

## **Problem Statement:**

Aquaponics is an innovative system that combines raising aquatic animals with cultivating plants through a symbiotic system. Vertical farming is a modern technique where plants can be stacked and monitored to thrive in an indoor environment. To incorporate vertical farming with raising aquatic animals, some problems that arise include fish vitality, budget, energy usage, and availability of resources.

The goal of this project is to develop a functional, well-documented prototype that allows Colombian farmers to improve their current value chain. This will include training guides, set-up and tear down documents, and an in-country field test plan. Our expected final prototype should be inexpensive, easily replicated, and locally sourced. The current constraints of this project are cost, limited environmental resources, and time.

## **Customer Interview Questions:**

- 1) What is the motivation behind this project? How did it start?
  - Develop working relationship between RIT and Colombian university
  - Assist low income families in rural areas by providing a low cost aquaponics system
  - System should be able to increase daily food production and eventually provide a business aspect with the crops for the family
- 2) What are the downfalls with the current solution and why?
  - Number of fish (2 - 5) within the tank were too high which affected their life span
  - Poor cycling of nitrogen and oxygen within the water affected fish vitality
  - Unknown residence time of nitrogen and oxygen cycling
  - Manual pumping solution could have an effect on oxygenation
  - Ammonia content of water could not be measured real time
- 3) What has the previous team done to try to remediate the downfalls?
  - Previous team had a lack of time to try and remediate any downfalls
- 4) Why were tilapia and lettuce the crops chosen? Is this flexible to be changed?
  - Tilapia was chosen because it can withstand environmental fluctuations in comparison to other fish
  - Tilapia and lettuce are both low cost
  - Other fish and produce can be used
- 5) What is the cost of the current solution?
  - \$400
- 6) What are key milestones unique to the project?
  - Get experimentation done with nitrogen/oxygen cycling weather permitting
  - Ballpark a drip/flow rate to improve oxygen content of water
- 7) Will we be working off of the existing system or creating our own?
  - We can work off the existing system, but can modify it keeping in mind the cost.
- 8) Are there any additional customer requirements that have not been included on the PRP?
  - Our team can use last year's requirements and build off of them as needed

- 9) How close/often will we be working with the Colombian students?
- Our team will be able to speak with Colombian students through the customer
  - Plan is for Colombian students to spend spring semester here and have the team visit Colombia in the Summer
- 10) What are the key observations or metrics we should be tracking when collecting data?
- Nitrogen and Oxygen content of system
  - Drip rate needed for satisfactory nitrogen and oxygen content
- 11) How often would you like us to meet?
- Tuesday/Thursday from 3PM to 4PM