Aquaponics is the combination of aquaculture: fish farming and hydroponics growing plants using mineral nutrient solutions, in water, without soil. The system we currently have is called an ebb & flow system meaning the water fluctuates in the grow bed. The system has been in operation for 1 year. Within that year, our team underwent personnel change and is currently co-managed by Carlos Daniels and Richmond Flint.

Our system has had some successes and messes. Along the way, it has reached a state of maturation. This is a success because our bacteria have reached a state of equilibrium and can support the cycle of nutrients. We have also had several harvests of lettuce and performed a blind taste test. Our lettuce consistently beat store-bought lettuce in taste and texture. In addition to these successes, there have also been failures. One example is our water pump failed causing the water to stagnate. In response, this caused a lack of nutrient making the plants weaker and therefore more susceptible to pests. Another problem was the automated feeding system. We had two systems fail and struggled to find a consistent and measurable feeding regime that was reliable and unfailing.

This semester we sought to expand our current system to a more dynamic. In our view, this is the most logical step to move forward for the Aquaponics project. We have proven that our system works and are ready to take it to the next level. This semester we were attempting to create a system that, according to our research,
does not exist. Furthermore, we feel compelled to push this project and the field of Aquaponics further. We sought to accomplish this by integrating three individual systems by connecting the water flow and allowing the systems to function under the same nutrient source one fish tank. Our hybrid-design is going to use the same space provided by the Office for Sustainability but will maximize the grow space. We currently have 36 sq./ft. of grow space, and will be adding 30 fish in order to increase production.

The system instead of a normal cycle it flows into the next system eventually cycling back to the fish tank. We will have to take into account different flow rates for the different systems and this can be adjusted with ball valves to increase or decrease flow rate.
2 path split

(NFT) SYSTEM PLANTS/NUTRIENT UPTAKE

(DWC) SYSTEM PLANTS/NUTRIENT UPTAKE

SYSTEM OUTPUT/ FISH/PRODUCE
A benefit of integrating the systems is the diversity of crops as each system has unique characteristics that certain crops can benefit from. For example in the EBS the dense growing media of clay pellets can support plants that are heavier. Unlike DWC or NFT that cannot bare the weight of heavier plants. Although, it is our intention to stay within the leafy green plant variety

As part of Western Michigan University’s Commitment to sustainability we feel it’s our responsibility to push this system to its capacity. We also feel that this project needs to be more research intensive and educational. As part of that commitment we are changing the design and increasing the production to act as a model for sustainability on campus. We hope Aquaponics can act as a catalyst for future students seeking examples of sustainability on WMU’s campus.