

Multipurpose Agriculture Machine

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Abstract –

Agriculture being one of the major occupations in India. Agriculture plays a vital role in the Indian economy. Indian agriculture has registered impressive growth over last few decades. It is very essential to discover and implement new idea in this field, though lot of work has been done in this area. It is unfortunate that, these ideas are not being implemented properly in actual field. This is due to high cost and is complicated for rural people.

Multipurpose agriculture or farming machine is basic and major machine involved in agriculture for maximum yielding. The Conventional method of cultivation and seed sowing is a laborious process and hence for that reason there is a scarcity of labors and basically, many farmers in India also use bullocks, horses and he-buffalo for farming operation. This will not satisfy need of energy requirement of the farming as compared to other countries in the world. This result in delayed agriculture crop production practices to overcome these difficulties, we are thinking that human and animal efforts can be replaced by some advance mechanization which will be suitable for small scale farmer from economical and effort point of view.

Key Words: (Growth, scarcity, production, agriculture)

1. INTRODUCTION

Agriculture has been the backbone of the Indian economy and it will continue to remain so for a long time. Agricultural sector is changing the socio-economic environment of the population due to liberalization and globalization. About 75% people are living in the rural area and are still dependent on agriculture. About 43% of geographical area is used for agricultural activity. Agriculture has been the backbone of the Indian economy. As Indian population is growing continuously, the demand for producing crop per hector is also increasing; this requires efficient and high-capacity machines. So mechanization in agricultural industry plays an important role in Indian economy. The basic Agriculture has been the backbone of the Indian economy and it will continue to remain so for a long time.

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1.1 DIFFERENT OPERATIONS

• Sowing

It is used for line sowing of cereals and other crops. It is a low cost line-sowing device in which seed metering is done manually by the operator by dropping the seeds in the funnel provided for the purpose.

• Spraying

Spraying of fertilizer is accomplished by help of a storage tank in which pump is submerged to pump out the liquid by a multiple nozzle attached via a pipe to it.

• Cultivation

This is the mechanism used in all the agricultural fields to maintain the fertility of land, due to forward movement of the equipment the ploughed is attached to the front of the equipment with predesigned number of teeth and teeth depth.

2. CONSTRUCTION & WORKING

The main components of multipurpose agriculture machine are as following-

1) PUMP:

In this Project we are using a 15 liters Hand pump which can be operated for farming for spraying pesticides on the crop which is totally manually. But in case of

multipurpose agriculture machine it is operated due to the motion of the rotating wheel axle.



Fig. Spraying Pump

Technical parameters

1. Back mounted
2. 40*190*555 mm
3. Net weight – 7.4 kg
4. Barrel capacity – 15 L
5. Pump – mini diaphragm pump
6. Max. Pressure – 0.4 to 0.45 MPa

2) SPROCKETS :

The name 'sprocket' applies generally to any wheel upon which radial projections engage a chain passing over it. It is distinguished from a gear in that sprockets are never meshed together directly, and differs from a pulley in that sprockets have teeth and pulleys are smooth. We use freewheel and chain wheel for chain and sprocket arrangement.

3) CHAIN :

The chain is made of plain carbon or alloy steel which is used to transmit power from gear sprocket to pinion sprocket, and it has a no sleep.

4) CRANK :

The function of crank is to transfer motion from prime mover to the connecting rod for further operation. Here the circular disc having eccentricity at which rotary

motion of crank is converted into reciprocating/linear motion of connecting rod.

5) FRAME :

It is the main part of the system on which the seed sowing & Pump is mounted. It consist of bottom frame and the top frame. The bottom frame is of 48*22 inch on which the seed sowing device is mounted while the top frame is of 22*22 inch on which the spraying pump is mounted.



Fig. Frame

6) ANTI FRICTIONAL BEARING :

In this Multipurpose Agriculture Machine we are using 8 number of full journal bearings. 4 no. of bearings on the front and rear shaft 2 no of bearings on the spray operating shaft and 2 on the seed sowing shaft to provide frictionless circulatory motion to the shaft.



Fig. Anti frictional bearing

7) CONNECTING ROD :

The main function of connecting rod is to convert rotary motion into reciprocating/linear motion. Here connecting rod convert rotary motion of crank to reciprocating motion of pump and extension rod.

8) NOZZLE :

It is a device which converts the pressure energy of fluid into kinetic energy, spray nozzle is a precision device that facilitates dispersion of liquid into a spray. Nozzle is used for purpose to distribute a liquid over an area. The number of nozzle generally depends on the requirement usually 3 no. of nozzles are used.



Fig. Nozzle

9) SHAFT :

The shaft main rod can be made of Alloy steel/cast iron and our model is of a length of 26 inch. The shaft carries all the main of the mechanical plough seed like the wheels, seed basin and the plough rods. The design of this shaft is done in a way that it should have the strength and the stress is developed at all the joins equally.

10) WHEEL :

Wheel is used to carry the whole assembly and move machine from one place to another by rotary motion of it. A bicycle wheel is a wheel, most commonly a wire wheel, designed for a bicycle. Bicycle wheel is designed to fit into the frame and fork via drop outs, and hold bicycle tyre. A typical modern wheel has a metal hub, wire tension spokes and a metal or carbon fiber rim which holds a pneumatic rubber tire. We use a tubeless tire wheel.



Fig. Wheel

11) CULTIVATOR BLADE -

The cultivator blades are mounted in front of the multipurpose agriculture machine which digged into the soil upto the depth 1 to 2 inches

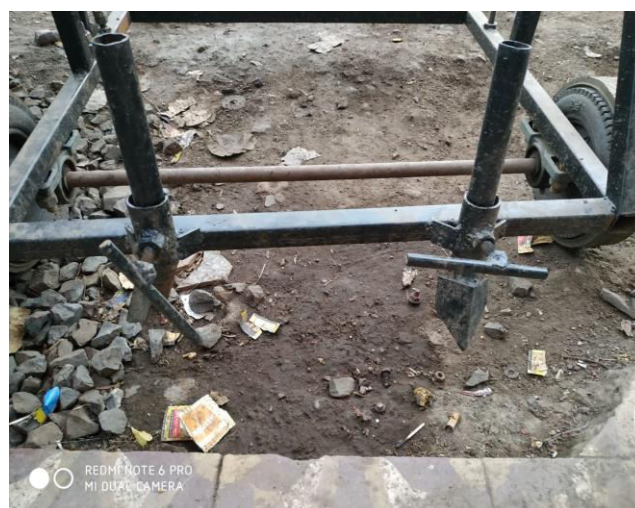


Fig. Cultivator blade

2.1 WORKING



Fig. Multipurpose agriculture machine

With the help of multipurpose agriculture machine , following four operations are performed simultaneously

1.Cultivation

When the machine is move from one place to another the road wheels rotate and at the same time the cultivator which is mounted on front side of machine moves up and down. In this way the cultivation process performed

2.Sowing

As shown in the above fig .Instead of hopper , the drum is used for sowing purpose . when the middle shaft is been rotated by the rotation of the rear axle the seed sowing drum or tank is rotate and the wholes are made on through which the seeds get drop into the land and the flat plate mounted on the rear covers the seed and working of seed sowing or ploughing is done in such a way we can perform sowing operation without manual efforts.

3.Spraying

As shown in fig the power is again transmitted from road wheel to chain wheel after that rotary motion is converted into oscillating motion in this way a vaccum pressure is created in the pump. The pumping is used for spraying the pesticides on the crop after a duration of time. As well as according to variety of the crops the level and height of the nozzle used for sparying can be adjustable.

3. ADVANTAGES

- 1.Seed can be placed uniformly in a row with required distance between plants.
- 2.It was made of durable and cheap material affordable for the small scale peasant farmers.
- 3.Time required to seed sowing and cultivation is also decreases.
4. Requirement of labor also decreased.
5. Increase in crop yield and cropping reliability.
6. Seed flow can be controlled.
7. Pumping water from river, well, canal, etc. to farming place.
8. Transporting cost is low.

4. DISADVANTAGES

1. Lubricatuion is required for chain and sprocket
2. If the dust get stick in bearing , then it's work affected.

5. APPLICATIONS

1. It is use for small farm
2. It is use for Garden.
3. It is use to sowing seed in small space with maintain equal distance between seeds

6. CONCLUSIONS

This multipurpose farming machine has considerable potential to greatly increase productivity of crops. So we are designing and fabricating a multipurpose farming machine which will do multiple-operation simultaneously i.e. plugging, seeding, irrigation. The machine is successfully tested into farming field and reduces time 30% for cultivation and 40% for seed sowing as compare to the traditional method. Less manpower needed to operate this machine i.e. 1 person to operate. Therefore, the cost of production crops is less.

Design and fabricate machine at affordable price for small farmer. The main task now is to promote this technology and have available to farmers at an affordable price. The multipurpose farming machine can be readily made from local components in workshops. This machine is more beneficial to small farmer who cannot afford farming equipment at higher cost. And one person can be easily handle this machine.

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