Growing Local: The Role of Urban Gardening in Fostering Food Security, Sustainability, and Community

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GROWING LOCAL:

The Role of Urban Gardening in Fostering Food Security, Sustainability, and Community

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STUDENT AUTHOR BIO SKETCH

Franklin Wagner is a third-generation Boilermaker originally from Cincinnati, Ohio. He received his BS in environmental and ecological engineering from Purdue in 2017 and completed his master's degree in the department of Forestry and Natural Resources in 2019. His graduate work involved applications of remote sensing for modeling forest structure. He received over $3,000 in grant and award funds during his time at Purdue. He plans to pursue a career in the field of environmental conservation.

FACULTY AUTHOR BIO SKETCH

Dr. Lindsey Payne is a director in the Office of Engagement at Purdue University coordinating service-learning programs and initiatives, as well as an assistant professor in Environmental and Ecological Engineering. She is the recipient of multiple teaching awards and is the chair of the Teaching Academy. She has a BA in biological sciences from DePauw University and MS and PhD degrees in ecological sciences and engineering from Purdue University. She has also worked professionally in the nonprofit and secondary education sectors, and currently serves on multiple community-based environmental boards.

ABSTRACT

The downtown center of Lafayette, Indiana, is situated in a food desert where access to healthy, nutritious food can be limited. Urban gardens are an effective way to increase access to healthy alternatives while also providing a number of benefits to the surrounding area, including opportunities for community growth, education, and physical activity. In summer 2016, researchers from Purdue University collaborated with Lafayette's GrowLocal Urban Gardens Network (GrowLocal) to perform a baseline analysis of the current community gardening initiatives and explore the possibilities for expansion, development, and future community involvement through urban gardening.

Both qualitative and quantitative data collection methods were utilized throughout the research process. Stakeholder perceptions were collected through a series of interviews and focus groups. The findings from this process revealed motivations and barriers to participation. Additionally, the data demonstrated that the urban gardens as community spaces may serve a greater purpose than the fresh, healthy food alternatives they provide. Garden inventories and soil analyses were also collected at each GrowLocal-affiliated garden site. The results of this study were further used to prepare a planning document for GrowLocal that contained the following strategic recommendations: (a) implement a governing structure to partition GrowLocal operations; (b) develop internal and external communication

frameworks; (c) connect with existing events, activities, and programs; and (d) develop a collaborative grant with Purdue University.

INTRODUCTION

According to the USDA (United States Department of Agriculture Economic Research Service, 2016), 59% of Indiana counties are classified as food deserts, areas in which individuals have limited access to affordable and nutritious food—in rural areas this is defined as more than 10 miles from a grocer or supermarket, in urban areas more than 1 mile. Additionally, in 2011, only 6.8% of Indiana high school students and 2.9% of Indiana adults reported eating the recommended amount of fruits and vegetables during the past week (ISDH, 2012). Tippecanoe County, home to Lafayette, Indiana, ranks as one of the worst counties in Indiana in terms of food security, as over 29,000 individuals lack access, at times, to enough food for an active, healthy life for all household members (University of Wisconsin Population Health Institute, 2012; Feeding America, 2016).
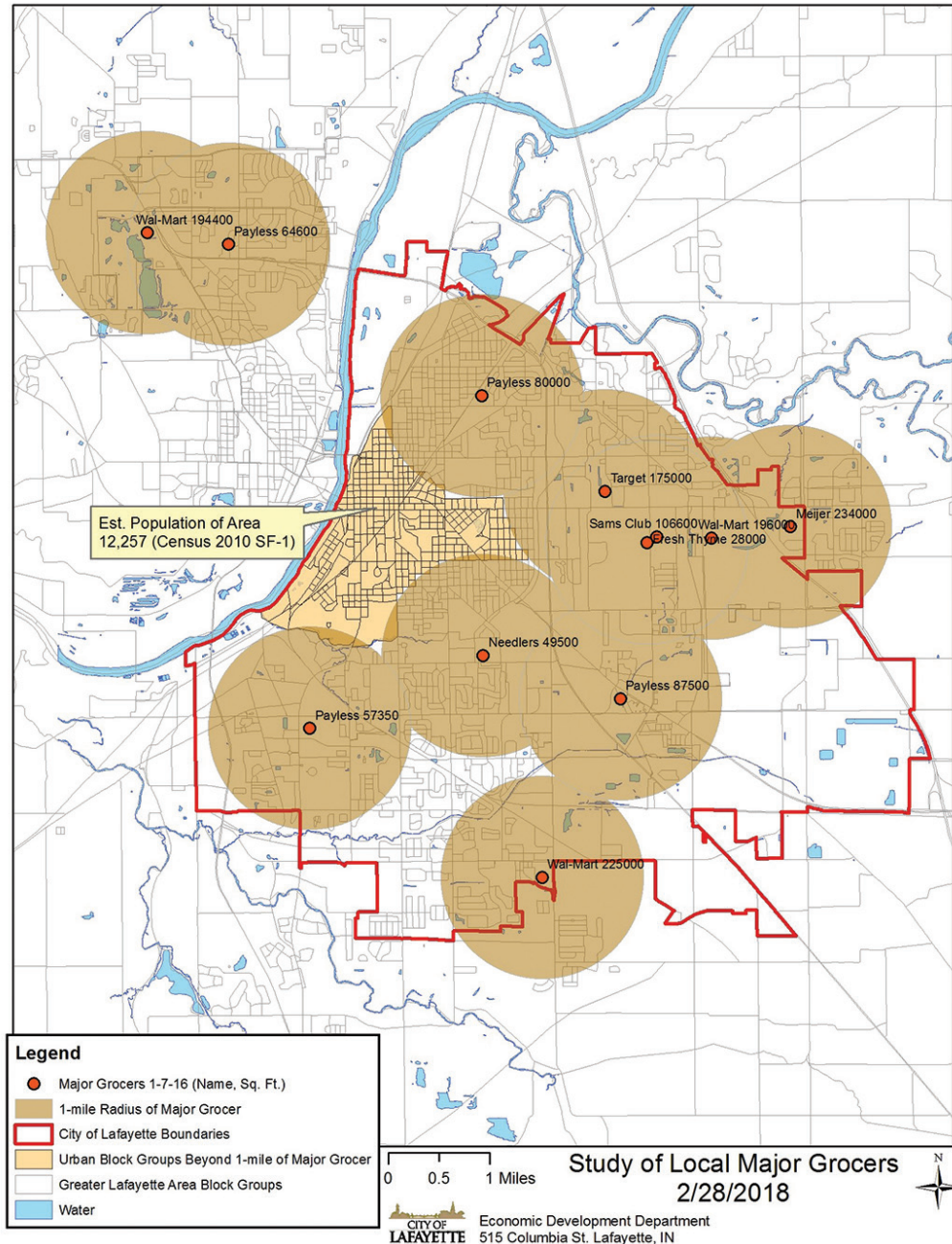

Figure 1. Study of major local grocers in Lafayette, Indiana (2018). Map provided by Dennis Carson, director of economic development for Lafayette, Indiana.

Farmers markets, farm-to-school programs, and urban gardens are ways to increase access to healthy, nutritious foods. Urban gardens, specifically, not only offer access to healthy food but also provide opportunities for physical activity, increased property values, decreased criminal activity, improved water and air quality, and creation of public spaces (United States Department of Agriculture Economic Research Service, 2009). City agencies and local community organizations that often foster the development of such urban gardening spaces additionally cite community building, educational opportunities, economic development, and ecosystem services as anticipated outcomes (Hodgson, Campbell, & Bailkey, 2011). A recent literature review by Santo, Palmer, and Kim (2016) corroborated well-documented benefits in increasing community well-being, a transition to a more environmentally sustainable and resilient food system, and individual health and well-being. Economic development

outcomes, conversely, are the least studied (Hodgson et al., 2011); however, some research has demonstrated an increase in property values and tax revenues (Voicu & Been, 2008; Guitart, Pickering, & Byrne, 2012)

Locally, in Lafayette, Indiana, recent activity in the development of local urban gardens led to the formation of an umbrella organization called GrowLocal Urban Gardens Network (GrowLocal). The fledgling organization is a network of gardeners devoted to supporting and encouraging urban gardening through action, education, and organization, ultimately enhancing community and quality of life. These urban gardens are situated in the downtown center of Lafayette, within the aforementioned food desert.

In summer 2016 researchers from Purdue University collaborated with GrowLocal to conduct a study on local
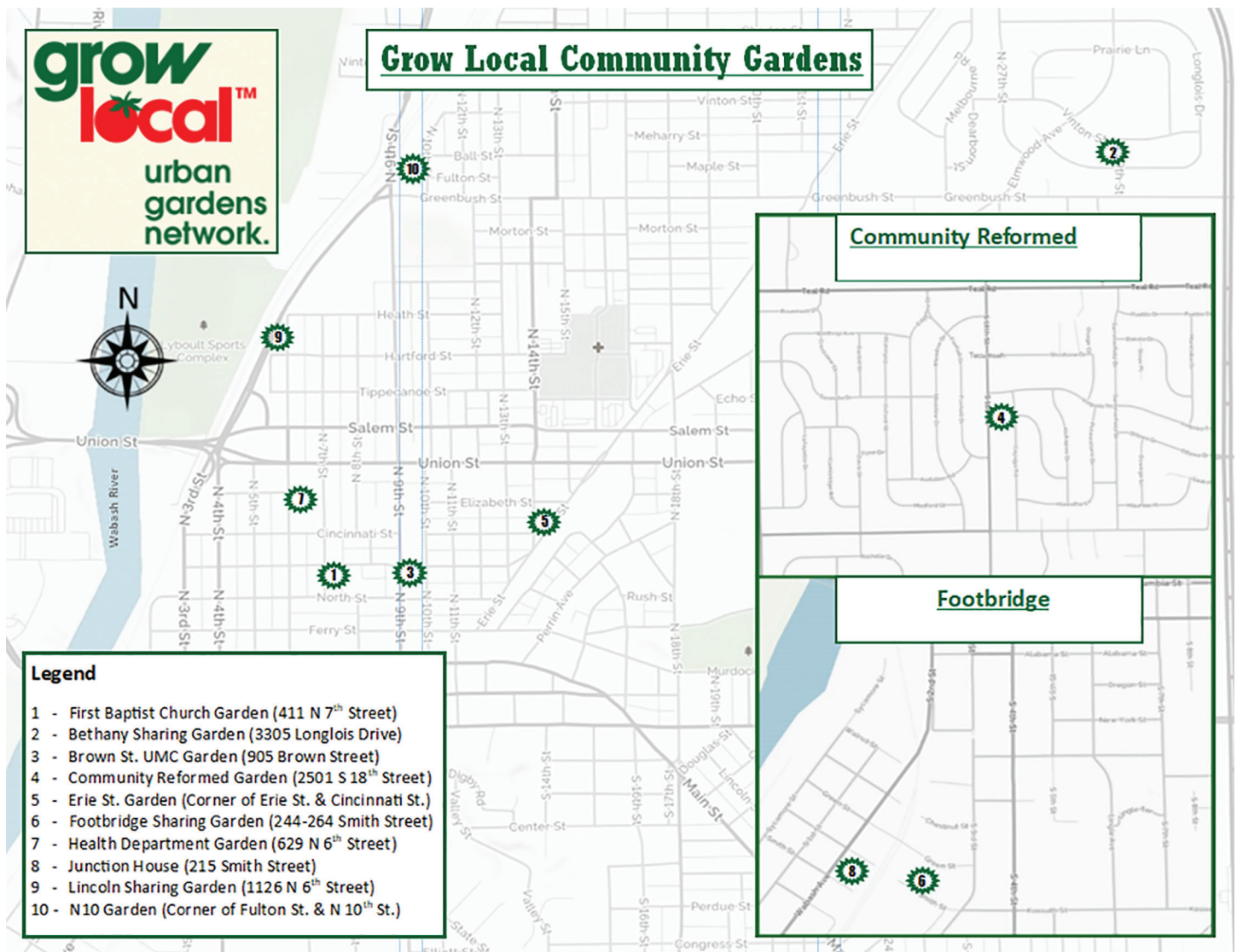

Figure 2. GrowLocal community gardens.

food systems and GrowLocal-affiliated urban gardens to explore their social, environmental, and economic benefits as well as to determine which opportunities and barriers exist for GrowLocal to support and encourage urban gardening through action, education, and organization.

METHODOLOGY

As there is a wide range of individuals, parties, and stakeholders involved with the GrowLocal urban gardening initiative, as well as an interest in interorganizational collaboration, both GrowLocal personnel and individuals from affiliated community agencies participated in this study, including Bauer Family Resources, Food Finders, Hanna Center, Healthy Active Tippecanoe, Right Steps Child Development Center, YMCA, Master Gardeners, and Purdue Extension. GrowLocal personnel included the leadership team and garden managers for each garden.

Both quantitative and qualitative research methods were used for data collection and analysis. Interviews and focus groups were key tools used for the qualitative portion. The interview and focus group guides were developed using the National Research Center's Community Food Project Evaluation Toolkit (2006), as well as the social, environmental, and economic evaluation framework for urban gardens provided by Santo et al. (2016). These guides sought to investigate attitudes, benefits, and behaviors as they relate to the GrowLocal urban garden initiatives. In total, nine interviews were conducted among the GrowLocal leadership, and fifteen individuals from various community agencies participated in three focus groups.

The interview and focus group data were thematically analyzed for emergent themes (Boyatzis, 1998) and coded into categories and subgroups. The four emerging categories included: (a) *local context* surrounding GrowLocal and urban gardening, (b) *motivation* for participating in GrowLocal and urban gardening, (c) *barriers* to participating in GrowLocal and urban gardening, and (d) *recommendations* for improving GrowLocal and urban gardening. Additionally, subgroups emerged under each category. For example, in the motivation category, subgroups included *community building*, *food security*, *knowledge and awareness*, and *personal benefits*.

The collection of quantitative data aimed to gauge existing GrowLocal urban gardening frameworks and compile baseline data, including garden inventories and soil analyses. Field observations involved visiting each GrowLocal-affiliated garden and recording the number

Figure 3. Example GrowLocal community garden (N10 Garden).

of plants of each species in the gardens. Furthermore, the available resources (i.e., compost, signage, water source, tools, etc.) at each garden site were recorded and inventoried.

Additionally, 10 or more random subsamples of soil were collected at each site and mixed in order to acquire a composite sample for each garden site. Samples were then analyzed for general soil properties, available nutrient concentrations, and contaminants. With respect to contaminants, the main constituent of interest was lead concentration, and with respect to soil fertility the focus was on nutrient and organic matter content.

All of these properties are influential with regard to how effective and safe a soil is for gardening purposes. They can also influence what management strategies will be most effective for achieving maximum garden productivity.

RESULTS

The outcomes of this exploratory study are presented below beginning with the qualitative data, then

Figure 4. Soil sampling at the Lincoln Sharing Garden.

Figure 5. Interview and focus group stakeholder responses for motivation, barriers, and recommendations surrounding community gardening and GrowLocal.

quantitative data, and finally recommendations. Perhaps the most significant outcome was the feedback collected through the interview process. Not only did these responses shed light on the attitudes, benefits, and behaviors of stakeholders as they relate to urban gardening and more specifically GrowLocal, but they also provided key considerations and recommendations for strengthening the GrowLocal urban garden initiative.

Among the responses collected, *community building* was found to be the most prevalent motivation for being involved with urban gardening. *Food security* was found to be the second highest motivation in terms of responses coded. This result is consistent with an idea presented in the literature that suggests that the capability of urban gardens to provide fresh and accessible food may in fact not be their most realized benefit (Santo et al.,
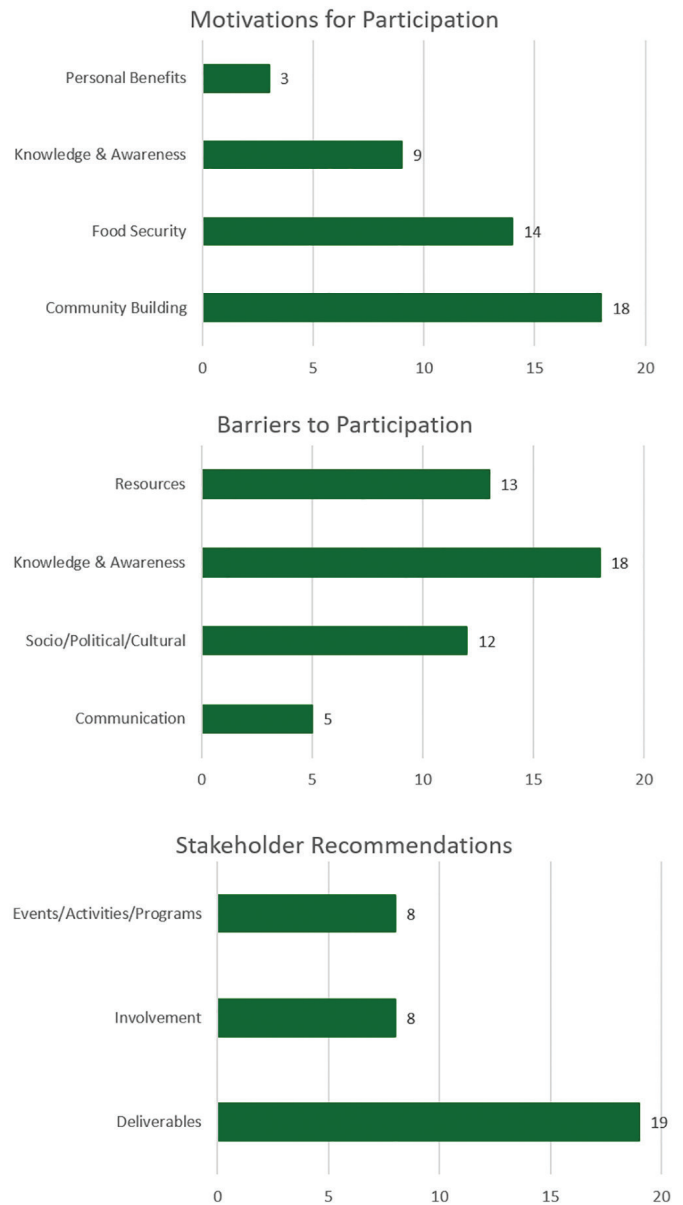
2016). Their functionality to act as a community space serves as a mechanism for community building as well as strengthening neighborhood bonds and identity. This has a compounding effect, as it compels individuals to explore sustainable practices and be more involved with the development of their community.

Barriers to urban gardening participation was another frequently mentioned topic in interviews, with *lack of knowledge and awareness* cited most frequently among participants. This is a multifaceted issue with a variety of components that all actively reinforce each other. Primarily, there is widespread interest in engaging with urban

gardening; however, people are not aware that these opportunities exist in their community. A second obstacle to participation is effective communication targeted toward the public regarding GrowLocal's urban gardening initiatives. This obstacle also pertains to a lack of efficient communication and organization both within the GrowLocal structure and between affiliated agencies. As GrowLocal continues to develop and expand, inter- and intra-agency communication will be crucial in accomplishing its mission. The final component related to a *lack of knowledge and awareness* concerns a deficiency in the knowledge and skills needed for urban gardening.

The main intent of reporting garden inventories for each garden was to understand the resources used by GrowLocal-affiliated gardens. Having this initial

record of what was available at each site will allow the organization to gauge growth and development moving forward. It also can prove useful when strategizing how to best allocate available funds and materials in the future. Inventories for each garden site are included in Table 1. As may be expected, on-site water is available at every location except for the Footbridge Garden, which was not in production when this study was completed. As for the availability of other resources, there is much more discrepancy from site to site.

The primary quantitative results that came out of this study were the garden soil analyses. A range of soil properties and characteristics were measured as part of the contaminant and soil fertility analyses. Table 2 shows key results of the soil fertility analysis. As would be

Table 1. GrowLocal garden amenities and inventories.

Garden	Species	Water	Compost	Signage	Tools	Mulched	Area (ft²)
First Baptist Church	13	✓		✓	✓		2,100
Bethany Sharing	6	✓	✓			✓	1,500
Brown Street UMC	15	✓	✓	✓	✓		2,444
Community Reformed	10	✓			✓	✓	1,500
Erie Street	14	✓					5,600
Footbridge	—	—	—	—	—	—	3,000
Health Department	5	✓				✓	150
Junction House	20	✓			✓		400
Lincoln Sharing	11	✓	✓	✓		✓	2,400
N10	21	✓	✓	✓	✓	✓	3,800
Totals	—	9	4	4	5	5	22,894

Table 2. GrowLocal garden soil analysis results.

Sample ID	Organic Matter %	Soil pH	CEC (meq/100 g)	Phosphorous (P-M3) (ppm)	Potassium (K-M3) (ppm)
1	2.7	7.7	20.0	50 (H)	153 (M)
2	2.6	6.8	13.7	159 (VH)	144 (M)
3	13.1	7.5	36.6	645 (VH)	1097 (VH)
4	4.8	7.5	27.0	315 (VH)	211 (H)
5	6.4	7.7	28.5	221 (VH)	246 (H)
6	9.1	7.5	41.5	74 (VH)	142 (M)
7	5.2	7.7	24.1	95 (VH)	129 (M)
8	2.9	7.6	17.1	59 (H)	148 (M)
9	5.7	7.7	23.4	174 (VH)	269 (VH)
10	4.4	7.4	21.2	262 (VH)	239 (H)

M = moderate, H = high, VH = very high. Testing was performed by A&L Great Lakes Laboratories. Specific gardens are not listed for confidentiality reasons.

expected, the results vary from site to site. The percentage of soil organic matter (%OM) is highly variable and is arguably most influenced by whether a site used raised beds as a growing medium. The soil pH among the gardens is much less variable than %OM and represents acceptable growing conditions. The main outcome from the soil fertility analysis is that none of the gardens exhibits significant deficiencies. The %OM could preferably be higher in some sites as this would help produce higher seasonal yields, but all sites represent suitable conditions for urban agricultural projects. With regards to contamination, there were no instances of alarming or toxic levels of any compound. As mentioned, the main constituent of interest was soil lead levels, and these fell in typical ranges for urban soils. The variability in these values is probably largely a result of past land uses and site histories.

Finally, based upon the results of this study, a number of different deliverables were prepared as resources for GrowLocal. The function of these deliverables ranges from advertisement to facilitating organizational structure. Specifically, the deliverables were aimed at combating some of the challenges and obstacles brought forth during the interview process. Foremost, a memo for the GrowLocal leadership was provided including the following recommendations: (a) implement a governing structure to partition GL operations; (b) develop internal and external communication frameworks; (c) connect with existing events, activities, and programs; and (d) develop a collaborative grant with Purdue University.

Both an advertisement brochure and a map of garden locations (Figure 2) were prepared for distribution by GrowLocal to promote and raise awareness surrounding the gardens. The development of these, both in terms of content and formatting, was an iterative feedback process with GrowLocal leadership at organizational meetings. In particular, the map is a useful tool for incentivizing community involvement and general awareness.

Figure 6. GrowLocal brochure.

A membership agreement form was also compiled for the group. This facilitates structure and represents a formal commitment to the development of the organization and expansion of urban gardening in Lafayette. The document lays out specific member expectations as well as membership benefits. Since the document was initially shared with GrowLocal, garden membership has doubled, which not only points to the effectiveness of the membership agreement but also highlights the community's genuine interest. While an urban garden can certainly exist and thrive in Lafayette without being affiliated with GrowLocal, membership in the group opens opportunities for collaboration, involvement, and outreach that may have otherwise not been possible.

COMMUNITY IMPACT

How the GrowLocal organization has grown since this research commenced is representative of the beneficial impact of this work. While the interview and focus group processes provided insight to us as researchers, they also seemed to provide insight for those who participated. The processes provided our stakeholders with the evidence they needed that the interest and excitement *is* out there for urban gardening. This evidence certainly seems to have generated momentum within the organization to develop and strengthen initiatives and increase community involvement.

The deliverables provided for the organization have already begun to be incorporated in planning and development strategies—notably, a formalized board structure and bylaws have been put in to place by the organization. Hopefully, some of the opportunities for engagement and outreach that were identified as part of this study will serve to motivate collaboration down the road between GrowLocal and Lafayette community agencies. It is apparent that the interest in urban gardening among the general public and agency personnel is there. The main obstacle, however, seems to be bridging the gap between interest and active participation. This speaks to the importance of continued, sustained, and effective communication not only within GrowLocal itself but especially between GrowLocal and both other community agencies and the general public.

Both researchers who worked on this study have continued to be involved with GrowLocal since the study's conclusion. In autumn 2017, Wagner received the Purdue Service-Learning Grant from the Office of Engagement for work involving this project. This grant awarded $1,500, which has been used to install dedicated, permanent signage at each GrowLocal-affiliated garden, addressing an identified communication need. This signage is extremely valuable, as it allows for the posting of garden rules and expectations, gardening tips, advertisement material, and other relevant information pertaining to GrowLocal and community activities. Wagner has additionally presented at poster sessions to spread awareness of GrowLocal and the positive difference it is making in the community. Even before this research commenced, Payne was involved with one of the community gardens (N10), and continues to serve as the operations chair. Furthermore, Payne now serves on the GrowLocal leadership and development team.

STUDENT IMPACT

This research study has been a tremendously enriching experience for Wagner, both professionally and personally. It has proved to be a very unique opportunity to apply skills that are not normally incorporated in a classroom setting. Verbal and written communication are both critical skills in the professional environment, and this project was a great opportunity to develop those skills, most prominently through creating questionnaires and leading focus groups and interviews.

The study also represented a unique networking opportunity and gave me the chance to give back to the area that I have called home for the past six years. Furthermore, I have never actively participated in gardening to any extent, and so this was both a very enriching and worthwhile experience from the standpoint of gaining new knowledge and skills. This study also increased my aspirations to work with sustainability and social engagement moving forward into my career. As I hope to work in conservation and environmental management, effective outreach with the general public will be a crucial component of that endeavor. Making people aware of the fact that they *can* make a difference is both important and valuable. Sustainable practices and values will continue to gain importance moving forward, and urban agriculture is one such practice that represents a unique opportunity to improve quality of life while also strengthening community bonds.

The main challenge I came across while participating in this study was developing interview questions that were effective in eliciting the type of responses for which we were hoping. This was an iterative process in which we not only drew from literature but also integrated feedback from GrowLocal personnel through organizational meetings. The qualitative data collection proved more challenging than the more traditional quantitative data collection techniques. This was a valuable learning

experience, as qualitative data collection can oftentimes be seen as "easier," when this is certainly not the case.

CONCLUSION

The purpose of this research study was to conduct an exploratory study for the GrowLocal affiliated urban gardens in the Lafayette, Indiana, community. Motivations and barriers associated with urban gardening were investigated, and these provided insight into opportunities and possibilities for further strengthening gardening infrastructure, networking, and community engagement. Additionally, we were able to provide recommendations and strategies that will facilitate the development, expansion, and community integration of GrowLocal.

This study also presents a unique opportunity for continued involvement and future research as GrowLocal and urban gardening continue to attract interest and involvement. Some of the specific findings could warrant further, more detailed probing (e.g., Why is community gardening such a powerful social medium?). Another important consideration with any localized social endeavor is how that system translates to some other context. What works best in Lafayette, Indiana, is probably not identical to what will work best in Phoenix, Arizona—but can these lessons and strategies be transferable? Developing plans that can overcome spatial and temporal differences is an important consideration that can help to improve the overall resilience and efficiency of urban agricultural systems.

Through this work, it is our hope that GrowLocal will continue to develop and expand upon their efforts to support and encourage urban gardening through action, education, and organization, ultimately enhancing community identity and quality of life in Lafayette, Indiana. In areas where healthy, affordable foods are not readily available, urban gardening can be a legitimate tool for improving food security, increasing sustainability, and elevating community ties.

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