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DEVELOPMENT OF NATURAL VENTILATION SYSTEM FOR CROP STORING STRUCTURE

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Abstract: The aim of the project is to use natural parameters like air, sunlight, etc for the storage of onions or tuber crops. For storage purpose materials like bamboo, fans, ventilation duct etc have been used or provided An onion ventilation system plays a vital role in extending the shelf life of onions and maintaining their quality during storage. By controlling temperature, humidity, and airflow, the system helps prevent spoilage, sprouting, and the development of diseases, ensuring that the stored onions remain fresh and marketable for longer periods. Implementing an effective onion ventilation system is essential for onion growers, distributors, and processors to maximize the value and profitability of their onion crops. Bamboo can be a viable material for use in ventilated onion storage structures, particularly in regions where it is readily available and cost-effective. Here is some information about the use of bamboo in such structures: Sustainability: Bamboo is considered a highly sustainable material due to its rapid growth rate and ability to regenerate quickly. It is a renewable resource that can be harvested without causing significant environmental damage. Choosing bamboo can contribute to environmentally friendly construction practices. Moisture Resistance: Bamboo has natural resistance to moisture, decay, and pests, which makes it well- suited for use in onion storage structures. Properly treated and processed bamboo can resist rotting and damage caused by insects, enhancing the longevity of the structure bamboo can be a suitable and sustainable material for ventilated onion storage structures. Its strength, moisture resistance, thermal insulation, and ventilation capabilities make it a viable alternative to other traditional materials. Incorporating bamboo into the design and construction of these structures can contribute to efficient and environmentally friendly onion storage practices

I. INTRODUCTION

As India is second largest onion producing country in the world after china as per NABARD report there is risk of high losses due to inefficient storage system. GOI has taken several initiatives to reduce the losses. So, by keeping that in mind the problem face by farmer, we are going to assess vulnerability Kharif crop like tuber Crop to changing climatic condition in recent years.

The Maharashtra is the leading State in production and export of onion responsible for about 90% export as we are aware of that post harvest losses in addition to loss of yield are because of improper handling of onions. To cope with the current and future demand of the increasing population for the food grains, it is emphasized to reduce the loss of stored crops during and after harvest. Crops seeds are stored for varying periods to ensure proper and balanced public distribution through out the year. Post harvest losses in India are estimated to be around 10 per cent, of which the losses during storage alone are estimated to be 6.58 per cent. But, with the advent of improved agricultural technology, the producer can afford to store the seeds for longer period with minimum loss

II. METHODOLOGY

THEORY/PRINCIPLES/IMPLEMENTATION RELATED TOONION STORAGE STRUCTURE

Specific storage requirements: Different onion varieties may have slightly different storage requirements, including temperature and humidity preferences. A ventilation system designed for one variety may not be optimal for another, requiring adjustments or separate storage spaces for different onion types.

Climatic variability in the last decade especially erratic rainfall pattern and extreme rises in temperatures led to a drastic reduction in the kharif onion crop yield i.e., 30 to 40% in Nashik (M.S.). Increases in temperature, rainfall and relative humidity also affected the post-storage quality causing considerable losses in storage (up to 40%). Reduced production creates deficit in the domestic market supply resulting in steep price hike. Onion farming being a major source of income for the farmers of Nashik, reduction in yield increases their vulnerability. Keeping in view the constraints faced by the farmers, the study was undertaken to assess the vulnerability of kharif onion crop to changing climatic conditions in the last ten years. Asurvey of 300 farmers was undertaken from two talukas of Nashik through questionnaire and focused group discussions for the vulnerability assessment.84% farmers revealed germination failure between 40% to 70% due to excessive rainfall and from 40 % to 70% due to drought. Ventilation systems primarily control airflow within the storage area, but they have limited control over external factors. External conditions, such as outdoor temperature, air quality, and ambient humidity levels, can still impact the storage environment and potentially affect onion quality.

III. PERFORMANCE EVALUATION

The Project, cooling tower system is implemented with a proper cost to performance ratio. Being a development , many repetitions are there, which cannot be avoided. Also, each spare of the projectsis to be done on 01 quantity, so the costing is more later it the regular production will be started, thecosting will be less the price details for our development are given as below:-

Cost Estimation:-Material rates:-

1) Mild steel =Rs 50/Kg
2) Cast iron =Rs 50/Kg
3) En31 =Rs 80/Kg
4) EN8 =Rs 60 /Kg
5) Gun metal =Rs 300 /Kg.

Machining rates:-

1) Turning = Rs. 20/hr.
2) Milling = Rs. 40/hr.
3) Drilling = Rs. 15/hr.
4) Shaping = Rs. 20/hr.
5) Horizontal = Rs. 150/hr.
6) Surface grinding = Rs. 75/hr.
7) Ram milling = Rs. 50/hr.
8) Hardning = Rs. 30/Kg
9) Toughening = Rs. 30/Kg.
10) Cylinder Grinding = Rs. 20/hr.

Component wise details:-

1. Vice base:- Material = C.I.

Weight = 45 Kg.

Material cost = 45x 50=2250 Rs.

Machining cost= shaping +grinding +milling

= 80 +750 + 40 = 870Rs.

Total cost = 2250 + 870Rs.

1. LH/RH screw:-Material =EN8

Weight = 6Kg.

Material cost = 6 x 60 = 360Rs.Machining cost

=lathe +milling

=90 +45 =135 Rs.

Total cost = 495Rs.

2. Gun metal nuts:-Material =G.M.

Weight = 3 Kg.

Material cost = 3x 300 = 900Rs.Machining cost

=lathe +Drilling

=5 +55 =60 Rs

Clamp :- Material = M.S.Weight =

1 Kg.

Material cost = 1x 50 =50Rs.

Machining cost = lathe +Milling +drilling

=15 +10+5 =30Rs

Total cost = 80 Rs

4. Rest pad :- Material =M.S.

Weight =0.5 Kg

Material cost = 0.5x 50 =25

Machining cost = Milling + drilling + shaping

= 20 + 5 + 10 = 30 Rs

Total cost = 60 Rs.

5. Fan:-

3 x700 =2100

Machining cost =lathe + welding + drilling

= 20 + 5 + 10 = 35 Rs.

Total cost = 35 Rs.

6. Net :-

Rate = 50 Rs /sq

= 50 x 3 = 150Rs

Machining cost =lathe + welding + drilling

= 20 + 5 + 10 = 35 Rs.

Total = 185 Rs

7. Pipe:-

1 x700 = 700

Machining cost =lathe + welding + drilling

= 20 + 5 + 10 = 35 Rs.

Total cost = 735 Rs.

8. Heater :-

1 x 180= 180 Rs

Machining cost =lathe + welding + drilling

= 20 + 5 + 10 = 35 Rs.

Total = 215/-

9. Sensor :-

2 x 280 = 280

Machining cost = lathe + plumbing + drilling

= 20 + 5+ 10 = 35

Total cost = 575/-Total = 5695 Rs

IV. CONCLUSION

Storage structure for fruits and vegetables hold huge importance considering in mind the amount of post harvest losses taking place in a developing country like India. In this aspect information regarding low cost storage structures for holding fruits, vegetables and other horticultural produce is even more important. In India where major population of farmers is poor, stay in the remote locations they can only afford construction of low cost storage structures to overcome gluts,limiting price falls and overcome shortage of a particular commodity when prices are high.

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