Genius Troop

Group 6 Hydroponics
Vertigro

PRESENTED BY Steven | Dora | Neven | Jeffery | Jean Paul

Jeffery

Background of our Project

- Client runs nonprofit indigenous organizations
- Looking for supply of fresh food
- Educate indigenous communities
- Future plans of sustainability

Client Needs
Empathy

Jeffery

Scalability	future plans of expansion
Reliability	dependable food source
Ease of usage	off-hands, automatic
Productivity	meet required produce.

Jeffery

Problem Statement

Low maintenance
Does not require specialized attention.

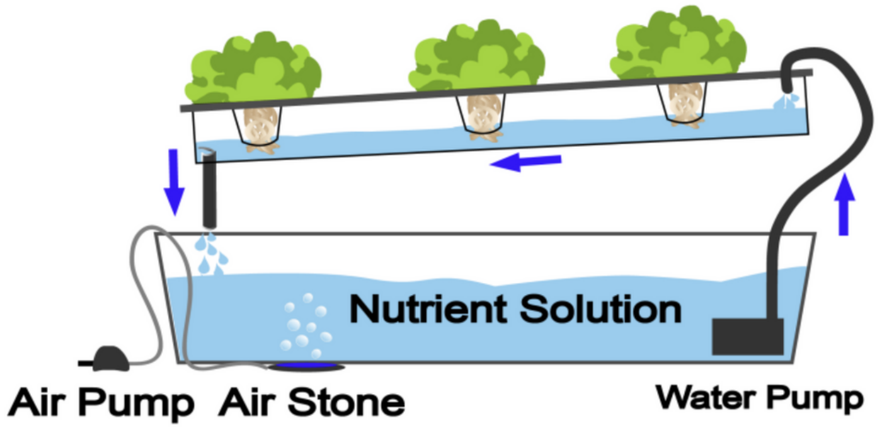
Minimal space
Optimizes harvest yield for area planted.

Cost efficient
Affordable and easily scalable.

Design Ideas

Dora

Nutrient Film Technique



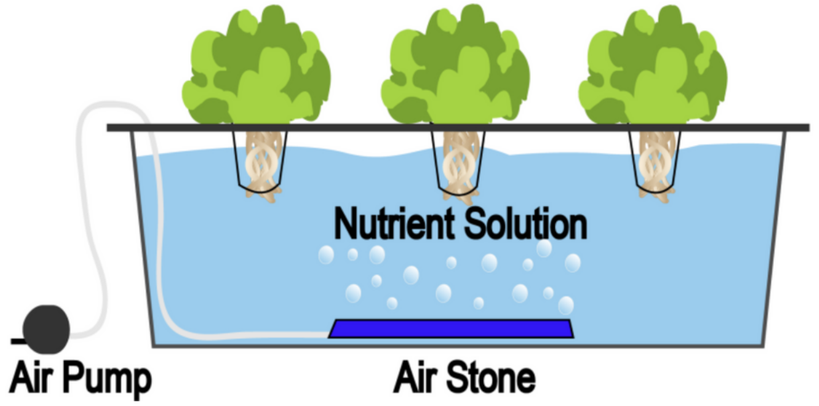
Pros

- Water efficient
- Plant efficent

Cons

- Relient on pump
- High maintenance

Deep Water Culture (DWC)



Pros

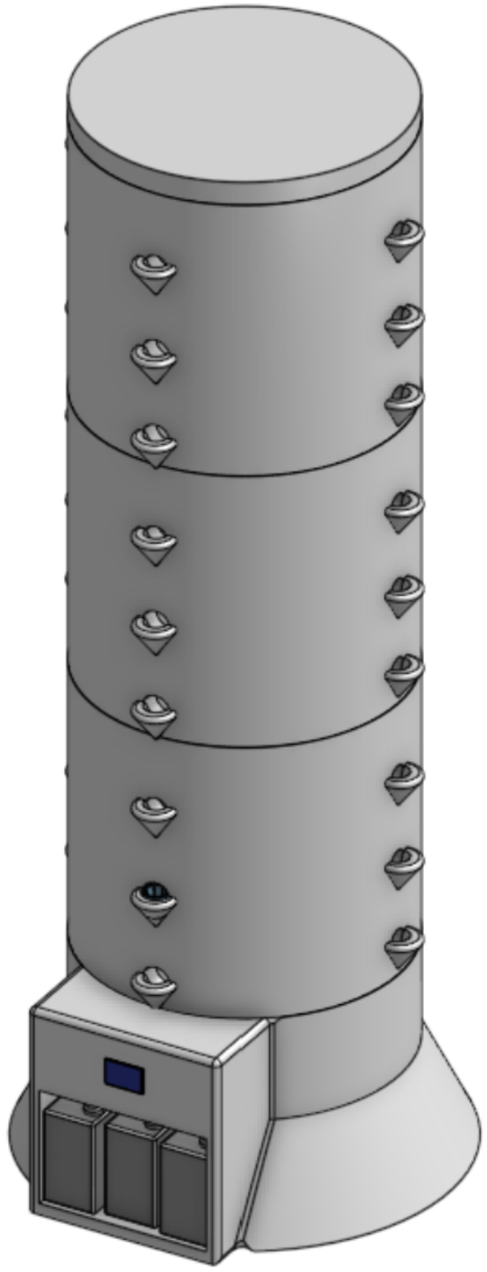
- Easy Maintenance
- Quicker growing time

Cons

- Plant efficient
- Temperature change

Original Design

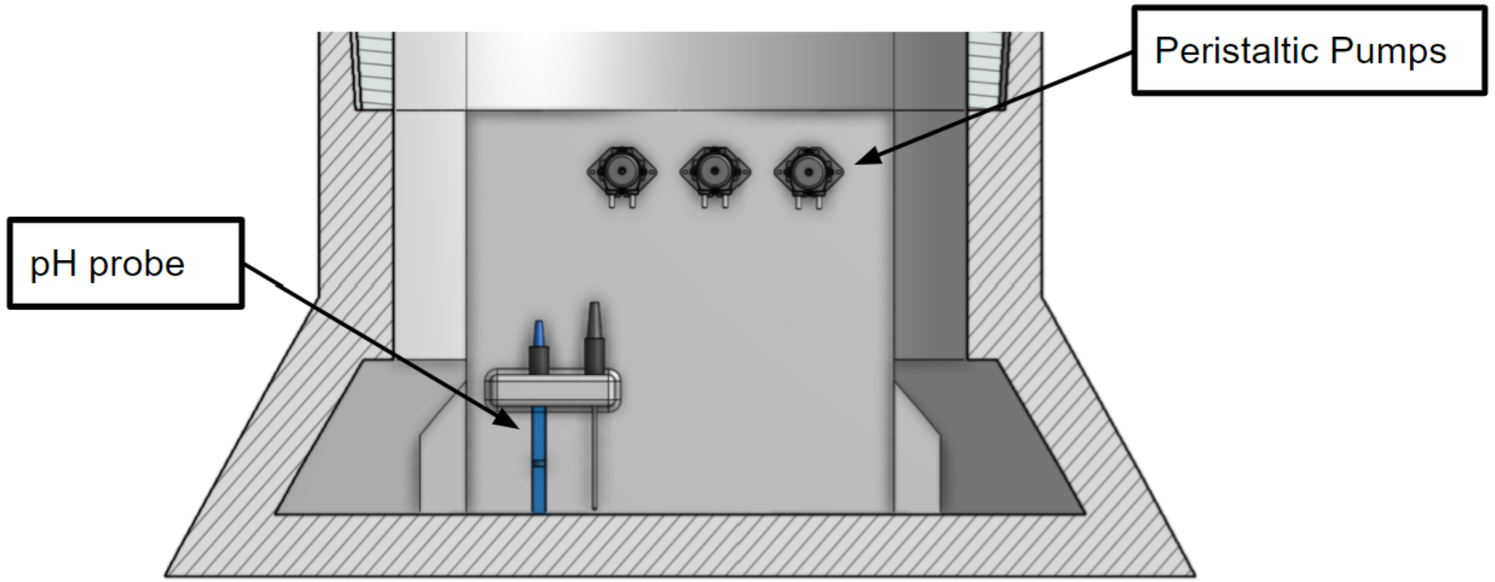
- Modified NFT watering system
- Vertical structure
- Automated pH and nutrients
- 18 plants per unit



Dora

Inside View

- Peristaltic pumps for maintaining pH and nutrients.
- pH probe for testing pH values



Dora

Prototype I

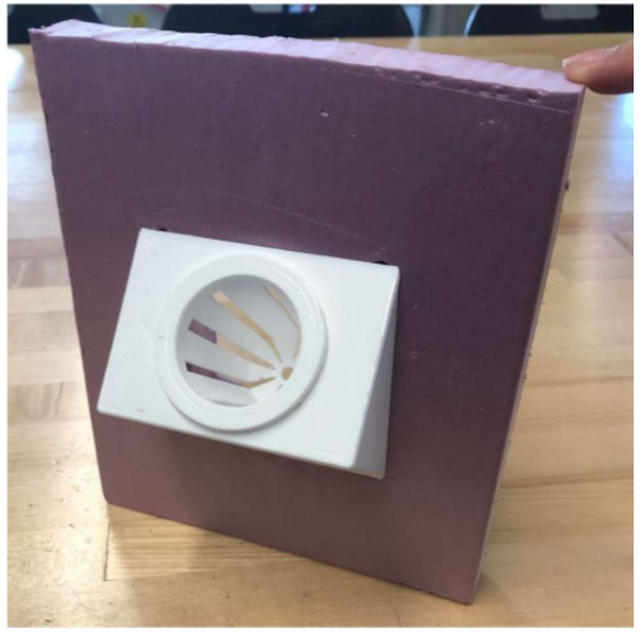
Delivery System

- Test the water system
- Rigid Foam
- Benefit: Water reaching each cups
- Cons: water leakage

Prototype II

Structural System

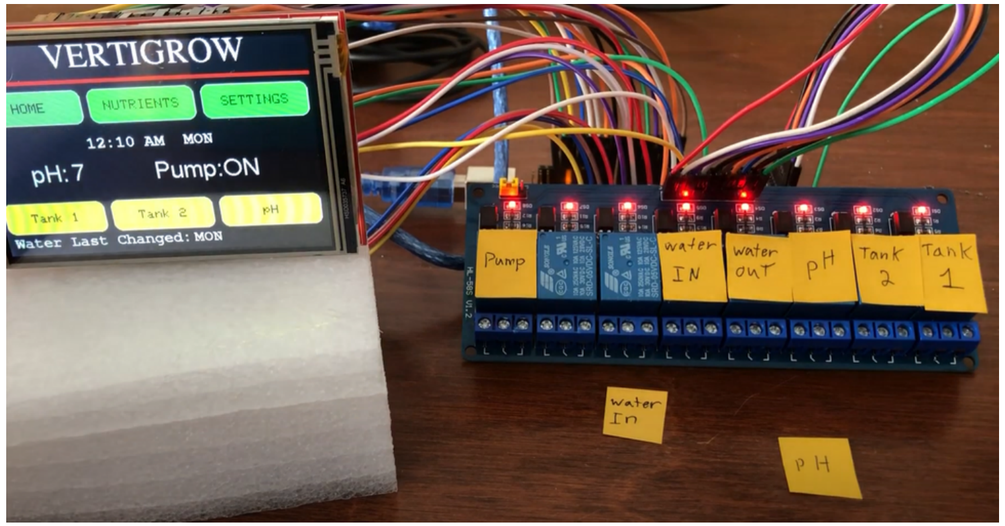
- 3D cup holders
- Testing water leakage
- Caulking the edges

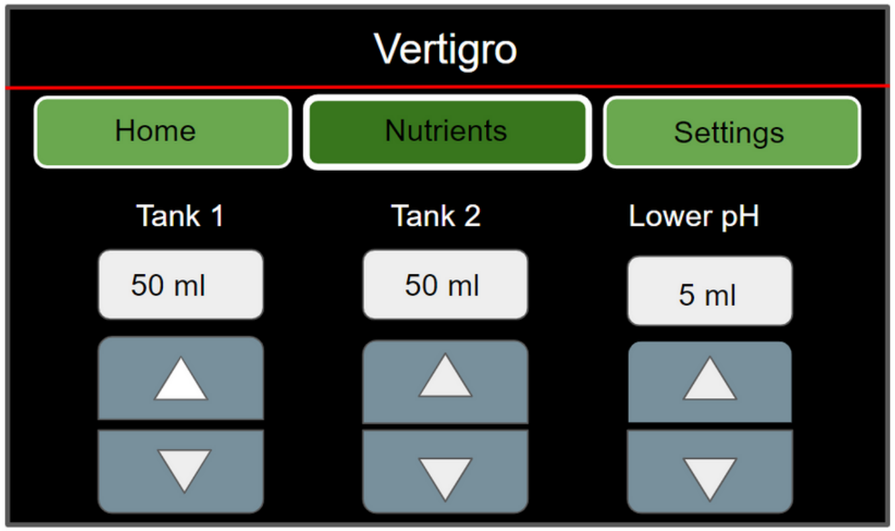


Prototype III

Nutrient System

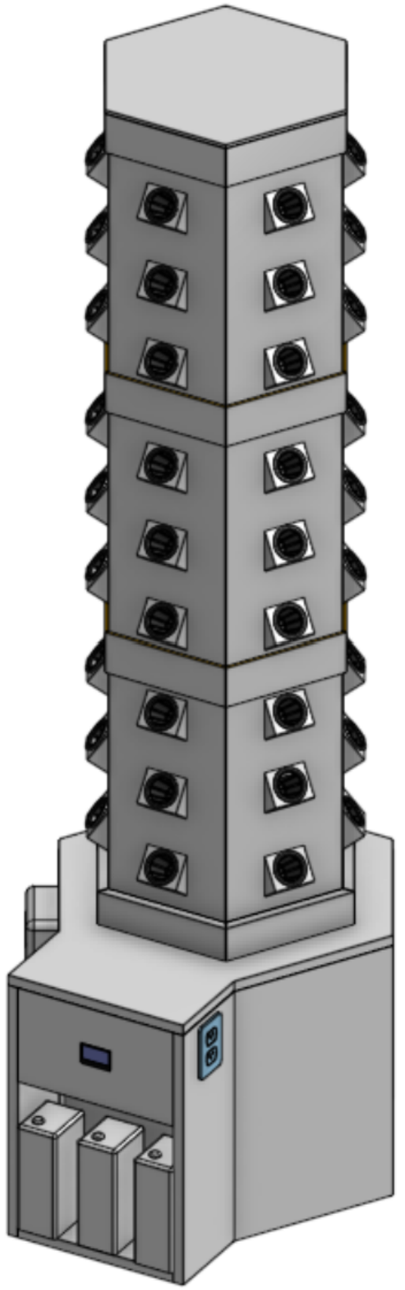
- Touch screen
- Debug Programming





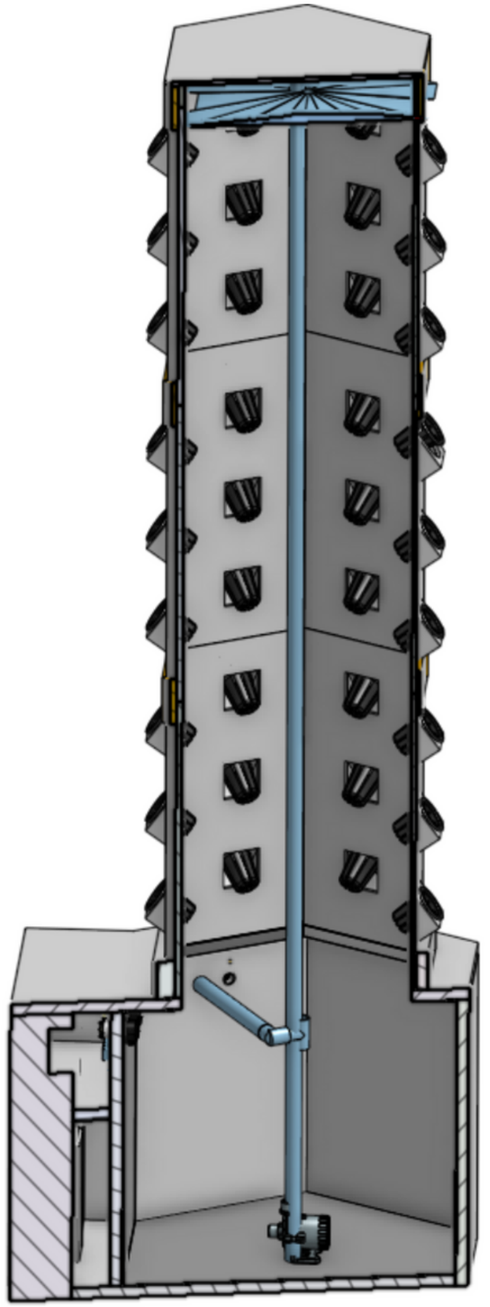
Final Design

- Hexagon Shape for ease of construction
- 3D printed cups and cup holders
- Outlet for adding grow-lights
- Holds up to 18 - 54 plants



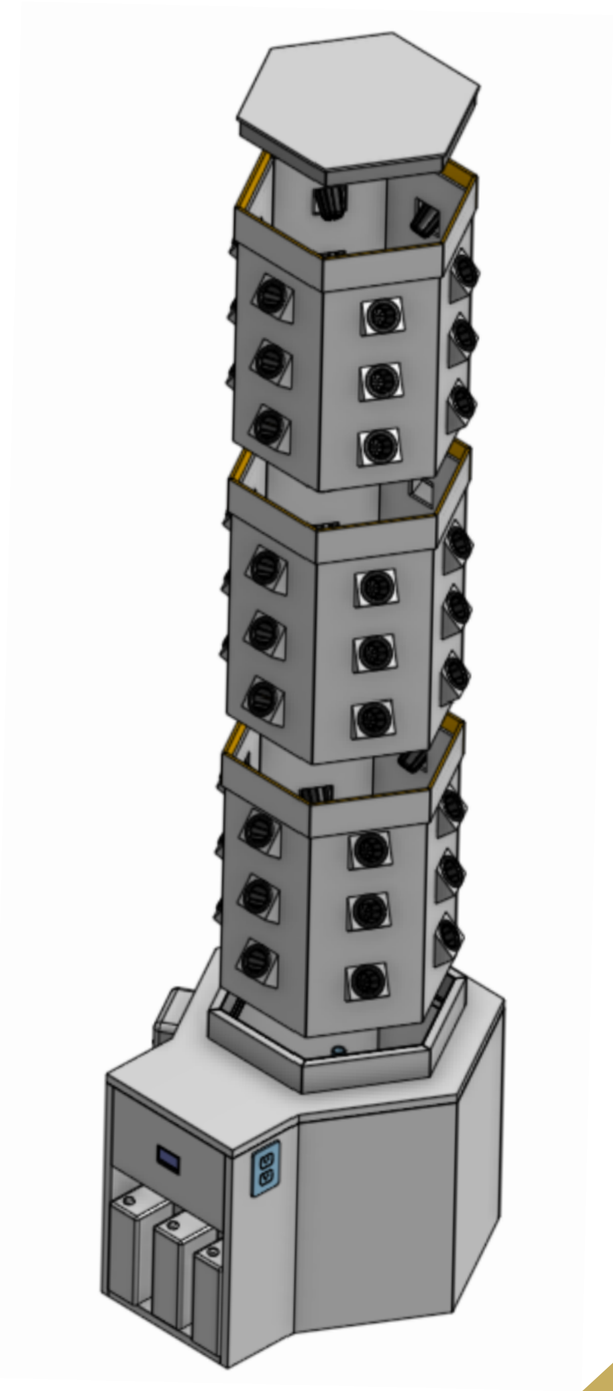
Final Design

- Modified Vertical NFT system
- Water Distributor plate
- Minimizes water usage
- Water in the tank can be automatically changed



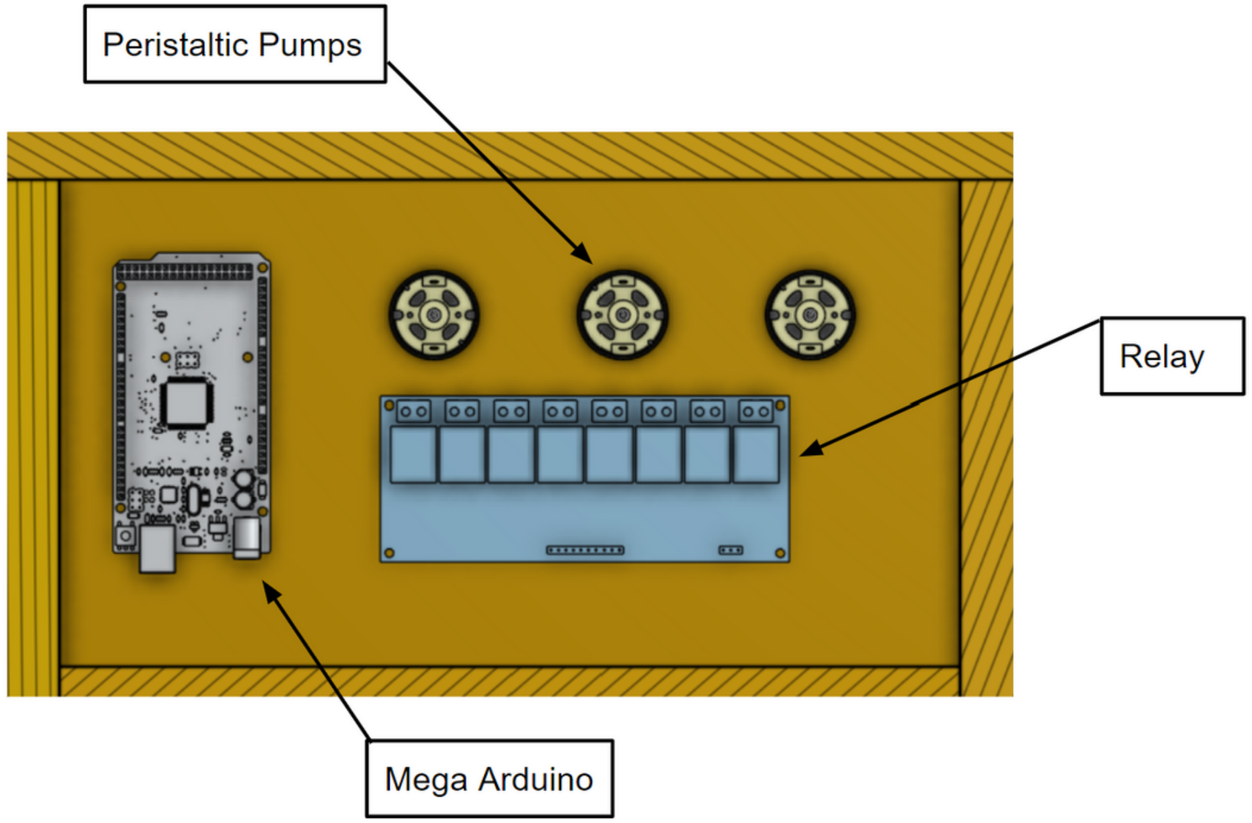
Final Design

- Stackable units
- Easy transportation
- Customize to your growing needs



Final Design

- System is controlled by a mega Arduino
- Electronics are activated through relay board
- Nutrient is added by peristaltic pumps.



Cost Summary

Brief outline of the expenses

	Initial ($)	Actual ($)	Percentage (%)
Structural System	$ 360	$ 195	37%
Electrical System	$ 315	$ 287	47%
Delivery System	$ 80	$ 83	16%
Total	$ 755	$ 525	100%

Future Plans

1

Specialized Units

Customize units to specifically handle herbs and lager plants.

2

Application

Create an app to control the system wirelessly.

3

Multi-Tower System

Multiple towers connected to a central tower for water and nuteient supply.

Questions?

Jean Paul

THANK YOU

for your attention