



FRESH & PROFITABLE: ZECC FOR FARMERS

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Abstract

Post-harvest losses are a significant challenge for farmers, especially in regions with limited access to refrigeration. The Zero Energy Cool Chamber (ZECC) offers a simple, cost-effective and eco-friendly solution to extend the shelf life of perishable crops such as cabbage, broccoli, tomatoes, bananas, pineapples and passion fruit. This article provides a detailed guide on constructing a ZECC and highlights its impact through a case study. By reducing weight loss and enhancing the quality of produce, ZECC is a transformative technology for sustainable agriculture.

Introduction

Efficient storage solutions are crucial for minimizing post-harvest losses and improving farmers incomes. The Zero Energy Cool Chamber (ZECC) is an innovative and low-cost technology designed to maintain optimal storage conditions without electricity.

How to Build a Zero Energy Cool Chamber (ZECC)

The construction of ZECC is straight forward and requires locally available materials. Below is a detailed guide:

For the construction of a 5x3x2.5m³ area ZECC, inputs requires are listed as under:

| Sl.No. | Particulars | Numbers/Amount |
|--------|-------------------|----------------|
| 1. | Bricks | 425-500 |
| 2. | Cement | 2 bags |
| 3. | Soiling stone | ½ trailer |
| 4. | River Coarse sand | 5 bags (50 kg) |

| | | |
|-----|--------------------------|-----------|
| 5. | Bamboo | 5 |
| 6. | PVC Pipe 1/2" x 10" | 4 |
| 7. | PVC Bend | 5 |
| 8. | PVC Tank Nipple 1/2" | 1 |
| 9. | PVC Socket | 2 |
| 10. | 100 Litres Tank | 1 (One) |
| 11. | PVC Water Regulator 1/2" | 1 |
| 12. | Thatch(Straw) | 5 bundles |
| 13. | PVC Glue | 1 |



Complete structure of the Zero Energy Cool

Dimensions and Construction Steps

Foundation Preparation:

- Choose a shaded location, well ventilated, away from direct sunlight with a elevated surface to prevent water logging.
- Mark a rectangular area measuring **165 cm x 115 cm** for the base.

Building the Chamber Walls:

- Arrange bricks in a double-layered rectangular shape, leaving a 7.5 cm gap between the two walls.
- The walls should be approximately **67 cm (2 feet)** high.

Filling the Sand Layer:

- Fill the 7.5 cm gap between the walls with sand.
- Ensure the sand is tightly packed for proper insulation.

Top Cover Construction:

- Create a frame using bamboo or wooden sticks to fit the top dimensions of the chamber.

- Cover the frame with straw or khus for natural cooling and insulation.

Moisture Maintenance:

- Sprinkle water on the sand layer regularly to keep it moist.
- The evaporation of water from the sand cools the chamber, maintaining temperatures 10–15°C lower than ambient conditions.

Optional Features:

- Add a polyethylene sheet during rainy seasons for extra protection.
- Install a drainage system to prevent water logging.

Maintenance Tips

- Refill the sand layer with water daily to sustain cooling.
- Periodically check for any damage to the bricks or cover.



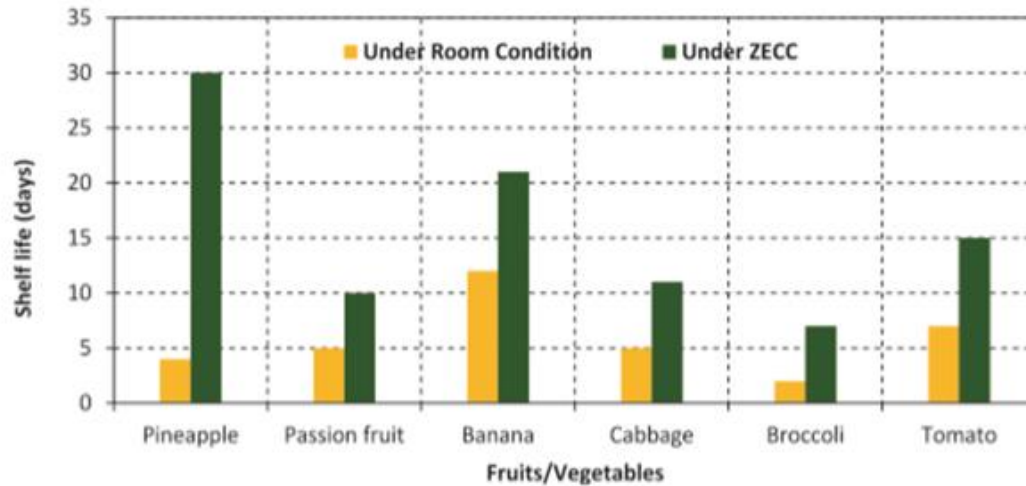


Fig.1. Comparison of shelf life of fruits and vegetables under ZECC condition and room condition in Churachandpur district, Manipur

Case Study:

A Success Story from Churachandpur, Manipur

Churachandpur district in Manipur is known for its production of high-value horticultural crops like cabbage, broccoli, tomatoes, bananas, pineapples and passion fruit. Despite their potential for high market returns, farmers in this region often faced substantial post-harvest losses due to the lack of refrigeration facilities. The introduction of ZECC proved to be a game-changer.

Conclusion

The Zero Energy Cool Chamber is a transformative solution for addressing post-harvest losses in perishable crops. By extending shelf life and reducing physiological weight loss, ZECC empowers farmers to optimize their earnings and contribute to sustainable agriculture. The success story from Churachandpur highlights its potential to revolutionize farming practices across India. Farmers are encouraged to adopt this cost-effective and eco-friendly technology to enhance their storage systems and secure better financial outcomes.

References:

- Singh S, Singh AK, Joshi HK, Lata K, Bagle BG and More TA (2010). Effect of zero energy cool chamber and postharvest treatments on shelf-life of fruits under semi-arid environment of Western India. Part 1. Ber fruits. *J Food Science and Tech* 47(4):446–449.
- Kumar A, Mathur P N and Chaurasia P B L (2014). A study on the zero energy cool chamber for the storage of food materials. *Int Res J Manage Sci and Tech* 5(7):65-69.