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Review Paper on Design and Fabrication of Multi-Tasking Agricultural Machine

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Abstract: *Agriculture is the backbone of many economies, yet small and marginal farmers often face significant challenges due to limited access to mechanized tools. Traditional farming practices demand high labor and time while also being cost-intensive. To address these issues, a number of research paper were reviewed and the research gaps were identified.*

Keywords: multitasking, mechanization, pre, post harvesting, sustainable

I. INTRODUCTION

Agriculture is the backbone of India. Paddy and Wheat is one of the new targets in agriculture where still, not many researchers and manufacturers participate. This field faces some problems such as how to maximize the profit, how to increase productivity and how to reduce the cost. In India, two types of agricultural equipment are used, manual method (conventional method) and mechanized type. Mechanization involves the use of a hybrid device between the power source and the work. This hybrid device usually transfers motion, such as rotary to linear, or provides ample of mechanical advantages such as increase or decrease or leverage of velocity. Agricultural machinery is machinery used in farming or other agriculture. Mechanized agriculture is a process of using agricultural machinery to mechanize the work of agriculture, increasing farm worker productivity. In modern times, powered machinery has replaced many farm jobs formerly conducted by manual labor or by working animals such as oxen, horses, and mules. The entire history of agriculture contains many examples of the use of tools, such as the hoe and the plough. But the ongoing integration of machines since the Industrial Revolution has allowed farming to become much less labor intensive. The biggest profit of automation is that it saves labour. However, it also saves energy and materials and to improve the quality, accuracy, and precision. The seed feeding, pesticides sprinkling and crop cutting are the important stages in the agriculture field.

II. LITERATURE REVIEW

1. D.A. Mada, Sunday Mahai, [2013], In this research paper author has mentioned importance of mechanization in agriculture 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 Farmet and Köckerling. Cultivators VäderstadTopDown 400 and Farmet Turbulent 450 showed good capacity in embedding plant residues.

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III. RESEARCH GAPS IDENTIFIED

Manual traditional seed sowing methods have the following limitations:

In manual seeding, it is not possible to achieve uniformity in distribution of seeds.

A farmer may sow at desired seed rate but inter-row and intra-row distribution of seeds is likely to be uneven resulting in bunching and gaps in field.

Poor control over depth of seed placement. Labor requirement is high because two persons are required for dropping seed and fertilizer.

The effect of inaccuracies in seed placement on plant stand is greater in case of crops.

Performing each task separately with different tools or by hand consumes excessive time during critical stages of cultivation.

Hiring labor or renting machinery for each operation increases overall farming expenses, which is not sustainable for low-income farmers.

Manual or poorly controlled applications of seeds, water, and pesticides often result in wastage and uneven distribution, affecting crop quality and yield.

Prolonged manual work under extreme conditions leads to physical stress and exposure to harmful chemicals during pesticide spraying.

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