

# Community perceptions of small-town food environments, food equity, and home-based food cultivation: Insights from a community-engaged research study

Mahbubur Meenar <sup>a\*</sup> and Leslie Spencer <sup>b</sup>  
Rowan University

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## Abstract

This paper presents findings from a mixed-methods study of small-town community perceptions of the food environment, food equity, and home-based food cultivation, specifically examining how participation in the Glassboro Grows home-gardening program influenced these views. Conducted in Glassboro, a small college town in southern New Jersey, USA, the study drew on field observations, food environment mapping, resident surveys ( $N = 156$ ), and interviews with community leaders ( $N = 17$ ) and program participants ( $N = 26$ ). According to the study's findings, persistent

barriers such as inadequate transportation options and insufficient access to information continue to perpetuate food inequities. Most participants viewed home gardening as a food supplement rather than a solution to food insecurity. Despite favorable conditions and program support, many participants encountered challenges in their gardening efforts. Residents and community leaders identified potential solutions to improve food access, including expanded bus routes, mobile apps to locate food resources, and the placement of refrigerators at food pantries. Overall, this study reveals food access disparities in Glassboro, where food insecurity persists even amid local farms and food outlets, highlighting food inequity that demands broader interventions beyond promoting home-based gardening.

<sup>a\*</sup> *Corresponding author:* Mahbubur Meenar, PhD, Associate Professor, Department of Geography, Planning, and Sustainability, School of Earth and Environment, College of Science and Mathematics, Rowan University; 201 Mullica Hill Road; Glassboro, NJ 08028 USA; [meenar@rowan.edu](mailto:meenar@rowan.edu);  
 <https://orcid.org/0000-0002-0869-3249>

<sup>b</sup> Leslie Spencer, PhD, Professor and Chair, Department of Health and Exercise Science, Virtua Health College of Medicine and Life Sciences of Rowan University;  
[spencer@rowan.edu](mailto:spencer@rowan.edu);  
 <https://orcid.org/0000-0002-3228-9668>

## Disclosure Statement

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## Keywords

home gardening, food equity, food insecurity, community perceptions, small-town food environment, community engaged research framework, CEnR

## Introduction

Food environments and food equity are integral to local food systems, which are complex, adaptive networks composed of individuals, organizations, and inputs and outputs involved in producing, processing, distributing, selling, purchasing, consuming, and disposing of food (Nesheim et al., 2015, 6–7). An urban food environment encompasses the physical, economic, and social factors within an urban area, such as the availability of stores and markets, food prices, cultural influences, and local policies, that shape how people access, afford, and choose food, ultimately impacting urban dietary habits and nutrition (Huang, 2021; Meenar, 2017a). Food equity is a trait essential to a resilient and inclusive food system, asserting that all people, regardless of socioeconomic status, identity, positionality, and power, have the right and should have opportunities to grow, procure, and/or consume healthy, affordable, and culturally appropriate food (Judelsohn et al., 2021; Mui et al., 2021; Tims et al., 2021).

Access to quality food, therefore, is not just a matter of consumer tastes and affordability but is directly tied to deeper structures of inequality that shape the national health profile along lines of race, gender, and socioeconomic status (Macias, 2008). Housing, for example, is intimately connected to food equity because lower-income families often consider housing costs before food costs, and housing location may determine food access (Judelsohn et al., 2021). Rural areas may have local farms and grocery stores offering healthier food options, whereas urban food environments offer bodegas and corner stores with food options that are more processed and less nutritious (Jensen & Orfila, 2021; Meenar, 2017b).

Community perceptions of food environments and food equity vary according to location, income, and race (Tirri et al., 2023). In one study, suburban residents had conflicting perceptions of food insecurity with stakeholders such as community work-

ers, food donors, and food program managers (Hamelin et al., 2008). Conflict arose as residents emphasized unmet needs in food quality and access, whereas stakeholders believed existing services and resources for residents were adequate. The study concluded that community food programs, by themselves, cannot create the social change required to prevent food insecurity.

The distance between low-income urban residents and healthy, affordable food outlets significantly influences perceptions of food environments and equity. In Philadelphia, 71% of low-income residents shop at least one mile from home (Glickman et al., 2021). Financial limitations also prevent low-income, minority, immigrant, and refugee residents from purchasing fresh foods (Meenar, 2017a). Many urban food justice concerns focus on closing the gap in food access between lower- and higher-income communities (Meyers, 2022). The grassroots food justice movement aims to provide alternatives to industrial agriculture and the corporate food sector, reconnect residents with traditional food practices, and reduce the economic burden of purchasing expensive processed store-bought food (Meyers, 2022).

One perceived alternative that aligns with these equity goals is home-based vegetable gardening, which empowers residents to grow their own fresh produce, reduce their reliance on distant or costly food sources, and reconnect with culturally rooted food practices. A review of the literature indicates that public perceptions of home gardening are shaped by a variety of factors, including health outcomes, barriers, motivations, productivity, economic benefits, socioeconomic status, land ownership, environmentalism, community interaction, and cultural traditions. For example, gardeners perceive that health and wellness benefits from gardening often include healthier diets and improved mental health (LoBuono et al., 2024; Spencer et al., 2023). Many find that home gardening reduces stress (Chalmin-Pui et al., 2021; Piras, 2019) and enhances overall quality of life (Meenar, 2014). Some gardeners feel they can safely grow their own food, controlling how crops are cultivated without concern over chemical use (Kortright & Wakefield, 2010; Porter, 2018). Most home

gardeners view gardening positively due to its economic benefits, believing that growing their own vegetables, along with the physical activity involved, can save them hundreds of dollars over time (Diekmann et al., 2018; Galhena et al., 2013; Gray et al., 2014). Some even see home gardens as akin to a savings account, as produce prices continue to rise while garden costs remain stable (Diekmann et al., 2018). Pro-environmentalists have positive perceptions of home gardening, viewing it as a way to utilize open space for local food production, reduce pesticide use, and support habitat conservation for wildlife (Ančić et al., 2019; Kortright & Wakefield, 2010; Raymond et al., 2018). However, there are also negative perceptions, with concerns about the sustainability of home gardening, especially the high-water usage required to maintain these gardens (Galhena et al., 2013; Kortright & Wakefield, 2010).

Despite the perceived benefits of home gardening as a solution to food inequity, socioeconomic barriers often hinder low-income households from gardening. A study in Silicon Valley, California found that low-income households are frequently situated with limited access to healthy foods and in contaminated areas where soil quality and lack of space hinder food growth (Gray et al., 2014). Homeowners with ample land tend to have a more positive view of gardening, benefiting from their harvests, while renters, particularly those in apartments with little or no open space, feel disadvantaged and view gardening less favorably due to lack of space for reliable food production (Piras, 2019).

Participating in home gardening connects gardeners with their communities, enabling them to share food and bond with neighbors. To avoid waste, gardeners often give away surplus produce to neighbors or donate it to charitable groups, benefiting both themselves and their communities (Jehlička & Daněk, 2017; Porter, 2018; Raymond et al., 2018). Home gardeners frequently grow foods tied to their cultural identity, motivated by traditions that connect them to their roots and preserve their culture (Diekmann et al., 2018; Kortright & Wakefield, 2010; Porter, 2018). Many see gardening as an enjoyable alternative means of accessing food, treating it as a hobby or pastime alongside its

other benefits (Ančić et al., 2019; Diekmann et al., 2018; Jehlička et al., 2018).

While substantial literature exists on public perceptions of food environments and food equity, most studies concentrate on large cities or urban areas, leaving a gap in understanding perceptions in small towns that connect urban and rural agricultural communities. Examining these settings is essential to gain a fuller, more nuanced understanding of food environments and equity across diverse community types. This study, therefore, aimed to capture perceptions of small-town residents of their food environments, address place-based social issues like food inequity, and explore solutions through resident participation in home-based vegetable gardening programs. We sought to address the following three research questions:

1. How do residents of a small town perceive food environments and food equity? Do the perceptions differ between residents and those community leaders who influence food production, availability, and/or distribution?
2. How do residents of small towns and community leaders perceive solutions to food inequity? What types of programs, projects, and policies do they recommend?
3. What are the perceived connections between home-based food cultivation and food equity? To what extent is home gardening perceived as a way to achieve food equity in a small-town setting?

### **Context, Data, and Methods**

This study was conducted in Glassboro, a small college town in New Jersey (NJ), USA, where many residents face limited access to fresh, affordable, and nutritious food. We employed a mixed-methods approach, analyzing data collected from field observations and mapping, resident surveys, and interviews with community leaders and home gardeners who participated in our Glassboro Grows program.

### **Study Area**

Glassboro is a small urban community in southern New Jersey's Gloucester County, approximately 20

miles from both Philadelphia, Pennsylvania, and Camden, NJ. Incorporated in 1778 as a glass-manufacturing town and now home to approximately 24,000 residents, it qualifies as a small town, defined as an incorporated place or census-designated place with a population of 2,500–25,000 (Geverdt, 2022). Glassboro has shifted from a glass industry base to a more diverse economy and is home to a state university campus, contributing to its cultural and educational vibrancy. Despite its growth, it faces economic disparities, with 22% of residents living below the poverty line, compared to 7.6% in Gloucester County overall (City Health Dashboard, 2022).

The food environment in Glassboro is marked by a concentration of grocery stores, restaurants, and fast-food outlets along major roads. According to 2022 data, about 70% of Glassboro residents faced limited access to fresh and nutritious food due to a combination of poverty and the scarcity of affordable, healthy food in certain census tracts (City Health Dashboard, 2022). To address food insecurity, the municipal authority, academic and religious institutions, and nonprofit organizations have launched initiatives such as community gardens, food pantries, and the "Fresh for All" program, which provides free fresh produce through a weekly drive-through for residents in need. Glassboro and the surrounding area have several mid-size farms that contribute to the local food supply through farm stands and markets. Despite these efforts, many low-income residents still lack easy access to healthy, fresh, and affordable food.

### *Methodology*

We used a community engaged research (CEnR) framework, focusing on shared leadership and a participatory approach that emphasizes equal power sharing, decision making, and shared ownership of the research process between community and academic partners. This model fosters collaboration, ensuring that research aligns with local concerns and enhancing the community applicability of findings (Minkler & Wallerstein, 2008). Community partners co-lead the project, determining the direction, communicating results, and owning the data, making the research highly responsive to community needs. The research received approval

from the institutional review board (IRB) at the authors' institution, ensuring ethical standards and participant protection were maintained throughout the project.

Our CEnR approach comprised three steps. We formed a team of six members from various sectors, including the municipality, county, region, and university, all with extensive experience in food systems and health. This team played a vital role in co-developing project ideas and formulating research questions to ensure inclusivity. Second, we established the Glassboro Health Equity Coalition, consisting of 12 members from organizations involved in food production, security, and education. The coalition included the original team and six new members representing diverse sectors of municipal government, county health organizations, hospitals, nonprofits, universities, and residents. Coalition tasks included engaging networks to understand community needs, co-developing and disseminating surveys, promoting a food cultivation program, and assessing outcomes.

Third, we launched the "Glassboro Grows" home-based food cultivation program. A member of the coalition who held a leadership position in a nonprofit community organization co-led the program with the university team. The program included three workshops open to all residents, with a home gardening initiative for 26 residents and their households, selected from 49 applicants based on economic conditions and needs. We promoted the program through email listservs and flyers at community events, targeting low-access and high-poverty areas for recruitment using data from City Health Dashboard and PolicyMap. Participants received training on growing fresh produce in their homes or apartments. Offered for three months during the peak growing season, the program provided a Grow Kit with seeds and seedlings, containers and soil, and care instructions. To ensure lasting change, we incorporated a health coaching program in which three undergraduate students in public health and nutrition, trained and supervised by a project co-lead, provided biweekly coaching to help participants gain confidence, skills, and motivation to grow and eat more fresh produce. Participants who completed the program received a US\$50 gift card. Figure 1 features a

**Figure 1. Photographs from the Glassboro Grows Program Featuring Sonya Harris of the Bullock Garden Project, Taken by Project Team Members and Participants**



collage of images that have been randomly chosen to represent various aspects of the program.

To answer the research questions, we collected and analyzed data in four ways.

#### *Field observation and mapping*

A team of three college students, supervised by a research team member and a community partner, conducted a thorough field observation of Glassboro's food resources. Over two months, we surveyed full-scale and small grocery stores, convenience stores that sell some food items, community gardens, food pantries, and urban farms. GIS data were created based on these field observations. Additionally, demographic data were collected

from the U.S. Census, and Indicators of Potential Disadvantage (IPD) data were gathered from the Delaware Valley Regional Planning Commission (2023). The IPD data identified local populations potentially disadvantaged by assessing populations of interest under Title VI of the Civil Rights Act and Environmental Justice, using U.S. Census American Community Survey 2014–2018 five-year estimates. The analysis included nine categories of disadvantage: youth, older adults, females, racial minorities, ethnic minorities, foreign-born individuals, disabled individuals, those with limited English proficiency, and low-income residents. We created quarter-mile and half-mile buffers around food resources and overlaid them with sidewalks, bus routes, and bus stops to determine accessibility via walking and public trans-

portation. Finally, we geocoded the addresses of the participants enrolled in the Glassboro Grows program. Interpretations of food accessibility were made based on the GIS maps and cross-verification of field notes.

#### *Resident surveys*

We designed a 14-question survey to explore Glassboro residents' perceptions of barriers to accessing healthy, affordable food (e.g., cost, transportation, food variety, knowledge about food and cooking), gardening experience, and visitation patterns to food outlets such as grocery stores, farm stands, farmers markets, convenience stores, and charitable food outlets like food pantries. The

survey also included open-ended questions about views of and potential solutions to food insecurity and inequity in Glassboro. Additionally, we gathered demographic information across seven variables: gender, age, income, race/ethnicity, household size, private transport, and homeownership. A digital version of the survey was shared via emails and organizational websites, while paper copies were distributed and collected at community meetings and events. The survey was distributed using a snowball sampling method with support from coalition members and their organizational networks, yielding 156 complete responses. We excluded 17 additional responses that were empty or incomplete.

Using the survey data, we conducted a chi-square test of independence to examine relationships between demographic characteristics (independent variables) and various perceptions (dependent variables). We developed nine separate multiple logistic regression models for each perception variable to analyze demographic factors associated with limited access, cost barriers, transportation barriers, food variety barriers, lack of food knowledge, gardening experience, grocery store visit frequency, and food pantry visit frequency. The perception outcome variables were binary (yes/no). The independent variables were gender, age, income, race, household size, access to private transportation, and homeownership. Odds ratios were calculated from the regression coefficients. For clarity, age was categorized into six groups following the U.S. Census Bureau schema. As all independent variables were categorical, the reference categories were female (gender), 18–24 years (age), low-income, non-Hispanic White (race), single household (household size), no private transportation, and non-homeowner.

#### *Community leader interviews*

We conducted in-depth semi-structured interviews with 17 members of the Glassboro community, including university employees, alumni, two municipal council members, two municipal board of health members, business owners, food activists, healthcare providers, family service providers, employees of religious institutions, staff in special needs services, local farmers, and long-time

residents. The interviews were held via phone, Zoom, or in outdoor public spaces. The questions explored the interviewees' backgrounds, their connection to Glassboro, their views on the local food system, and their involvement in Glassboro-based food projects. All participants had lived or worked in the Glassboro area for many years. The project team and coalition members initially identified 21 potential interviewees, of whom 17 agreed to participate. Interviews were audio-recorded, transcribed, and analyzed using qualitative content analysis and coding. Three team members independently coded the data to enhance reliability and ensure consistency in identifying key themes.

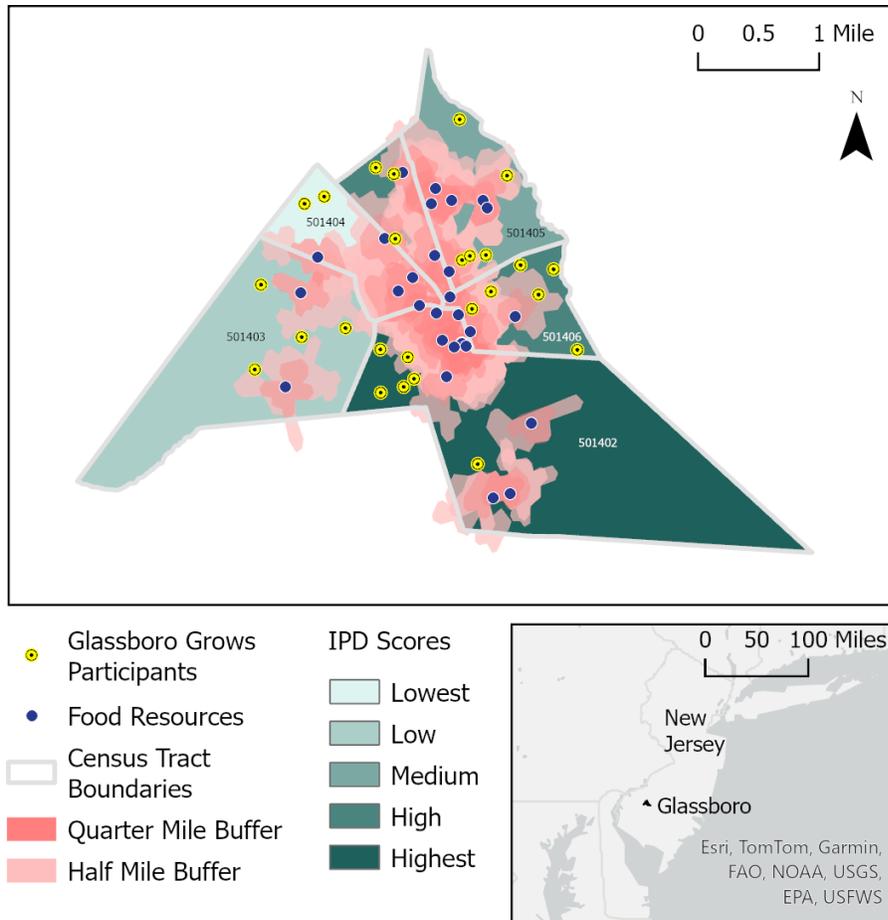
#### *Home gardener interviews*

We interviewed 26 participants in the Glassboro Grows program at program baseline, and 14 participated in the post-program interview. The remaining participants were either unavailable or uninterested in a follow-up interview. Some lost interest after experiencing limited success with home-grown vegetables, while others faced logistical challenges such as moving out of town, going on vacation, or taking on a second job that made scheduling difficult. The goal of these interviews was to understand the impact of the program on participants' daily lives and behaviors, and whether it influenced how they perceive food insecurity and food equity in Glassboro. Interviews were conducted in person or by phone, with some audio recorded and transcribed, while others relied on handwritten notes that were later digitized and compiled into comprehensive transcripts. The team analyzed the transcribed data using qualitative content analysis and coding, following methods similar to those described for community leader interviews.

## **Results and Discussion**

The results highlight food environment and community-level factors influencing food access; residents' and community leaders' perceptions of food equity; proposed solutions to local challenges related to food access and inequity; and insights gained from participation in the home gardening initiative Glassboro Grows.

**Figure 2. Locations of Food Resources, Participants in the Glassboro Grows Program, and Quarter- and Half-Mile Walking Access to Food Resources for Residents**



Note: Census tracts are shaded in five distinct colors, representing varying Indicators of Potential Disadvantage (IPD) scores.

### *Field Observation and Mapping of the Food Environment*

We observed from fieldwork and GIS mapping that food inequity exists in Glassboro, disproportionately affecting vulnerable populations in specific areas. Figure 2 illustrates the distribution of these groups across Glassboro census tracts using IPD scores, alongside the locations of community food resources, including full-size and small grocery stores, convenience stores, community gardens, farms, food pantries, and food education programs. The highest IPD score was recorded in tract 501402, which lacked full-scale grocery stores. The sole small grocery store in this tract offered

only three fresh food items during our visits. Although a few community gardens and food pantries were present, they were not easily accessible on foot from many areas. Similarly, tract 501406 had a high IPD score but no grocery stores, and many parts of the tract lacked walkable access to grocery stores in neighboring tracts. The figure also depicts quarter- and half-mile walking buffers around food resources. Our analysis revealed several barriers: many areas lacked sidewalks, and public transportation poorly served most food resources. Walking surveys within these buffer zones showed that 57% of sidewalks were in poor condition and unsuitable for individuals with disabilities. Additionally, 62% of Glassboro Grows program participants lived outside these buffer areas, limiting their convenient access to food resources.

### *Community Perceptions of Food Security and Food Equity*

Glassboro residents and community leaders expressed concerns about food security and equity, emphasizing issues such as affordability, limited access to fresh food, and systemic barriers in the local food environment.

#### *Resident perceptions*

Of the 156 respondents to the resident survey, 25.5% reported they “definitely” lacked access to healthy and fresh food, while 6.4% said their access was “somewhat limited.” The most common barrier was cost: 46.8% felt “very restricted,” and

31.9% felt “somewhat restricted.” For transportation, 23.4% reported it being very restricted, and 10.6% somewhat restricted.

Respondents highlighted several issues, including a lack of food variety in Glassboro and their limited knowledge about food choices and nutrition. Some criticized food pantries for offering mostly canned foods, which they deemed unhealthy, and noted the absence of cold storage as a missed opportunity to store perishable items from restaurants and institutions. Many felt Glassboro lacked “healthy” and inclusive food stores that accommodated all dietary needs. Two participants stated that the township-managed community garden did not have enough space to serve everyone. Respondents indicated that local food pantries were vital resources for addressing hunger, though they also expressed that the availability of culturally appropriate foods was often insufficient.

Some respondents also expressed concerns about the healthiness of school lunches. Addressing food equity, many emphasized protecting Glassboro children from food insecurity. A former teacher stated:

People like me don't like to talk about it but experience food insecurity all the time. Many people and many children in our community don't have access to food (let alone healthy food) all the time, kids go hungry, and we need to do more collectively.

College students living in Glassboro who participated in the survey claimed that food equity was a significant concern, particularly for those who relied heavily on fast and inexpensive food options due to time constraints and limited cooking resources. They reported not having the time to shop for groceries or prepare meals, making access to affordable, fresh produce difficult for their overall well-being. The distance to grocery stores, lack of transportation, and the cost of food further exacerbated the challenge.

Table 1 shows the results of the chi-square test for demographic characteristics and perceptions independence. The perception of limited access to healthy and affordable food had significant relationships with age, income, race, private transport,

and homeownership. The perceptions of food cost and lack of transportation as barriers to healthy and affordable food, knowledge, experience, and variety of food were not associated with gender. The perception of a lack of food variety was significantly associated with all demographic characteristics except gender. Age had no significant relationship with knowledge barriers. Household size was not associated with the perceptions involving food cost, knowledge barrier, and gardening experience. Similarly, race had no association with knowledge barriers, grocery store visits, and convenience store visits.

The association between income and all perception variables might be an indication that low income reduces the ability to afford diverse food options, while the absence of private transportation limits access to a wider range of stores and food sources. Among our participants, while access to healthy food knowledge and gardening experience was influenced by factors like transportation and homeownership, income played a crucial role in determining food knowledge, and age influenced the likelihood of having gardening experience. Finally, the table suggests that factors such as age, income, household size, private transport, and homeownership played a significant role in determining grocery and food pantry visits, while convenience store visits were also influenced by gender. This indicates that men and women may have different shopping habits or preferences, with gender shaping the likelihood of visiting convenience stores for food access.

Table 2 provides valuable insights into the odds ratios of outcome variables and sociodemographic characteristics. Participants aged 55 years and older were more likely to experience limited access to healthy and affordable food compared to those 18–24, but were less likely to visit grocery stores than their younger counterparts. This suggests that their reduced grocery store visits may contribute to their perceived limited access to fresh and healthy food. In addition, the population in the middle age group (35–44) had more knowledge barriers, gardening experience, and lack of food variety compared to the young population.

Medium-income and high-income participants were 0.014 and 0.005 times less likely respectively

**Table 1. Results of the Chi-Square Test for Demographic Characteristics and Perceptions Independence**

		Limited Access	Barrier Cost	Barrier Transportation	Barrier Variety	Barrier Knowledge	Gardening Experience	Grocery Store Visit	Convenience Store Visit	Food Pantry Visit
Gender	$\chi^2$	0.228	1.746	3.311	0.494	1.904	3.368	4.853	11.254	8.553
	<i>p</i>	0.892	0.418	0.191	0.781	0.386	0.186	0.088*	0.004***	0.014**
Age	$\chi^2$	17.3	21.981	31.782	11.909	8.064	23.869	43.668	19.137	55.392
	<i>p</i>	0.004***	0.001***	0.0000***	0.036**	0.153	0.0000***	0.0000***	0.002***	0.0000***
Income	$\chi^2$	71.153	68.909	42.807	13.567	22.986	6.465	54.473	39.263	55.597
	<i>p</i>	0.0000***	0.0000***	0.0000***	0.001***	0.0000***	0.039**	0.0000***	0.0000**	0.0000***
Race	$\chi^2$	12.601	10.794	8.949	9.144	4.275	10.065	0.662	3.905	8.908
	<i>p</i>	0.006***	0.013**	0.03**	0.027**	0.233	0.018**	0.882	0.272	0.031**
Household Size	$\chi^2$	5.306	10.017	16.282	13.426	6.416	9.103	51.81	17.771	38.855
	<i>p</i>	0.505	0.124	0.012**	0.037**	0.378	0.168	0.0000***	0.007***	0.0000***
Private Transport	$\chi^2$	45.117	61.563	87.424	13.903	27.869	10.148	34.924	58.596	33.4
	<i>p</i>	0.0000***	0.0000***	0.0000***	0.001***	0.0000***	0.006***	0.0000***	0.0000***	0.0000***
Homeowner	$\chi^2$	46.036	45.531	45.598	3.524	13.979	8.549	18.193	28.957	13.93
	<i>p</i>	0.0000***	0.0000***	0.0000***	0.061*	0.0000***	0.003***	0.0000***	0.0000***	0.0000***

\* *p* < 0.1; \*\* *p* < 0.05; \*\*\* *p* < 0.01

**Table 2. Regression Analysis Results: Odds Ratios for Key Variables (N = 156)**

		Limited Access	Barrier Cost	Barrier Transportation	Barrier Variety	Barrier Knowledge	Gardening Experience	Grocery Store Visit	Convenience Store Visit	Food Pantry Visit
	Intercept	50.69	1.3E+14	110129000	0.166	0.539	0.204	0.0011	3.93	5.26
Gender	Female	1	1	1	1	1	1	1	1	1
	Male	0.78	0.275	0.089	0.8	0.531	0.74	0.69	1.44	0.284
	Other	2.96	0.51	2.72	2.24	0.27	0.47	2.175	250.79***	5.22
Age	18-24	1	1	1	1	1	1	1	1	1
	25-34	0.65	3E-14	0.798	7.19**	2.58	4.87*	0.2176	3.08	0.012
	35-44	50.48	4E-12	0.16	22.79**	50.1**	6.32*	0.2723	0.107	0.559
	45-54	43.33	6E-13	7.54	1.87	3.98	1.28	0.0183*	0.999	0.135
	55-64	717.0**	3E-12	16795670	5.63	9.2	0.31	0.00101**	6.12	4.32
	≥65	925.2**	5E-13	5017761	9.6*	1.29	6.25	0.000857***	6.32	2.98
Income	Low	1	1	1	1	1	1	1	1	1
	Medium	0.014***	0.103**	5E-5**	0.49	0.058**	1.37	890.4***	0.0716***	3.30E-11
	High	0.005***	0.026***	21.28	4.1*	8.0 E-8	1.24	4.44	2.7E-10	7.82E-17
Race	White	1	1	1	1	1	1	1	1	1
	Black	16.02**	9.16**	0.0021**	0.81	1.14	0.3**	6.34*	0.769	4.08*
	Hispanic	15.39**	1.45	80.33	0.75	1.61	0.5	2.34	0.83	79.08*
	Other	3.49	0.16	0.00092***	4.93**	0.82	3.62*	3.4	2.49	9.49
Household Size	Single	1	1	1	1	1	1	1	1	1
	Two	1.06	3.74	0.15	0.6	0.48	1.1	1004.62***	0.082**	0.0167**
	Three-Four	0.28	0.56	0.0038	0.58	2.61	1.28	1414.29***	8.497	0.261
	≥Five	0.59	1.26	9E-9**	0.1**	4.56	0.98	72968.15***	4.54	0.014
Private Transport	No	1	1	1	1	1	1	1	1	1
	Limited	2.55	22.38**	42.4	0.88	0.1112**	1.48	0.625	1.23	0.87
	Yes	0.37	0.2	0.000439***	1.84	3E-13	1.03	14.57*	0.0067***	0.114
Homeowner	No	1	1	1	1	1	1	1	1	1
	Yes	0.005***	0.03***	0.000084**	1.31	0.41	2.93*	9.55*	0.131*	2.37

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

to have limited access to food compared to low-income participants. However, high-income participants were 4.1 times more likely to feel there was not enough food variety. This could indicate that higher-income individuals have greater financial flexibility, reducing the impact of food costs, but that options for food varieties are limited. Interestingly, medium-income participants were 890.4 times more likely to visit grocery stores, but were 0.07 times less likely to rely on convenience stores compared to low-income groups, possibly reflecting a combination of a preference for fresh food options available at grocery stores and having financial/transportation means to access grocery stores. Medium-income income participants were also 0.058 times less likely to think that there were any knowledge barriers.

When examining racial differences, Black and Hispanic participants were 16 times and 15 times more likely to face limited access to healthy food compared to the white population. In addition, Black participants had limited access to affordable food and were more likely to use food pantries than white participants. This may reflect systemic barriers to food access in minority communities. However, Black participants were 0.3 times less likely to view transportation as a barrier to obtaining food, perhaps suggesting stronger local networks or alternative transportation methods. They were also less likely to have prior gardening experience, which may limit opportunities for growing their food.

Household size also played a role, with two or more member-households more likely to visit grocery stores but less likely to visit convenience stores and food pantries than single-person households. This suggests that larger households may have better access to resources or to better planning for food shopping. This could also be out of necessity, as the quantities and types of food needed by larger households may not be affordable at a convenience store.

Transportation access further influenced food-related behaviors. Participants with limited private transportation were more likely to cite cost as a barrier, possibly because they had fewer shopping options and faced higher prices at nearby stores. Those with private transportation were less likely

to visit convenience stores, but were 14.6 times more likely to visit grocery stores than those without private transportation, probably because they had better access to full-service grocery stores.

Finally, homeowners were less likely to experience limited food access or view food costs and transportation as barriers to obtaining healthy food, probably due to the financial stability, race, age, and neighborhood advantages typically associated with homeownership. Additionally, homeowners reported 2.93 times more gardening experience and made grocery visits nine times more frequently than renters. These findings underscore the significant demographic and socioeconomic factors that influence food access and purchasing behaviors.

#### *Community leader perceptions*

Most interviewees defined food equity as ensuring that everyone in the community has equal access to grow, obtain, and consume healthy food. Some also included access to educational resources for making healthy food choices. An interviewee elaborated:

Food equity is twofold. ... On one hand, there is a wide variety of healthful food options available located nearby, depending on the area's main transportation method. Secondly, food costs should align with the median income of the area, with or without subsidies.

Another defined it as the "ability to acquire and consume an adequate quantity of nutritious food sustainably." Culturally relevant food access was also noted as important. Community leaders differed in their opinions about food equity in Glassboro. Some interviewees, including two Borough officials, felt there were no significant inequities, citing policies that promote food equity. In contrast, grassroots activists, community organizations, and teachers reported inequities in parts of the town and called for more efforts.

Our qualitative analysis of the interviews uncovered key themes surrounding food equity in Glassboro:

### *Limited improvement to address food insecurity*

According to most interviewees, many low-income residents in Glassboro, regardless of age or race/ethnicity, experienced food insecurity. They lacked easy walking access to full-scale grocery stores or could not afford fresh, healthy food. Despite the presence of several small and mid-size farms nearby, the town did not have a farmers market. A church member stated, “There are three big supermarkets. The issue isn’t availability, but it is the transportation and the affordability.” Some interviewees acknowledged efforts by the township to address food insecurity, pointing to grocery store availability, but fresh food accessibility remained limited. Glassboro faced a trend of unhealthy food dominance, with prevalent advertising for “junk food” replacing fresh and nutritious options. This particularly affected residents, including university students, who often opted for cheap convenient meals. Several interviewees also criticized the lack of community engagement in addressing food-related issues, highlighting a gap between food-insecure populations and town leaders.

### *Reservations about hunger relief services*

Hunger relief programs in Glassboro included food pantries and services from two major regional food banks, with one pantry offering fresh produce. However, limited hours and limited food availability posed barriers for food-insecure individuals. A public health professional noted the stigma and pride that prevented people from seeking welfare assistance. An environmental non-profit interviewee connected food insecurity to systemic issues:

Most food-insecure communities are the communities of color... When the native people were pushed into the West and their land was taken, we also took away people’s rights and ability to access healthy food. Now if you only give people crap in a can, what are they going to do during the meal? They’re going to eat whatever they can.

### *Issues with public school programs*

Some school teachers argued that school meals lacked adequate nutrition and that the paperwork for free or reduced lunches was burdensome for

parents. They did appreciate the veggie gardens at a few schools, which contributed to meals during the growing season. New Jersey allows schools to use produce from their gardens, but the teachers emphasized that while school gardening initiatives can support healthy eating habits, they do not address the root causes of food insecurity. Many students both arrived at and left school hungry due to broader systemic issues, such as limited access to affordable and nutritious food at home. A former teacher shared concerns about the “flawed” free lunch application process, which disadvantages families just over the income threshold while others stretched the truth. Teachers often assisted parents with complex forms, which were difficult even for educators to understand.

### *Transportation as a barrier*

Transportation was one of the most cited obstacles to food equity in Glassboro. While produce was available in town, many low-income residents struggled with affordability and accessing due to inadequate public transportation. Interviewees noted the need for more frequent bus routes and direct services to grocery stores, job centers, and other key locations. Guests at food pantries, often limited to what they could carry, relied on backpacks, carts, or bicycles. Some interviewees suggested that businesses adopt shuttle services, similar to those used by local congregations, to support employees and customers. An environmental advocate emphasized safety concerns, as low-income housing is often located along busy highways, making walking to stores dangerous.

### *Lack of food cultivation opportunities and urban agriculture policies*

Most interviewees agreed that food cultivation opportunities were limited in Glassboro. Community gardens were tied to specific institutions like universities, schools, and churches, restricting access. Reflecting on Glassboro’s past, an older resident remarked, “Back then, everybody had gardens, people used to have chickens, and so they had fresh eggs. They were a little more self-sufficient.” These traditions had faded as the community distanced itself from its agricultural roots. Interviewees also claimed policies on food cultiva-

tion and animal husbandry were unclear or absent, with residents raising chickens without permits. Furthermore, there was minimal home gardening, reflecting a lack of community initiatives promoting urban agriculture.

#### *Inadequate food and nutrition education*

Many residents lacked knowledge about cooking, storing, and preparing fresh food, especially those not raised on farms or without home gardening experience. Some food pantries and grocery stores failed to provide consumers with practical information on using their products. A local family service worker noted, "A lot of people who really need the food don't know where the food pantries are." Community service interviewees proposed solutions such as teaching food preservation methods like canning and providing advice for small-scale gardening. Glassboro Borough hosted community dinners with chefs to teach cooking skills, but broader educational outreach remained limited. More efforts are needed to connect residents with resources and practical food education.

#### *Community Perceptions of Solutions to Food Inequity*

Glassboro residents and community leaders identified a range of solutions to food inequity, including improved transportation, better access to information, expanded community programs, and infrastructure like mobile apps and food pantry refrigerators.

#### *Resident perceptions*

About 85% of participants indicated that Glassboro needed inclusive community gardens and incentives for home-based food cultivation programs. By "inclusive community gardens," they referred to projects not tied to specific institutions (e.g., churches, schools, universities) but managed by the municipality or nonprofits, open to all residents as gardeners. For incentivizing home gardens, they suggested providing free seeds, tools (possibly through a rental system), and education and consultation on food cultivation. One urban agriculture advocate remarked, "I don't know who gets to decide what programs the community should have to solve food insecurity. I do what I

can do rather than waiting for the town administrators and businesses to get things done."

Additionally, some residents felt that Glassboro should incorporate food co-ops, nutritional and farming education programs in schools and community centers, more food pantries with community fridges, greenhouses to supply fresh vegetables in winter, farm-to-institution programs, healthy corner stores, and farmers markets. A few participants also recommended projects to achieve food equity, such as more school gardens, full-size grocery stores, for-profit urban farms, donation of unused food by restaurants and farms, and expanded public transportation. Suggested transit solutions included new bus routes and stops, affordable ride-sharing programs, sponsored shopping trips, and affordable food delivery services.

The college students also offered solutions to food equity challenges, particularly through their interest in sustainability and community engagement. Many students expressed desire to contribute to local food production, some suggesting that connecting students with residents needing assistance with home gardening could be beneficial. Respondents believed that such initiatives would allow students to gain hands-on experience in food production while also helping to address local food access issues. Students also saw value in receiving fresh produce in exchange for their work, and several proposed integrating the work into academic programs to earn credits. These findings suggested that such programs could improve food access, strengthen community ties, and enhance student social networks and resumes.

#### *Community leader perceptions*

Many leaders felt that Glassboro needed more municipally sponsored community gardens because the existing garden had very few plots. They advocated for assistance in building garden beds, providing tools, and offering other resources to attract residents from all economic backgrounds. A few leaders strongly supported introducing a chicken ordinance. They proposed developing and implementing clear policies for home-based food production and animal husbandry practices to address confusion over issues such as whether front lawn food growing is allowed or if food cultivation is

permitted in multi-unit housing complexes.

Several leaders emphasized improving community perceptions to achieve food equity. They highlighted the importance of farmers markets to support local farmers and the local food system, initiating farm-to-institution programs, especially in schools, implementing health screenings to assess the community's health and nutritional needs, offering informal education on growing and cooking food to encourage healthy eating habits, and improving public transportation systems. Suggestions included direct routes to grocery stores and other food access points from areas where low-income individuals and families live without vehicle access.

Finally, a few leaders advocated for better use of technology to address food insecurity. They suggested launching mobile apps to provide information about food pantries and other resources, integrated with Uber-like services to deliver to regular food pantry patrons leftover food from restaurants and events. Apps and websites could also facilitate grocery and package delivery. Keeping elderly residents engaged and informed about these services was deemed essential. Ideas included creating informative videos, marketing campaigns, and projects involving college students to promote technological solutions.

### *Insights from the Glassboro Grows Program*

Before the program, participants shared their food shopping habits and experiences with home-based food cultivation. About 66% reported shopping regularly at two local full-scale grocery stores, and 31% occasionally purchased produce from farmers markets or farm stands. Some participants, less concerned about nutrition or constrained by time, relied on convenience stores or gas stations for food. Notably, 40% had utilized food pantries within the past year. 42% of participants had prior experience with home gardening, citing reasons such as sustainable food production, improved taste and freshness, supplemental food security, and access to culturally appropriate foods. Some participants reported access for gardening to outdoor spaces, such as decks and backyards or front yards. However, many needed more space or permission from housing authorities to cultivate food.

The post-program interviews indicated two major shifts in participant perceptions, one positive and one negative. The positive shift was in renewed interests in a healthier lifestyle. While participating in Glassboro Grows, about half the participants incorporated homegrown vegetables into meals, juices, and smoothies, exceeding the recommended daily intake of fruits and vegetables. Five participants specifically noted that home gardening supplemented their food supply and described it as an easy, rewarding, and de-stressing experience. Several participants who had been initially skeptical about the program later recognized that home gardening improved access to healthier and culturally appropriate foods, fostered local food production and resilient food systems, and empowered families to take greater control over their food choices—reflections that align with findings in existing literature (Diekmann et al., 2018; Kortright & Wakefield, 2010; Porter, 2018).

However, there was a realistic shift in perceptions of the connection between home gardening and food equity. Before the program, most participants viewed home gardening as a primary solution to food insecurity and inequity. After participating, they came to see it as a complementary approach rather than a universal solution, identifying as barriers to achieving food equity through home gardening three significant challenges:

### *Knowledge, motivation, and social networks*

Our study revealed that participants' education, prior experience, motivation, and social connections were critical for home gardening success. This is consistent with research demonstrating that successful gardening depends on education and experience (Chalmin-Pui et al., 2021; Galhena et al., 2013; Gray et al., 2014) as well as motivation (Conway, 2016; Jehlička et al., 2018). Many participants, particularly those new to gardening, lacked basic knowledge about seasonal planting, crop care, and pest management, often leading to frustration, loss of motivation, and limited gardening productivity. Participants who struggled noted that starting with low-maintenance plants or engaging in community gardens could have eased their learning curve. A few economically disadvantaged participants lacked a social network to share gardening

insights or surplus produce; a participant experienced overproduction but could not distribute the excess due to limited social connections. Furthermore, some participants did not know how to cook certain vegetables, highlighting that consumption challenges often arose from a lack of cooking knowledge.

#### *Time and cost effectiveness*

Economically disadvantaged participants faced significant challenges, including managing costs and balancing gardening with other obligations. Many noted financial and time-related barriers, raising concerns about the cost-effectiveness of home gardening. Some invested heavily in supplies, tools, and water but reported low yields, questioning whether the effort was worth the expense. For instance, one participant spent US\$400 on their garden but harvested only US\$20 worth of produce. Time constraints further hindered those juggling multiple jobs or caregiving responsibilities. A participant observed, “Backyard gardens aren’t really affordable or practical means to solve food insecurity or achieve food equity.” These findings suggest that while gardening offers potential benefits, its practicality as a solution to food insecurity is uncertain for many. Our findings are consistent with the literature, which depicts time and cost as significant barriers to gardening, often rendering it inaccessible to economically disadvantaged populations (Conway, 2016; Kortright & Wakefield, 2010; Smith et al., 2013).

#### *Land access, ownership, and zoning issues*

A significant challenge among participants was access to suitable gardening space. While most reported having outdoor areas like backyards, patios, or porches, renters and apartment dwellers often lacked sufficient or appropriate spaces. Some participants faced restrictions from housing authorities, prohibiting even container gardening. Participants who received guidance for indoor gardening still struggled due to limited sunlight and cramped environments. These challenges were particularly severe for lower-income participants, whose housing conditions or rental status limited their gardening potential. These findings support existing research that links land access and ownership to

gardening success (Jehlička et al., 2021; Kegler et al., 2020; Taylor & Lovell, 2013), with zoning and housing restrictions also identified as significant barriers (Meenar et al., 2017; Smith et al., 2013).

It is worth noting that, unlike urban gardeners who often face challenges such as contaminated soil or heat islands, our suburban small-town participants reported minimal environmental issues, mentioning only pest control. Furthermore, their perspectives on food equity were shaped by their local food environments, consistent with findings from prior studies (Meenar, 2017a). However, some participants with limited access to affordable, nutritious food expressed more negative views on food equity in Glassboro, regardless of their income, gender, or race.

Based on the program evaluation, we concluded that the benefits of home gardening are often contingent on adequate resources and gardening expertise, which may not be equitably distributed across communities. A few participants expressed that encouraging individuals to rely on home gardening to address food insecurity could be viewed as part of a neoliberal agenda, which shifts responsibility onto individuals instead of addressing broader and systemic issues such as wages and affordable food. Socioeconomic disparities shape who can participate in home gardening and to what extent they can benefit. Wealthier neighborhoods tend to have greater access to gardening resources, further amplifying inequities in food systems. Conversely, low-income areas face barriers that limit affordability and accessibility to gardening supplies, water, and time. Addressing broader food equity issues requires systemic changes to ensure that all communities, not just those with the privilege of resources and expertise, can share in the benefits of sustainable food production.

#### **Concluding Remarks**

The purpose of this study was to explore how small-town community members and food-related leaders perceive food environments and food equity, assess their views on potential solutions to food inequity, and examine the perceived role of home-based food cultivation, particularly home

gardening, in promoting food equity in these communities.

The resident survey revealed that food access and equity were significant concerns in Glassboro, with many respondents reporting challenges in accessing healthy food due to high costs, limited transportation, and lack of food variety. Respondents also criticized food pantries for offering mostly non-perishable, culturally inappropriate foods. College students, in particular, struggled with accessing affordable, fresh produce, often relying on fast food and local food pantries. Community leaders discussed six major issues: limited progress in addressing food insecurity, concerns about the effectiveness of hunger relief services, deficiencies in public school nutrition programs, transportation barriers to accessing food, insufficient opportunities for food cultivation and weak urban agriculture policies, and a lack of food and nutrition education for residents.

Based on resident surveys and community leader interviews, we developed a definition of food equity as inclusive food systems that ensure individuals have the rights and opportunities to grow, purchase, and consume healthy, affordable, and culturally appropriate food, regardless of socioeconomic status, cultural identity, positionality, or power. To achieve food equity in Glassboro, residents and community leaders emphasized expanding inclusive community gardens and supporting home-based food cultivation programs, with resources such as free seeds, tools, and educational workshops. They also advocated for food co-ops, nutrition education, and improved public transportation to increase access to healthy food. College students expressed interest in assisting with local gardening projects and gaining experience while addressing food access issues. Leaders further recommended policies supporting urban agriculture, farm-to-institution programs, and mobile apps that would connect residents with food resources.

The success of the Glassboro Grows program was influenced by several factors, including participant knowledge, motivation, and social networks, with many residents lacking basic gardening skills, time, and support systems. Challenges such as financial and time constraints, limited access to suitable land, zoning issues, and environmental fac-

tors like poor soil quality and extreme weather also hindered ability to grow food effectively, particularly for the economically disadvantaged. Based on this program, we conclude that while home gardening has potential to support food equity by providing access to healthy and culturally significant foods and supporting a healthy lifestyle, its effectiveness is limited by socioeconomic factors, including time, money, knowledge, space, and housing restrictions, which disproportionately affect economically disadvantaged households.

The study had several limitations. The sample size for surveys and interviews was small, which may not fully represent the broader community. Additionally, the Glassboro Grows program was a pilot, with limited participants and only one season, which restricted the opportunity to observe long-term gardening outcomes. Many gardeners tend to improve in the second season, so a longer duration could have yielded more positive results. There was also no systematic way to collect data on race or gender, as the focus was on economically disadvantaged participants, which may have affected the diversity of perspectives. Future studies could expand the sample size and focus on race and gender to better understand how these factors influence gardening success and perceptions. A multi-year study would also provide a deeper analysis of the long-term impacts and sustainable outcomes of gardening programs.

Despite these limitations, the study offers valuable insights for policymakers and health officials in Glassboro and similar small towns. The findings can guide urban agriculture policies, new food access programs, and stronger partnerships with local educational institutions. While not offering exhaustive solutions to food inequity, this research provides community perceptions that can inform decisions and help shape effective food-related strategies. 

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