Sustainable Food Production

Nicole Haragutchi
Timberlin Creek Elementary
Saint Augustine, Florida, USA

The Background

Through my Foundation I have supported people affected by many disasters:

- Floods in Venice
- Wildfires in Australia
- Typhoons in the Philippines
- Hunger in Brazil

I wanted to help more so I tried to use my knowledge to create a solution that would benefit the community going through all these situations.

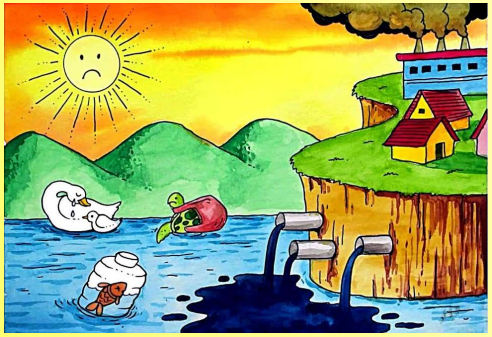
Sustainable Food Production

Avoid Population Migration

Low cost
Scalable

Carbon neutral
Sustainable energy

Avoid Changes in Climate Change



Avoid Pollution

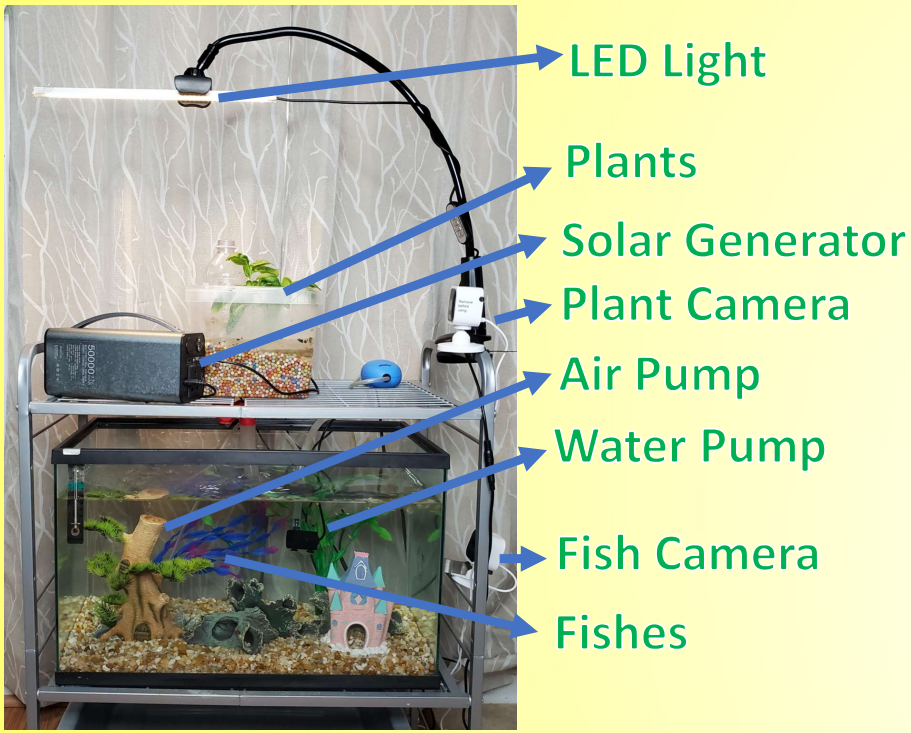
No emissions
No chemicals runoffs

Food Security
No water waste

Avoid Hunger

Project Prototype: Aquaponics

Actual prototype photo



Aquaponics

- Take advantage of the symbiotic relationship between fishes and plants
- Avoid water waster since it is being recycled
- Avoid chemical products runoffs to rivers and oceans
- Use of inert substrate and no need for soil
- Use of sustainable energy for LED Light, pumps, and monitoring (solar generators)
- Contained and easy installation of monitoring and automation
- Scalable system which can easily grow
- System recommended for small leafy plants

Project Prototype: Water Collection

Actual prototype photos

Water Collection From Thin Air

- This device was created because some water was being lost through evaporation
- Take advantage of the Peltier device to separate hot and cold air
- Use of sustainable energy for Peltier device and fans (solar generators)
- Cold air is lifter to the metallic surface
- Water is collected through condensation
- Scalable system which can easily grow

Additional Prototype: Hydroponics

- Use of chemical fertilizers on a closed water cycle
- Avoid water waster since it is being recycled
- Avoid chemical products runoffs to rivers and oceans
- Use of inert substrate and no need for soil
- Use of sustainable energy for LED Light, pumps, and monitoring (solar generators)
- Contained and easy installation of monitoring and automation
- Scalable system which can easily grow
- System recommended for larger plants

Actual prototype photo

Hydroponics:

Uses only 10% of the water used in traditional farming

Avoid chemical fertilizer runoffs to rivers and oceans

Inert substrate (no soil used)

Fertilizer solution pumped to plant

Water flow back to container

Fertilizer solution Inside container

Water pump inside container

Additional Prototype: Microgreens

Actual prototype photo

Microgreens

- Only water mist is required/No chemical fertilizer
- Avoid water waster since it is only a mist
- Use of inert substrate and no need for soil
- Use of sustainable energy for LED Light, and monitoring (solar generators)
- Contained and easy installation of monitoring and automation
- Scalable system which can easily grow
- System recommended for very young plants

Additional Prototype: Sprouting

Actual prototype photo

Sprouting

- Only water mist is required/No chemical fertilizer
- Avoid water waster since it is only a mist
- No need for substrate or soil
- Use of sustainable energy for LED lights, and monitoring (solar generators)
- Contained and easy installation of monitoring and automation
- Scalable system which can easily grow
- System recommended for very young plants

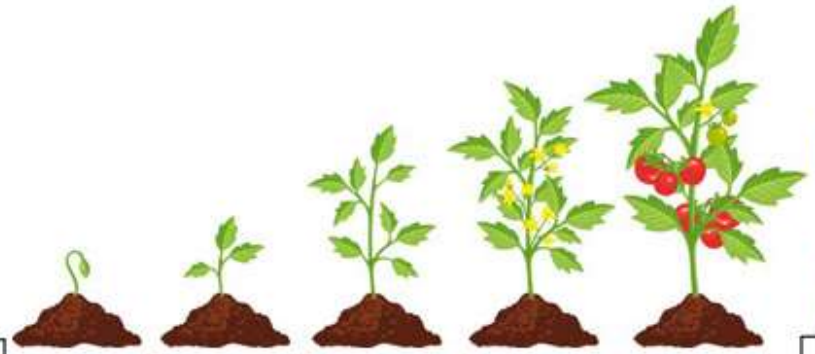
Additional Prototype: Fungi

Actual prototype photo

Fungi

- Only water mist is required/No chemical fertilizer
- Avoid water waster since it is only a mist
- Substrate was already cultured with mycelia
- Use of sustainable energy for LED lights, and monitoring (solar generators)
- Contained and easy installation of monitoring and automation
- Scalable system which can easily grow
- System used to grow mushrooms and it can be used in other cases (NASA is considering it for construction material, radiation protection, food)

How they complement?



Sprouting	LED	N/A	Automation friendly by being scalable and modular making it easier and cheapier to monitor and use automation and robotics
Microgreens	LED	N/A	
Aquaponics	LED, pump	Fish waste	
Aeroponics	LED, pump	Fertilizer	
Hydroponics	LED, pump	Fertilizer	
Spores	LED	N/A	

Future Prototype: Aeroponics

Aeroponics

- Use of chemical fertilizers on a closed water (dripping or mist) cycle
- Avoid water waste since it is being recycled
- Avoid chemical products runoffs to rivers and oceans
- No need for inert substrate or soil
- Use of sustainable energy for LED Light, pumps, and monitoring (solar generators)
- Contained and easy installation of monitoring and automation
- Scalable system which can easily grow
- System recommended for larger plants

Future Prototype: Beekeeping

Honeybee farming on bottles

- Important for the pollination of the plants
- Use of plastic bottles for a touchless beekeeping
- Use of sustainable energy for monitoring (solar generators)
- Contained and easy installation of monitoring and automation
- Scalable system which can easily grow

Future Prototype: Ocean Farming

Ocean Farming

- No need for chemical fertilizers
- Lowers the oceans acidity
- Very effective carbon sink
- Use of sustainable energy for monitoring (solar generators)
- Scalable system which can easily grow
- Prototype will be used to study Kelps, seaweeds and seagrasses

Sharing

Prototype being replicated at:

1. Jonalou Ortis, student from the Tagaytay City Special Education Center in the Philippines and her coach Gratcielo Chiara Badillo (aquaponics)
2. Katori Two Bulls, student from the American GlobalHorse School at the Lakota Indian Reservation in Allen, SD, USA and her coach Jelisa G. Adula (aquaponics)
3. Negotiations with the Amazon and Southern Brazil Indian Reservations

Participation in international conferences:

1. Global Innovation Field Trip in November 2022
2. International Kids Conference in December 2022
3. Global Innovation Field Trip in January 2023

The End