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# Design And Fabrication Of Multi-Purpose Farming Machine

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***Abstract:*** This study has been done regarding the different innovations made to fertilizer spraying and sowing machines is provided in this paper. The primary element in agriculture is the field spraying machine. Farmers need to adopt new practices that will boost crop productivity overall without affecting the texture of the soil to fulfil future food demands. This study focuses on fertilizer spraying and seed sowing techniques and the range of crop cultivation technologies utilized in India. A comparison is made between the new machine that is suggested, which has several advantages and can execute multiple tasks simultaneously, and the conventional technique of applying fertilizer. This system lowers the labour costs and overall effort involved in fertilizer spraying and sowing, which is a major problem for farmers as labour.

***Index Terms*** **- Multipurpose, Sowing, equipment, spraying.**

## I. INTRODUCTION

India's agricultural heritage begins with the Rig-Veda, which was composed in 1100 BC. The past fifty years have seen a significant change in farming. India currently leads the world in agricultural productivity. As India's economy grows broadly, the agricultural sector's share of the national GDP is gradually decreasing. On the other hand, there is a consistent growth in the industrial and service sectors. Nonetheless, agriculture is the most diverse economic sector in terms of population and contributes significantly to India's overall socioeconomic structure. India makes a significant contribution to global agriculture.

In INDIA agriculture is major occupation. It is also a backbone of the Indian economy and it will continue for a long period of time. This tool is used for sowing of seed, ploughing, cutting, spraying of chemical & water, leveling. Modern techniques and equipment are not used by small land holders because the equipment is too expensive. It is very important to use scientific farming methods for maximum yield and good quality crops but most farmers still use primitive methods of farming techniques because of lack of knowledge or lack of investment for utilizing modern equipment. Agriculture is nothing but the science and art of farming including cultivating the soil, producing crop etc., over the year's agricultural has been carried out by small land holder cultivating between 2 to 3 acre using human labor and traditional tool like wooden plough, yoke, leveler, harrow, etc. The use of hand tool for 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 a farmer 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. Other than improving generation productivity, automation supports enormous scale creation and now and again can improve the quality homestead produce.

## II. LITERATURE REVIEW

1) Mahesh R. Pundkar The review by Mahesh R. Pundkar, A. K. Mahalleare gives a quick overview of the different kinds of advances made in seed-sowing machines that are available for plantations. One essential tool in the agricultural sector is the seed-sowing machine. The cost and yield of agricultural goods are significantly impacted by the effectiveness of seed sowing devices. There are numerous methods available now for determining a seed-sowing device's performance. It has been demonstrated that a key element influencing crop yield and seeding vigour is depth of sowing. The core of a seed-sowing machine is a seed-metering mechanism, which measures the distance and size of seeds between different seed kinds. For a broad range of crop varieties and seed sizes, highly precise pneumatic planters have been created, leading to homogeneous seeds distribution along the travel path, in seed spacing.

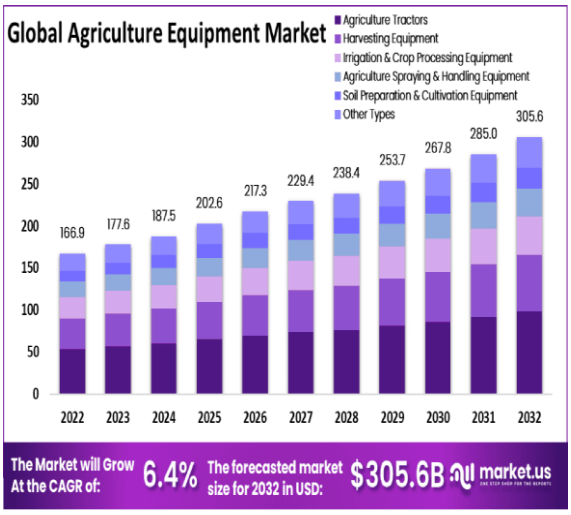
2) Based on Laukik P. Raut and others, modern agriculture is unavoidable to meet the food needs of the expanding population and the fast-paced industrialization. Through accurate metering that ensures better distribution, lowering the quantity required for better response, and preventing losses or wastage of applied inputs, mechanisation makes it possible to conserve inputs. Mechanisation lowers manufacturing costs per unit by increasing productivity and conserving inputs. Farmers have always used the same tools and techniques. In addition to the fact that the industrial and service sectors have developed more than the agricultural sector, farming is still done the traditional way in our nation. Traditionally, labour-intensive backpack sprayers have been used for the spraying, which takes more human effort. Typically, the weeding is done using the support from bulls, which is expensive for farmers with small farms. To solve the above two issues, a machine that will help farmers with weeding and spraying has been designed.

3) According to Pranil V. Sawalakhe and colleagues' investigation, all sectors of the economy, including the agricultural one, are expected to grow rapidly in the modern period. Farmers must use new procedures that will not alter the texture of the soil but will boost crop yield overall to fulfil future food demands. This essay discusses the many seeding techniques and fertiliser placement strategies utilised in India. A comparative analysis is conducted between the conventional sowing method and the newly suggested machine, which offers several advantages and can execute multiple tasks simultaneously. With labour costs rising and labour availability becoming a major worry for farmers daily, this equipment lowers the effort and overall cost of seeding, fertilizer placement.

4) H.P. Girish Kumar and D. Ramesh talked about the facts regarding the many kinds of advancements made in seed sowing machines that are accessible for plantations. One essential tool in the agricultural sector is the seed-sowing machine. The cost and yield of agricultural goods are significantly impacted by the effectiveness of seed sowing devices. There are numerous methods available now for determining a seed-sowing device's performance. It has been demonstrated that a key element influencing crop production and seeding vigour is seeding depth. The core of a seed-sowing machine is a seed-metering mechanism, which measures the distance and size of seeds between different seed kinds. for a variety of seed sizes, leading to a consistent distribution of seeds along the seed's travel path.

5) R. Joshua, V. Vasu, and P. Vincent talked about how "energy-demand" is a key issue facing our nation. The biggest difficulty facing our nation's industrialists, engineers, social scientists, and entrepreneurs is coming up with ways to meet the "energy demand." They contend that the only other option to meet the demand for conventional energy is through the application of non-conventional energy. The idea and technology that use this unconventional energy are becoming increasingly popular for many development operations. One of the main sectors with a lot of applications is the agriculture sector. In rural areas without electricity, solar energy is crucial for irrigation purposes and for drying agricultural products and well pumping. This solar energy technology can be expanded to spray fungicides, insecticides, and solar sprayers for fertilisers and other products. This study discusses the conversion of an existing fossil fuel-powered "Power Sprayer" into a solar sprayer that runs on renewable energy sources.

MEASUREMENTS AND GRAPHS



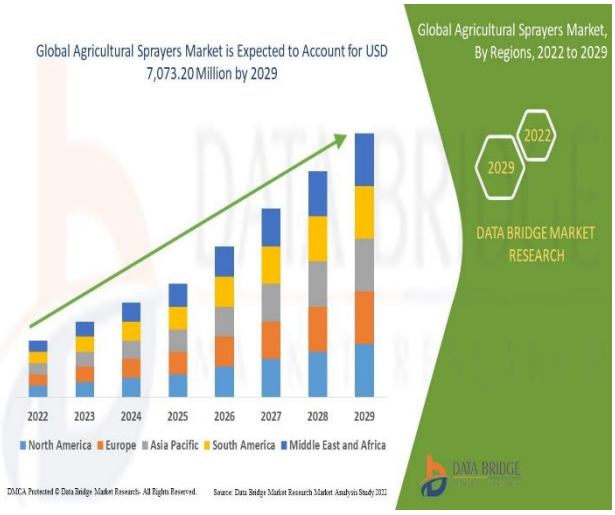




Fig.No.1 Market Research

How farmers adopt mechanization depends on several factors such as socio-economic conditions, geographical conditions, crops grown, irrigation facilities, etc. According to the Indian Council of Agricultural Research, the level of mechanization of major cereals, pulses, oilseeds, millets, and cash crops. (ICAR) shows that soil preparation is highly mechanized for major crops, while harvesting and threshing are least mechanized for major crops except rice and wheat. The level of mechanization of seeding production is higher for rice and wheat plants compared to other crops. However, the level of mechanization of sowing is the highest for the wheat crop (65%). Cultivation of sugarcane and rice is 20% and 30% mechanized respectively. In relation to harvesting and threshing, the degree of mechanization of rice and wheat is more than 60%.

## III. PROBLEM STATEMENT

1) The effect of inaccuracies in seed placement on land Lack of mechanization in farming.

2) Required so much efforts for different types of process.

3) Low productivity because of insufficient power.

4)Taken too much time for performing individual process and manpower.

5) In manual seeding it is not possible the uniform seed spacing.

## IV. OBJECTIVE

1) To understand the basic principle of our project.
2) Describe the construction and working of various parts of our project.
3) Development of the working model of our project.

## V. METHODOLOGY

Using spraying, an effort is made to create and construct equipment that can carry out both tasks more effectively and with reduced costs. At this point, the project primarily focuses on creating an appropriate operating system through mobile application design. The locally fabricated unit has been used in the design to maintain economy and simplicity. With our project, safety is increased, human labor is reduced, efficiency is increased, work load is decreased, worker fatigue is decreased, and maintenance costs are decreased.

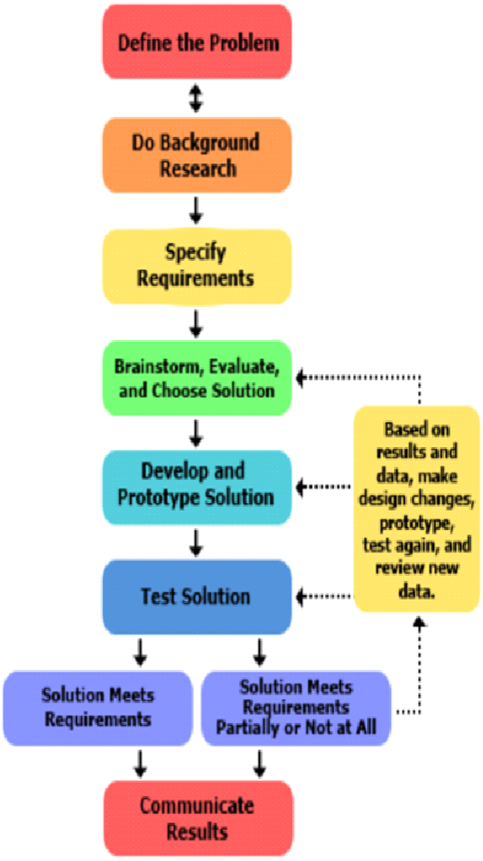



Fig. No.2: Design Procedure

## VI. CONSTRUCTION AND WORKING

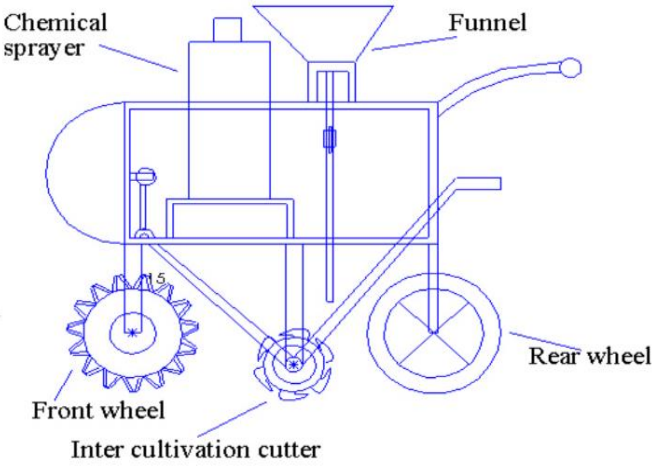



Fig.No.3 Rough Sketch

This project focuses on reducing the harmful effort involved in using a manual spraying pump. In the newly developed sprayer, the pump is wheel-mounted and consists of various parts such as bearings, spray and its handle, and water tank. In the new modified injector, the pump mount is attached to the frame and between two bearings to the support wheel and the front wheel frame. Then the wheel starts to rotate, the pump arms start to rotate, as the pressure builds up in the nozzle. Now the project is mainly focused on designing a suitable operating system. To maintain simplicity and economy, the design used locally produced equipment. With our

project, greater safety is achieved, human labor is reduced, lawn mower efficiency is increased, workload, worker fatigue and maintenance costs are reduced.

## VII. DESIGN MODEL

Fig.No.4 Front View and Side View

**Software's Used**: CATIA and Siemens NX

## VIII. WORKING MODEL

Fig.No.5 Final Model

## IX. PROJECT COST

Table No.1 Cost Estimation

| SR. NO | PARTS | QTY. | AMOUNT(RS.) |
|---|---|---|---|
| **1** | Chain and Sprocket set | 2 | 670 |
| **2** | Fabrication | 1 | 3000 |
| **3** | Bearing and Support | 2 | 300 |
| **4** | Tank (With Pump) | 1 | 700 |
| **5** | Nut and Bolt | - | 200 |
| **6** | Wheels | 3 | 200 |
| **7** | Nozzle | 2 | 150 |
| 8 | Miscellaneous | - | 3000 |
| | | Total | 8220 |

## X. FUTURE SCOPE

Spraying machine is a device which helps in the Spraying fertilizer in a desired position hence assisting the farmers in saving time and money. So, considering these points related to spraying an attempt is made to design and fabricate such equipment which will able to perform both the operations more efficiently and will results in low cost. Decrease the operational cost by using new mechanism.

- Work reliably under different working conditions.
- Decrease the cost of machine.
- Decrease labor cost by advancing the spraying method.
- Operation can be done in small scale farm land (1 acre)
- For performing the both operations we fabricate the machine

## XI. RESULTS AND CONCLUSION

Our project a fertiliser spraying and sowing machine has been implemented effectively. The machinery is specifically made for farmers with 5–6-acre plots of land. It is appropriate for both seed sowing and spraying at the lowest possible cost to the farmer so that he may afford it. When used for weeding, the equipment performs best when it is placed in moist soil since the weed cutter can more easily pierce the soil, pull it up, and complete the weeding task. When the machinery is used on a smooth or less uneven surface, its performance will improve. It will also work better on crops that are almost comparable in height and have less gap between them.

## XII. ACKNOWLEDGEMENT

We would like to express our deep gratitude to everyone who contributed to the successful completion of the development of this Multipurpose Farming Machine. First, we would like to thank Department of Mechanical Engineering JSPM'S RSCOE for providing us the resources and facilities necessary for this research. The support of faculty and staff related to our project was invaluable. We are very grateful to our research advisor, Dr. P.S. PATIL, whose knowledge, guidance, and encouragement were crucial throughout this project. Our advisor insightful suggestions and unwavering support inspire us to strive for excellence.

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