

FINAL REPORT
North Central Region
Sustainable Agriculture Research and Education (SARE) Program



Final Report

Project Title: The Viability of Small Scale Aquaponics in Urban and Rural Underserved Communities

Project Number: FNC13-911

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WORK ACTIVITIES

Summary: According to the 2010-2011 American Community Survey, poverty increased in Nebraska by nearly 3%. For Black and Hispanic youth (0 to 17 years old) that poverty rate was pushed to 52.2% and 33.8%, respectively. There is sufficient income in the community to support local foods enterprises while also equipping the most disenfranchised populations to improve education, increase personal income and develop community centered solutions to significant economic, nutritional and health disparities. The lack of access to fresh, local produce and protein is an issue faced by both urban and rural communities. The ability for communities to grow their own food including a protein source, such as fish, at the point of consumption could be a critical factor in helping communities become self-sufficient while providing healthy food to their populations.

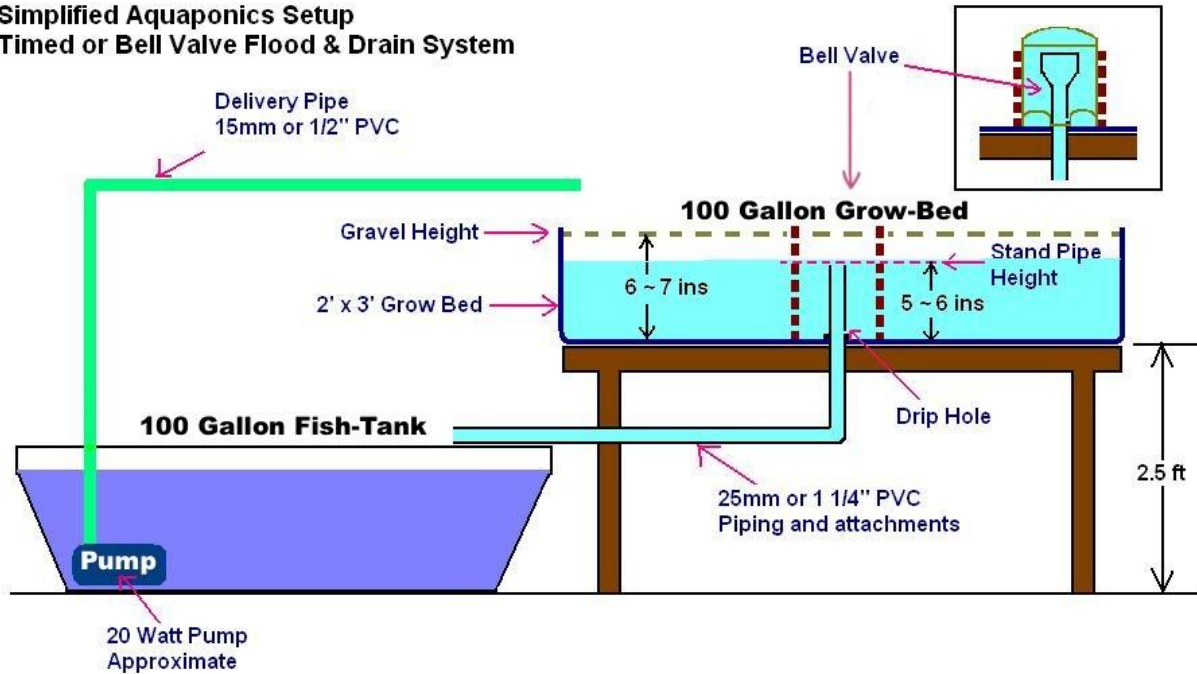
Through a collaborative, comprehensive, urban farming initiative, Whispering Roots focused on the production and training portion of our healthy food project. Whispering Roots expanded its

highly successful school based Aquaponics pilot initiative by scaling up its Aquaponic work to include more systems design research, crop growth research and community engagement. The fact that Aquaponics systems are closed, organic, recirculating systems requiring up to 90% less water to grow crops, speaks to the sustainability and environmental friendliness of the process.

Utilizing additional space in an Omaha school located in one of the most impoverished African American communities in the United States, the Aquaponic system was constructed. This is a Tilapia based “Flood and Drain” system utilizing a 550gph pump, PVC constructed aerator with shower head drilled cap tapped off the main pump line for additional oxygen, 10” deep expanded clay media for the grow bed, food grade liner, full spectrum fluorescent bulbs and fixtures for lighting, tank water heater and a 2:1 ratio bell siphon for drainage. The system has been running with a pH of 6.8 -7.2 with Ammonia concentrations of approx. 0.25ppm and Nitrites <0.5ppm. Nitrates vary based on the amount of crops in the grow bed. Water quality tests were taken daily during the start-up phase to monitor the growth of beneficial bacteria required for Ammonia conversion. After start-up, water tests are taken as needed but a minimum of once per week.



Simplified Aquaponics Setup **Timed or Bell Valve Flood & Drain System**



Affnan Simplified Design

All crops are started in seedling trays using Coir. Seedlings are transplanted into the system after approximately 2.5 weeks.



RESULTS

The project was highly successful. Crops such as Peppers, Eggplant, Kale, Lettuce, Beets, Peas, Swiss chard, Basil, Microgreens, Strawberries, etc. have been grown and harvested. Crop production has definitely met expectations with successful field taste/acceptance tests being conducted at local restaurants, grocery stores and in multiple community locations. A successful crop taste test also occurred at the “high end” restaurant The Grey Plume in Omaha, NE which has won multiple awards for its outstanding food and focus on sustainability.



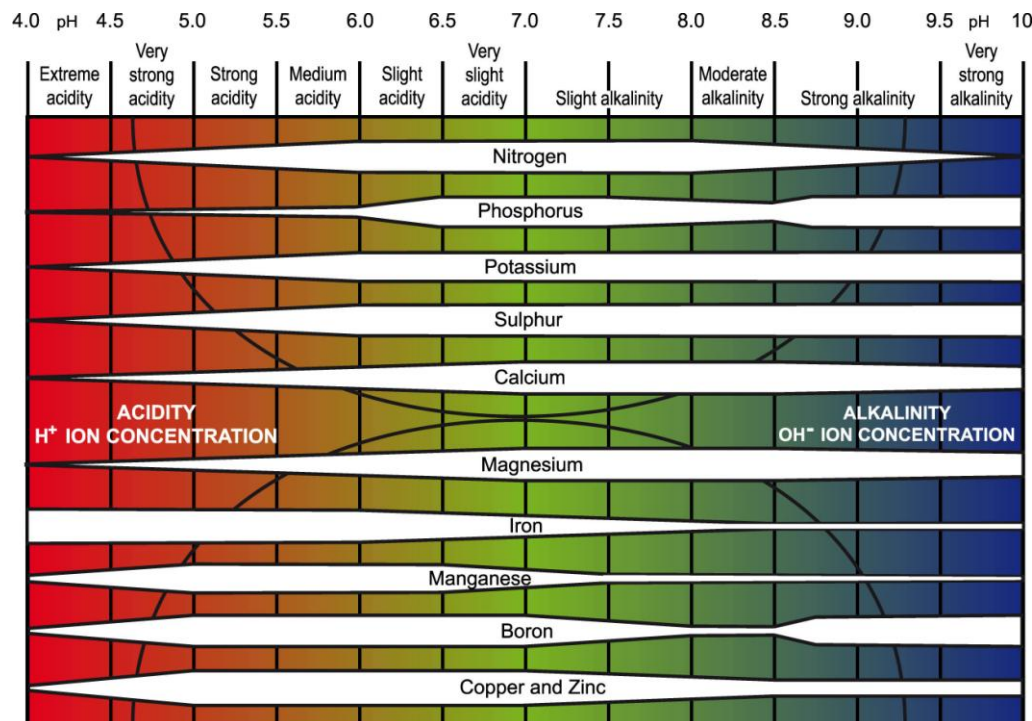
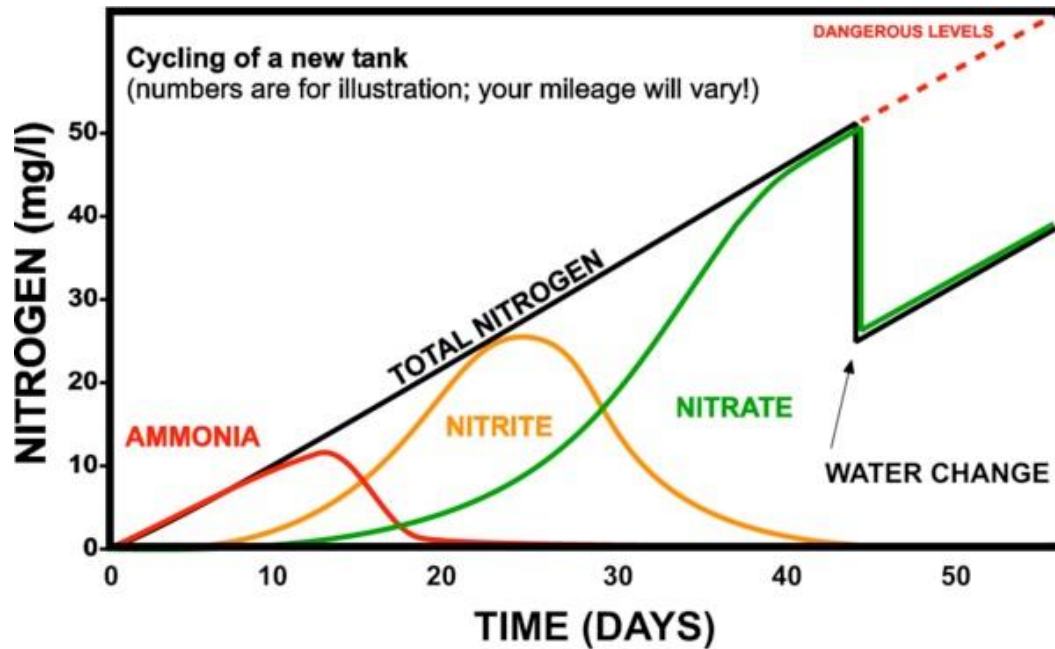


Fish growth rates met expectations as well with fish reaching harvest weights of 1.5 – 2.00 lbs in approximately 9 months based upon feeding rates. Slower growth rates were experienced in other locations when feeding rates were not maximized.



Greg Fripp and Tilapia
Photo credit: James R. Burnette Omaha World Herald

For maximum system production and health, producers should pay particular attention to the initial cycling of the system and water quality during normal operations. Water hardness will affect the grower's ability to manage pH. The pH affects the ability of bacteria to convert Ammonia to Nitrate and the ability of crops to uptake nutrients. Aquaponic systems traditionally run low on Iron. Chelated Iron is a good supplement should crops show signs of Chlorosis.



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The success of the project helped lead to Whispering Roots receiving an additional \$25,000 grant from the Children's Hospital and Medical Center Preventing Childhood Obesity Grant program to implement the process in several additional communities. In addition, our work was expanded to include a system at the Henry Doorly Zoo and Aquarium as well as a project which supports a majority Native American population in South Dakota.



Multiple tours were conducted and included individuals from urban communities, colleges, universities and non-profit organizations as well as representatives from rural school districts, state agencies and visitors from other states. The marked increase in Aquaponic research projects, home systems, commercial scale and semi-commercial scale systems is a testament to the importance of this work.

WORK PLAN FOR THE FUTURE

The plan for the future is to build a community engagement and training center in North Omaha, Nebraska. The facility will allow the organization to increase the amount of food produced in the community while enhancing our educational offerings for all interested parties.



OUTREACH

I completed 49 presentations for approximately 1240 participants. Included in those presentations were events such as the NCR-SARE Farmers Forum at the 2014 Sustainable Agriculture Education Association (S.A.E.A.) Conference, 2014 Extension Small Farm Conference, 2014 International Improving University Teaching Conference, Siouxland Garden Show, University of Nebraska Omaha Service Learning, University of Nebraska Lincoln Engineering, Metropolitan Area Planning Association Heartland 2050 Initiative and multiple school and community events.

SUMMARY

Aquaponics has the potential to provide access to healthy vegetables and fish (protein) to underserved communities at the point of consumption. Like all farming, there is risk associated with the work and there are no guarantees of success. Interested parties should approach these projects with open minds and good planning to help ensure the greatest likelihood of having a positive outcome.

RECOGNITION

I would like to thank the S.A.R.E. organization for their support during this project. Their professional and financial enagement during the grant period was a critical part of the success of this initiative. Programs such as the Farmer-Rancher Grant Program are essential to the advancement of this type of work.

Additional Pictures

