

Engineering for People Design Challenge

Public Waste Treatment System

Develop and implement a sustainable human waste composting facility to produce high-quality organic fertilizer for local farmers and gardeners, reducing reliance on chemical fertilizers and improving soil health. Waste material can be collected from new public bathrooms, giving the community public bathrooms to use instead of dumping waste.

Stakeholders



Local Community Members: Farmers and gardeners need access to clean sanitation facilities, improved health, and a cleaner environment. Citizens need access to public restrooms.

Local Government Officials: Need effective waste management solutions, improved public health, and sustainable community development.

Waste Management Companies: Need contracts for waste collection and disposal, efficient waste management solutions, and profitable operations.

Opportunity Statement:

Many residents of Maker's Valley do not have access to a bathroom. Because of this lack of access, residents end up dumping human waste, which can lead to contamination of local rivers and bad odors. Because the rivers in the area are sources of drinking water for Maker's Valley residents, contamination can lead to illness and disease.

Constraints:

Cannot be too expensive or far away. Must be intuitive and easy to use.

Metrics:

System must be publicly available, self-sustainable, and compact.

Assumptions:

Based on similar successful sanitation projects in low-income Haitian communities, this project is expected to provide similar benefits.

Broader Impacts:

- Reduced incidents of waterborne diseases and improved overall health.
- Proper waste disposal and composting can reduce pollution and protect the environment.
- The creation of jobs in sanitation, waste management, and compost production can boost the local economy.

The Process



Individuals use public bathrooms instead of dumping waste

Waste is collected from restroom and transported to be composted



Waste is composted and turned into soil

Composted soil is sold to farmers and gardeners



Research Questions we considered:

- How can we solve the issue of sanitation?
- What challenges do we face in implementing this project in South Africa?
- How does converting human waste into compost benefit South Africa's environment?
- How many people are affected by sanitation and waste issues? Where can public restrooms be constructed?
- Would farmers be willing to buy the soil?

Measuring Success:

- Lower levels of phosphorus, nitrogen, algae, and E. Coli in surrounding rivers due to lack of dumping
- High levels of phosphorus and potassium in soil
- Amount of waste properly disposed of