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Sustainable Agriculture

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Sustainable Agriculture

"We believe that food can be grown affordably, efficiently, and sustainably to feed a hungry world."

19th Annual School of Science, Engineering and Health Symposium
Cassie Gehenio, Miggy Matanguihan, Josh Rosengrant, Jacob Wong

Clients

Youth with a Mission (YWAM) in Hawaii aims to equip Christians to serve others in everything from agriculture to healthcare.

Trans World Radio (TWR) ministers to communities through Christian broadcasts. Their Benin system allows for two prototype tests in West Africa.

Project Overview

The Sustainable Agriculture team designed aquaponics systems to help those struggling with malnutrition because of infertile soil. This resulted in fresh produce and fish for them to enjoy. Past work included reducing power consumption and increasing system efficiency.

System Optimization

This year, the team constructed 9 aquaponics systems. They were based off previous flood and drain systems, and built over media beds that were remade to be water basins. These were used to run a sensitivity analysis.

They also made pump alternatives, like the burper pump, which uses air to move water, instead of mechanical parts.

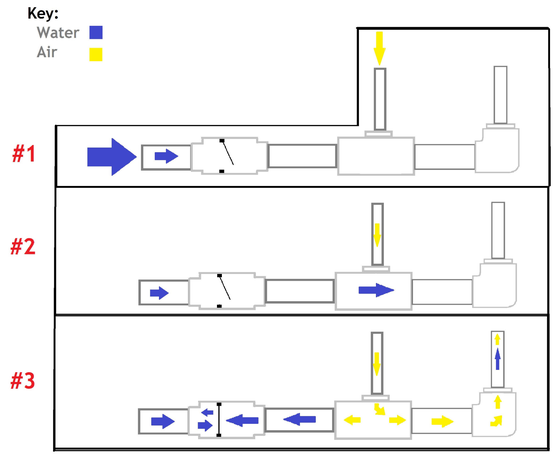
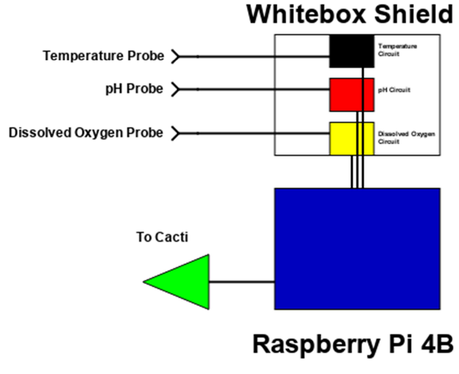


Fig. 1: Burper pump operation

Digitization

The team made a sensor array that captures pH, dissolved oxygen, and temperature data and broadcasts it for remote viewing. The system is expandable for up to six additional sensors. The sensor array also features an easy sensor recalibration program.



The Sustainable Agriculture Team

Conclusions

- We constructed 9 flood and drain systems, based off previous systems.
- These were used to run a sensitivity analysis, testing flowrate, nutritional source, and nutritional concentration. They determined the best set of conditions for their clients.
- The team designed energy efficient pump alternatives, like the burper pump, for their partners.
- The team built a sensor array that can monitor vital aquaponics information from anywhere with an internet connection.

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