

Ability Score

Low

High

EXPLORING URBAN AGRICULTURE AS A VACANT LAND USE SOLUTION IN SAGINAW, MICHIGAN

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Executive Summary

The Saginaw Basin Land Conservancy (SBLC) has worked diligently to restore vacant lots in Saginaw, Michigan through a variety of conservation projects such as cultivating native pollinator gardens and removing invasive species. Focusing on the city of Saginaw, SBLC is now exploring sustainable solutions to the challenges posed by vacant land management. Urban agriculture is a strong candidate as a vacant land solution because of its potential to provide environmental and sustainability benefits such as increased fresh food production, job opportunities, community empowerment, and land stabilization (Carlet et al 2017, Horst et al. 2017).

Prior to moving forward with any alternative land use projects, however, SBLC will first holistically evaluate the quality of the initiative, with special consideration for community input and perspectives. A proposed urban agriculture initiative would first need to be confirmed as an appropriate solution for the community, a feasible venture within the local policy environment, and a safe and environmentally sustainable use of the land before further development by SBLC. In order to explore the potential for urban farming as a vacant land-use solution in Saginaw, our 2020 Dow Fellows team conducted a holistic feasibility assessment incorporating three different components: a community assessment, a policy analysis, and a GIS suitability analysis.



Methods

A community assessment and policy analysis were conducted collaboratively to understand local perspectives as well as policy barriers and opportunities with regard to urban agriculture in the City of Saginaw. This work involved conversations with diverse stakeholders across Saginaw through 18 semi-structured interviews. These were analyzed within the community assessment using qualitative data coding techniques. The policy analysis utilized interview data to construct a brief policy ethnography alongside a review of Saginaw's local ordinances to evaluate urban agriculture's existing status as a permissible land use. Using this social and material data, policy issues were defined through social science and public health theoretical frameworks. This process resulted in recommendations to promote a sustainable and equitable urban agriculture system in Saginaw.

The GIS suitability analysis was conducted in ArcGIS Pro to identify the best vacant land parcels for farming on vacant land parcels based on the following weighted criteria solicited from SBLC: (1) parcel density and size, (2) proximity to potential irrigation sources, and (3) distance from major highways. Vacant parcels were considered more suitable if they were larger, closer to other vacant parcels, within 50 feet of a fire hydrant or 200 feet of a water well, and at least 100 feet away from all major truck routes. Highly suitable parcels were highlighted in a series of map displays that visually overlaid zoning ordinances and local community organizations such as neighborhood associations and faith-based establishments for further consideration.

Results

The suitability analysis results revealed an area of land that would be considered highly suitable for urban agriculture in Saginaw's northeast region. This "hub" fell primarily within the following zoning groups: residential, business, and business allowing closed environment agriculture. Interviews with community stakeholders identified some initial perspectives regarding perceived benefits and concerns for urban agriculture in Saginaw. Benefits include new fresh food options, neighborhood beautification, and community empowerment and education. Concerns centered around program sustainability and equity, health risks of environmental contamination, and uncertainty about support from the local land bank for urban agriculture in Saginaw. Several key policy issues serve



to frame the structural issues associated with vacant land challenges, and the community impacts of urban agriculture as a potential land-use solution were identified. These include:

- Blight as a Legacy of Community Disinvestment and Dislocation
- Resident Impact and Input: Centering Community Priorities in Food Systems Planning
- Land Use Planning and Environmental Health
- Urban Agriculture Feasibility Within the Local Policy Environment
- Transitional Land Use, Gentrification, and Social Vulnerability

Recommendations

This report includes recommendations and proposed next steps based on the collective insights drawn from the GIS suitability analysis, community assessment, and policy analysis. Report recommendations are categorized under (1) urban agriculture planning and zoning recommendations, (2) equitable food systems policy process recommendations, and (3) recommended action for community empowerment and protection. These recommendations should be considered as possibilities to inspire SBLC and other key stakeholders to develop the most equitable and sustainable urban agriculture system possible. While these recommendations are extensive in scope, they do not fully encompass all considerations, and this report addresses some of these missing elements by discussing limitations and recommended next steps for additional research.

Anticipated Impacts

The results of this multi-component exploratory study have laid much of the groundwork for SBLC and the City of Saginaw to evaluate urban agriculture as a sustainable option for vacant land use in Saginaw, taking into account community perspectives and policy issues, and decide whether or not to move forward with this alternate land use initiative. In addition, the suite of GIS maps and detailed policy and community-centered recommendations will allow SBLC to communicate key insights to stakeholders, potential community partners, and grant committees. Finally, our report also provides context for other sustainable land use solutions, additional research into urban agriculture in Saginaw, and continued conversations with community members to ensure that any new initiative meets their most salient needs. Should SBLC decide to move forward with urban agriculture in Saginaw, there is also the potential for several United

Nations Sustainable Development Goals (SDGs) to be advanced, including **SDG 2: Zero Hunger**, **SDG 11: Sustainable Cities and Communities**, and **SDG 15: Life on Land**.

Limitations and Next Steps

Due to time and other constraints, the data conveyed here do not fully include all important Saginaw stakeholders and do not include environmental safety assessments. Data was also analyzed independently and, therefore, does not always represent a group consensus. These limitations advise suggested next steps for SBLC.

Based on the preliminary work conducted by this team, this report recommends further investigation regarding:

- Best practices for the economic viability of future urban farms and programs
- Additional engagement with community organizations and residents
- Soil and water quality and safety testing
- Additional GIS analyses





Introduction and Background

The City of Saginaw embraces a tight-knit community that has weathered multiple changes in its industrial economy. After reaching its peak population in 1960, the City of Saginaw has seen continued population decline and property foreclosures that have resulted in over 6,000 plots of vacant land. Management of these vacant properties continues to carry a high-cost burden through demolition, mowing, and snow removal, while illegal waste dumping further extends resources. This poses a challenge for the Saginaw County Land Bank, which continuously maintains these lots through the seasons with a limited budget and reduced tax base. Additionally, most Saginaw residents live considerable distances from grocery stores, reducing food accessibility in many neighborhoods. However, within these challenges lies the potential for a coordinated community effort to explore the simultaneous opportunities of local fresh food production and vacant land stabilization.

Given the strains of urban blight on the local government and surrounding neighborhoods, the Saginaw Basin Land Conservancy (SBLC) has worked diligently to restore vacant lots in Saginaw through various conservation projects. This has included cultivating gardens for native pollinator insects and removing invasive species of plants. Focusing on the city of Saginaw, SBLC is now exploring alternative options for vacant land use, including the potential for a thriving network of urban agriculture operations. This concept has been proposed to improve environmental sustainability, beautify the landscape, empower the community, and provide new sources of fresh food.

In 2020, SBLC partnered with our graduate student team from the University of Michigan Dow Sustainability Fellows Program to conduct an assessment that explored the possibility of introducing an urban agriculture program in Saginaw. This assessment was developed from SBLC's dedication to thoroughly evaluate the challenges and opportunities posed by urban agriculture, its potential impacts on the surrounding community, and considerations for long-term sustainability. Our team undertook this study with three focal components:

- 1) a community assessment to understand local perspectives about urban agriculture and its expected impacts
- 2) a policy analysis to evaluate key issues, policy barriers and facilitators for urban agricultural land use, and

- 3) a geographic suitability analysis to determine appropriate locations for a potential agriculture operation.

This multidimensional approach allowed our team to create holistic recommendations for SBLC and the City of Saginaw to make informed decisions regarding the appropriateness of urban agriculture in the community and its efficacy as a sustainable land use strategy.

Methods

The community assessment was conducted cooperatively with the policy analysis and focused on perspectives from local organizations and community leaders in Saginaw. Eighteen semi-structured interviews were conducted remotely and recorded with verbal informed consent from participants (Table 1). Participants were identified through recommendations by SBLC and other interview participants. Interviews were coded for the community assessment to identify important themes that emerged across the different participants. Following early collaboration on a case study of urban agriculture policy priorities in Michigan (Rib et al., 2020), this localized policy analysis utilized interview data to construct a brief policy ethnography alongside a review of Saginaw's local ordinances to evaluate urban agriculture's existing status as a permissible land use. Using this social and material data, policy issues were defined through social science and public health theoretical frameworks. This process resulted in recommendations to promote a sustainable and equitable urban agriculture system in Saginaw.

Table 1: Breakdown of interview participants

6 representatives from local non-profit organizations	1 representative from one neighborhood association
4 representatives from city government and planning offices	1 representative from the Saginaw County Land Bank
2 representatives from local community gardens	1 representative from the Saginaw County Health Department
1 representative from the Saginaw County Chamber of Commerce	1 representative from Saginaw Conservation District
1 representative from the Saginaw Intermediate School District	



“There’s a huge need. There’s a lot of passion for things like this in our community. So I think if there’s any place where it could be successful, it’d be here.”

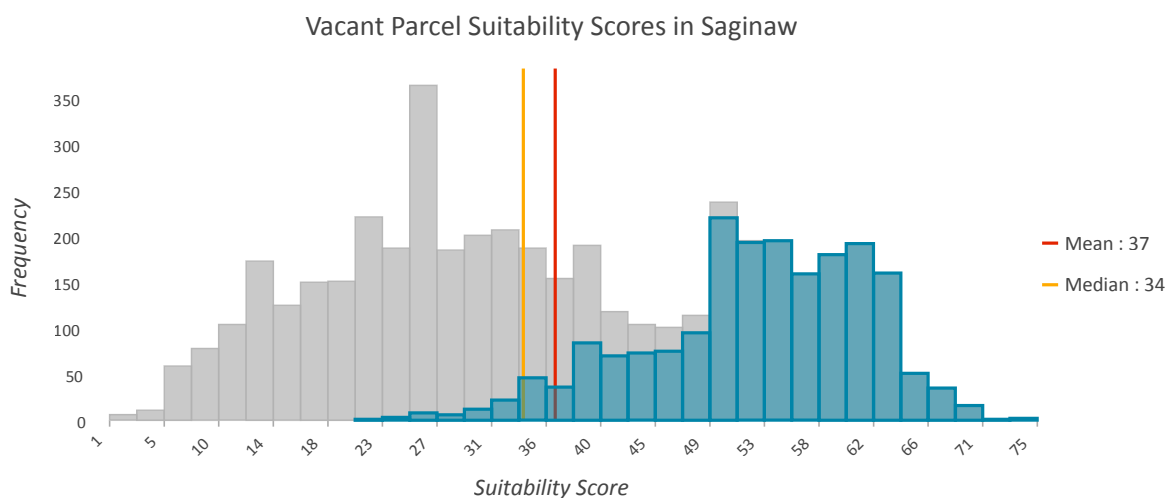
For the suitability analysis, consultation with SBLC established a set of weighted criteria that were initially defined to identify the vacant land parcels most logistically practical for an urban farming operation. High suitability was defined by larger vacant lot size, higher vacant land parcel density, closer proximity to potential irrigation sources (i.e., water wells and fire hydrants), and further distance from major roads (i.e., truck routes). Data layers were processed in ArcGIS Pro (Version 2.6), and a suitability analysis was carried out to score each vacant parcel on a scale of 1-100 based on how closely it met the criteria. Parcel size and density were prioritized in this analysis due to a preference for relatively larger vacant parcels that could support more crop variety and potentially allow room for farming machinery and structures such as hoop houses. Parcel density, or areas with a high spatial concentration of parcels, was also desired to facilitate the expansion of urban farming operations to nearby parcels. Fire hydrants and water wells were included as potential irrigation sources, but fire hydrants were prioritized over water wells due to their higher abundance and regular spacing in the city. Distance from major truck routes was also included as a security consideration for an urban farming operation and to parse out areas located closer to residential centers. To draw relationships with the policy analysis and the community assessment, proximity to nearby community organizations and zoning considerations were highlighted in subsequent map overlays.

Results

Suitability of urban agriculture based on geographic relationships

The suitability analysis results revealed a “hub” of land that would be considered highly practical for an urban agriculture operation in the northeast region of Saginaw. Vacant parcels in this high suitability hub tended to be larger, more densely clustered, located closer to potential irrigation sources, and further from major roads. Ranging from 23 to 75 on a scale of 1-100, suitability scores in the northeast region of Saginaw were higher than the overall mean and median of all parcels indicating higher than average suitability in the hub (Figure 1).

When overlaid with a map of zoning ordinances in Saginaw, this hub of highly suitable vacant land parcels fell within the following zoning groups: residential, business, and business allowing closed environment agriculture. This overlay illustrates the relationship between the suitability criteria and current zoning practices. This map helped to prioritize the policy analysis of ordinances impacting zoning areas wherein the most suitable parcels are located. Residentially-zoned lots were the most predominant intersection in the overlay, reaffirming the significant role residents must play in considering urban agricultural land use and its potential benefits. Lots zoned for business allowing closed environment agriculture held promise for supporting this specific form of farming but intersected with a smaller proportion of suitable lots. Some areas zoned for industrial activity fell within the high suitability region, and these parcels were removed from this overlay map, as these sites likely hold



“I think that in the long run, it’s going to be a better place to live, work and play for the citizens who live [here]. So I think that, for me, I know that there’s a lot of potential.”

Community Organizations Near Suitable Vacant Land Parcels

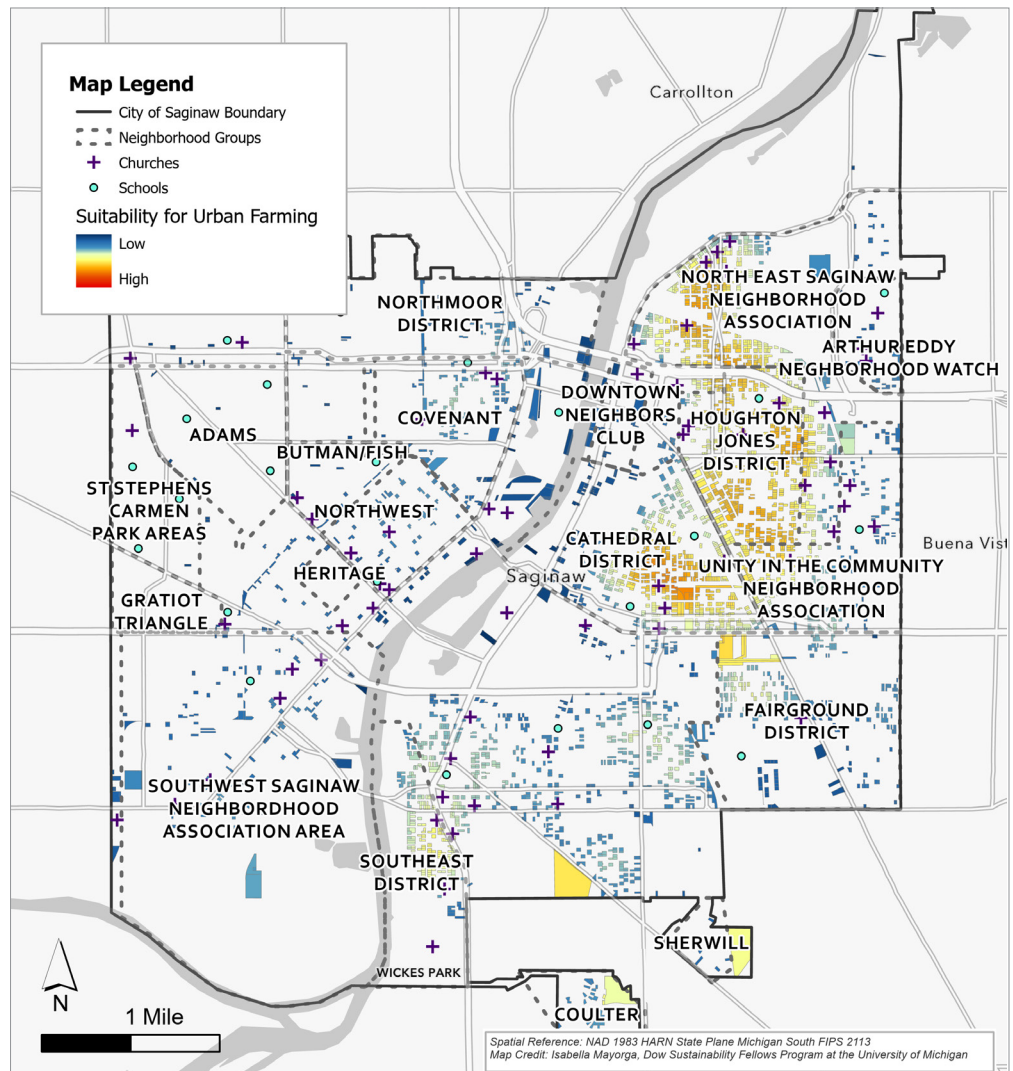


Figure 2: Suitability scores for each of the vacant parcels in Saginaw according to parcel size and density, proximity to fire hydrants and water wells, and distance from major roads. The locations of nearby community organizations are overlaid.

a significant risk of environmental health hazards for food production. Further policy implications are discussed in the policy analysis.

Three schools fell within the orange-yellow hub region and at least 5 faith-based organizations fell well-within the region (Figure 2). Overlapping neighborhood groups most notably included the Northeast Saginaw Neighborhood Association, the Houghton Jones District, the Unity in the Community Neighborhood Association, and the Cathedral District. This proximity could be considered beneficial as the success of a potential urban agriculture operation would largely be determined by the support of residents and nearby community organizations.

Community-Defined Benefits and Disadvantages

Interviews with community stakeholders helped to identify some initial perspectives regarding perceived benefits, concerns, and opportunities for urban agriculture in Saginaw. While we recommend further community engagement to develop community-centered and sustainable programming, the predominant themes that emerged from these community conversations are summarized in Table 2.

Table 2: Summary of commonly cited benefits and disadvantages of urban agriculture as expressed by community stakeholders.

Benefits and Opportunities	Disadvantages and Concerns
<ul style="list-style-type: none"> • New source of fresh, healthy, and affordable food options • Neighborhood beautification with opportunities for outdoor recreation and exercise • Community empowerment and cohesion fostered through relationships and collaboration • Community education and youth development to promote knowledge of food, nutrition, cooking, and skill development • Potential business and job growth in the city 	<ul style="list-style-type: none"> • Uncertainty about having sustainable funding, staffing, and leadership • Health risks associated with possible soil and water contamination on vacant land or as a byproduct of agriculture • Initiatives that are not community-centered may result in social exclusion and inequities • Divergent impressions about Saginaw County Land Bank support for urban agriculture
<p>“Benefits? I mean it is fresh produce. That’s wonderful for our community and people in need. It’s an additional food source, so that is a benefit.”</p> <p>“I think that the advantage would be, one, it would be pretty. It would look attractive, and it would have purpose.”</p>	<p>“I think the only disadvantage would be if the people running it are running it without equity in mind or running it without a community perspective in mind. We see a lot of projects that could be really awesome happen in Saginaw and then they hire people to run it who maybe are business people or don’t have experience doing public health work, and it’s really obvious.”</p>



Key Policy Issues

Blight as a Legacy of Community Disinvestment and Dislocation

To critically consider sustainable vacant land stabilization solutions, it is necessary to consider the historical context of the current magnitude of blight. Community disinvestment and dislocation have created a legacy of blight within Saginaw. Justice-centered urban agriculture policies consider the psychosocial and economic toll of disinvestment on long-term residents, and prioritize equity and inclusion in decisions that can reshape the community's future.

Resident Impact and Input: Centering Community Priorities in Food Systems Planning

Understanding the beneficial and concerning impacts of urban agriculture for residents will be critical for implementing effective urban agriculture initiatives. Including stakeholders and residents in the planning and policy development process is necessary to build trust and equitable relationships across the city. An effective community development project is one where community members feel shared ownership of decisions, direction, and impact.

Land Use Planning and Environmental Health

The environmental health impact of urban agricultural activity will depend largely on the regulation of activities, pest management strategies, and existing contamination of potential sites. It is essential to identify potential sources of environmental health risks when selecting sites and establishing policies.

Urban Agriculture Feasibility Within Planning and Zoning Policy Environment

Under the existing Saginaw Code of Ordinances, urban agriculture is not a permissible land use in most areas of the city. The upcoming 2021 City Master Plan and future city ordinances will need to include specific policies to include and promote urban agriculture as a permissible and sustainable land use.

Transitional Land Use, Gentrification, and Social Vulnerability

City greening projects in communities with legacies of disinvestment can at times present a risk of gentrification and land dispossession without adequate consideration for existing residents. Urban agriculture policies and programs require simultaneous protective measures against gentrification and land dispossession as a possible long-term outcome of green development.

Recommendations

This set of recommendations is a summary of best practices guided by the overall results of our synthesized findings in this Dow Fellows team project. The following recommendations are intended to illuminate how urban agriculture in Saginaw can be realized while prioritizing community goals and insights, protecting public health, and planning for a more just and equitable food system. All recommendations within this study are preliminary, as COVID-19 conditions limited engagement and collaboration with city residents. We strongly encourage further community engagement to incorporate all critical stakeholders prior to adopting policy and program recommendations. Further information pertaining to these recommendations and citations can be found in the policy report.

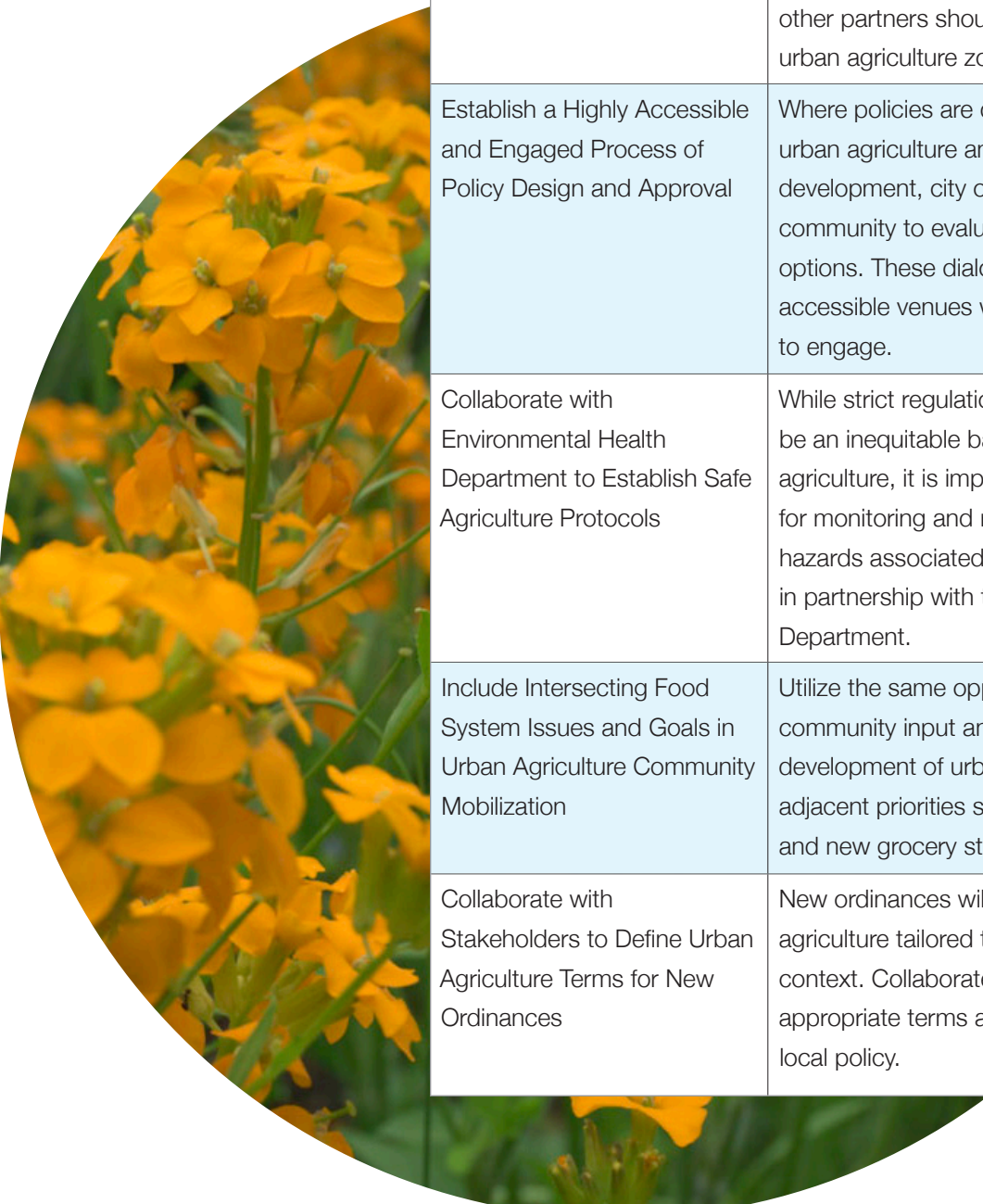




Urban Agriculture Planning and Zoning Recommendations	
Include Urban Agriculture as a Land Use in the 2021 City Master Plan	In order to create a permissible environment for urban agriculture, ordinance changes must be preceded by the inclusion of urban agriculture within the Master Plan. As it is currently under revision, the Board of Commissioners must include urban agriculture as a community priority and land use option in 2021.
Design and Implement an Urban Agriculture Ordinance for the City of Saginaw	Many cities create a unique urban agriculture ordinance to address agriculture and gardening as a special use or by-right use of private or public land. City officials should collaborate with local stakeholders to create and implement a formal urban agriculture ordinance for the City of Saginaw.
Include By-Right or Permitted Use Policies for Residential and Community Gardening	As a matter of equity and food justice, an urban agriculture ordinance must extend food production privileges to community organizations and individual residents on private land not held by the land bank.
Establish Community-Defined Urban Agriculture Overlay Zone(s)	Currently, urban agriculture is not permitted in the most suitable areas of the city due to zoning. Without removing existing classifications of zoning regions, a new type of zoning should be designed as an overlay code to suitable urban agriculture areas, with the boundaries of urban agriculture zones supported by residents of the proposed zone.
Require Soil and Water Testing Prior to Urban Agriculture Use Permitting	Urban agricultural activities should be regulated by a standard of public health and safety, and require that soil and water contaminants on site do not pose a threat to workers, consumers, or the neighboring communities.
Permit Greenhouses and Hoop Houses on Vacant Lots Without Primary Structures	Currently, these structures are classified as accessory buildings to a primary structure. Within urban agriculture zones, accessory structures needed for farming activities should not require a primary structure, as most of these properties are vacant.



Urban Agriculture Planning and Zoning Recommendations	
Incorporate Occupational and Environmental Safety Measures into Urban Agriculture Ordinances	Pest management, machinery utilization, and other commercial production activities should be regulated to protect the safety of residents in urban agriculture zones. This language should be developed in consultation with the Environmental Health Department.
Permit On-Site and Sidewalk Sale and Distribution of Produce	Currently, these activities are not permitted in residential districts. Ordinance language should allow for on-site availability of fresh produce to local community members.
Include Permissive Language for Co-Location of Pollinator Propagation Activities	While pollinator propagating activities have been difficult to establish independently from urban agricultural activities on vacant lots, efforts should be made to consider and permit activities enhancing pollinator habitat and biodiversity in Saginaw, as this will benefit agricultural activities as well.
Include Permissive Language for Edible Forestry/Orchards	Some lots may be better suited for edible forestry, and thus an urban agriculture ordinance must include language to permit this land use.
Evaluate Community Interest in Urban Animal Husbandry and Beekeeping and Develop Ordinances Accordingly	These activities can often overlap with nuisance ordinances and demand direct input from local communities about inclusion of new ordinances to permit animal husbandry and beekeeping in residential zones.



Equitable Food Systems Policy Process Recommendations	
Mobilize Stakeholders to Establish a Saginaw Food Policy Council	In cities across the country, Food Policy Councils are mobilized to take on advocacy work across priority issues such as urban and peri-urban agriculture, grocery stores, school nutrition, and food waste. Stakeholders should mobilize to form a long-term organizing body for local food systems policy advocacy.
Utilize Community Benefits Agreements for Food System Development	Community Benefits Agreements (CBA) are often used in community (re)development projects to determine and agree through a contract to the direct impacts communities can expect to see. SBLC and other partners should work with residents of future urban agriculture zones to develop CBAs.
Establish a Highly Accessible and Engaged Process of Policy Design and Approval	Where policies are designed and drafted for urban agriculture and food systems change and development, city officials should work with the community to evaluate the quality of the policy options. These dialogues should be held in highly accessible venues where residents have opportunity to engage.
Collaborate with Environmental Health Department to Establish Safe Agriculture Protocols	While strict regulation of use and activities can be an inequitable barrier to participation in urban agriculture, it is imperative to develop a protocol for monitoring and reducing environmental health hazards associated with urban agriculture activities in partnership with the Environmental Health Department.
Include Intersecting Food System Issues and Goals in Urban Agriculture Community Mobilization	Utilize the same opportunities for continuing community input and collaboration for the development of urban agriculture to consider adjacent priorities such as improved transportation and new grocery stores.
Collaborate with Stakeholders to Define Urban Agriculture Terms for New Ordinances	New ordinances will require terms and definitions for agriculture tailored to Saginaw's specific community context. Collaborate with stakeholders to develop appropriate terms and definitions that will impact local policy.



Recommended Action for Community Empowerment and Protection	
Establish a Farmer Training and Employment Program	Farmer Training and Employment Programs should be established to develop a local source of urban agricultural expertise. These programs should promote equity, empowerment, and racial and economic justice within the city, and prioritize local participants to meet the need for urban farming expertise.
Establish Equitable Land Tenure Policies and Programs	Programs should be developed in partnership with the Land Bank to assist farmers in the establishment of long-term urban agriculture projects that will remain as resources within the community as a sustainable local resource.
Ensure Urban Farms Can Acquire Adequate Resources for Long-Term Viability	Long-term funding options and additional resource needs must be identified and acquired to support urban agriculture as a sustainable and equitable land use within the city. This is a critical aspect of future food system planning.
Prioritize Distribution of Vacant Land Back to Long-Term Residents in the Community	Collaborate with the Land Bank to establish incentive programs to create avenues for transfer of land to long-term residents through urban agricultural use opportunities and side lot programs, in order to share in the potential of property value appreciation from community investment while conserving land.
Prevent Displacement and Gentrification By Retaining and Creating Protective Policies	Protect existing policies, such as the property tax cap, that protect vulnerable residents from risk of displacement in the event of improved property value and future gentrification to reduce foreclosures and blight and promote justice.
Establish a Community Urban Farmland Trust	Include urban agriculture in SBLC's conservation easement program to protect urban farmland from development and guarantee long-term sustainability.

Anticipated Impact

The results of this multi-component exploratory study have laid much of the groundwork for SBLC to:

- Evaluate the feasibility and fit of urban agriculture as a sustainable option for vacant land use in Saginaw from an informed, community-centered perspective
- Communicate data and key insights from the Dow Fellows report to stakeholders, potential community partners, and grant committees
- Consider next steps toward sustainable land use solutions and plan for additional research and continued conversations with community members to ensure that any new program is meeting their most salient needs

The insights and many recommendations gleaned from this project reveal that the successful and sustainable implementation of urban agriculture in Saginaw would be a considerable undertaking. With this information, SBLC plans to work with key stakeholders and the community to advocate for recommended policies that would make urban agriculture more permissible in the city of Saginaw. As a first step, SBLC intends to advocate for the development of a Food Policy Council to support diverse stakeholder collaboration in influencing the Saginaw food environment, of which urban agriculture may be a part.

In addition to these direct impacts, our project and public-facing documents also contribute to the body of information supporting the thriving urban agriculture movement in southeast Michigan. Interviews with community members revealed much excitement about the potential for urban agriculture. If properly implemented and culturally appropriate, urban agriculture could provide a variety of public health and community empowerment benefits to Saginaw residents.

Though the direct impacts of our project are focused primarily in Saginaw and the greater southeast Michigan region, catalyzing a new urban agriculture program by SBLC could more broadly contribute to the advancement of several global Sustainable Development Goals (SDGs) created by the United Nations (United Nations, n.d.). These may include **SDG 2: Zero Hunger**, **SDG 11: Sustainable Cities and Communities**, and **SDG 15: Life on Land**. In establishing a network of local food production operations on previously vacant land, urban agriculture could advance many of the targets defined by



these SDGs (see Table 3). Therefore, a holistic approach to urban agriculture implementation could provide benefits not only to local communities but also to the larger urban social-ecological system.

Table 3: Project Applications of Sustainable Development Goals

Sustainable Development Goal	Target	Dow Fellows Project Application
Sustainable Cities and Communities (SDG 11): <i>Make cities and human settlements inclusive, safe, resilient, and sustainable</i>	Target 11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities	Recommendations for additional community engagement and collaboration encourage inclusive participation in urban agriculture planning. Recommendations for soil and water testing and cooperation with public health experts ensure safety is a priority.
Zero Hunger (SDG 2): <i>End hunger, achieve food security and improved nutrition and promote sustainable agriculture.</i>	Target 2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment	Recommendations call for urban agriculture to be included in city planning as an authorized land use option while also considering avenues for equitable land access and food distribution. Products of urban agriculture include additional sources of fresh food options with potential to increase individual or household food access (Santo, Palmer, & Kim, 2016). An urban agriculture program could also provide community education opportunities surrounding food, nutrition, cooking, and farming or gardening skills.
Life on Land (SDG 15): <i>Protect, restore and promote sustainable use of terrestrial ecosystems.</i>	Target 15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts	Policy recommendations include support for planning and permitting dedicated pollinator habitat and edible urban forestry. Farming on vacant land and promoting a local food economy also reduce the demand for natural landscapes to be brought into production.

Limitations

Though the suitability analysis does preliminarily identify suitable parcels, it should not be used as a singular determinant of the best parcels for an urban agriculture program. Community input, zoning restrictions, and environmental justice must critically be considered when determining where urban farms should operate. Our data does not evaluate soil quality and safety in Saginaw, which must be considered for future work. Additionally, analysis of community assessment data was conducted individually, and therefore insights gained from interviews were subjective and not reached by consensus.

Furthermore, this study does not include all important stakeholders that should be consulted to evaluate the appropriateness of urban agriculture in Saginaw. Time restrictions and unforeseen circumstances created by the COVID-19 pandemic prevented in-person community engagement that would have enhanced our understanding of Saginaw and diverse community perspectives. There are currently no policy advocacy bodies in Saginaw to consult with community members for policy input and advocacy surrounding food systems issues, though hopefully, this work will encourage future mobilization. The timeframe for implementing recommendations may be hard to predict externally, and recommendations based on our interviews and best practices from other cities will not necessarily translate directly to the true context of Saginaw and resident policy priorities. While we have done our best to incorporate community insights, real policy implementation must be done with greater community input than could be captured here.



Next Steps

Economic Viability for Future Urban Agriculture Initiatives and Independent Farms

Conduct further research to identify and secure critical resources for the economic viability of future urban farms and supporting community programs. This is necessary to establish urban farming as a sustainable and equitable land use in the community. The prospective benefits of urban agriculture will only be realized if this work has an economically and environmentally sustainable future within the city. SBLC will need to work with community stakeholders to establish a model of urban agriculture promotion that best suits local priorities.

Further Engagement with Community Organizations and Local Residents

We recommend additional research to incorporate perspectives about interest and impact of urban agriculture from other groups underrepresented in our study. While there are many important stakeholders to consider, we do want to highlight the inclusion of neighborhood associations, community garden establishments, faith-based organizations, and neighborhood residents. Methods to gain these insights may differ but should consider accessibility to ensure equitable and inclusive participation opportunities (i.e., internet access, safety considerations, transportation barriers, time of day).

Soil and Water Testing

To achieve a complete picture of suitable locations for urban farming in Saginaw, it is critical to perform adequate testing before ground is broken on any urban farming operation. This would include 1) rigorous soil and water contaminant testing to ensure that urban agriculture is a safe land use, and 2) soil nutrient testing to evaluate soil quality and inform soil care and any necessary amendment(s).

Recommended Future GIS Analyses

Expanding on the preliminary work detailed here, there are several avenues for additional GIS analysis to pursue. These include incorporating social vulnerability indexes and socioeconomic census data to identify areas of underserved demographics and income groups that could potentially benefit the most from having a well-managed urban agriculture program on nearby vacant land. Additionally, modeling stormwater pathways in the city could be conducted to evaluate the potential for water quality reduction related to urban agricultural runoff.

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Appendix: Important stakeholders for urban agriculture in Saginaw, Michigan

This table lists people and organizations that are likely to be important stakeholders in the development of an urban agriculture initiative. This list was created through team research and conversations with community members and should not be interpreted as an exhaustive list of important stakeholders.

Stakeholder groups	Examples and organizations
Saginaw City residents	
City government organizations and city planning	City Council, City Manager, Neighborhood Services and Planning, City Planner, Saginaw City Planning Commission, Saginaw Transit Authority and Regional Services, Saginaw Housing Commission
County government organizations	Saginaw County Land Bank, Saginaw County Health Department, Saginaw County Planning Department, Saginaw Conservation District
Saginaw Basin Land Conservancy	
Community-based organizations	Neighborhood associations, faith-based organizations, local non-profits, social service organizations, Saginaw Community Foundation, United Way of Saginaw County
Economic development and business community	Saginaw Chamber of Commerce, local businesses, Saginaw Future, Saginaw Downtown Development Authority, Downtown Saginaw Association
Food access and hunger relief organizations	Food banks and pantries, soup kitchens, Hidden Harvest, Food Access Collaboration Team of Saginaw, Downtown Saginaw Farmers' Market
Agricultural organizations	Existing urban farm and community garden operations, MSU Extension, local USDA offices, Saginaw County Farm Bureau
Schools and universities	Public and private school districts, Saginaw Intermediate School District, Saginaw Valley State University