FABRICATION of MULTI UTILITY AGRO MACHINE

S. M. Mowade¹, S. T. Bhugaonkar², Vikas Bhade³, Zakas Chandanbawne⁴, Shubham Kalambe⁵

¹H. O. D. Department Of Mechanical Engineering, SRPCE, Nagpur, India.
²Professor of Department of Mechanical engineering, SRPCE Nagpur, India,
³Department of Mechanical engineering, SRPCE Nagpur, India
⁴Department of Mechanical engineering, SRPCE Nagpur, India
⁵Department of Mechanical engineering, SRPCE Nagpur, India

Abstract:
Agro Technology is the modification in the agriculture technology which can be use in daily life and used that in the agriculture which sector improves the productivity of the crop produced and also makes good mechanical machine. Reduces the cost and time of work mechanical machine available at cheaper rate and also which can sow and seed the crop at the same time.
In India farm sizes are small and unorganized so we can’t use machine which are used in other nation. In this paper we study one such machines multifunctional Agricultural Vehicle. As day by day the labour availability becomes the great concern for the farmers and labour cost is more, this machine reduces the effort and total cost of sowing the seeds and fertilizer placement.

I. INTRODUCTION
Agriculture is backbone of India. This field faces some problem such as how to maximize the profit. In India, we use method conventional method and mechanized type. Mechanization involves the use of a hybrid device between the power source and the work. Agricultural machinery is machinery used in forming or other agriculture. Mechanized agriculture is a process in which, we are use mechanized for increasing the farm worker efficiency. The most profit of mechanized agriculture saves labour cost. However, it also saves the energy and material and to improve the quality, accuracy and precision. The seed sowing pesticides sprinkling and crop cutting are the important stages in the agriculture field. The design of multipurpose agro equipment sprinkling and crop cutting are the important stages in the agriculture field. The design of multipurpose agro equipment machine will help Indian farmers in rural side and small farm. It will reduce the cost of seed sowing, pesticides sprinkling and crop cutting the field and will help to increase economic standard of an Indian farmer. Seed sewing machine is a device which helps in the sowing of seeds in the desire position hence assisting the farmers in the saving time and money.

II. CONSTRUCTION DETAIL
2.1) Basic concept design
Design equipment for small scale growers. In equipment multifunction can be done with lower cost other agricultural equipment for this purpose not required much skilled person. Mechanism equipment should be very simple so that can be used for gardening and small scale farming.

2) Functions
1. Spraying 2. Seed sowing

Multipurpose agriculture machine consist of following components;
1) Plant cutter
The cutter assembly consists of cutter and bevel gear arrangement. The cutter is made up of cast iron. It content about 56 teeth. The cutter is forced to run through a pair of bevel gears so that motion is transferred correctly. The bevel gear assembly is also made of cast iron which transfers motion.
2) Engine
It is a 1.5 Hp manual engine. It works on petrol and kerosene both. It is petrol strays and run on kerosene. The main purpose of using this engine is to save natural resources by using kerosene and it adds to economy. It can run up to max. speed of 300rpm. The engine has pulley which acts as the driver pulley. It drives the shaft having pulley mounted on it, with the help of V-belt.

3) Seed sowing (Hopper, Nozzle, and Furrow’s)
Hopper is a tank which is use to stored the seeds during the seed sowing. Sowing is a process of planting an area or object that has had seeds planted in it will be described as been sowed. In sowing little if any soil is placed over the seeds as can be generally sown in to the soil by maintaining a planting depth of above 2-3 times the size of the seed. Nozzles are connected hopper which supply seed to the furrows which

4) Grass cutter
The grass cutter is working on two side wheel. Having two with surface of lawn. Cutter’s blades are in middle which cuts the grass and collect in tin box.
5) Sprayer

The hand sprayer is a small capacity pneumatic sprayer. The sprayer has a short delivery tube to which a cone nozzle is attach. Another type of sprayer is knapsack sprayers are used for spraying insecticides and pesticides on small trees and crop. And it is also contain less amount of medicine and not suitable at many crop in farm. So that we arrange new type of medicine sprayer which is operated on centrifugal pump.

![Fig. 4. Pesticide sprayer tank](image)

2.3) Working of machine

In India most population of the country is based on agriculture sector. They have direct income from the farming. In India 10-20% farmers are rich but most of farmers are poor, they don’t have much money to purchase equipment. Main purpose of machine is fertilizer, spraying, seed sowing, plant cutter and grass cutter. For performing this operation, we design this machine. Hopper drops the seed’s then sowing operation will be completed. The sowing operation can be done manually. A hopper box is used to seed storage. We have provider’s 3 holes to the furrows. This connected through a pipe to hopper box. Drop a seed from hopper then the digging and sowing operation will be completed. The sowing operation can be done by semi manual. A sheet metal hopper box is used for seed storage. We have provided 3 holes to the main wheel shaft, Where the storage box is placed about it .A water container is used for water storage. A water pump is used for pumping water to the water sprayer. The water flows to the sprayer through pipe. The power for pump is regulated by a toggle switch. Attachment of lawn mower in project is to reduce effort. The grass cutter is working on two side wheel. Having two wheel contacts with surface of lawn Cutter’s blade are in middle which cuts the grass and collect in tin box. Plant cutter is consisting of a bevel gear arrangement. Cutter is made up of cast iron and has 56 teeth. Bevel gear transfers motion of shaft to the cutter.

![Fig.5. assembly of MAE](image)

2.4) Specification and Construction

1. Pulley Dia. of parts
   - Engine – 90mm
   - Reciprocating pump -180mm
   - Centrifugal pump – 70mm

2. Shaft pulley pulley -80mm
   - Engine -80mm
   - Reciprocating 45mm
   - Engine rpm -3000 rpm
   - 2. Shaft pulley pulley -80mm pump -100mm

3. Reciprocating pump
   - Pressure -7.5cm/inch
   - Cylinder -20mm dia. and 50mm length
   - Delivery of R.P -150 lit/hr

4. Centrifugal pump
   - Outer dia. -130mm
   - Impeller radius –inner -30mm
   - Outer -45mm
   - Inner shaft -20mm
   - Delivery of C.P -500lit/hr
5. Bevel Gear
\[ P = 24 \]
\[ G = 19 \]

6. Dimension Of Frame

\[
\begin{align*}
& L = 900 \text{mm} \\
& W = 600 \text{mm} \\
& \text{Wheel dia.} = 350 \text{mm} \\
& \text{Ground clearance} = 170 \text{mm} \\
& \text{Height of frame} = 500 \text{mm} \\
& \text{Delivery of C.P} = 500 \text{lit/hr} \\
& \text{Delivery pipe} = 30\text{mm} \\
& \text{Suction pipe} = 30\text{mm}
\end{align*}
\]

7. Water tank dimension

\[
\begin{align*}
& L = 300 \text{mm} \\
& W = 130 \text{mm} \\
& H = 400 \text{mm}
\end{align*}
\]

8. Cutter
\[
\begin{align*}
& \text{Cutter dia.} = 95 \text{mm} \\
& \text{Cutter operating height} = 90 \text{mm} \\
& \text{Bearing dia.} = \text{inner} = 25 \text{mm} \\
& \text{Outer} = 60 \text{mm}
\end{align*}
\]

9. V-Belt Lengths
\[
\begin{align*}
& \text{Engine} = A31 \\
& \text{Reciprocating pump} = A53 \\
& \text{Centrifugal pump} = A36
\end{align*}
\]

10. Grass cutter
\[
\begin{align*}
& \text{Shaft length} = 534 \text{mm} \\
& \text{Wheel dia.} = 216 \text{mm} \\
& \text{No of blade} = 6
\end{align*}
\]

11. Seed sowing
\[
\begin{align*}
& \text{Hopper length} = 508 \text{mm} \\
& \text{Upper width} = 229 \text{mm} \\
& \text{Lower width} = 153 \text{mm} \\
& \text{Depth} = 208 \text{mm} \\
& \text{Shaft dia.} = 15 \text{mm}
\end{align*}
\]

12. Water tank dimension

\[
\begin{align*}
& L = 300 \text{mm} \\
& W = 130 \text{mm} \\
& H = 400 \text{mm}
\end{align*}
\]

13. Cutter
\[
\begin{align*}
& \text{Cutter dia.} = 95 \text{mm} \\
& \text{Cutter operating height} = 90 \text{mm} \\
& \text{Bearing dia.} = \text{inner} = 25 \text{mm}
\end{align*}
\]

Bearing = UCP 203
Dist. Between two furrows - 101 mm

III. SCOPE OF PROJECT
We found that there is an emerging interest in the small-scale grain production need for low cost machine that could efficiently harvest grain on a small scale. We establish that there are no suitable for small scale grain harvesting machines available to consumers in the India and that is unlikely in near future that this manufacture will adopt foreign

V. ADVANTAGE
One unit can perform number of operations. Hence asset value of farmer is decrease labor work is reduce fuel consumption is reduce. Productivity is increase loss of grain is reduced.

IV. CONCLUSION
Relatively new technology has caught on quickly and is replacing century old methods for development. Use not only in typical machines applications but in household thing and many industries. As material and industrial technology advances faster, longer component life and good products will be achievable. Overall project helps the farmers to spray, water, dewater and cutting with pure efforts, at less operating cost and take the advantages of new development of science. There are few different potential end users that could benefit from our multipurpose agro equipment.

REFERENCES

