Potato Storage in Bareti, Georgia

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Project Goals

Increasing local economic opportunity by creating a *potato storage facility* to decrease seed degeneration and prevent postharvest losses, while providing the village with a space for *agricultural education*.
Project Statement

Our group has evaluated the sectors of building structures, HVAC systems, layout, and maintenance that is needed to efficiently store and protect potatoes in Baretí, Georgia.
Bareti, Georgia

Maps from Google Maps
Project Background

Prospective Facility:

- **Facility Size: 500+ square m**
  - This prospective facility has only 300 square meters of usable space

- **Desired Tonnage: 900 tons of stored potatoes**
  - This facility does not have the floor plan or necessary height to meet needs

- **Educational Workspace**
  - No distinctive educational workspace in this facility
Background - cont.

- **Timeline**
  - Construction will start in early summer
  - Facility needs to be operational by fall harvest
  - Classes will be held over summer months

- **Budget**
  - Grant of 90,000 USD from the Japanese Embassy in Georgia
  - Must be used during 2019 Calendar Year
How Potatoes Go Bad...

- Bruising
- Mechanical damage
- Blackheart
- Growth cracks

Images from Store Managers Guide 3rd edition
Research Findings

01 Architecture
02 HVAC
03 Layout & Maintenance
Research Findings

01 Architecture

- Importance of drop-down ceiling to more easily maintain temperature
- Need for interior Vapor Barrier in high humidity environment
- No windows in Potato Storage Structure
- Double-Sliding doors to minimize loss of heat/controlled environment
- Value of Anteroom in maintaining climate control, additionally:
Research Findings

- **Temperature** for seed potatoes is recommended to be between 3 and 4 °C.
- **Insulation** is best at an RSI of 6.1. This is 250mm of fiberglass or 150mm of polyurethane.
- **Circulation** is recommended for storing above 160 tons of potatoes.
Research Findings

- There should be a **600 mm gap** for **ventilation** at the end of the stack of boxes.
- Stacks should be a **uniform height**.
- Stacks should be **alternated** to promote airflow and discourage hot spots.
Research Findings

- Storage Boxes: sizes, carrying capacity, stack height, construction
- Forklift Reach and Maneuverability
- Safety Protocol
- Record Keeping
- Pre and Post Storage Activities

03 Layout & Maintenance
Life Cycle Analysis

Potato Storage Facility

Maintenance:
- Temperature equilibration
- Curing stage
- Sugar reduction
- Holding phase
- Pre-market warming

Equipment cleaning and repair
Check control systems
Pre-storage screening

Harvest

Potatoes in storage

Agricultural extension education
Summer camps

Post-storage cleaning

Post-storage handling and transport to market/processing

Potatoes leave storage

Potatoes leave storage

Potatoes in storage

● Temperature equilibration
● Curing stage
● Sugar reduction
● Holding phase
● Pre-market warming
**SWOT Analysis**

**Strengths:**
- Funding
- New/Advanced
- Backing of Community Organization
- Well connected Client

**Weaknesses:**
- Knowledge of Best Practices
- Buy-In from Farmers
- New/Unproven
- Rushed Time Frame

**Opportunities:**
- Scalability
- Collaboration with other Organizations (CIP)
- Educational Opportunities

**Threats:**
- Winter
- Government Bureaucracy
- Road Infrastructure
- Drop in Potato Prices
Recommendations for D-Lab II

Potato Box System

HVAC control system
Thank You!