

## **Fabrication of Mini Tiller and Multipurpose Agriculture Machine''**

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### **Abstract**

India is an agricultural country. The economy of India based on agriculture, where 90% farmers are of small scale. Most of them are having small area of agriculture land, which makes it difficult for them to adopt/buy the costly tractor & other equipment. This machine facilitates the small scale farmers, who cannot afford the bull pair, as it has large initial cost & is high maintenance cost year around. The mini tiller is lower in cost & much lesser maintenance cost.

The mini tiller is provided with multiple tool attachment and can be operated by unskilled Person. This project aims to develop a multipurpose agriculture machine to overcome difficulties of

Small scale farmers and improve their economic condition with added social benefits. After a number of successful trials the mini tiller is ready to serve nation.

### **INTRODUCTION**

As we know that the soil tiller and cultivator is one of the many farm mechanization and soil/ power tillers frequently named as walking tractors has been used as an equipment to prepare/use for farming and for transportation. We were getting reference from OLEO- MAC company. The company would make rotary tiller (MH-195) which is having less torque and more speed, and not having extra arrangement of tool which is not suitable and conventional for Indian farming, hence to overcome this drawback we were making model based on combination of plough tiller and cultivator and give more arrangement facility.

The design development and fabrication of soil tiller and cultivator is a system which can be used in small lands around 1.5-3 acres due to its light weight (40-45kg) and low power (2-3 HP). Anybody would be handled this cultivator. In most part of India, farms remain at center of agriculture and rural development and the machine which is specially designed for those farms. According to Indian Government surely

there are 65-70% of farmers having less than 2.5-3 acres farming land and 50-60% farmers having income below 1.5-2 lacks per annum. Those farmers can easily afford this type of machine.

By the news of “Hindustan Times” farmers are facing issues such as shortage of Labour. cost and tractor cost. Therefore, solution need to be find for this whole problem, thus combination of users, survey and expert view point will be used to make the design and fabrication of soil tiller and cultivator.

## **LITERATURE REVIEW**

In this review we gone through various aspects of machines set up in various parts of world for the purpose of tilling. In order to carry out this work we have undergone extensive research of topic and contribution of by various authors is as follows, D.A. Mada, Sunday Mahai, [2013] [1] concluded that the importance of mechanization in agricultural. The information from the paper was need of multifunctional vehicle for pre-and post-harvesting. We have taken this as base for our research and further production of our multifunctional agricultural vehicle. F.A. Adamu, B. G. Jahun and B. Babangida [2014] [2]. In his paper authors draws our attention towards the performance factor of a power tiller. Among those demand for light weight power

tiller was sought out most. Fuel efficiency and field capacity of such parameters are also discussed. we take those points in consideration while designing a sustainable multifunctional agricultural vehicle. Md. Aqib Naque, Akhtar Ali Rizvi [2013] [4] this machine is developed to reduce the time and effort required for production up to the great extent. Also, this machine manufacturing cost is less as compared to other, by selecting above topic we are understand, familiar and know the details of agricultural technology, with the help of this machine we are trying to reduce labour cost, time of a middle class and small sector farmers. Kshirsagar Prashant, Kuldeep Ghotane [2016] [5]. In this paper after completion, this

## **WORKING PRINCIPLE**

In this paper, engine is placed at top of model and with the help of engine belt of pulley going too rotated and with help belt and gear box chain is rotated. The wheel shaft is rotated with the help chain and wheel base with blades are going to start its rolling motion, due to tractive effort, plough is moving forward in linear direction. For support and changing the direction of plough handle is placed.



#### IV COMPONENTS LIST

**ENGINE** - kisankraft FB - PE4 -226



- Displacement: 163 cc
- Power: 5.4 HP, 4.1KW
- Power (RPM): 3600
- Engine Type: 4 Stroke, Air cooled, Single Cylinder, OHV
- Fuel used: Petrol
- Fuel Tank Capacity: 3.6 Litre
- Engine Oil Capacity: 0.5 Liter

- Fuel Consumption: 940 ml/hr
- Max. Torque: 12.5 N m
- Bore X Stroke: 68 \* 45 mm
- Weight: 15Kg

**Main Body** – On the main body we mounted all the necessary parts which is used, such as engine, wheels, plough, handle drives etc.

**Wheel**– It is basically using for moving purposes which are move the overall body ahead. Blades are mounted on wheel for achieve traction effect



**Material** – MS

Number of blades – 16 on each wheel

Number of wheel – 2

**Bearing** - It is part which is used to enable rotation or linear movement while reducing friction and handling stress



Bearing number – P204

Shaft size –  $\frac{3}{4}$  inch

Bolt size – M10

Weight – 0.66 kg

**Plough** – The main aim of plough for initial cavitation's of soil in preparation for bowing seed.

### Speed reduction unit



We are using three different stages to reduce speed to get maximum torques we required for this machine, there are two units are as follows:

**Belt Drive** – It may be used as source of motion to transmit power efficiently track relative movement. Belts are looped over pulley and may have twist between the pulleys, and the shafts need not be parallel.



Type – A, V-Belt

Big pulley – 300mm

Small pulley – 50mm

**Chain Drive** – It is a way of transmitting mechanical power from one place to another. It used to convey power to the wheel of a vehicle particle



Type – Simplex, ISO12A-1

Small sprocket – 14 teethes

Big sprocket – 39 teethes

### VI CONCLUSION

The main advantage of this technology is that any farmer in India can easily handle this mini cultivator. For increasing the traction and torque we have reduces speed in three different stages as,

- By using V-belt drive
- By using two different chain sprocket mechanism and by using gear box

As increasing the traction and torque for tilling process achieving by depth of 4-7 inch. The transportation of tiller can be replaceable to bladed wheel with normal type. It is advance technology, by which reduces work time, man power, easily handle. The agricultural machine was designed and developed with an aim to working to machine at different speed and soil conditions, machine is able to sustain and faces frequently changing conditions. This machine is affordable to farmers and capable of performing multifunction like Plowing, Differential Cultivation, Wrapper, Pudding etc.

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