What Will We Learn Today?

● Aquaponics Basics
● Design Criteria
● Fish Species
● Filtration
● Hydroponic Systems
● What’s Next
● Conclusion
Aquaponics: How it Works

Aquaponics = Aquaculture + Hydroponics

(farmXchange, 2015)
Design Criteria

Design goal:

Upgrade the aquaponics system to test new design concepts before constructing a hoop-house system at the Gibbs Farm.

Criteria:

- Durable & low maintenance
- High efficiency & productivity
- Adaptable, simple troubleshooting & parts replacement
- Demonstrate potential for outdoor and commercial systems in Michigan
Fish Species: Yellow Perch

Based on a 2% feed rate and the size of our system, we will purchase 40 fish from Laggis' Fish Farm in Gobles, MI.

Benefits of yellow perch:

- Tolerate poor water quality
- Native to Michigan
- Reproductive reliability

(Kansas Wildlife Federation, 2014)
Mechanical Filtration

A radial flow separator (RFS) is made of common materials. A RFS redirects water flow and uses gravity to provide efficient mechanical filtration of heavy waste solids.

Benefits of the RFS:

- Relatively cheap DIY build
- Better solids capture than swirl/vortex filters
- Accessible materials

Radial Flow Separator (RFS)

(WMT, 2015)
Sand and gravel filters use a slow flow rate and a high surface area of gravel and sand to create ideal conditions for the growth of the bacteria culture that converts ammonia into nitrate.

**Benefits of sand and gravel filters:**

- Relatively cheap DIY build
- Superior biofiltration
- Accessible materials

(Living Water Solutions, 2015)
In a deep water culture (DWC) system, plants grow in rafts floating over a pool of aerated water.

**Benefits of this DWC design:**

- Will not clog with solids
- Easy access for troubleshooting
- Relatively cheap DIY build
- Safety, durability, and ease of sanitation

(Tucson AquaPonics Project, 2015)
Vertical tower systems grow plants in towers with water running down them.

**Benefits of this tower design:**

- Optimizes space
- Cost effective
- Performs nitrification, solids filtration, and mineralization
What's Next?

- Hire and train new teammate
- Upgrade and maintain new system
- Monitor system data to assess design concepts
- Adapt system as needed for optimal production
- Create revised design for Gibbs Farm hoop-house system
Brief Review

- Aquaponics Basics
- Design Criteria
- Fish Species
- Filtration
- Hydroponic Systems
- What’s Next


