

Stakeholder Interview Template

Date	9/19/19	Project #	P20762
Start Time	2:30 pm	Customer Name	Mark Balfour
End Time	3:30 pm	Location	Webster-Schroeder School Greenhouse
Team Members	All		

Was a follow-up with the customer completed? (circle one) **YES** NO

If so,

Date: 09/19/19 Time: 4:40pm

Member who clarified the information: Caleb Wheelock

How was it clarified: Email

Signature: Caleb Wheelock

Summary:

The purpose of this meeting was to observe an existing successful aquaponics system maintained by Mark Balfour at Webster Schroeder School District. Mark was able to show us their entire system and describe many of the technical details of the system that apply to our own project. In addition, there were talks of purchasing one of their spare fish tanks for our own system. More to come on this note. Overall, this really helped us to gain a better understanding of how to care and maintain our fish and crops.

Interview Transcript:

What was the motivation for this?

No real background in farming, but was working in the school district and noticed the knowledge gap that exists in many students where they have little awareness of where their food comes from.

What were some initial challenges you faced in setting this up?

Not having any background knowledge on the subject. Overcame this with time, effort, trial and error, and patience. The more people you get involved the more knowledge you can gain.

How much maintenance and electricity is required daily for your small home system?

No heat needed if using goldfish as the water does not need to be heated. Electricity required to heat water if using tilapia. The system uses a 110V pump which could be adapted to use solar power. Little to no maintenance if fish reproduce, only require you to remove the fry.

What is your flow rate for cycling water?

He does not use any additional ammonia, instead, allows the fish to develop ammonia and bacteria naturally to stabilize water parameters.

What ammonia, pH, and nitrate levels do you maintain?

Ammonia is converted into nitrites which are then converted to nitrates. Nitrate Levels must be at a minimum of 10ppm, ideal is 40ppm.

pH: 6-7 is okay, 6.5-6.8 is optimal. Note that tap water in the area is typically at 8 pH.

Water temperature is held at 75 degrees Fahrenheit

What is the monthly yield for the system in terms of fish and produce?

Varies with the crop and the season. Harvest fish at around 2lbs. He can let them grow larger but it is subject to diminishing returns: Fish having an increasing rate of growth per feeding up until roughly 2lbs, then their growth rate declines and are getting continuously less amount of growth for the same amount of food used.

Crops are harvested typically 40 days after planting the seed.

What Fish/Crops are being used and why?

Fish are tilapia as they are very durable and easily sourced fish. Perch are also effective and would not reproduce as much as the tilapia, but grow at a slower rate. The crops vary by season and are on rotation. Crops include lettuce, cucumbers, and tomatoes.

Additional details:

- Recommends starting out with goldfish
- The fish are fed 3 times daily (weekdays), 2 times daily (weekends). Optimal is 4-5 times, but 2-3 works fine.
- During each feeding, continuously feed fish until they stop eating. (No set amount of food, fish will stop when they want to). Do not feed after fish stop eating as it only creates more waste in the system.
- Fish tank for sale
 - Price: \$75
 - Size: 150 gallons, 39 in. x 58 in. x 24 in.
 - Mark thinks roughly 4-6, 4-5lb fish can live in it, or 8-10, 1-2lb fish

- Also offering PVC, lights, foam board, grow cubes, and water if needed
- Small home system only cost him about \$120
- Use pool/pond rubber liner to keep water from leaking out of the plant bed
- To automate the pumping of water, Mark recommended making tiny holes in the bottom of the plant styrofoam. This will create ripples which help to oxygenate the water.

Reflections:

This interview was extremely beneficial and was very timely in our work in MSD towards concept selection. This gave us many more ideas about what materials and concepts we might use for our system and will certainly add to our list of alternatives to consider during this phase. I like the idea of using the 150-gallon tank, but I am afraid it will not truly be reflective of what our system will actually cost to replicate in Colombia. In Colombia, they will not have the same opportunity to get this size of tank at a discount. I would rather buy a smaller tank for about the same price, but we know we would be able to buy it at the same price in Colombia. The same goes for the other materials he would offer at a discount. This ensures that our system and cost estimates will be much more reflective of exactly what would be replicated in Colombia.