EPICS Urban Farming: Bringing Sustainable Fresh Food to Gary, Indiana

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to seeing the volunteers each week and will be disappointed when volunteers miss weeks. Getting to know the children and developing relationships with them is incredibly rewarding. Volunteering at the Hub is a great opportunity for any Purdue student who wants to give back to the Lafayette community and unwind by spending just a couple hours each week coloring, reading, playing basketball, tag, video games, and just spending time with a large group of energetic children. Volunteering at homework time also provides an opportunity for students studying education, social work, or health professions to practice their skills working with kids by motivating them to focus on schoolwork. Purdue students with a STEM background may consider sharing their technical skills with the new First Lego League robotics as well. Student volunteers have been brought to the Hub through EPICS projects, academic clubs, and Greek life. The Hartford Hub’s website provides a link for signing up as well as training videos and guidelines for volunteers.

For students who want to incorporate volunteering at the Hartford Hub into their studies, there are Dr. Ware’s classes and research group. The HONR 29900: Urban Youth Advocacy and HONR 39900: Well-Being courses focus on increasing the interactions between Purdue students and the Lafayette community. Students learn about defining and researching well-being while directly applying that knowledge in a project with a community partner, one of which has been the FCDC’s Hartford Hub. Students practice skills such as gathering data through surveys, interviews, and direct observation and recording it in a research log. They then apply methods of qualitative data analysis to help community partners find solutions. HONR classes are available to all Purdue students with a GPA of at least 3.00, and the Ware research group is open to all students as well. The group works to help empower the urban poor populations of Lafayette to improve their quality of life and well-being using similar research methods and working with community partners such as FCDC and the Hartford Hub.

**Takeaways**

The Hartford Hub is a community center that has been effective at enriching the lives of Lincoln Neighborhood residents and volunteers that help run the programs. Purdue students have volunteered in different ways, many through Dr. Ware’s research group and courses, and there are still many opportunities for students to get involved. Purdue students looking for opportunities to volunteer should consider the Hartford Hub to develop their skills working with children in a constructive and fun environment. Additionally, Dr. Ware’s research group and honors courses can give students valuable experience in using qualitative and participatory action research to better understand and impact our communities. Volunteering at the Hub gives students context for their own community as a part of the Greater Lafayette area, encouraging them to take ownership of their time spent here. Constantly surrounded by fellow college students, we can forget how valuable our time and friendship can be to others. By volunteering locally at the Hartford Hub, students can diversify and enrich their Purdue experience by taking an opportunity to develop themselves and have fun developing relationships with their neighbors.

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**EPICS Urban Farming: Bringing Sustainable, Fresh Food to Gary, Indiana**

**Elijah Klein (First-Year Engineering)**

**Student Author Bio Sketch**

**Elijah Klein** is a freshman pursuing Computer Engineering at Purdue University. He intends to work in industry on laptop technology after graduation. He joined Engineering Projects in Community Service (EPICS) to gain career experience and has been a part of the Urban Farming team for a semester. In this article, he describes his experiences working to design a sustainable urban farming solution.

**Introduction**

The United States Department of Agriculture (USDA) tracks food access based on several factors including accessibility to sources of healthy food, family income, vehicle availability, average neighborhood income, and availability of public transportation. The reason they track these factors is to track indicators of food deserts, as well as to track the expansion or contraction of food deserts. Most of Gary, Indiana fits these factors at half mile and 10-mile tract measurements. This means that for 33% of the population, there is at minimum a half mile to the nearest grocery store in urban areas, and over 10 miles in rural areas (Food Access Research Atlas,
2019). This distance, combined with other factors such as low income and lack of public transportation availability, make Gary, Indiana a food desert. To better gauge what the community believes are the top five issues that they are facing, Methodist Hospitals—a not-for-profit, community-based health care system, local to Northwest Indiana, and primarily centered in Lake County—performs a Community Health Needs Assessment (CHNA) every three years (Methodist Hospitals, 2019). The data from their 2019 CHNA shows that 46% of the residents interviewed from Gary place food access, affordability, and safety in the top five health issues they face in their day-to-day lives. This is more than one and a half times the results reported from the rest of Lake County at 29% (Methodist Hospitals, 2019). There is a clear need for a solution that provides healthy, accessible food to the community.

In response to this need, EPICS partnered with a local pastor in Gary, Indiana to develop innovative food solutions for those in need. As a result, community members will receive fresh food on a regular basis, and students learned how to use their educational backgrounds to solve community problems.

**Community Partner Description**

Pastor Marty Henderson is a master gardener at Peace Garden and Farms, as well as the senior pastor of Peace Baptist Church. Through the program Indiana Grown for Schools, Pastor Henderson has been bringing healthy, fresh food from his farm to local schools. This promotes healthy eating within the younger generation and offers it so that there is no extra cost (Indiana Grown for Schools, 2020). Pastor Henderson also feeds 85 families in Gary through his restaurant, Sunday Dinner, which is based out of the community center shown in Figure 1.

Pastor Henderson also works with Work One to provide jobs to justice-served individuals at his restaurant, Sunday Dinner, and his farm. This offers them a next step to becoming a part of the community again and encourages growth in the community. While Pastor Henderson has a very wide reach within the community, he wants...
to be able to provide more. The short growing season, urban environment, and extreme temperature fluctuations between seasons make it difficult to attain this goal throughout the year. Purdue students are helping find a way to achieve this goal in an urban area such as Gary.

**EPICS Team Opportunities and Impact**

Engineering Projects in Community Service (EPICS) is a service-learning program at Purdue that gives students professional work experience with a community partner to design a solution based on their needs. The EPICS Urban Farming team is comprised of 17 undergraduate students, partnered with Pastor Henderson, to help combat the issue of food deserts within Gary, Indiana. Over the past year, our team has been working to develop an urban farming option that is efficient, cost effective, easily maintained, and able to produce nutritious foods based on the needs of the community.

The original idea was to build rooftop gardens on the motor pool next to the community center as shown in Figure 1. Rooftop gardens would also allow the community to get involved with growing crops in the gardens. However, after further research, we decided against this option due to its not being a year-round solution, structural issues with the motor pool, and the amount of labor required to maintain such a project. The team then decided on an aquaponics system, which would allow crops to be grown year-round while being efficient and sustainable. There are plans to later expand the project with the rooftop gardens and add solar panels to supply the electricity for the aquaponics system. Even with a theoretical food production solution, the Urban Farming team also needed to develop a method of getting the food to the community effectively.

**Aquaponics System Implementation**

There is only so much that Pastor Henderson can do with his current growing space as the harsh weather makes it impossible to grow outside in the winter. However, over the past year, we have developed an aquaponics system that will not only be able to produce fresh vegetables but also yield fish that can then be sold.

An important part of designing an aquaponics system is deciding on what the plants are grown in to best fit the user’s needs. In our preliminary testing, we considered a biologic compound as a germinating material (Figure 2), which would have been a great choice for being ecologically friendly, but the adhesive substance in it would break down over time and clog the pipes. After several iterations of testing, we found that sand-based germinating material in tandem with fine filter containers suspended in water not only prevents pipes from being clogged but also yields better results in testing as shown (Figure 2).

Once we determined the germinating material for our design, the next step was to add sensors to monitor important environmental factors that would affect the productivity of the system, such as flow rate of the water, pH, and dissolved oxygen (Figure 3). We finalized our design with piping, shelves, and lighting to produce a prototype aquaponics unit to test with live fish. Once our system has been proven to work with live fish (Figure 4), we will order and deliver it to the motor pool. The delivery itself will be done in three phases to account for...
next phase of expanding the aquaponics system until all three phases are complete.

Producing fresh produce is the goal of the Aquaponics team, but the actual distribution method is being designed and tested by the Community-Based Agriculture (CBA) team. The Soul CBA program will be comparable to Blue Apron: boxes with the CBA logo sticker Figure will be delivered to families with a recipe card (Figure 5). This recipe card will outline storage and nutritional information for the included ingredients as well as the recipes for a main and side dish (Figure 5). This is so that the recipients can keep the recipe cards for future use to continue making recipes that they enjoy.

A focus for this part of the project is also to make it enjoyable by basing the recipes on culturally relevant and healthy foods. To confirm that we are moving in the right direction, we are testing the project with eight local families who volunteered through the help of our project partner, Pastor Henderson. During this test, the families will receive CBA boxes and be asked for feedback on the program. Once the program is fully refined, and we have yielded the necessary produce from the aquaponics system, we will expand the program to reach as many in the community as possible.

Reflections on Community and Student Impact

While the project is still ongoing and progress has been affected by COVID-19, there is still success in the progress that we have already made. The aquaponics system that we have designed is more effective than the preconstructed competitors, and our CBA system is an
COMMUNITY PARTNER SNAPSHOTs

VEGETABLE STEW & SMOTHERED GREENs

Mench’s entire and delicious menu is Vegetable Stew and Smothered Greens! These recipes are from the National Institute of Health and Purdue Extension and feature heart healthy versions of soul foods we know and love. These versions of the recipes are low fat and check off full of vegetables.

**Vegetable Stew Ingredients:**
- 4 cups water
- 1 tablespoon vegetable stock (low sodium)
- 3 large potatoes, peeled and diced
- 1 cup sliced carrots
- 2 cups corn
- 2 medium-sized zucchini, diced
- 2 medium-sized green bell peppers, diced
- 1 cup chicken broth
- 1 cup beef broth
- 1 teaspoon dried basil
- 1 teaspoon dried oregano
- Salt and pepper to taste

**Smothered Greens Ingredients:**
- 1 onion, diced
- 2 cloves garlic, minced
- 1 tablespoon vegetable stock (low sodium)
- 2 tablespoons vegetable oil
- 1 cup chopped spinach
- 1 cup chopped kale
- 1 cup chopped collard greens
- Salt and pepper to taste
- 1 tablespoon vinegar

**Vegetable Stew Directions:**
1. Add water and vegetable stock to a large pot. Bring to a boil.
2. Add potatoes, carrots, corn, zucchini, and bell peppers. Reduce heat to low and let simmer for 15 minutes.
3. Add chicken broth and beef broth. Let simmer for an additional 15 minutes.
4. Add basil, oregano, salt, and pepper. Let simmer for an additional 15 minutes.
5. Serve hot with a side of cornbread.

**Smothered Greens Directions:**
1. Heat 2 tablespoons of vegetable oil in a large skillet over medium heat.
3. Add spinach, kale, and collard greens. Sauté until wilted.
4. Add vegetable stock. Cover and let simmer for 5 minutes.
5. Add salt and pepper. Let simmer for an additional 5 minutes.

**Figure 5.** Example of Community-Based Agriculture team’s recipe and nutrition card for EPICS Urban Farming.

unexplored idea that has already gotten attention from groups with similar goals. There have been issues such as the current pandemic, but the project will continue to be sustained and grown by new and old students alike. We hope to get the system up and running as soon as possible, which will make the community impact much more quantifiable.

As a freshman, it is very difficult to get meaningful, professional work experience but EPICS has allowed me to gain this experience. As a member of the Urban Farming team, I have been exposed to a variety of engineering disciplines as well as learned how to work with them, earned a certification to work with fish in a lab setting, and learned how to handle the finances of a project. The most valuable thing that I have taken away from my time in EPICS is the experience of working with a client to design a product that fits their needs. I am glad to have worked with this team in a way to gain experience in a way that also lets me help the community.

Before this I did not know explicitly what a food desert was. I knew that there were areas with lower food access but learning how widespread this issue has raised my awareness as well as my desire to help. Having the opportunity to do something that can have such a large impact within our community is immensely gratifying and is an experience that will stay with me for the rest of my life.

**Getting Involved**

There are a lot of reasons to get involved with EPICS, such as the experience offered in working with the community. Specifically, with the Urban Farming team, there is a different relationship that exists within the team. This team offers a unique connection point between students across all engineering disciplines; from computer to biological engineering, there is a place on the team for all of them. Having this integration gives students an opportunity to learn in depth about other disciplines as well as make connections in them. The community service is incredibly gratifying as well; being able to serve others and make such a difference is an immensely rewarding experience in itself. Getting to work on this team is an experience that will stay with students long past EPICS, and even graduation.

**Conclusion**

Ultimately, our project will not be a complete solution to the issue of Gary, Indiana being a food desert. It will be a step in the right direction, though, providing easily accessible, healthy food and encouraging healthy eating. The outreach will start within a small circle at first but expand over time. Pastor Henderson’s ministry and involvement throughout the community is going to be invaluable in this regard. The extent of this project is likely something we do not fully realize yet. Our team has designed one of the most efficient aquaponics systems available and revolutionized a delivery method that can carry a longer lasting impact than one week. If this project succeeds as well as projected, it could be adapted to be applied in other areas facing similar issues. We hope that as this project expands, the outreach will be even greater than we could have expected.

**References**


Housing Instability in the Lafayette Community and Beyond

Aameneh Kermani (Brain and Behavioral Sciences)

Student Author Bio Sketch

Aameneh Kermani is a freshman in the Honors College & College of Health and Human Sciences. She is majoring in Brain and Behavioral Sciences with minors in Psychology and Biology. She plans on going to medical school after graduation. In high school, she was part of Key Club, through which she volunteered at the Salvation Army once a month to help serve meals to elderly people. In this article, Kermani describes her experience volunteering at the Lafayette Habitat for Humanity ReStore (ReStore), and the methods used to fight housing instability in the Lafayette community and beyond.

Student Introduction

I was introduced to the option of volunteering at the Lafayette Habitat for Humanity ReStore through my service-learning English 108-S class. This class required us to connect and collaborate with a community partner of our choice, with the goal being to serve the community and become a better writer in the process. The ReStore was my first pick because I had volunteered throughout high school with my local Key Club. I had worked with people at the Salvation Army, and seen what poverty looked like firsthand. After researching the ReStore’s mission and goals, I knew it was the right pick for me. I wanted to help reduce the rates of housing instability in my community, so I started volunteering every other Wednesday and Friday for two hours. This allowed me to get acquainted with the ReStore staff and know what my responsibilities were. I collaborated with the ReStore manager, Nancy Ingram, about what I could do each time I volunteered and interviewed her for a project I did on raising awareness of resources in the Lafayette community (Figure 1). With this experience in hand, I asked myself this question: How can my volunteering hours at the ReStore help improve the marketing/advertising of their resources and address the housing instability many people face in the Lafayette community and beyond?

Community Partner Description

The ReStore is a nonprofit organization working to “build affordable homes in the Greater Lafayette area to empower families with strength, stability, and self-reliance.” The ReStore is a donation center where every item sold has been donated by members of the community and all the proceeds go to building houses for low-income families around the world (“Restore,” n.d.). Some items they currently sell are flooring, plywood, kitchen appliances, furniture, lighting supplies; almost any items that can be used to remodel a house, they sell.