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EMPOWERING AGRICULTURE WITH MULTI -UTILITY EQUIPMENT

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Abstract: The empowering multipurpose agricultural equipment is made for performing various types of operations like Ploughing, Seeding Sowing, Spraying and levelling. The modification includes fabricating a vehicle which is small and compact in size. The research is about a vehicle design which makes cultivation much simpler. The ploughing tool is designed and modified. Farming is backbone of Indian economy 70% of people live in rural area. In rural area agriculture is one of the major source of earning money. In agriculture sector there are lot of tasks such as seed sowing, cultivation, levelling, spraying for doing this operation farmers required hand tools but doing operation by hand tool is very time consuming and quality of work is not good therefore results of this type work is poor productivity and less quality of work so this type of problem face by farmers. The most of the farmers are low level income so they can't invest on the purchase of large machine so our team is decided to research on this type problem and design empowering agriculture with multi utility equipment. The main aim of this equipment is design and build a multipurpose equipment for performing multiple major operation like ploughing, cultivation, spraying, levelling. The modification of this project is not only small but also cost is less compared to other equipment. This machine makes all operations in less work and much simple. Agriculture equipment is small smart machine that can do right things in right way. This research paper reviews multiple operations can be done on a single equipment.

Keywords: Empowering agriculture, Agriculture equipment, Seed sowing, Cultivation, levelling, Fertilizer Sprayer, Research etc.

I. INTRODUCTION

Agriculture is one of the major occupations in India, it is very important to discover and implement new ideas in this field, though lots of work has been done in this area. It is unfortunate that, these ideas are not been properly implemented in actual field. This is due to high cost and it is complicated for rural people.

Agriculture is the occupation of our country for increase the productivity of agriculture products this equipment is help and solving the difficulty in farm. This equipment is the combination of multiple equipments and it can do multiple operations on a single machine. Hence efficiency of the work is increases with the help of this machine and other hand the productivity also increase. This machine can optimize the efficiency and enhance the productivity.

1.1 OBJECTIVES

The objective of our research is to develop empowering multipurpose agriculture machine, for performing various operations like ploughing, seed sowing, spraying and levelling the soil also the land. The Empowering multipurpose agriculture machine is designed for the small scale farmers. This machine will helps to the farmers.

- This machine requires less manpower.
- Easy to operate.
- Low maintenance cost.
- We can do more than one operation on a single machine.
- Machine can do different operations at same time.
- Easy to handle.
- To reduce the labours cost and time required for doing operation.
- All parts are easy to assemble and disassemble.
- Tools are used for the cultivation, seed sowing, fertilizing, levelling.
- It occupies less space.

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1.2 TOOLS AND EQUIPMENT USED

- Cutting machine
- Drilling machine
- Grinding machine
- Wrenches
- Welding machine
- Lathe machine

II. BASIC CONCEPT OF DESIGN

The concept of equipment is designed for small scale farmers. Multiple operations can do on single machine at low cost as compared to other agriculture machine. For this concept unskilled person can operate the machine. The mechanism of machine is very simple by considering the design with aesthetics and ergonomics. This design is useful for small farm and gardening.

2.1.1. MAIN COMPONENT

2.1.1 Motor-

24v &350-watt dc motor is connected to the spike wheel. This motor is run with the help of a 24V battery. The movement of the vehicle is due to the rotation of motor by the battery.

Fig.1

2.1.2 Battery

In order to make the vehicle electrically driven, we have to make use of a 24V, 18amp battery, which is used to drive a motor that is connected to the rear wheels of the vehicle which in turn assists in the mobility of the entire vehicle.

Fig .3

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2.1.3 Controller – 24 V, 350W.

Fig.4

2.1.4 Water pump- 12V, 4Lpm.

Fig.5

III. COMPONENTS AND CONSTRUCTION

Chain:
The chain is made up of steel which is used for transmitting the power from gear sprocket to pinion sprocket.

Pump:
This pump is used to transfer water from tank to the crops with the help of pipe through nozzle. This pump is generates pressure of 2 bar and discharge 4 litters per minutes.

Nozzle: The nozzle is a device which converts the pressure energy of fluid into the kinetic energy. Spray nozzles are the precision devices which facilitates dispersion of liquid into a spray. Nozzle is used for purpose to distribute a liquid over an area with a pressure.

Tank: The tank is to carry as much fluid as it can be along with its self-weight as less as possible. A material used for the tank is plastic fiber. Plastic fiber is used because of very low in weight as compared to the other materials and life. Its cost is low.

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3.1 RESEARCH APPLICATIONS

- Ploughing
- Levelling
- Sowing
- Fertilizing
- Spraying

3.2 IMPLEMENTATION OF RESEARCH IN REAL LIFE -

It is a concept to design research for small scale farmers. And in single equipment multiple functions can be performed with a low cost as compared to other agriculture machines. For this concept not required a skilled person. Mechanism of the vehicle should be very simple. For helping the small-scale farming, we are designing this vehicle. After making the manufacturing of equipment and trials on the empowering multipurpose agricultural equipment based on the overall performance of the machine we can say that can satisfies the needs of small-scale farmers with low cost, because they are not able to purchase high-cost agricultural equipment and machines. The equipment requires less manual operating power and less time compared to traditional methods used by farmers, so if this type of vehicle is manufacture it on a large scale its cost gets significantly reduced and importance towards the engine will be less. So that the hope that this equipment will satisfy the partial trust of Indian agricultural. So, in this way we solve the labours problems which is the need for today's farming in India.

3.2.1 ADVANTAGES

- Simple design and structure of the vehicle
- Skilled labours are not required to operate
- Easy for maintenance
- Zero fuel emission
- Faster operations
- Easy to handle
- The fuel requirement is removed hence cost of operation is reduced and light weight

3.2.2 DISADVANTAGES

- Not suitable for heavy field work
- Required strict supervision of vehicle Depends upon weather condition.
- Due to having multiple functional operations consumes times for initial settings

3.2.3 OUTCOMES

- Multipurpose operations can be performed on single machine.
- Machine should easy to operate.
- Reduce human effort.
- All operations can be performed by single person thus it will reduce the labour cost.
- To reduce amount of time for operation.

IV. RESULT AND TESTING

- When the testing of empowering agriculture with multi utility equipment in this machine multiple operation is done so first test the cultivation of land test the cultivator tool cultivation is done

- Second testing of levelling equipment after a testing of levelling equipment level of land is done according to land level of land is dependent

- Third test of fertilizer according to crop fertilizer position is done

- After a testing of project this project is used for small farm and nursery and compared to other equipment cost is less of this project so it is suitable for farmers in small sector and multiple crop and multiple land

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V. MODEL DESIGN

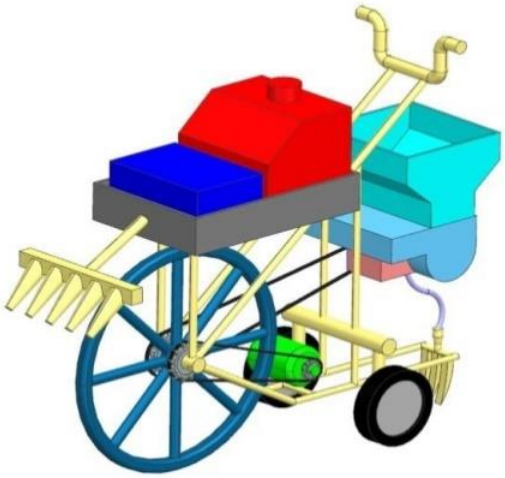

Fig. 6

VI. IMAGE OF RESEARCH

Fig. 7

VII. FUTURE SCOPE

- This vehicle can be made for self-propelled by the vehicle hybrid system, for further improvement in design of wheels and individual end effectors will make this vehicle more efficient and effective.
- The More précised mechanism of seed sowing operation and fertilizing by using advanced technologies.
- Involving of hydraulics in the working of ploughing operation. The size of the vehicle is must be increased to use it in large field area.

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VIII. CONCLUSIONS

- Based on the overall performance of the machine we can definitely say that the project will satisfy the need of small scale farmer, because they are not able to purchase costly agricultural equipment.

- The machine required less man power and less time compared to traditional methods, we hope this will satisfy the partial thrust of Indian agriculture.

- So, in this way we can solve the labours problem that is the need of today farming in India. Electrical Multipurpose vehicle is designed and fabricated in a low cost and easy for use and effective equipment for agriculture for formers in India.

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