Aeroponics
Sustainable and Alternative Agricultural Methods

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The Problem

Malnutrition is a large issue in Burkina Faso. This phenomena is the result of low economic development and lack of availability of advanced agricultural methods. Malnourishment effects mental health and thus, impacts an individual's ability to have a good quality of life. The Aeroponics team hopes to offer alternative agricultural solutions for their clients at Open Door Development and Sheltering Wings and thus, improve the community's nutrition.

Specifications

OPEN DOOR DEVELOPMENT

- Alternative agricultural system
- Year-round growth of tomatoes
- Conserves space and water
- Uses no electricity
- Costs under $50

Sheltering Wings

- Troubleshoot currently installed aquaponics system in Yako
- Develop cost efficient modifications
- Assist SW to produce a successful harvest

Goals

IMPROVE MALNUTRITION IN BURKINA → AEROPONICS → VIABILITY → SIMPLICITY & INNOVATION / AQUAPONICS

= **IMPROVED HEALTH**

Methodology

Alternative Agriculture

OPEN DOOR DEVELOPMENT

- Researched various alternatives, using available materials in Mahadaga

Figure 1. Alternative 1: 55 Gal Drum

Figure 2. Alternative 2: Raised Bed System

Solution:

Figure 3. Alternative 3: Actual Construction

- Sketched/Designed the Chosen Solution
- Built a Prototype of the Design and Undertook Testing

Aquaponics

Sheltering Wings

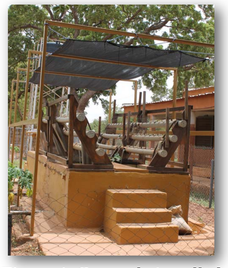

Figure 4. Currently installed aquaponics system in Yako

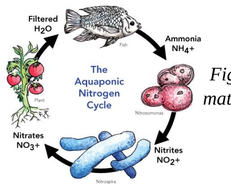

Figure 6. Nitrogen transformations in aquaponics system

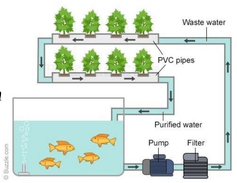

Figure 5. Nutrient Film Technique

- Studied current aquaponics system specifications
- Researched aquaponics systems to develop a strong foundational understanding

Concept Design

1. Irrigation System
   Cups, Media, Plants, Pumps, Troughs
2. Structure
   Trough Structure, Planks
3. Tanks
   Water, Fish, Fish Feed, Nutrients

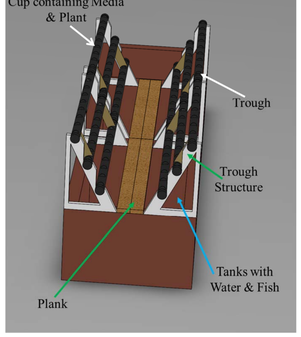

Figure 7. Conceptual Drawing of System

- Developed concept design to organize order of approach

Conclusions

At this point, the Aeroponics team is finished with their work for Open Door Development. The sketches of the final design will be sent to the team's client contact, Matt Walsh, at the end of the current semester with the hopes that the team's work will accomplish the intended goal of improving the community's nutrition. The team will continue to work on modifying the aquaponics system with the goal of ultimately rehabilitating the system for Sheltering Wings so they will have a successful harvest.

Further Information

- For more information about the organizations, please visit http://www.opendoordevelopment.org/ for Open Door Development and http://sheltering-wings.org/ for Sheltering Wings

- For more information about sustainable agricultural methods: Contact Professor Michelle Lockwood at mlockwood@messiah.edu

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