

ABSTRACT

Recidivism is defined as “a relapse into criminal behavior, often after the person receives sanctions or undergoes intervention for a previous crime.” A landmark 1994 study of 300,000 released prisoners from 15 states indicated that the recidivism rate of these prisoners was an astonishing 67.5%. Many factors contribute to this disturbing statistic, most of which (e.g., prior arrests, domestic abuse, homelessness, dropping out of school, etc.) link these individuals to various high risk populations. Numerous programs are offered by governmental agencies and charitable organizations that aim to intervene in the lives of members of such populations, especially at young ages, in an attempt to break the cycles that lead to such poor life outcomes.

The Gulf Coast Trades Center (GTCC) is an organization that serves at risk youths between the ages of 15-18. These teenagers work through structured programs to obtain their GED or high school diploma, their driving permit and one of several trade certificates within a 6-9 month period. Healing Hands Ranch (HHR) is a charitable organization that serves adult males of all ages to overcome homelessness, poverty and/or addiction through a holistic approach. HHR and GTCC recently initiated a United Way-funded partnership (the Independently Healthy Program or IHP) to train participants at both locations to become empowered to develop a community of sustainable culture in an attempt to reduce recidivism in these young men. Many precedents exist supporting the efficacy of such programs, most notably the “Insight Garden Program” at San Quentin State Prison which has reduced recidivism among its participants to less than 10%.

A serendipitous confluence of events has dramatically accelerated the progress of the IHP. Specifically, the Lone Star College Biotechnology Institute (LSCBI) recently established an undergraduate research platform to develop a significant campus aquaponics infrastructure that will enable myriad educational opportunities for college and area high school students regarding environmental science, agriculture and biotechnology. During the initial months of this project, however, numerous practical obstacles impeded progress. The intersection of the IHP with this LSCBI initiative made possible a mutually beneficial relationship between the two programs.

BACKGROUND

The Independently Healthy Program (IHP) is a United Way-funded collaborative effort between the Gulf Coast Trade Center (GCTC) and Healing Hands Ranch (HHR) designed to reduce recidivism in at-risk youths by providing them with training to build and maintain aquaponics systems. Lone Star College-Montgomery (LSC-M) has provided a research greenhouse-based platform to help facilitate this project. This mutually beneficial partnership will result in the establishment of a pilot scale aquaponics “Living Laboratory” which will provide myriad educational opportunities for high school and college students.



GCTC students participating in an aquaponics “Build Day”

MATERIALS AND METHODS

- IBC Totes were used to construct the plant beds
- Tanks and beds were plumbed with schedule 40 PVC pipe.
- “Skippy” filter was filled with industrial floor scrubber pads which provide surface area for bacteria
- System was designed with a single water pump/gravity feed design
- Expanded shale was used as bed media
- Only organic seed was used
- Mozambique tilapia was the chosen fish species



- A. Organic produce growing in the “Baby Greenhouse” aquaponics system media bed
 B. Early stage construction of “Baby Greenhouse” aquaponics system
 C. Functioning “Baby Greenhouse” aquaponics system

RESULTS

From January until May of 2015, approximately seventy five GCTC students have collectively contributed seven hundred and fifty hours (*i.e.* an average of ten hours per student) toward the construction of two aquaponics systems (see below) at, respectively, LSC-M and the GCTC campuses. In addition, thirty additional students have contributed to and/or learned about the GCTC system. These efforts have resulted in a fully functioning two bed (media and raft) system at LSC-M, early stage construction of a single bed (media) system at GCTC and mid-stage construction of a large, four bed (two media, one raft and one wicking) “Indy 23” system at LSC-M.

The GCTC students typically struggle with numerous life issues, ranging from abuse or neglect to limited education to struggles with poverty to gang influences, drugs or other issues associated with juvenile delinquency. As such, they are typically considered to be “at-risk” teens and have extreme needs for life enhancing activities and opportunities. The experience with the aquaponics education described here has been exceptionally positive for many of these students, as exemplified by numerous expressed desires to share their new knowledge with family and friends, as well as motivation to continue their education regarding sustainability and related topics.

CONCURRENT PROJECTS



- Partial construction (A) and schematic (B) of the “Indy 23” aquaponics system being constructed by GCTC and LSC-M students
- C. Early phase construction of single bed aquaponics system at GCTC
- Mozambique tilapia (D) and koi (E) being tested for aquaponics suitability
- D. “Ikea Hack” indoor aquaponics system project with flood and drain autosiphon
- E. “Back to the Roots Aquafarm” tabletop aquaponics system being used to promote LSC-M aquaponics projects

CONCLUSIONS

The collaborative efforts between four not-for-profit institutions (Lone Star College-Montgomery, Gulf Coast Trade Center, Healing Hands Ranch and the United Way) centered on using aquaponics education as a platform to reduce recidivism among at-risk youths has met with early success. We hope to continue these efforts into the foreseeable future. Such a mutually beneficial partnership can serve as a model for other organizations attempting to maximize the efficacy of initiatives depending on limited resources.

In addition to providing benefits to the at-risk students from GCTC, the work described in this project will serve to provide multiple aquaponics platforms which can be integrated into myriad STEM curricula. Aquaponics systems, by their very nature, can serve as both practical examples of sustainable agricultural technology as well as ecosystem models for biology and/or environmental science courses. We intend to take full advantage of these attributes and parlay the efforts of the GCTC students into the implementation of a “Living Laboratory” on the LSC-M campus.

ACKNOWLEDGEMENTS

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