized but compact seed bed for good and uniform germination. So, for that land should be ploughed deeply in summer with soil turning plough followed by clods crushing, removing of stubbles of previous crop and weeds and leveling. Under Sikkim condition one deep ploughing and one shallow ploughing is sufficient due to light texture of soil. Excess tillage causes loss of soil moisture which reduces the uniform germination. The terraces of the hills of Sikkim should be well leveled for uniform distribution of irrigation water and to avoid irrigation water accumulation at different places.

7.3. SPRAYING

The material used for this mechanism is mild steel. It consists of water storage tank of capacity 5 liters. To which tap and sprinkler is attached, the tap is used to control the flow of water. The sprinkler has minute holes through which the water is dropped on the field. Sprinklers that spray in a fixed pattern are generally called sprays or spray heads. Sprays are not usually designed to operate at pressures, due to misting problems that may develop. Higher pressure sprinklers that themselves move in a circle are driven by a ball drive, gear drive, or impact mechanism (impact sprinklers). These can be designed to rotate in a full or partial circle.

Rain guns are similar to impact sprinkler, except that they generally operate at very high pressures of 275 to 900 kPa and flows of 3 to 76 L/s, usually with nozzle diameters in the range of 0.5 to 1.9 inches. In addition to irrigation, guns are used for industrial applications such as dust suppression and logging. Many irrigation sprinklers are buried in the ground along with their supporting plumbing, although above ground and moving sprinklers are also common. Most irrigation sprinklers operate through electric and hydraulic technology and are grouped together in zones that can be collectively turned on and off by actuating a solenoid-controlled valve.

IX. VIII. THEORETICAL CALCULATIONS

8.1 BENDING STRESS CALCULATION OF THE AXLE SHAFT

Consider the weight of 1500 N is acting on the shaft,

Induced stress,

$$\sigma = M/Z \text{ Moment,}$$

$$M = (WL)/4$$

Where,

W = load;

L = Length

$$M = (1500 * 1100)/4$$

$$M = 412500 \text{ Nmm}$$

Section modulus, $z = (\pi/16) * d^3$

$$Z = (3.14/16) * 35^3$$

$$Z = 8414.21 \text{ mm}^3$$

$$\sigma = (412500/8414.21)$$

$$\sigma = 49.02 \text{ N/mm}^2$$

Therefore,

Induced stress < Allowed stress

$$49.02 \text{ N/mm}^2 < 270 \text{ N/mm}^2$$

(Hence the design is safe).

8.2 FEED RATE CALCULATION FOR PLOUGHING OPERATION

Depth of cut= 5 cm

Speed of the tool= 2.5 km/hr. = 41.66 m/hr.

No. of tool= 3

Feed rate= Rpm x N x CL

FR= 41.66x3x0.05

Feed rate, FR= 6.249 m² /min

8.3 TOOL LIFE CALCULATION

From Taylor's tool life equation,

$$vT^n = C$$

Where,

v= velocity

T= tool life

C, n= Taylor coefficient

For HSS,

n=0.2

V= 41.6 m/min

41.6xTⁿ=100

T= 2.4x10²⁰cycles

For mild steel,

T= 2.4x10¹⁰ cycles.

8.4 SEED DROPPING CALCULATION FOR SEED SOWING

Speed of the motor= 30 rpm

Row spacing= 15 cm

Seed sowing time= 2 sec/per seed

No. of openings = 3

Seed dropping per minute = 30x3= 90 seeds

BILL OF MATERIALS

SERIAL NO.	COMPONENTS	QUANTITY	COST PER UNIT IN (RUPEES)	COST IN(RUPEES)
1.	ENGINE	01	6000	6000
2.	SOLAR PANEL	01	1200	1200
3.	BATTERY	01	1000	1000
4.	WHEELS	04	700	2800
5.	SPROCKET AND CHAIN	01	500	500
6.	DC MOTOR	01	1500	1500
7.	FRAMEWORK (Includes sowing, ploughing and seed sprayer)	-	3500	3500
8.	HOPPER AND WATER TANK	-	1500	1500
9.	MISCELLANEOUS (labor cost& travelling charges)	-	1500	1500
	TOTAL			17400

X. RESULT AND CONCLUSION

The multipurpose agricultural machine is developed for sowing, seed spraying, water spraying purposes. The equipment which are connected to the machine operations are detachable when there is no use. By collecting all the required Ideas from different fields of agricultural Engineering in which to improve the yield, reduce labor cost and time, work Effectively and friendly. The semi-Automatic machine which makes farmers little effort and the manufacturing cost of the machine is less for middle class or a small-scale farmer, as they are poor to purchase costly machines or equipment. The Agricultural machine is Innovatively developed and can work in real life problems. This project also taught us how to work with a coordination with a project teammate.

It will be easier for the people who are going to take the project for the further modifications. It very useful for small scale farmers. The cost can be reduced by using this type of vehicle. The agricultural operations are made easier. The reduction in cost of the plough tool is done and the life is also increased. The seed sowing machine is made with simple mechanism. The cutter blade is made working by scotch yoke mechanism. Our team has successfully combined many ideas from various fields of mechanical engineering and agricultural knowledge to improve the yield and by reducing the labor effort and expenses. The whole idea of multipurpose equipment is a new concept, patentable and can be successfully implement in real life situations.

XI. FUTURE ENHANCEMENT

More operations can be included to the vehicle like pesticide sprayer, tiller and many other machines for various operation. The engine of the vehicle can be replaced with diesel engine. The tire can be changed according to the type of the land. The plough tool tip arrangement is made separately, so in case of breakage

the tip of the tool is alone changed. The collection system of the harvester can be made more efficiently. By increasing the equipment strength and quality to its peak, we can have multipurpose agricultural equipment for life time usage. By providing hydraulics, gear arrangements and some minor adjustments the equipment can also be made as tractor powered equipment.

Main purpose of our project is to work various operations at a time at low cost. Our project can be implemented in various ways like we can replace solar energy to any other energies like wind energy to run machine. It can be implemented in both rural and urban areas for cultivation. It can be modified to run itself without using any man power. It can be fixed to other agriculture machines like tractor, thriller etc.

If we increase number of blades which uses for ploughing purpose it covers more space at less time. We can use different seeds for cultivation by just changing different sizes hooper plates which depends on seeds size.

We can also make a separate channel to supply the fertilizers like how the seed dropping channels are made.

By increasing the equipment strength and quality to its peak, we can have multipurpose agricultural equipment for life time usage. By providing hydraulics, gear arrangements and some minor adjustments the equipment can also be made as tractor powered equipment.

XII. REFERENCES

- [1]. "Design and Fabrication of Multipurpose Agro System" By P.V. BUTE and SHAIKESH DESHMUKH, International Research Journal of Engineering and Technology (IRJET), Volume 05, Issue 01, January 2018, pp.2395-0072
- [2]. "Design and Fabrication of Multipurpose Farming Equipment" By T.V. ARJUN and ASHWIN CHANDRAN, International Journal of Research in

- Engineering, Science and Management, Volume 03, Issue 08, August 2020, pp.2581-5793
- [3]. "Design, Development and Fabrication of Soil Tiller and Weeder" By MD. Aqib Naque Akhtar Ali Rizvi, Amogh V. Tijare, Prof. A.B. Tupkar, International Journal of Innovation in Engineering and Technology (IJJET), Volume 02, Issue 02, April 2013, pp.2319-1058
- [4]. "Multipurpose Farming Machine" By Abin Johns Thomas, Mebin C Mathew, Thomas John, Allen Easo Mathew, Anu Nair P, International Journal of Applied Engineering Research, Volume 14, Issue 14, 2019, pp.0973-4562
- [5]. "Fabrication of Multipurpose Farm Equipment" By Vishal SG, Pratap SP, Narayan RH, Praveen SH, International Journal Of Innovative Research Explorer, Volume 05, Issue 05, May 2018, pp.2347-6060
- [6]. "Study of Multiple Seed Planting Machine" By Vaibhav Thorat, Badal Autade, Tushar Jagtap, Krishna Abhale, Kishor Kumbharde, International Research Journal of Engineering and Technology (IRJET), Volume 05, Issue 01, January 2018, pp.2395-0072
- [7]. "A Review Paper on Farming Machine" By C. N. Sakhale, S. N. Waghmare, Rashmi S. Chimote, International Journal for Innovative Research in Science and Technology, Volume 03, Issue 06, November 2016, pp.2349-6010
- [8]. "Mechanical Farming Machine" By Mohd Yousuf Masood, Bharatjeet Kumar, Konark Rakesh, Sunny Patel, Ajay Singh Parmar, International Research Journal of Engineering and Technology, Volume 05, Issue 05, May 2018, pp.2395-0072

Cite this article as :

Kadole Pavan Prabhakar, Bharath Raj H K, D Yogeshwar Naidu, G Tharun Sai, Manjunath R, " Development of Multi-tasking, Multi-powered Machine for Agriculture Purpose , International Journal of Scientific Research in Science, Engineering and Technology(IJSRSET), Print ISSN : 2395-1990, Online ISSN : 2394-4099, Volume 8, Issue 4, pp.284-293, July-August-2021. Available at doi : <https://doi.org/10.32628/IJSRSET218444>
Journal URL : <https://ijsrset.com/IJSRSET218444>