ZECC: Zero Energy Cooling Chamber for Vegetables

Cut Post-Harvest Losses for Vegetables

The Zero Energy Cooling Chamber (ZECC) is a brick chamber that cools through evaporation. It has double walls with sand in between, and the walls are kept wet for cooling. This chamber can reach temperatures between 10 and 15°C with about 95% humidity, which helps extend the shelf life of perishable crops.

This technology is **pre-validated**.

9·8 Scaling readiness: idea maturity: 9/9; level of use: 8/9

Cost: $$$ **400 USD**

a 2 cubic meter ZECC

10 — 15 degree celsius	**95 %**	**IP**
temperature inside ZECC	humidity inside ZECC	Open source / open access

Problem

- **High Post-Harvest Losses:** Up to 50% of fruits and vegetables spoil before reaching consumers, causing food waste and income loss for farmers.
- **Reduced Availability of Nutrient-Dense Foods:** Post-harvest losses mean fewer fruits and vegetables for consumers, impacting their health and nutrition.
- **Limited Access to Cooling Technologies:** Many rural areas lack electricity and affordable cooling methods, making food preservation challenging.

Solution

- **Extends Shelf Life:** ZECC significantly extends the shelf life of vegetables (e.g., up to 8 more days for tomatoes, 11 days for peppers, 5 days for amaranth).
- **Environmentally Friendly:** ZECC is an eco-friendly storage solution that operates without electricity.
- **Low-Cost and Accessible:** ZECC offers an affordable and accessible cooling method, ideal for farmers in rural areas.

Key points to design your business plan

Farmers using ZECC can expand their business by offering higher-quality, longer-lasting produce, accessing new markets, and selling at better prices by reducing waste.

Essentials for ZECC:

- **Materials:** Locally source bricks, sand, jute cloth, and plastic crates.
- **Training:** Learn ZECC construction, maintenance, and usage best practices.
- **Support:** Seek help from agricultural experts for guidance.
- **Water Supply:** Ensure a steady water source for cooling.
- **Cost:** Building a 2 cubic meter ZECC costs around $400, including materials and labor. Minimal ongoing costs, mainly for water, are quickly offset by increased income from reduced losses and better-quality produce.

Inclusion assessment 👍 4

Climate impact 👍 4 👎 1

World Vegetable Center
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Commodities

Vegetable crop

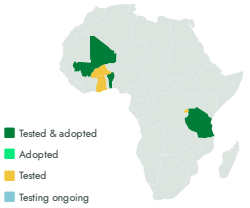
Sustainable Development Goals

1 NO POVERTY · 2 ZERO HUNGER · 3 GOOD HEALTH AND WELL-BEING · 12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Categories

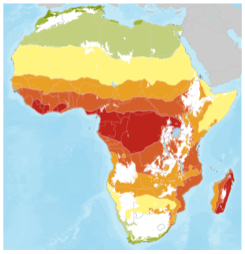
Prevention & storage, Equipment, Conservation and Storage System

Tested/adopted in



Where it can be used

This technology can be used in the colored agro-ecological zones.



Target groups

Farmers, Sellers