# "DESIGN AND FABRICATION OF MUTIPURPOSE MANUALLY OPERATED SYSTEM FOR AGRICULTURE PURPOSE"

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**ABSTRACT:** *India is an agriculture based country in which, 70% of people depends on the outcome of farming. But if we observe that with increase in population the farm gets distributed among the family and because of this, farmer in India held averagely only two acre farm. Also economically, farmers are very poor due to which they are unable to purchase tractors and other costly equipments hence they use traditional method of farming. 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. So 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. So we are developing this equipment which will satisfy all this need and to solve labour problem. In this equipment We used 24cc engine for digging operation. And for spraying used motor with 12V battery. Next two operations are manual base which is cultivation and sowing . This machine perform four farming operation (digging, sowing, cultivation, spraying) which is used small scale farming .By using above attachments one may perform various farming operations in less time and economically.*

## 1. INTRODUCTION

Agriculture is a vital source of income in India. The Indian economy is based on the Agriculture field and hence there is need of more advancement in the equipment used during the cultivation or during the process of farming. The process of farming includes the main stage as the seed sowing. Seed sowing process in traditional ways includes the bullock driven sowing equipment. Animals are considered to be the back bone of rural economy in India. Apart from the manual labour, the traditional cultivation in India was based on the use of animal power for 97.6 % of farmers (land owners) accounting for 77.2 percent of land holdings. As the Indian economy is based on the animals there is limit of their use in farming due to their efficiency. Hence to increase their efficiency and ultimately improving the cultivation capacity we have to improve the bullock driven sewing machines or equipments and also the tractor driven equipments. Most of the planter can't achieve equidistance placement between crops causing the less production crops having lack of nutrient. According to researches, equidistance placement of plants or seed with proper environment gives maximum possible yield, quality, and uniformity of crops. The basic objective of seed sowing operations is to sow seed and fertilizer in rows and at desired depths considering different types of seed and their sizes. Hence there is need of inventions of such seed sewing machine and further improvement and development in such equipment's. The Design And Fabrication Of Advanced Seed Sowing Cum Fertilizer Drilling Machine is a basically seed sewing machine which is the modification of previous model. Bull or tractor is used to pull a machine. With modified machine we can sow the seeds but also the fertilizer. The modified seed sewing machine can sow seed at equidistance and with equal depth but again it is capable of sowing the fertilizer at equidistance and equal depth. The depth of sowing is controlled by the metering mechanism and the equidistance sowing is achieved by the gear mechanism which is run by chain drive driven by ground wheel. The machine is simple and contain less complicated mechanisms this makes the machine more efficient and beneficial to farmer. Agriculture is the backbone of Indian economy and it will continue to remain for a long time. As India's population is growing so the demand for food will definitely increase for that better techniques of farming will require to increase production of crops. And for that better techniques of seed sowing and fertilizer placement requires.

The basic objective of seed sowing is to place seed at desired depth and maintain proper spacing between seeds and cover it with soil for its yielding. Seed sowing depth and seed to seed distance varies from crop to crop and different agricultural climate conditions. This paper is for designing such machine which should fulfill above requirements with relatively saving of time and labour cost. Conventional method have many disadvantages and if we talk about tractors and other advance sowing devices they are costly and not affordable to medium and small scale farmers. The machine we are designing and developing is multifunctional i.e. it will simultaneously sow the seed and place the fertilizers at desired depth. This machine can be used with either bull cart or mini tractor.

**2. Reason for selecting the problem**

- Lack of mechanization in farming
- Required excess efforts for different process.
- Required more man power.
- Excess time consumption for performing individual process.

**3. Scope of the project**

Multifunctional agricultural vehicle mainly focuses on the basic problems faced by fellow farmers. i.e. Seed Sowing, fertilizers spraying ,cultivation and digging. We are looking this project as revolution in small farms in India, which is most uncovered area in this sector is cost and more efficient way.

**4. LITERATURE REVIEW**

1. D.A. Mada, Sunday Mahai, [2013], In this research paper author has mentioned importance of mechanization in agricultural by giving examples. The conclusion from the paper was need of multifunctional single axel vehicle for pre and post harvesting . We have taken this as base for our research and further production of our multifunctional agricultural vehicle.

2. V.K. Tewari, A. Ashok Kumar, Satya Prakash Kumar, Brajesh Nare[2012] In this research papers author have done case study on farm mechanization in west Bengal as being part of India it give clear status about availability and progress in India. This ensured us to take right steps compared to current steps.

3. F.A. Adamu, B. G. Jahun and B. Babangida [2014]In this 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 such parameters are also discussed. We taken those points in consideration while designing a sustainable multifunctional agricultural vehicle.

4 .P. Šařec, O. Šařec [2015] The lowest values of soil penetration resistance below the cultivated profile were determined with the cultivators equipped with chisel shaped shares i.e. in the case of Framed and Köckerling. Cultivators Väderstad Top Down 400 and Farmet Turbulent 450 showed good capacity in embedding plant residues. This results have taken for our research basis

**5. Basic concept Design**

Concept to design a project for small scale farmers. And in one machine multi functions can be performed with cheap cost as compared to other agriculture machine. For this concept not essential to skilled person. Mechanism of the machine should be very simple. so, that for gardening and small scale farming ,design this concept.

**Functions**

1) Cultivation 3) Sowing

2) Digging 4) Spraying

**6. CONSTRUCTIONAL DETAIL**

Multipurpose farming machine consist of following components

1) Chassis frame 2) Engine 24 cc 3) Sprayer 4)

Auger bit drill tool 5)Hopper 6) Fertilizer tank 7)12 V Motor 8) 12V Battery 9) Switch 10) Accelerator 11) Lever 12) Cultivating tool 13) Hub wheel 14) Shank 15) Handle

**Chassis frame:**

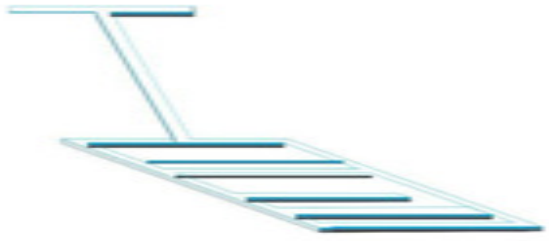


**Figure 1:** Chassis

• A consists of an internal framework that supports a man-made object in its construction and use. It is analogous to an animal's skeleton. An example of a chassis is the under part of a motor vehicle, consisting of the frame (on which the body is mounted). If the running gear such as wheels is included then the assembly is described as a rolling chassis.

• The chassis is considered to be one of the significant structures of an automobile. It is the frame which holds both the body of machine and the power train. Various mechanical parts like the engine and the drive train, the axle assemblies including the wheels, the suspension parts, the brakes, the steering components, etc., are bolted onto the chassis.

**Engine 24 cc**

**Figure 2:** Engine 24 cc

- Engine is mounted on front of the chassis ,it is used for digging operation.
- The auger bit drill tool connected to the engine for dig a hole.
- The speed of engine can be increased or decreased by the accelerator which is given near to the handle.

**Auger bit drill tool:**

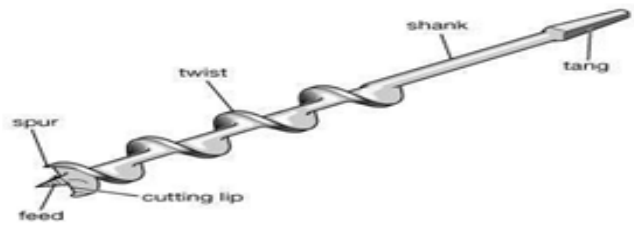



**Figure 3:** Auger bit drill tool

- An auger is a drilling device, or drill bit, that usually includes a rotating helical screw blade called a "flighting" to act as a screw conveyor to remove the drilled out material. The rotation of the blade causes the material to move out of the hole being drilled.
- Drill mechanism consists of drill tool with machine to in this project we are using engine + auger drill.

**Hopper**

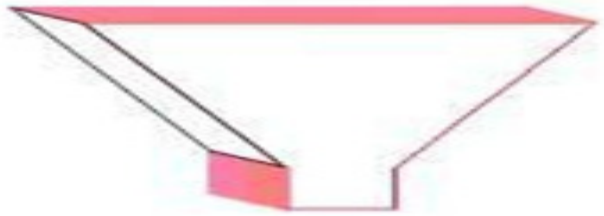


**Figure 4:** Hopper

- Hopper is mounted on chassis back to the engine, for stored seeds
- Shank is the shaft of hopper for bowing seeds.

**Cultivating tool**

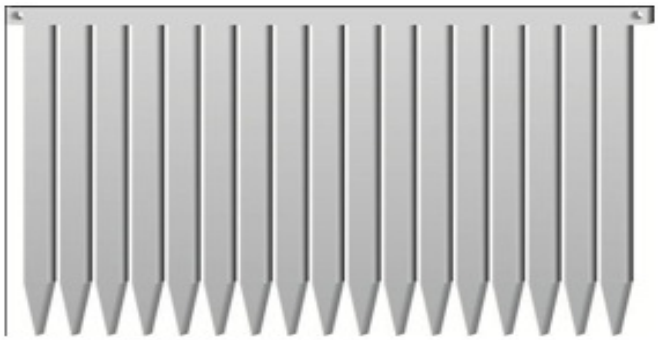


**Figure 5:** cultivating tool

Cultivation tool is connected between two rear wheels it is operated by manual force.

**12V Battery and Motor**

Battery is mounted on chassis near to the handle shaft and motor is activated by battery current for spraying operation .

**Fertilizer Tank**

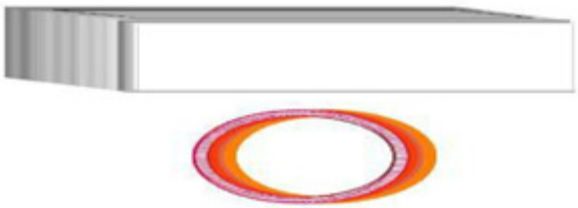


**Figure 6:** Fertilizer Tank

- It is mounted on the back of the chassis between the battery and motor.
- For spraying operation pipe connected to motor from the tank

**Sprayer**

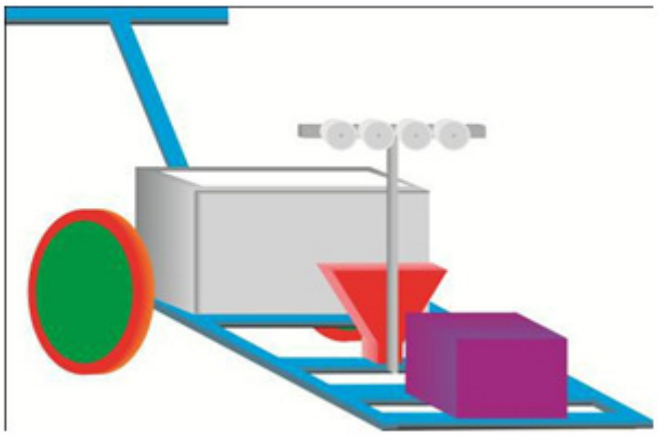
**Figure 7:** Sprayer

Sprayer is mounted between the engine and hopper.

**7. WORKING OF MACHINE**

India is a country where farming is main occupation and culture then also in India most of farmers attempt suicide reason behind this is machine , as in India 10-20% of farmers are rich but rest of farmers don't have much source to purchase heavy equipment and machines. So we have decided to design a machine which can fulfill basis need of farming and price of machine should be very less as compared for market. Main objective of machine is drilling, fertilizer spraying , seed sowing & cultivating .For solving this purpose we have designed this type of machine

- When engine is started the auger bit drill tool will activated to drill hole for seed sowing after that operator press lever for drop a seed from hopper then the digging and sowing operation will be completed. The sowing operation can be done by semi manual.
- Cultivating tool is easily assemble and dissemble .This operation is done by the manual force.
- For spraying operation motor, battery and switch is given. When switch is on, fertilizer pump from the motor and enter to the sprayer nozzle then it spray with high velocity to the crops.



In above 3d model of machine we can see in front of machine we have used 24 cc petrol engine from bottom of that engine we will place auger bit for drilling purpose on bottom side of engine we can see sprayer which is having 4 nozzles and we can adjust height of that nozzles these nozzles are connected through pipe with pump and water tank, water tank is shown at end of machine

- We have used hopper for seed sowing and that hopper is connected to lever at handle so handler can press lever to drop seed
- Cultivating tool is detachable component of machine which can be attached at the end part of machine when cultivating has to be done. Machine has 2 wheels as to move machine is y direction for drilling purpose.

**8. SPECIFICATION OF COMPONENT**

**Dimensions**

- Height - 36 inches
- Width – 16 inches
- Length -24 inches
- Wheels – 12 inches
- Water tank – 12 inch width x 6 inch length x 18 inch height
- Handle - 15 inches

**9. MATERIAL USED**

- Chassis – MS pipe – 2 x 1 inch – 14 gauge
- Handle – 1 inch round pipe MS - 14 gauge
- Wheels – center plate MS , upper grip rubber tire
- Water Tank - GI 6.0
- Engine – 24 cc petrol engine – 6000 rpm , 1 ltr petrol tank
- Bit – N8 material – bit dimension's - 3 inchs x 1 inch
- Hopper - 18 inches height x 12 x 12 input top

**10. CONCLUSION**

After the manufacturing and trail on the "Multipurpose Agricultural Automobile (Farm Machine)" conclusion which we made are as follows:

1. 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.

2. The machine required less man power and less time compared to traditional methods, so if we manufacture it on a large scale its cost gets significantly reduce and we hope this will satisfy the partial thrust of Indian agriculture.

3. So in this way we solve the labor problem that is the need of today's farming in India

**11. FUTURE SCOPE**

- We can interface sensors to this Machine so that it can monitor some parameters.
- We can add Wireless Technology to Control Machine.
- We Can add More Drill for different crops.
- We can add water tank + fertilizer tank in Machine to reduce more efforts.
- There are to be proper provisions are needed to couple the machine with the tractor.
- We can add solar panel for spraying system

**12. REFERENCES**

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