Multipurpose Agriculture Machine

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Abstract: As we all of us know that Farmers are the back bone of our nation. In India 58% of the population depends upon the agriculture. In the agriculture sector there is a lot of field work, like tilling, sowing, spraying, weeding, harvesting, etc. these are all the very important works in the agriculture field. But in the present scenario Farmers are facing many problems such as improper availability of tools and machineries in a viable cost. In India nearly 82% of Farmers are small and marginal land holders who require the machinery, that can do all the agricultural operations starting from tillage, sowing to harvesting. As there are plenty of machineries are available in the market, but all of them are too heavy and costlier for the marginal land holders. So, in order to bring a practically possible and viable solution, we are thinking about the machinery that can perform several operations in a single course of time, with increasing the efficiency in the work and reducing the barriers that the farmers are facing currently.

Our intention is not only to bring a machinery to society i.e. to bring a multitasking machinery that could reduce the overall cost of cultivation and help the marginal and small land holding farmers in order to perform different agricultural operations within their own field without any interference of the other labours or rented machineries.

Key words: Agriculture, harvesting, multiple operations, sowing, tillage.

I. INTRODUCTION

Indian agriculture has been started in early days by 9000 BCE as a result of cultivation of plants, and domestication of crops and animals. Agriculture is the one of the main occupation in India [1]. About 43% of geographical area is used for agricultural activity [42]. As we all know that the agriculture is the back bone of our country's economy and it will continue for a longer period of time [3]. Without food it's impossible for a human being to alive. Agriculture is nothing but it is the science and practise of cultivating plants and rearing animals for food, medicinal plants, fibre and some other products used to sustain and enhance human life. It encompasses a wide range of activities related to farming, including crop production, livestock farming, forestry and fisheries. India ranks second in farm out puts across the world [6]. But the small and marginal land hold farmers are facing many problems starting from tillage to harvesting. In olden days farmers are used animals for doing tillage operations and for some other works. But nowadays the animal population was becoming too less. So, the farmer was moving towards the rented machineries. The one of the major problem in the agriculture sector is weeds [40]. In India nearly 4.2 billion rupees are spent for every year in controlling weeds in the production of major crops [40]. Removal of weeds in the crop is very tedious and laborious work. As there are plenty of machineries available in the market for removal of weeds and for other purposes. But Indian farmers cannot use modern agricultural techniques and equipment which are available in the market because these are too expensive and difficult to purchase [18]. That's why farmer require multipurpose agriculrtural machinery. Multipurpose agricultural implements are very simple and maximum vital gear in agriculture for max yield [11]. Agricultural machinery plays a critical role in modern agriculture. In the past agriculture was heavily reliant on manual labour but with the advent of advanced technology and machinery farming has become more efficient productive and profitable. The main reasons for the essentiality of agricultural machineries are increased efficiency, time saving, cost effective, and precision agriculture. Overall agricultural machinery is critical to modern agriculture helping farmers to produce more food more efficiently with less waste and at lower cost. Early Indian farmers used simple tools like plow, sickle and hoe to till the land and harvest crops. Overtime, various other agricultural implements were developed and used such as the harrow, cultivator and seed drill [47].

In the 19th century, the British colonial government introduced modern agricultural machinery to India. One of the earliest examples was the steam engine,

which was used to power threshing machines and other equipment. The first steam engine was brought to India in 1853 and was used in the Punjab region to power a sugar mill. In the early 20th century, tractors and other farm equipment were introduced to India. The first tractors were imported from the United States in the 1920s, but they were too expensive for most farmers. It was only in the 1950s, with the establishment of the Hindustan Tractors company, that tractors became more widely available and affordable for Indian farmers. The Green Revolution of the 1960s also had a significant impact on the use of agricultural machinery in India. The government invested heavily in irrigation, fertilizers, and high-yielding varieties of seeds, which led to an increase in crop yields and created a demand for more advanced farm equipment. During this period, the Indian government also established the Farm Machinery Training and Testing Institutes to train farmers on how to use and maintain modern agricultural machinery. Today, Indian agriculture is increasingly mechanized, with a range of equipment available to farmers, including tractors, combine harvesters, and threshers. However, the adoption of modern machinery is still uneven across the country, with many small-scale farmers relying on traditional tools and practices. The Indian government has implemented various schemes to encourage the use of modern agricultural machinery, such as subsidies for purchasing equipment and the establishment of custom hiring centres where farmers can rent machinery at affordable rates.

The use of hand tool for the purpose of cultivation is still predominant in India because of tractors can be easily require sources so it is essential that to be improve the agricultural cultivating tool for an farmers to better in quality of crop while most of the necessary components and performance of equipment is lacking and communication between farmers and agricultural research and development department is unsuccessful [26].

What is MAE?

MAE is a multipurpose agriculture equipment. It is a semi-automatic machine which would be driven with the help of motor and with minimal human efforts. They often incorpate modular design and interchangeable attachments to adapt to different agricultural activities.

Scope and Objective

Reason for selecting the problem:

- Lack of mechanization in agriculture.
- High time consuming to do manually.
- Costs of the existing machines are too high.
- Small and marginal land hold farmers not able to purchase the existing machineries.
- Inefficiency of the current machineries.
- Depending on rented machineries.

Scope:

Multipurpose agriculture Machine mainly focus on the basic problems facing by the small and marginal land hold farmers. We are looking this project as a revolution in small land hold farmers in India.

The main objectives are:

- To increase productivity and allows farmers to complete more work in less time.
- To reduce overall cost of cultivation.
- To perform multiple agricultural operations with a help of a single machinery.
- To reduce the dependence of small land holding farmers on the rent buying of larger machineries.
- To bring flexibility in the way of performing different agricultural operations.

II. LITERATURE REVIEW

Dhatchanamoorthy.N[13] et. al [2018] carried out a project to develop a multipurpose agricultural vehicle, for performing major agricultural operations like ploughing, seeding, harvesting. The modification includes fabricating a vehicle which is small and compact in size. The project is about designing a machine which makes cultivation much simpler. The design of the classic of the vehicle is done in such a way that it is suitable for the operations. The design for automatic seed sowing equipment is made. The plough is designed and modified the currently available plough tool in such a way that it with stand the load. The harvester (cutter) is designed and working by scotch yoke mechanism.

Mr.A.B. Salunkhe[2] et. al [2020] Discussed about the field work carried in the agriculture field like weeding, sowing, spraying, etc. As agriculture is the main stay of population, farmer requires hand tool to do work, along with hand tool they require the labour

productivity and quality of working, therefore the results in the less productivity and low yield the multipurpose agriculture machine was developed. This will do the several operations like sowing, fertilizing, chemical spraying, weeding and also used for other inter-cultivation operations.

Abin Johns Thomas [3] et. al [2019] Discussed about the present farmers paying large amount on machines that makes them to decrease labour work and increase the yield of the crops. Even though huge number of machineries are available in the market for weeding, tilling, sowing etc. But the separate machinery is required for every single operation. So in order to improve productivity and quality of work. They had developed multipurpose agricultural equipment and this simple machine is used for ploughing and grass cutting.

Bhoopathi. R [9] et. al [2019] carried out a project to develop the multipurpose agriculture machine. For performing various major operations such as ploughing, seed sowing water spraying, and land levelling etc. This project is about designing a machine to help the small scale farmers. Even though the farmers are using the bullocks and he-buffaloes for farming operations. This will not satisfy the need of the energy requirement of the farming as compared to other countries in the world.

Dr. C N. Sakhale[10] et. al [2016] Discussed about Multifunctional agricultural vehicle. which is mainly focused on the basic problems which have been faced by small and marginal land hold farmers. i.e. Tilling, Sowing, Spraying, Weeding etc. And they are looking this project as to bring revolution in small farms in India, which is most uncovered area in this sector is cost and more efficient way.

Asst. Prof. Dilip Radkar[14] et. al [2021] carried out a research on the problems faced by the small and marginal land hold farmers and they had developed a multipurpose agriculture machine. And it can perform the operations like tillage, sowing, kolapani operation and spraying. Tillage is done by attaching the tillage implement to the vehicle, and the spraying is done by using the sprinkler which has the DC motor pump operated, and the kolapani is used to remove the unwanted grass in the rows of the crop.

Dr. B. Vinoth[15] et. al [2021] done a project on the development of the multipurpose agriculture machinery. The project is about the machine design which makes cultivation much easier. The design of the chassis of the vehicle is done in such a way that it is suitable for the operations like ploughing, sowing, harvesting etc. The plough has been designed and modified in such a way that it with stand the load. The harvester (cutter) is designed and working by scotch yoke mechanism.

Dr.Y. Sasharao[16] et. al [2021] Done a research on the development of the robot which can dig the soil, put the seeds, leveler to close the mud and sprayer to spray water, these whole systems of the robot works with the battery and the solar power. And the vehicle is controlled by Relay switch through IR sensor input. The language input allows a user to interact with the robot which is familiar to most of the people.

Dr. Hanumesh pujar [17] et. al [2020] Done a research on the topic named as 'Design and fabrication of multipurpose agricultural mini farm vehicle using scooter engine' they innovatively thought about developing a scooter into a farming machinery. It has been mainly developed to perform agricultural operations like ploughing, pesticide spraying, goods carrying, etc. It is developed for the small land holding farmers having land of 10-12 acre.

Anvesh. S[41] et. al [2021] done a research on a topic named as 'multipurpose agriculture cultivator'. In order to mainly focus on the basic problems faced by marginal and small land hold farmers. That is sowing of seeds, fertilizers spraying, cultivation, and digging. They made a plan to create a semi-automatic machine which uses motor to run and thereby reduces the human efforts and increases the efficiency. Which also involves a sprinkler used to soften the soil there by making the land more suitable for performing field operations.

III. *PROBLEM IDENTIFICATION*

In India most of the work associated with agriculture was done with manually. This situation changed after some years when people came to know about the machineries. But all the people are not able to use the machinery because of some particular reasons. In that the main reason is expensive of the machine, making it difficult for farmers to invest in new equipment. And the agricultural machine requires regular maintenance and repair to ensure it operates efficiently. However, farmers may not have the necessary knowledge to perform these tasks. And then the machineries may not be compatible with the crops and terrain in a particular

region. This can limit farmers ability to adapt new technology and lead to decreased productivity and less income. Like these the farmers are facing many problems related to agriculture machinery that's why a farmer requires a multipurpose agriculture machine with low cost and less maintenance and which is easily operated by a farmer and the machinery does not require any skilled labour to operate it.

IV. *BASIC CONCEPTS DESIGN*

After looking into the various machineries and tools developed for various agricultural practices such as weeding, tillage, spraying etc. we thought about the machinery constituting the following parts which is used for multiple tasking in agricultural operations.

Parts involved: Handle bar, front axle, wheel, galvanized iron pipe, 52cc two-stroke motor and its components, fork, Hopper, seed drill, seed metering unit, share, levelling plate, etc.

Front axle: The main task of the front axle is to transfer the power from the engine to the wheels. And it is essential in overall handling, stability and safety.

Handle bar: The main function of the handle bar is to provide the operator with a means to steer and control the movements of the machine. The handle bar is typically connected to the front wheels of the machine, and by turning the handle bar, the operator can change the direction of the machine's movement. Additionally, handle bar may also include controls for the operation of the machine, such as speed and break controls.

52cc two-stroke motor: The main function of the 52cc two-stroke motor is to provide power to the drive machinery. The 52cc twostroke motor is a popular choice for small agriculture machineries because it is compact, lightweight, and powerful enough to handle the demands of agriculture work. And it is a reliable and efficient engine choice for small agriculture machinery.

Fork: Fork is used as a cultivator. Its main function is to break up and loosen soil. The fork typically has several tines to loosen the soil. This fork is used as the weeding purpose when the weeds are at initial growth and also used as to loosen the soil.

Share: The main function of the share is to break up and turn the soil. The share is a pointed or a flat blade which is attached to the bottom of the plow and it is designed to slice through the soil as the machine is pulled through the field. When the share is pulled through the soil by the machine, it cuts into the ground and turns the soil.

Hopper: The main function of the hopper is to store the various types of agriculture inputs such as seeds, fertilizers and pesticides and to deliver the inputs to the ground in a controlled and efficient manner during the planting or fertilizing process.

Levelling Plate: It is a large flat metal plate that is typically attached to the rear or bottom of the land levelling implement. It serves to distribute and level out the soil. The levelling plate helps to smooth out uneven terrain, fill in low spots, and create more even surfaces for planting or other agricultural operations.

Fig. 1.1 Main Components of the Product

V. *METHODOLOGY*

Our machine is a complete set of all the required operative techniques performed in the agriculture field. With a help of a single labour any kind of the agricultural operation can be done through our machinery. For example consider the tillage operation as we switch on the machine the motor starts to rotate which in turn makes the machine to move there by makes the tillage implement to get into the soil and create the furrows and ridges required to sow the seeds also if we consider the seed sowing operation the hopper can be placed in the upper part of the machine and the seeds and the required fertilizers are mixed and placed in the hopper as the machine moves here the tillage operation is done followed by the seed sowing with the help of seed tube and also fertilizers are placed in the soil with the seed in an appropriate rate with the help of the seed metering unit. And also, for weeding operation tillage implement can be replaced with the weeding operator called fork. The weeding operations which can be done efficiently in prior to tillage operation and also in the primary stage of the crop growth. Here we are completely taking of the

weed from the ground by destructing its roots itself and this operation can be done only when the weeds are in the preliminary stage of their growth. And also, by replacing the operator with levelling plate we can also level the agricultural farm land, so that any ridges placed and any furrows formed other than required are completely levelled so that no disturbance will be found during any agricultural operations. By replacing the hopper with the tank containing liquid nutrients by operating its opening and closing with the bear hands we can supply requires amount of nutrients to the growing plants in an efficient way which is going to reduce the time requirement for the person without the machinery. And also increases the efficient use of the nutrients without wasting or making improper supply. Also by replacing the operating tool with strong rock rollers the soil can be pulverized and make soil suitable for the tillage operations which is going to reduce the efforts put on during the tillage. With the help of this machinery the traditional methods that we are following using Ox or Bulls can be performed much more efficiently and with more accurate and proper manner. Here we are not only replacing the traditional methods but revolutionising the present day modern agricultural operative methods with the help of this machine we can reduce the way weight of cost and work load hanging on the shoulders of the present day farmer which is going to even inspire the present day youth agriculturist to take part in agricultural practices.

VI. *CONCLUSION*

This machine can be very much helpful for the small land holding farmers who are struggling at this stage to perform various agricultural operations in every aspect, so our main aim is to reduce the burden which is on the farmers who really are the backbone of our nation but not getting the proper outputs for their restless efforts. So, the main idea for this proposal of the machine is just to bring about the problems present in the present day machineries.

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REFERENCE

1. [1]A.A Phansopkar, [2]Dr. S. N. Waghmare, [3]R. G. Gupta, [4]Y. S. Ughade, [5]D. P. Bavdhane [1,3,4,5]UG Student, [2]Associate Professor, Mech Engg Dept, RMCET, Ambav, Maharashtra, India. Remote Controlled Agricultural Robot with Sowing Seed Mechanism.
2. Mr. A. B. Salunkhe[1], Mr. H. S. Bhore[2], Rohit Suryawanshi[3], Bhushan Jadhav[4], [1,2]Assistant Professor [3,4]Student [1,2,3,4]Department of Mechanical Engineering [1,2,3,4]AITRC, Vita, India. Design and Development of Multipurpose Agricultural Equipment.
3. Abin Johns Thomas UG Student, Mebin C Mathew UG Student, THOMAS JOHN UG Student, Allen Easo Mathew UG Student, Anu Nair P Assistant Professor, Department of Mechanical Engineering, Mar Baselios Christain College of Engineering and technology Kuttikanam, peermade. MULTI-PURPOSE FARMING MACHINE.
4. Ankitsingh Vyas[1] , Bharat Parkhedkar[2] , Kailas Samarth[3] , Rohit Gurumukhi[4] , Pooja Walokar[5] , Prof. S. G. Bawane6 Mechanical Engineering Department, K.D.K. College of Engineering, Nagpur. SOLAR BASED MULTIPURPOSE AGRICULTURE MACHINE.
5. Anola Ku Panda [(1)], Anil Hembram [(1)] Anil Ku mallick [(1)], Soumyadip Panda [(1)] Alok Mohapatra [(2)]. [1] UG Scholar, Department of Mechanical Engineering, Gandhi Institute for Technology (GIFT), Bhubaneswar [2] Professor, Department of Mechanical Engineering, Gandhi Institute for Technology (GIFT), Bhubaneswar. MULTIPURPOSE AGRICULTURE MACHINE: APPLICATIONS AND USES.
6. Anveer[1] , Manjunath Tolagatti[1] , Manjunath Kharvi[1] , Suhan Nayak[1] , Manjunath L.H[2 1B]. Tech Students, [2]Professor School of Mechanical Engineering, REVA University. Design and

Fabrication of Multi-Purpose Agriculture Vehicle.

7. Arun Kumar Rajamanickam, M. Sanjay, S. Swetha, R. Ramprasath Department of Mechanical Engineering, Sri Krishna College of Engineering and Technology, Coimbatore, Tamilnadu, India. Development of multipurpose agricultural machine.
8. Ashwin Chandran[1] , K. Varun Krishnan[2], T. V. Arjun[3] , Vignesh[4] , Nithin Joshua[5] .[1,2,3,4]Student, Department of Mechanical Engineering , Srinivas Institute of Technology, Mangalore, India [5]Assistant Professor, Dept. of Mechanical Engineering , Srinivas Institute of Technology, Mangalore, India. Design and Fabrication of Multipurpose Farming Equipment.
9. [1] Bhoopathi R, [2] Jagathiskumar U, [3] Shiva Ganesh R, [4] Sanjay T, [5] Muralidharan R [1]Assistant Professor, [2][3][4][5] Student [1][2][3][4][5] Department of Mechanical Engineering Sri Sai Ram Engineering College Chennai, India. Development of Manually operated Multipurpose Agriculture Machine.
10. Dr. C.N.Sakhale Associate Prof., S.N.WAGHMARE Associate Prof., 1. Rashmi S.Chimote PG Research Scholar, Dept. of Mechanical Engg., Priyadarshini College of Engineering, Nagpur, MH India. MULTIPURPOSE FARM MACHINE.
11. Chandana N C, Chethan Kumar V U, Mahadevaprasad G B, Shiva Kumar M. Advanced Solar Operated Multi-Purpose Agricultural Equipment.
12. Deepali Sanap Asst Prof, Dr.D.Y.Patil Shivkumar Mathpati Asst Prof., Nilesh Suralkar BE, Shubham Jane BE, Vishal Shinde BE Department of Mechanical Engineering Dr.D.Y.Patil Collage of Engineering And Innovation,Varale,Pune,INDIA. MULTIPURPOSE AGRICULTURE MACHINE.
13. Dhatchanamoorthy.N[1] , Arunkumar.J[2] , Dinesh Kumar.P[3] , Jagadeesh.K[4] , Madhavan.P[5] B.Tech Students[1, 2, 3, 4 ,] Assistant Professor5 Department of Mechanical Engineering Achariya College of Engineering Technology, Villianur, Pondicherry, India. Design and Fabrication of Multipurpose Agriculture Vehicle.
14. Asst. Prof. Dilip Radkar[1], Goraksh Choughule[2], Abhijeet Desai[3], Prathamesh Gawand[4], Pradip Bade[5], Yogesh Chaudhari[6] .[1]Asst. Professor, Dept. of Mechanical Engineering, Bharati Vidyapeeth College of Engineering, Navi Mumbai, Maharashtra, India [2,3,4,5,6]Student, Dept. of Mechanical Engineering, Bharati Vidyapeeth College of Engineering, Navi Mumbai, Maharashtra, India. Multipurpose Agriculture Machine.
15. Design and Analysis of Multipurpose Agriculture Vehicle Dr. B. Vinoth[1] , M. Vinothpandiyan[2] , R. Sethumadhavan[3] , C. Pavithran[4] Associate Professor, Department of Mechanical Engineering[1] UG Students, Department of Mechanical Engineering [2,3,4] Mangayarkarasi of Engineering, Paravai, Madurai. Design and Analysis of Multipurpose Agriculture Vehicle.
16. Dr.Y. SashaRao[1] , V.S.J.C Prasad[2] , Chinna Veeresh[3] , Satishkumar[4] , Y Kalyana Krishna[5] Professor, Department of Mechanical Engineering, QIS College of Engineering and Technology, Ongole, AP, India[1] Assistant Professor, Department of Mechanical Engineering, QIS College of Engineering and Technology, Ongole, AP, India [2,3,4,5]. Multi-Purpose Agriculture Robot with Android Controller.
17. Elayaraja.D[1] , Aneesh.K.C[2] , Amrutha pavani[3] , Arun kumar A[4] Professor, Department of Mechanical Engineering, QIS College of Engineering and Technolgy, Ongole ,A.P[1] Asst.Professor, Dept. of Mechanical Engineering, QIS College of Engineering and Technolgy,Ongole,,A.P[2,3] Asst.Professor, Dept. of Mechanical Engineering, E.G.S.Pillay Engineering College,Nagapattinam[4]. Solar Energy Based Multipurpose Agricultural Robotic Vehicle.
18. Hanumesha Pujar[1] , Prashant D Banakar[1] , S C Sajjan[2]. [1]Assistant Professor, [2]Professor Department of Mechanical Engineering, K. L. E. Institute of Technology, Hubballi, Karnataka, India. Design and Fabrication of Multipurpose Agricultural Mini Farm Vehicle Using Scooter Engine.
19. [1]Prof. Hardik Mehta, [2]Sahil Patel, [3]Akshat Ghataliya, [4]Yash Shah, [5]Devesh Vora. [1]Professor, [2-5]Students, [1-5] Dept. of Mechanical Engineering,

Indus University, Gujarat, India. Design and Fabrication of Multipurpose Agricultural Machine.

20. Harsh Yadav[1], Siddharth Yadav[2], Sagar Kanadiya[3], Himanshu Singh[4], Vishal Kandalgaonkar[5]. Pravin Patil College of Diploma Engineering and Technology, Mira Bhayandar, Maharashtra. Multifunctional agricultural machine.
21. Jivesh Hedau[1] , Shubham Dixit[2] , Tanmay Dhurde[3] , Nitesh Gharatkar[4] , Ritik Shende[5] .[1, 2, 3, 4, 5] Student, Dept of Mechanical Engg, K.D.K College Of Engineering, Nagpur, Maharashtra, India. Design and Fabrication of Multipurpose Agricultural Machine.
22. K. Krishna reddy [1] , dr. M. Lakshmikantha reddy[2], b mounika[3] , k rajkumar[4] , d nandini[5], e prathap[6], r stephen babu[7]. [1]assistant professor & hod in dept of eee in mother theresa institute of engineering and technology palamaner, andhra pradesh. [2]professor & principal in mother theresa institute of engineering and technology palamaner, andhra pradesh. [3,4,5,6,7]b.tech in dept of eee in mother theresa institute of engineering and technology palamaner, andhra pradesh. Multipurpose agriculture robot using solar energy.
23. K. Venu[1] , P. Naga Sumanth[2] , I. Hemanth Reddy[3] , SK. Davood[4] , B. HarithaBai[5] , P. KumarBabu[6]. [1,2,3,4]B.tech(pursuing),Department of Mechanical Engineering, Sree Venkateswara College of Engineering, Nellore, A.P, India [5]Associate Professor, Department of Mechanical Engineering, Sree Venkateswara College of Engineering, Nellore, A.P, India [6]Professor, Department of Mechanical Engineering, Sree Venkateswara College of Engineering, Nellore, India.
24. [1] Kanchana Daoden, [2] Sureeporn Sringam, [3] Supanat Nicrotha, [4] Thanawat Sornnen [1] [4] Faculty of Industrial Technology, Uttaradit Rajabhat University, [2] [3] Independent Researcher. Development of Medium-Sized Multipurpose Agriculture Vehicle.
25. [1]M. DWARAKESH, [2] M. JEGADEESAN, [3] S.AJITH KUMAR, [4] T. HARISH KUMAR, [5] P. VIJAYAN. [1] [2] [3] [4] T. Harish Kumar, Student, Department of Mechanical, SRM Valliammai Engineering College, Tamilnadu, India [5] P. Vijayan, M.E., Assistant Professor, Department of Mechanical, SRM Valliammai Engineering College, Tamilnadu, India.
26. Mahesh Balpande[1], Harish Adewar[2], Pavan Wadbudhe[3], Amey Bhandakkar[4], Gaurav Sukhdeve[5] ,Akshay Mankar[6] , Dr. S. K. Choudhary[7]. [7]Assistant Professor, Department of Mechanical Engineering K.D.K.C.E., Nagpur, Maharashtra, India. [1-6]UG Student, Department of Mechanical Engineering K.D.K.C.E., Nagpur, Maharashtra, India. Design and Fabrication Of Motorized Multipurpose Agricultural Machine.
27. [1]H. Mohamed Suhail, [2]G. Saravanan, [3]S. Ravikumar, [4]S.Rajesh, [5]B.Vijaya Ramnath, Dept. of Mechanical Engineering Sri Sai Ram Engineering College.Design and Fabrication of Smart Multi-Purpose Agricultural Companion.
28. Mr. Muruganantham S[1] , Sivanantham P[2], Sudharsan P[3], Jothi Ragavan E[4], Ramji N. [5,1]Assistant Professor, Department of Mechanical Engineering, Nandha Engineering College, Erode India. [2,3,4,5]UG Student, Department of Mechanical Engineering, Nandha Engineering College, Erode India. Design and Fabrication of Multipurpose Agricultural Machine.
29. [1]Nitin kumar mishra, [2]Shashwat khare, [3]Sumit singh, [4]Mithun dabur [1, 2, 3]B.Tech.Student (Swami Vivekanand University), [4]Guide H.O.D (Swami Vivekanand University). MULTI-PURPOSE AGRICULTURE MACHINE.
30. Om Khadke[1], Lokesh Manekar[2], Khomeshwar Sarode[3] , Rishabh Sakhare[4], Sachin Bagde[5], Prof. Mr. Samish Fale[6]. [1,2,3,4,5] Student Department of Mechanical Engineering, NIT Polytechnic Nagpur 6 Faculty Department of Mechanical Engineering, NIT Polytechnic Nagpur. Fabrication of Multipurpose Agriculture Machine.
31. [1]P. V. Prasad Reddy, M. [2]Yadi Reddy, Department of Mechanical Engineering Mahatma Gandhi Institute of Technology Hyderabad, India. Development of Multi-Purpose Agricultural Vehicle by using Solar Power.
32. Patil Nikhil V[1] , Shaikh Ajaharuddin G[2] , Gaykawad Ratanlalsingh D[3] , Deore Ganesh S[4], Chaure Ganesh[5] ,Prof. P.G.Tathe[6]. Department of Mechanical Engineering, SavitribaiPhule University of Pune, SCSCOE, Shrishivajinagar, Maharashtra, India. Multipurpose Agriculture Vehicle.

33. [a]Pavan Kumar B, [b]Kiran Kumar A, [c]Sai Kiran D, [d]Siva D, [e]Sai Gunadeep E, [f]Ganesh E, [g]Prasanth Kumar G. [a,b,c,d,e,f,g]Graduate, Mechanical Engineering, GMR Institute of Technology, Rajam, Andhra Pradesh, India. Design and Fabrication of Multipurpose Agricultural Machine.
34. Prof. D.S. Pawar[*1], Mr. Shubham Patare[*2], Mr. Sachin Dale[*3], Mr. Akshay Hase[*4], Mr. Vishal Gandole. [*5] [*1]Assit. Professor, Dept. Of Mechanical Engineering, Pravara Rural Engineering College Loni, India. [*2,3,4,5]Student, Dept. Of Mechanical Engineering, Pravara Rural Engineering College Loni, India. MULTIPURPOSE AGRICULTURE MACHINE.
35. [1]Pranav Chavan, [2]Atharva Deshmukh, [3]Rahul Bachute [1]Student, [2]Student, [3]Guide(HOD) Mechanical Engineering Department, Dr. DY Pail School of Engineering and Technology, Pune, India. Review Paper on Multipurpose Agricultural Robot.
36. Pratikkumar V. Patel[*1], Mukesh Ahuja[*2].[*1] Student,(Machine Design)Mechanical Department, L.C.I.T , Bhandu, Mehsana, India. [*2] Professor, Mechanical Department, L.C.I.T., Bhandu, Mehsana, India. RESEARCH AND DESIGN OF MULTIPURPOSE AGRICULTURE EQUIPMENT.
37. Prof.S.A.Bobade[1], Nikhil Yavalkar[2], Abhishek Bankar [3] , Pranil Tiwaskar [4] ,Shubham Bhorgade [5]. [1]Assistant Professor, [2,3,4,5]Student, Department of Mechanical Engineering, DBACER, Nagpur, Maharashtra, INDIA. DESIGN AND FABRICATION OF MULTIPURPOSE AGRICULTURAL SOLAR OPERATED SEED SOWING MACHINE.
38. R S Rakhimov[1], I R Rakhimov[1], E O Fetisov[1], Ya Yu Khamitov[1] and F I Dymshakov[1] [1]South Ural State Agrarian University, Troitsk, Russia. Multi-purpose sowing machine for agricultural crops using various technologies.
39. [1]Prof. Hardik Mehta, [2]Sahil Patel, [3]Akshat Ghataliya, [4]Yash Shah, [5]Devesh Vora [1]Professor, [2-5]Students, [1-5] Dept. of Mechanical Engineering, Indus University, Gujarat, India. Design and Fabrication of Multipurpose Agricultural Machine.
40. Sai Vinay.M.R, Ananda.G, Vinod.K.V, Vikas Noolkar , Kumar Swamy.R. Fabrication of Multipurpose Agricultural Tiller.
41. ANVESH S[(1)], SARFARAZ R[(1)], AKASH S[(1)], TAUFIQ S[(1)] DILIP B R[(2)] [1]UG Student, Department of Mechanical Engineering, Bharati Vidyapeeth College of Engineering, [2]Professor, Department of Mechanical Engineering, Bharati Vidyapeeth College of Engineering, CBD Belapur , Kharghar, Navi Mumbai, Maharashtra, India. A RESEARCH PAPER ON MULTIPURPOSE AGRICULTURE CULTIVATOR.
42. Sheikh Mohd Shahid Mohd Sadik[1] , H.A. Hussain[2]. [1, 2] Dept of Mechanical Engineering 2Assistant Professor, [1,2] Anjuman college of Engineering and Technology Nagpur, Maharashtra, India. Design and Fabrication of Multipurpose Farming Machine.
43. Shivam Rai, Navneet Rai, Deepesh Yadav Under the guidance of Shiv Saurabh Srivastava Prasad Institute of Technology Jaunpur, U.P, India. Multipurpose agriculture machine.
44. Sumeet S.Kandalkar[1] , Rahul B.Patil[2], Shrikrushna D.Kajale[3], Pravin A.Datir[4], Prof. Deepak S.Patil[5] B.E., Dept. of Mechanical, Logmieer, Nashik, India. [1-4] B.E., Dept. of Mechanical, Logmieer, Nashik, India.
45. Sumit kumar Bhagat, Piyush kumar chobarka, Sudhanshu kumar, Nitin kumawat, Shivendra verma. Design and development of multipurpose solar powered agriculture machine
46. V.Sathyamoorthy[1], R.Santhosh Kumar[2], S.Sreedhar[3], M.Sridhar[4], S.Surendhar[5]. [1]Asst. professor, Dept. of Mech Engineering, KPR Institute of Engineering and Technology, Coimbatore. [2,3,4,5]Student, Dept. of Mech Engineering, KPR Institute of Engineering and Technology, Coimbatore. Design and Analysis of Adoptable Multipurpose Tillage Equipment.
47. Manjunatha, K., Sushilendra, Sunil Shirwal and Vijayakumar, P. (2014). "Development and evaluation of manually operated sprocket weeder". Internat. J. Agric. Engg., 7(1) : 156-159