MSUS Culminating Experience

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Date: 4/26/2016

Project name: International Rescue Committee (IRC) Aquaponic Incubator Farm

Case Study

IRC Phoenix, New Roots, and the Aquaponic Incubator Farm

Beginning in January 2016, I joined the Phoenix chapter of the International Rescue Committee (IRC Phoenix) as an intern to satisfy the capstone requirement of the MSUS degree. IRC Phoenix is engaged in myriad programs designed to help refugees fleeing from grave humanitarian crises to establish themselves in Phoenix and become stable and productive members of their new environment.

Among the myriad programs and services provided by IRC Phoenix to refugees is the New Roots Program, which empowers refugees to reestablish their ties to the land, celebrate their heritage, generate income, and nourish both themselves and their surrounding community by cultivating fresh and nutritious produce that is often difficult to find in low-income urban areas. By equipping refugees with the skills, tools, and knowledge necessary to become successful farmers, the refugees can become self-sufficient and contribute to their new surroundings through community gardening and small-business farming.

The Aquaponic Incubator Farm is an expansion of the New Roots program in Phoenix. It is a social entrepreneurship program whose goal is to train refugee farmers in aquaponics agriculture and good business practices in the United States. Through this process, the program will grow affordable and nutritious produce that is both profitable for the IRC and client farmers, while serving a market demand across farmer’s markets and local restaurants for local, fresh, nutritious, and certified organic produce. Goals of the program include equipping refugee and community farmers with aquaponics agriculture and business skills, generating consistent profits through sales, and increasing access to healthy and nutritious foods across the local community. The program will involve extensive community outreach and aspires to influence the City of Phoenix to encourage entrepreneurial enterprise.

The aquaponics system for this venture is designed for semi-commercial production within a climate-controlled greenhouse, allowing for both food production and community education. Seasonal specialty crops, fish, prawn, and plant seedlings will be produced in this system. The development of secondary support infrastructure, including a semi-commercial cold kitchen, cold storage, solar panels, and storefront present the opportunity to facilitate food processing and create marketable goods to be sold on site or to client markets and restaurants and enhance operational sustainability. It will be
necessary to achieve good handling practice and good agricultural practice (GHP/GAP) certification, as well as USDA organic certification to support and legitimize sales to certain customers.

Immediate services provided at the facility will include basic courses in aquaponics and entrepreneurship. The primary markets for products derived from the aquaponics system include contract-based sales at high-end restaurants, local universities, ethnic markets, farmer’s markets, and individuals. The markets for local, high-quality fish and produce are rapidly growing in conjunction with Arizona’s population growth rate, which is among the highest in the nation. The project has few competitors able to match target product quality and price. These primary sources of revenue will also be supported through point sales generated at periodic, on-site markets.

The program will raise revenue through sales to cover operational costs and will be additionally sustained through grant funding. Growers in the program are expected to earn the equivalent of $6.50 - $10.80 per hour depending on hours contributed to the program. For those who wish to start a business venture, it is projected they will earn an equivalent hourly wage of $10.57 per hour.

Refugees in Phoenix face several sustainability challenges including restricted access to fresh and nutritious produce, adverse socioeconomic conditions, and the adverse impacts of climate change. Generating produce in a contained aquaponic greenhouse helps refugees avoid many difficulties associated with growing food in a desert climate. Creating the opportunity for refugees to achieve financial security by growing and selling their own produce through agricultural micro-enterprise is the key driver of the New Roots and Aquaponic Incubator Farm programs, although it should be noted that there will also be several ancillary benefits once the aquaponics facility integrates other functions including community education and outreach, solar power integration and training, on-site storefront and market, and strategic partnerships.

The ultimate vision is to transform the vacant lot at 1616 West Camelback Road into a vibrant agricultural hub and community center. Through the sustainable development of previously un-arable land into a productive aquaponic farm and community center, struggling refugee populations will have access to fresh and nutritious food, and be connected to markets for selling produce to generate much needed income. Also note that this program dovetails nicely with the intention of other citywide efforts including Reinvent Phoenix, Phoenix Renews, Keep Phoenix Beautiful, and the Solano Transit Oriented Development (TOD) policy.

Achieved goals for this MSUS project include:

- Assisted in building the primary infrastructure of an aquaponic farming facility for refugees to grow fresh and nutritious produce for personal and economic benefit
• Helped develop educational modules to train refugees on how to grow produce and engage in micro-enterprise

• Developed farmer’s market and retailer relationships to flesh out distribution network

• Engaged in community outreach to recruit program participants and potential partners

Stakeholders

David Cardello – MSUS Student, IRC Phoenix Intern

I completed this project for IRC Phoenix as part of the New Roots program, and reported to Mr. Timothy Olorunfemi and Mr. Tristan Dunton for the project duration. Mr. Olorunfemi is the New Roots Supervisor and Mr. Dunton is the Community Garden Coordinator. I joined IRC Phoenix as an intern in January 2016 and supported development activities of the aquaponic incubator farm as described in this document.

Tristan Dunton – Community Garden Coordinator, IRC Phoenix

Mr. Dunton is spearheading the transformation of a vacant lot at 1616 West Camelback Road in Phoenix into an aquaponic farming facility and community center. The area around 1616 West Camelback has limited access to fresh produce and is located near refugee communities. Additionally, the property has direct light rail access – an attractive feature when considering the plan to eventually build out a storefront for selling vegetables produced at this location.

Timothy Olorunfemi – New Roots Program Supervisor, IRC Phoenix

As the New Roots Program Supervisor, Mr. Olorunfemi has a vested interest in the success of the aquaponic incubator farm as the latest effort of the New Roots program in Phoenix. He supervises staff, assists and monitors program spending, conducts client interviews, conducts field visits, oversees community outreach, and oversees curriculum development for the facility.

Katherine Coles – Village Planner at City of Phoenix

Ms. Coles is a point person for IRC Phoenix in developing vacant lots in the City of Phoenix. She worked on Reinvent PHX, which is a collaborative partnership between the City of Phoenix, The U.S. Department of Housing and Urban Development, Arizona State University, St. Luke’s Health Initiatives, and several other local organizations committed to growing a sustainable city. The Reinvent PHX team has produced sustainability action plans for five districts along the existing light rail line through a holistic community engagement process, and this development project is in line with the motives of Reinvent PHX.
Laura Pastor – District 4 Councilwoman at City of Phoenix

The site to be developed sits at 1616 West Camelback, which lies in district 4 of the City of Phoenix. Garnering Councilwoman Pastor’s support is crucial to the success of this project. From a political perspective, this project is a win because it will create jobs and economic growth among disadvantaged refugee populations, reduce crime, and reduce reliance on public services. Upon the unveiling of the aquaponic incubator farm, Councilwoman Pastor actually rented one of the aquaponic plots as one of the first program participants!

Tom Waldeck – Keep Phoenix Beautiful / PHX Renews

Phoenix Renews is an initiative started by Mayor Greg Stanton to reduce the number of empty lots throughout the city by using them as community and educational spaces. The IRC currently occupies part of a 15-acre lot in the center of the City of Phoenix that is home to more than 11 sponsors, dozens of community gardens, a pet exercise area, and art installations of local artists. Bringing in Mr. Waldeck as a stakeholder will add the positive Keep Phoenix Beautiful and PHX Renews brand image to this development project.

The Steele Foundation

The Steele Foundation is committed to the well being of children, young adults, and families in Arizona. Their philanthropic resources are focused on education, preventative health, and community enrichment. In particular, this project addresses the Steele Foundation’s commitment to community enrichment, which supports projects in neighborhood infill, redevelopment, and revitalization that enhance local communities, increase property values, and attract economic development. In addition to the aforementioned, these community enrichment programs support education of children on environmental sustainability, conservation of natural resources, and community garden and urban farm initiatives that deliver a sense of community pride.

Project Beginnings

The aquaponic incubator farm project began in May of 2015 when the New Roots Program supervisor, Timothy Olorunfemi, received a $100,000 grant from the Steele Foundation to expand New Roots through an aquaponic greenhouse. At first, IRC Phoenix planned to use the money to build small-scale educational aquaponic systems to be replicated by refugee gardeners in backyards or anywhere in the city.

With this first round of funding, IRC Phoenix hired Tristan Dunton as the Community Garden Coordinator at IRC who would be responsible for completing phase one of the project and reporting to Mr. Olorunfemi, the New Roots Program Supervisor. Mr. Dunton, realizing that the initial plan would cost too much money, suggested building a semi-commercial system instead. This system would serve as a shared space, with a conglomerated harvest to be sold through various sales channels. This would serve to
train refugees on agricultural crop production, and demonstrate paths to either scale the system down for personal use, or scale it up if the ambition exists to become commercial-scale farmers.

Site Information and Development – 1616 West Camelback

The site at 1616 West Camelback in Phoenix was a brownfield site before we broke ground, and is owned by an associate of IRC Phoenix who agreed to rent the property to IRC Phoenix at $300 per month for 10 years. The property is along the light rail, in the Solano District.

The area surrounding the site is comprised of refugee communities, socio-economically disadvantaged populations, and businesses. While not technically a food desert, there is a noticeable lack of fresh and nutritious produce available in the area.

I joined this project just as Mr. Dunton was engaged in meetings with the City of Phoenix in order to obtain a building permit to approve breaking ground and beginning construction. After being hired, he was met with a lease agreement, piece of property – about one acre, operating under the City of Phoenix community garden policy. This actually created roadblocks when dealing with the city because the community garden policy had no guidelines covering construction of permanent structures like the greenhouse. After several rounds of back and forth with the city and relevant professionals – sharing site plans, electrical diagrams, and having utilities visit the site and sign off on safety, having plans stamped and approved by architects and engineers – the building permit was secured and we were able to being construction in early January, 2016.

The brownfield site at 1616 West Camelback at this time was also extremely littered and was obviously a temporary home for transients and the homeless. Cleaning up the site was hazardous, as we encountered used needles, prophylactics, and other objectionable materials. It was a challenge to deter people from entering the site, and we eventually had to settle for making a sign reading, “Smile, you are on camera!”

Fortunately, the site was progressively cleaned up as the back and forth continued with the City of Phoenix. At this point, we received some timely advice from School of Sustainability (SOS) faculty member Colin Tetreault. Colin was able to draw on his experience working in the mayor’s office to help us frame our approach to City Hall so that our project would be considered a “win” for the city. At the time, tensions were high in the country surrounding refugee populations because of the terrorist attacks in San Bernardino and across Europe. Political backlash against refugees was high, with mayors and governors illegally closing their borders to refugees. Where there is crisis, there is opportunity.

Keeping that in mind, the proposal to the City of Phoenix was framed a little bit differently. The approach was now to suggest we are creating an opportunity for refugees to thrive in Phoenix and become productive members of the community.
According to Colin, this would give the mayor of Phoenix a reason to thumb his nose at the governor in terms of refugee acceptance. At this point we also began communicating with Councilwoman Laura Pastor. This site is in her district, and so we wanted to demonstrate that this site would create jobs, reduce crime, and improve the quality of life in the neighborhood. I believe that getting the support of high-level city officials was helpful in eventually securing the building permit.

**Greenhouse and Aquaponic System Construction**

With the building permit in hand, we were able to begin construction on the greenhouse. Tristan had secured a contractor, Mark Bogart, owner of Valley Aquaponics, to assist in building the greenhouse and aquaponic system. A large portion of my time was spent on site at 1616 West Camelback, helping Tristan and Mark interpret the plans for building the Agritech greenhouse that was procured for ~$35,000. Every week on Thursday and Saturday I would join Tristan and Mark, and we would put our work gloves on and get to building the greenhouse and aquaponic system. Over the course of several months we worked diligently to get everything completely built, and in mid-April we held a ribbon cutting ceremony with visiting dignitaries such as Councilwoman Pastor, to celebrate the beginning of the project.

**Business Plan and Operations Development**

Developing a business and operational plan for this project was not an easy task. This type of social entrepreneurial enterprise is new to the IRC, so there were no previous projects to serve as models. I was tasked to help write the business and operational plan, and exchanged several versions with IRC headquarters in New York City over the course of the semester.

Among the items developed and formalized in the business and operational plans include:

- Organization mission
- Goals, objectives, and strategies
- Products and services
- Production cycle and characterization
- Integration of educational components
- Accounting
- Insurance
- Certifications and permits
- Market analysis
- Sales channel analysis
- Marketing implementation strategy
- Management
- Financial plan

I also helped create the educational materials that would be presented to refugees when going through the aquaponics training course.
Strategic Alignments

A. Valley Aquaponics

Mark Bogart is the owner of a local business called Valley Aquaponics. Mark won the bid for the job to build the greenhouse and aquaponic system after Tristan met with him and reviewed his aquaponic design. Tristan was impressed with the elegance of the system in terms of its efficiency in water and energy use.

Mark has offered to pay rent at the site to bring over his own aquaponic systems for demonstration purposes. In so doing, Mark will have the opportunity to sell systems to people who have been through the aquaponic incubator program and are interested in pursuing aquaponics either recreationally, semi-commercially, or commercially. In order to do so, Mark has suggested renovating and occupying the front building of the property for free in exchange for electricity and water services to be paid for by IRC Phoenix.

B. ReinventPHX: Solano District Transit-Oriented Development (TOD)

In brief, ReinventPHX is a partnership between the City of Phoenix, HUD’s Sustainable Communities program, and local organizations focused on achieving the transformative potential of the light rail system. The new urban development model in Phoenix is dubbed “Walkable Communities.” While there are several characteristics that help define a Walkable Community in the Solano TOD Policy Plan, I would like to highlight a few for the purposes of this case study:

- **Resource efficient buildings, infrastructure, and access to parks and healthy food**

  Clearly a solar-powered aquaponic greenhouse should be considered a resource efficient building. All electrical needs during the day will be met by the solar array, and if enough funding is secured to build a battery system, the site could easily run on renewable energy all the time and perhaps sell energy back to the grid.

  The long-term vision to turn this site into a community center is arguably worth framing as a park where local denizens can gather, work in the greenhouse or traditional garden plots, or contribute art to the brick walls of the property.

  Lastly, the aquaponic greenhouse will provide a high yield per unit area of fresh and nutritious food for the local community to enjoy.

- **Public places that are free from violent crime**

  The transformation from a hazardous brownfield to a productive community center satisfies this characterization of a walkable community space.
• **Cool, shaded areas for relaxation and social interaction**

Future development goals include building shade structures for community gathering and social interaction. This is meant not only to be a space for growing food, but also a space for community members to interact and engage with one another. That can be done by growing the food, participating in the weekly market, or working together on micro-enterprise ventures.

**Future Development**

**A. Collaboration with Mortensen Construction**

With the greenhouse and aquaponic systems successfully constructed and operating, the facility is set to operate according to the business plan, where individuals rent space in the greenhouse for a modest program fee, and at the end of the prescribed program, clients own all of the produce they harvest, and are free to do with the produce what they see fit, whether that is consuming it themselves, sharing with family and friends, selling it at farmer’s markets, or distributing it to commercial entities through established sales contracts.

Jessica Cheng at ASU’s Global Institute of Sustainability has linked the aquaponic incubator farm with Mortensen Construction. Mortensen seems very interested in bringing some more money to the project in order to facilitate build out of the supportive secondary infrastructure including a prep kitchen and storage refrigerator. This infrastructure will allow famers using the site to grow, harvest, process, and prep for sale all on site. Eventually, the site will be home to a weekly farmer’s market that will be available to passers by on the street and people riding the light rail. This market, while serving as an outlet to sell produce, will also be open to collaborate with other artisans and entrepreneurs who wish to participate.

Mortensen also has connections to Fox restaurant concepts, which would be a great sales outlet for this locally grown, fresh and nutritious produce.

Lastly, Mortensen also has connections to a company that is potentially interested in building out a solar array to support this site with renewable energy. Not only would this be great from an operational sustainability standpoint, but it also creates the opportunity to train refugees and other program participants in solar technology, and provide the instruction on how to perform operations and maintenance on solar arrays. This is another example of how this site can contribute not only produce to the community, but serve as a hub for economic development by providing training in relevant skill sets such as solar energy.

**B. Future Funding from the Steele Foundation**

A second round of funding is imminent from the Steele Foundation now that the greenhouse and aquaponic systems are completely built. This funding is to be used to
continue build out of secondary facility infrastructure that will support downstream efforts including prepping vegetables and storing them on site, as well as renovating the front building and preparing the property to serve as a neighborhood market.

C. Long-term Vision as Multi-Dimensional Community Center

The long-term vision is for 1616 West Camelback to serve as an integrating community center. The site will be an arid, urban permaculture landscape with aquaponic vegetable and fish production running on renewable solar energy. Programs at the site will lead to economic development in the surrounding community through educational programs in agricultural micro-enterprise and solar energy operations and maintenance. A vibrant, multi-cultural market will distribute the vegetables produced on-site, but also display the work of local artists and entrepreneurs who wish to participate in the market.

*Sustainability Outcomes*

Upon the successful completion of this project, refugee populations supported by IRC Phoenix will have the opportunity to cultivate, eat, and sell produce grown locally and sustainably in an aquaponic production facility. The immediate sustainability changes realized will be improved access to fresh and nutritious produce among refugee populations, and opportunities for refugees to support themselves through agricultural micro-enterprise.

In addition to these initial outcomes, the facility, once operating in a financially sustainable manner, will support intra- and inter-generational equity and socioeconomic justice among refugee populations. Once the key infrastructure is in place and the facility is producing consistently, opportunities for creative and interactive community educational activities can be developed and implemented.

Finally, this facility will be one component of a broader citywide sustainability initiative including Reinvent Phoenix, Phoenix Renews, and other elements of the Solano District TOD policy.