



A REVIEW ON MINI TRACTOR ATTACHMENTS

Suraj Yadav¹, Shivam Kumar Pandey², Tarun Kumar³,

Rohit Kumar Yadav⁴, Raj Kumar Gupta⁵

^{1, 2, 3, 4, 5} *Research Scholar, Department of Mechanical Engineering,*

Buddha Institute of Technology, Gida, Gorakhpur, Uttar Pradesh, India

ABSTRACT - Farming is the backbone of Indian economy. In this agriculture sector, there's tons of fieldwork, like weeding, reaping, sowing etc. These operations previously were done by traditional equipment's. There are sort of machines are available for nearly every task in agriculture. This machines not only easier way to do this task but also very efficient. The agriculture machineries that are used now a days are costlier and can't be afforded by most of farmer with rural background. Most of the farmers in India own very small pieces of land and owning this costlier machine may not be feasible for them. Apart from this most of farmers consider the normal ways of farming as primary methods. The AIM of "Fabrication of multipurpose agricultural Mini Tractor" is provide farmer with multipurpose equipment which implements all the scientific farming specifications and technology to get maximum yield and good quality crops reducing investment and member of labor. Considering above mentioned factors there's got to develop such an equipment, which can be of multiple use and particularly are going to be of low cost. In this equipment we used 135cc petrol engine, 8500 rpm, power 13 BHP, torque 11.88 Nm and next five operation are manual base which is cultivation, row maker, leveler, hopper, seed sower.

Key Words: Cultivation, Ploughing, Row making, Multipurpose, Fabrication, etc.

I. INTRODUCTION

Agriculture has been foundation of the Indian economy and 70% of people depends on the outcome of farming. Farmers are poor due to which they are unable to purchase tractors and other costly equipment's hence they use traditional method of farming. Mainly, many farmers in India also use bullocks, horses for farming operation. This will not satisfy need of energy requirement of the farming as compared to other countries within the world. So, we are thinking that human and animal efforts can be replace by some advance mechanization which will be suitable for small scale farmer from economical and Effort point of view. In today's world everything is getting modernized. Agriculture fields are slowly destroying & these land are used for some other purpose this is because the income from agriculture is less, although the work involved is high. Mechanization was one among the massive factors liable for urbanization and industrial economies. Modern agricultural techniques and equipment's aren't employed by small land holders because these equipment's are too expensive and difficult to accumulate. By adopting scientific farming methods, we will get maximum yield and good quality crops which may save a farmer from going bankrupt but majority of farmers still uses primitive method of farming techniques thanks to lack of data or lack of investment for utilizing modern equipment. The special vehicle field are successively increasing its productivity in agriculture field. Some of the main problems within the Indian agricultural are rising of input costs, availability of skilled labours, lack of water resources and crop monitoring. To overcome such adversity, the automation technologies were

utilized in agriculture. The automation within the agriculture could help farmers to reduce their efforts. The vehicles are being developed for the processes for cultivating, seed sowing, levelling, hopper, row making. All of these functions haven't yet performed employing one vehicle. In this equipment we used 135cc engine, 8500rpm and next five operation are manual base which is cultivation, row maker, leveller, hopper, seed sower. This machine performs five farming operation;

1. Cultivator
2. Row Maker
3. Land Leveller
4. Hopper Tool
5. Seed Sower



Fig. 1 – Mini Tractor

II. OPERATIONS

The operation of a mini tractor involves sitting on the driver seat and operate handle with the help of starting. Starting is attach in on wheel which smoothly turn the mini tractor. During peak seasons of seedbed preparation, farmers operate power tillers even for quite each day. The operator has got to guide/control the forward movement of the machine by actuating hand clutches provided on each handle or sometimes by pushing/pulling the handles towards sides. We attach a differential gear for turning the mini tractor. We attach a compound gear for reducing the speed of mini tractor and increasing the torque which provides more power to the wheel the most clutch may be a lever on the handle. The lever are often shifted to on or off position while operating within the field. This machine done many operations by small changes or assembly and disassembling of some tools. Operations are cultivation, seed sowing, row making, leveler, hopper, flour milling, and water pumping.

III. COMPONENTS OF MINI TRACTOR

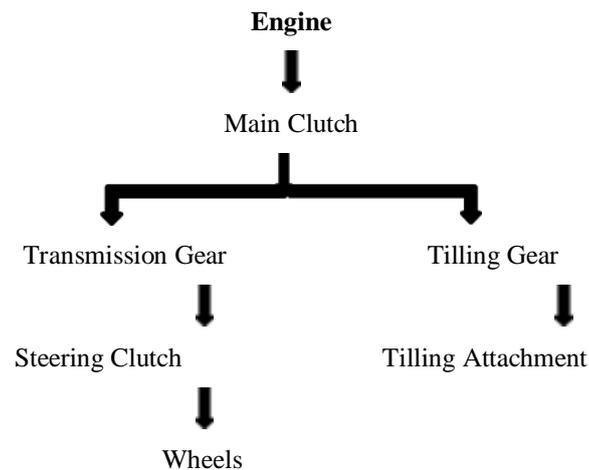
A Mini Tractor/Power Tiller consists of the following main parts:

- Engine
- Transmission Gears
- Clutch

- Brakes
- Chain sprocket
- Differential Gear
- Wheels

IV. POWER TRANSMISSION IN A MINI TRACTOR

The flow chart for transmission of power is given below:



V. ATTACHMENTS ON A MINI TRACTOR (POWER TILLER)

Several attachments are made on a mini tractor because this machine provides enormous amount of power at a low cost. The attachments made on a mini tractor and their operations are given below:

1. Cultivator:



Cultivation tool is connected between two wheels it is operated by manual force. Cultivating tool is easily assemble and dissemble. This operation is completed by the manual force.

Features:

- It is designed for toughest operations.
- Top quality steel shanks are heat treated for long life.
- Rugged all steel construction for durability.

- Ideal for seedbed preparation.

2. Row Maker



The row maker creates planting furrows by simply pulling the tool through worked soil. It is easily assemble and dissemble.

3. Land Leveler



Land Leveler is an important equipment that is used for farming and agricultural with a purpose to level the land.

4. Hopper Tool



Hopper is mounted on chassis front to the engine, for stored seeds. Shank is that the shaft of hopper for slouching

Seeds.

Features:

- High strength and rigidity.
- Tough in construction.
- Depth control adjustment screw.

5. Seed Sower



The sowing operation are often done by semi manual. The operation of seed sowing is to place the seed and seed in rows at required depth and seed to seed spacing, cover the seeds with soil and provide proper compacting over the seed.

Features:

- Seeding sowing distance can be maintained.
- Suitable for sowing directly after paddy harvest without prior seed preparation.
- Saves seeds, petrol and time.
- Saves labor cost.
- Gives higher yield crops.
- Quite one crop seed sowing possible at a time.

6. Flour Milling





This machinery is attached with the assistance of pulley. When mini tractor is in standing position then this flour milling can be done.

VI. CONCLUSIONS

The product was designed and developed on existing engine operated sweeper welder machine, implementing the 3-wheeler arrangement. The AIM of “Fabrication of multipurpose agricultural Mini Tractor” is provide farmer with multipurpose equipment which implements all the scientific farming specifications and technology to get maximum yield and good quality crops reducing investment and member of labor. The machine is successfully tested into farming field and reduces time 62.5% for ploughing and 66% for seed sowing as compare to the traditional method. Less manpower needed to work this machine i.e. 1 person to operate. Therefore, the value of production crops is a smaller amount. The device is formed such are often easily operated in field. The vehicle power is provided by four stroke petrol engines, and controls are given at handles and foot rest. When it is in standing position flour milling, water pumping, etc. Operations can be done with the help of pulley attachment.

VII. ACKNOWLEDGEMENT

First of all we sincerely thank the almighty who is most beneficent and merciful for giving us knowledge and courage to complete the training work successfully.

I derive immense pleasure in expressing our sincere thanks to the Guide Assistant Professor **Mr. Dharendra Kumar**, for his permission and infrastructural facilities for the successful completion of our paper. I express our heartfelt gratefulness to Prof. **Mr. Sharique Hayat**, Head of department, Mechanical Engineering, for his valuable guidance and suggestions during the preparation of this paper.

I also express our gratitude to all the teaching and non-teaching staff of the college especially to our department for their encouragement and help done during my work. Finally, we appreciate the patience and solid support of our parents and enthusiastic friends for their encouragement and moral support for this effort.

REFERENCES

- [1] S.R. Kulkarni, Harish Nayak, Mohan Futane, “Fabrication of portable foot operated Agricultural Fertilizer and pesticides spraying pump”, “International journal of Engineering Research and technology”, ISSN:2278-0181, volume 4, Issue 07(July-2015).
- [2] Saharawat, Y.S., Singh, B., Malik, R.K., Ladha, J.K., Gathala, M., Jat, M.L. and Kumar, V. 2010. Evaluation of alternative tillage and crop Establishment methods in a rice wheat rotation in northwestern IGP. Field Crops Res. 116: 260–267.
- [3] Kalay khan, S.C. Moses, Ashok Kumar “A Survey on the Design, Fabrication and Utilization of Different Crops Planter” European Academic Research - vol. iii, July 2015.
- [4] Prof. Swati D. Kale, Swati V. Khandagale, Shweta S. Gaikwad, “Agriculture Drone for Spraying fertilizer and pesticides”, “International journal of advance research in computer science and software Engineering”, volume 5, Issue 12, (Dec-2015).



- [5] Shree Harsha B T, Saketh Chellur, Aparna Latha A, Sandeep Kumar Y H M “Multi-Purpose Agricultural Vehicle” (IJIR) Vol-3, Issue-6, 2017.
- [6] B. Mursec, P. Vindis, M. Janzekovic, F. Cus, M. Brus “TESTING OF QUALITY OF SOWING BY PNEUMATIC SOWING MACHINES” Journal of Achievements in Materials and Manufacturing Engineering VOLUME 26 ISSUE 1 January 2008.
- [7] Subrata Kr Mandal, Dr. Atanu Maity, Ashok Prasad, Palash Kr Maji, Sankar Karmakar “Design & Development of a Suitable Implement Matching with Low HP Tractor” International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056, p-ISSN: 2395-0072, Volume: 02 Issue: 02 | May-2015.
- [8] Puja Mondal, 10 Major Agricultural Problems of India and their Possible Solutions and there 5th point I read "lack of mechanisation ".
- [9] The presentation by rohan Gandhi, Crop production practices and management.
- [10] Patel Bhavik, Patel Chandresh, Patel Jaimin, Patel Drumil “DEVELOPMENT OF AUTOGEAR TRANSMISSION WITH USE OF MAGNETICCLUTCH” Department of mechanical engineering, Smt. S.R. Patel college of engineering, unjha.
- [11] Design data book of B.D. Shivalkar, for specification of knuckle joint.
- [12] P. Vijay, K. Rakesh, “Design of a multi-purpose sower cum ploughed”, International Journal of Emerging Technology and Advanced Engineering, 3, (2013), pp. 1-8.
- [13] Aditya Kawadaskar, Dr. S. S. Chaudhary “Review of Methods of Seed Sowing Concept of Multi-Purpose Seed Sowing Machine”, International journal of pure and applied research in engineering and technology, 2013; Volume 1(8): 267-276.
- [14] Kannan, K. Esakkiraja, “Design modifications in multipurpose sowing machine”, International Journal of Research in Aeronautical and Mechanical Engineering, 2, (2014), 35-40.
- [15] D. Ramesh, H. Girish Kumar, “Agriculture seed sowing equipment’s: A review international journal of science”, Engineering and Technology, (2014) 1987-1992.
- [17] Amol B. Rohokale, Pavan D. Shewale, Sumit B. Pokharkar and Keshav K. Sanap A REVIEW ONMULTI-SEED SOWING MACHINE" International Journal of Mechanical Engineering and Technology (IJMET), ISSN 0976 – 6340(Print), ISSN 0976 – 6359(Online), Volume 5, Issue 2, February (2014),