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MANUAL SEED SOWING MACHINE

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ABSTRACT

Presently, small land holding farmers use work bulls mostly for land preparation. Generally, cultivation of any crop involves various steps like seed selection, field preparation, fertilizing, sowing, irrigation, germination, thinning and filling, weed removal, vegetative stage, flowering stage, pesticide spraying, fruit or pod formation stage, harvesting and threshing. Farmer has to use various agricultural Equipment's and labours for caring out those steps, our purpose is to combine all the individual tools to provide farmers with mechanical seed sowing equipment which implements all the scientific farming techniques and specifications and suitable for all type of seed-to-seed cultivation with as minimum cost as possible. This project work is focused on the

KEYWORDS: Human power, mechanical equipment, soil digger, seed sowing, levelling.

INTRODUCTION

Agriculture has been the backbone of the Indian economy and it will continue to remain so for a long time. A man without food for three days will quarrel, for a week will fight and for a month or so will diel. Agriculture is a branch of applied. science. Agriculture is the science and art of farming including cultivating the soil, producing crops and raising livestock. It is the most important enterprise in the world. Over the years, agricultural practices have been carried out by small-holders cultivating between 2 to 3 hectare, using human labor and

traditional tools such as wooden plough, yoke, leveler, harrow, spade, big skill etc. These tools are used in land preparation, for sowing of seeds, weeding and harvesting. Modem agricultural techniques and eq…

- Minimizing seed waste
- Enhancing operator comfort through ergonomic design
- Ensuring durability and ease of maintenance with locally available materials

This report documents the complete design, development, and testing of the prototype, highlighting its potential to contribute to sustainable and productive small-scale agriculture.

LITERATURE REVIEW:

M.V. Achutha, Sharath Chandra. N, Nataraj. G.K, done the work on, Design and Analysis of Multipurpose Farm Equipment, according to his work, all trades of village artisanship in black-smith carpentry, stone etc. contributed to the design of development of farm tools through artisan's ingenuity. Carpentry made the counterpoise to lift the water from wells to irrigate crops. Big size of earthenware was made by potters to store grains for month to be safe from insects and pest's cobblers used whole skins of animals to carry water to irrigate horticultural crops besides entering dust roads. Farming is the backbone of Indian economy. In this agriculture sector there is a lot of field work, such as weeding, reaping, sowing. etc. Apart from these operations, spraying is also an important operation to be performed by the farmer to protect the cultivated crops from insects, pests, funguses and diseases for which various insecticides, pesticides, fungicides and nutrients are sprayed on crops for protection. As agriculture was the mainstay of the population, farmer required hand tools to do work, improve labour productivity and quality of work, therefore the results in poor productivity and obtain low yield MAE (Multipurpose Agriculture Equipment) was developed. We have developed agriculture needs to find new ways to improve efficiency. One approach is to utilize available information technologies in the form of more intelligent machines to reduce and target energy inputs in more effective ways than in the past. The advent of new concept gives the opportunity to develop a completely new range of agricultural equipment based on small smart machines that can do the right thing, in the right place, at the right time in the right way.

Nitin Kumar Mishra, Shashwat Khare, Sumit Singh, Mithun Dabur, done the work on, Multi-Purpose Agriculture Machine, according to his work, Finding solutions, to meet the "Energy demand" is the great challenge for Social Scientist, Engineers. Entrepreneurs and Industrialist of our Country. Applications of Nonconventional energy are the only alternate solution for conventional energy demand. Like other development activities, agriculture sector is one of the major areas, which finds number applications of making it work using non-conventional.

METHODOLOGY / SYSTEM DESIGN

Design Objectives

- To ensure seeds are sown at equal spacing and depth for better genration
- To minimize physical labor copmraed to hand sowing methods
- To increase the speed and of seed sowing
- To a machine that is economical and for small frames
- Use to simple easy opration long service life
- Ensure ease of operation and maintenance.□

Design Components and Specifications

The machine consists of the following main subsystems:

- **Frame**

Made of mild steel or lightweight metal.

Supports all components and provides strength and stability.

- **Seed Hopper**

A container used to store seeds.

Designed with a sloped bottom for smooth seed flow.

- **Seed Metering Mechanism**

Controls the quantity and spacing of seeds.

Can be a rotating plate, fluted roller, or adjustable orifice.

- **Ground Wheel**

Moves the machine forward.

Transfers motion to the seed metering mechanism using gears or chains.

- **Furrow Opener**

Creates a small trench in the soil.

Ensures proper depth for seed placement.

- **Seed Delivery Tube**

Guides seds from the hopper to the furrow.

- **Covering Device**

Covers seeds with soil after sowing.

Maintains moisture for germination.

- **Handle**

Used by the operator to push or pull the machine.

Designed ergonomically to reduce fatigue.

Working Principle

1. **The operator pushes the machine manually using the handle.**
2. **Forward movement causes the ground wheel to rotate.**
3. **Rotation of the ground wheel drives the seed metering mechanism.**
4. **Seeds are released from the hopper in controlled quantity.**
5. **Seeds pass through the seed delivery tube.**

IMPLEMENTATION / RESULTS

Prototype Construction

- The manual seed sowing machine was fabrecade uising mild steel frame seed hopper ground wheel seed meting furrow opner and handel
- Fabrication done using cutting, welding, drilling, and assembly.
- Total material cost: Rs.8000-9000
- Assembly time: approximately 72 hours.

Testing and Performance Evaluation

The manual seed sowing machine was tested under filed condition with different soil type

Table 1: Performance Results

parameter	Observed result
Type of operation	Manual
Seed spacing	Uniform
Seed depth	Proper and consistent
Seed damage	Very low
Seed wastage	Minimal
Field efficiency	Uniform
Time required for sowing	Good
Human effort	Less than methods
Machine stability	Stable during operatio
Maintenance	low

Key Observations:

- The machine sowed seeds at uniform spacing and consistent depth.
- seed wastage was significantly reduced compared to manual hand sowing.
- The effort required by the operator was less and comfortable.
- the machine operated smoothly without clogging of seeds

Calculated Efficiency Gains:

- seed wastage reduced by 20–30%
- Labour requirement reduced by 40–50%
- Field efficiency improved due to uniform spacing

Limitations Observed:

- The machine is not suitable for very hard or stony soil conditions.
- Manual operation causes operator fatigue during long working hours.

CONCLUSION AND FUTURE WORK

Conclusion: The manual seed sowing machine is a simple, cost-effective, and efficient agricultural tool designed to improve the sowing process for small and marginal farmers. It ensures uniform seed placement, proper depth control, and reduced seed wastage, leading to better germination and crop growth. The machine significantly reduces human effort and time compared to traditional hand sowing methods. Its easy operation, low maintenance, and eco-friendly nature make it a practical solution for small-scale farming. Overall, the manual seed sowing machine enhances productivity and supports sustainable agricultural practices.

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