Team 4 – Project Proposal

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Project Goals:

The goal of our project is to design a scalable, carbon neutral, rainwater neutral hydroponic/aquaponic greenhouse. Hydroponics is the raising of produce without soil. Aquaponics further increases the complication of the system by introducing an aquaculture component where the fish live in the water holding ponds producing waste that is converted by bacteria into usable nutrients that are consumed by the plants. Aquaponics uses 90-95% less water than traditional farming while increasing yield per acre to 10-20x as compared to traditional farming.[1] With an urgent drought, a growing farm to table movement, and one of the fastest growing populations, the state of Texas needs new ways to feed it's population: Aquaculture is one of those ways.

The design we plan to emulate is an ebb and flow system. During the course of the day the system cycles on and off. When the system is on the growth medium beds flood and the roots are able to derive nutrients from the water present. Eventually the system drains and remains in a drained state for several hours. We plan to utilize multiple tanks to hold the fish and surplus water. Each of the tanks will act as independent retention areas; in the event a tank becomes infected with a water borne plant disease the tank could be purged without compromising the other tanks.

In order to ensure the success of the project, our team has formed relationships with Brite Ideas a local hydroponic parts supplier. Their expert team and customer facing business will allow us to get accurate cost estimates and ensure that we are utilizing the newest available technology.[2] We have also begun talking Ten Acre Organics a local hydroponic farmer about designing the project specifically for its current operations site. Ten Acre Organics specializes in growing lettuces but, plans to diversify more in the future.[3] Their team will provide the appropriate guidance with regard to production difficulties and maintenance.

With the collection of mentors we have accumulated thus far, we anticipate we will have enough support to develop a design that accomplishes all of our goals. The project scope is rigidly defined and solves a specific problem.

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[1] See http://www.tenacreorganics.com/aquaponics.html
[2] See http://bihydro.com
[3] See http://www.tenacreorganics.com