Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
https://foodsystemsjournal.org

Garden access and barriers for low-income community members

Cherish K. Duerst,[a] * Robert Williams,[b] and Jose Lopez [c]
Texas A&M-Commerce

Douglas LaVergne [d]
Lincoln University Missouri

Submitted July 31, 2023 / Revised September 15 and November 28, 2023, and March 25, July 25, and September 6, 2024 / Accepted September 9, 2024 / Published online November 15, 2024

Citation: Duerst, C. K., Williams, R., Lopez, J., & LaVergne, D. (2025). Garden access and barriers for low-income community members. *Journal of Agriculture, Food Systems, and Community Development*, *14*(1), 271–284. https://doi.org/10.5304/jafscd.2024.141.008

Abstract

Gardening can be an important source of fresh food for impoverished households, yet people experiencing food insecurity in the United States often lack access to any form of garden. Although research on community gardening is plentiful, research on other forms of gardening, such as residential and container gardening, especially among rural populations, is scarce. This project investigates the garden-related experiences of food pantry customers in rural northern Minnesota, in the Bemidji area. We address gardening in its many forms, including residential, container, community, and other types of gardening. We focus on the specific barriers to garden access, and propose several solutions to these barriers, as suggested by study participants.

Over one-third of food pantry customers during the study period responded to a questionnaire administered in the waiting room of the food pantry (n = 205, N = 562). Although 91% of respondents stated that they wanted to garden, and 85%

[a] * *Corresponding author:* Cherish K. Duerst, Graduate Student, Agriculture, Texas A&M University-Commerce; 39956 Fairground Road; Bagley, Minnesota 56621 USA; +1-218-556-8159; https://orcid.org/0009-0007-8891-8375; cduerst@leomail.tamuc.edu

[b] Robert Williams, Professor of Agriculture, Food, & Family, Texas A&M University-Commerce; 2200 Campbell Street; Commerce, Texas 75428 USA; +1-903-886-5350; https://orcid.org/0009-0005-1754-5482

[c] Jose Lopez, Associate Professor of Agribusiness, Texas A&M University-Commerce; 2200 Campbell Street; Commerce, Texas 75428 USA; +1-903-886-5623; https://orcid.org/0000-0003-4008-6913

[d] Douglas LaVergne, Dean, College of Agriculture, Lincoln University Missouri; 816 Chestnut Street; Jefferson City, Missouri 65101 USA; +1-573-681-5552.

Disclosure Statement

The authors declare they have no conflicts of interest.

Author note

The first author's graduate thesis is the basis for this article (Duerst, 2022).

had gardened in the past, only 31% were active gardeners. This equates to 60% of questionnaire respondents who wanted to garden but were currently not gardening, and is 22% of the total customers to the food pantry during our study period. Although it may be easy to assume that these individuals simply do not want to garden, our study found many specific reasons that prevented these otherwise motivated individuals from gardening. Participants offered suggestions to relieve these barriers, some of which are in the control of local policymakers. Our findings showcase the motivation, knowledge, and experience of rural, low-income individuals and encourage policymakers to take this into consideration when trying to promote gardening.

Keywords
access, barrier, food pantry, food production, garden, household, low-income, residential, rural, questionnaire

Introduction and Literature Review

More fresh fruits and vegetables are consumed by people who have access to a garden (Taylor & Lovell, 2014). Despite this, many people experiencing food insecurity do not have garden access (Darby et al., 2020). "Gardening has been proven to have great potential in improving social and ecological well-being for people and the food system in general" (Darby et al., 2020, p. 56), and yet there is a deficit of information regarding the barriers to any kind of gardening, especially among low-income populations. This study seeks to understand the factors that prevent people from gardening.

Known Benefits of Gardening

The benefits of gardening have been well researched and documented (Draper & Freedman, 2010). Gardening improves the health of individuals and communities by influencing social, spiritual, mental, and physical wellbeing. These positive outcomes are compounded by increased access to fresh vegetables.

Community gardeners in southern East Toronto enjoyed access to fresh produce, exercise, and an enhanced sense of community—especially across linguistic and cultural barriers (Wakefield et al., 2007). Gardeners viewed community gardens as a place to communicate with people from other cultures, to appreciate social diversity, and to come together over the shared experience of food (Wakefield et al., 2007). Other studies agree that gardening contributes to social unity; this is especially well researched in the context of community gardening (Firth et al., 2011; Teig et al., 2009; Ullevig et al., 2021).

Mental health benefits of gardening are also documented. Horticultural therapy supports overall mental health (Diehl & Brown, 2016). Horticultural therapy with Alzheimer's patients can slow cognitive deterioration versus the control group, lessen apathy, slow the loss of attention span and recent memory, create a sense of pride in caring for something living, and increase sociability (D'Andrea et al., 2007–2008). A study among women at a shelter for unhoused families found that horticultural therapy increased their levels of self-efficacy (Pierce & Seals, 2006).

Research by North American Indigenous people was particularly relevant to our study, due to the high Native American population in Bemidji, Minnesota (Lawrence, 2010). Gardening and caring for plants has significant ceremonial and cultural implications for Indigenous people and their food security (Baskin et al., 2009; Cidro et al., 2015; Power, 2008). Access to traditional food production methods such as gardening has "symbolic and spiritual value, and is central to personal identity and the maintenance of culture. … Food security is integral to cultural health and survival" (Power, 2008, p. 96). Our study sought to identify the barriers that reduce access to gardening in the Bemidji region.

Gardeners additionally enjoy the benefits of increased access to nutritious food, physical activity, a sense of responsibility, pride in caring for something alive, the ability to learn something new, added aesthetic beauty and ecological health, improved self-efficacy and community-efficacy, a connection to growth, the ability to help each other out, increased social capital, social connections across language and culture barriers, and improved community cohesion and unity (Firth et al., 2011; Wakefield et al., 2007; Wang & Glicksman, 2013).

Gardening brings diverse people together despite cultural, political, and class differences, and helps them to find common ground as they discuss broader community issues.

Correlation of Low Gardening Rates to Poverty

Research has indicated a correlation between poverty and the lack of a garden in any form. A study in rural Pennsylvania found that higher-income households were more likely to garden (a 69% gardening rate) than lower-income populations (a 46% gardening rate; Darby et al., 2020). Although not compared with higher income households, a survey of 484 low-income households in Toronto found that only 2% participated in community gardens (Kirkpatrick & Tarasuk, 2009). A study that mapped community food production in Madison, Wisconsin, found a disparity surrounding the placement of resources for community food production (Smith et al., 2013). Although there were historic community gardens in low-income areas, home gardens and newer community gardens were focused in neighborhoods with above-average household income (Smith et al., 2013). This could indicate that poverty itself is the most prominent barrier to gardening for food security.

Holistic Garden Research

Although community gardening has been thoroughly studied (Draper & Freedman, 2010), less information is available on residential or any other kind of gardening, especially in the global north (Darby et al., 2020; Taylor & Lovell, 2014). Specifically, very little data is available on the barriers faced by low-income individuals who want to garden (Darby et al., 2020). Community gardening is distinct from other forms of gardening, and home food gardens have especially "been overlooked, understudied, and unsupported by government agencies, non-governmental organizations, and academics" (Taylor & Lovell, 2014, p. 285). In 2021, Vávra et al. noted that rural home gardens have been overlooked and understudied. Again in 2022, Pham et al. point out that "residential food gardens are the dominant form of UA [urban agriculture] in North American cities. … Residential food gardens produce three times more food than community gardens do. … Despite its predominance, residential food production has received less attention in the literature than these other forms of UA" (p. 1). In addition, it is possible that low-income households participate more readily in residential gardening as opposed to community gardening (Pham et al., 2022). Home gardens and gardening as a holistic topic should receive more attention, since community gardening is not only well studied, but possibly also less effective.

Community garden research has touched on access and barriers, but this cannot be extrapolated to apply to all other forms of gardening. The issue of space is especially difficult to extrapolate since community gardens can simply fill to capacity, while the reasons a household may have no space for a garden are more numerous and complex. Participation rates in community gardening alone cannot be assumed to represent residential gardening or other forms of gardening. When planning initiatives designed to boost gardening rates among an entire demographic group or locale, it should be understood that the barriers to gardening as a whole are completely different from the barriers involved in community gardening specifically. Community gardening is a very targeted form of a multifaceted and diverse activity.

Access to Gardening

Nonprofit organizations, Indigenous food sovereignty efforts, and even city boards have been working to increase access to gardening in its many forms (4-Directions Development, 2022; Bergstrand, 2014; Montgomery, 2018), yet few studies provide holistic data to inform their projects and policymaking, or to reveal the factors preventing motivated individuals from gardening. With several exceptions, the currently available data on household gardening among low-income populations generally consist of small focus groups, geospatial analyses, and broad surveys of multiple food-related topics that include gardening as one component of the research.

In rural New York state, a survey including 28 households living below 185% of the poverty level found that lack of time, skills, tools, and interest were major barriers to gardening, and that limited land access and poor soil were also challenging factors (Webber & Dollahite, 2008). In the urban

environment of southern East Toronto, a series of focus groups and interviews showed that low-income, minority community gardeners face issues related to land access, including misunderstanding or resistance by policymakers, soil contamination, and a lack of awareness from the rest of the community (Wakefield et al., 2007). Also in East Toronto, a survey of 371 low-income families found that many who did not participate in community gardens faced barriers of time, lack of interest, lack of knowledge about available resources, or no access to community gardens—such as that all the plots were taken (Loopstra & Tarasuk, 2013). Although time was cited as a primary barrier, the authors indicate that the short answers requested by the instrument may have limited feedback, and that participants may have cited other, more nuanced reasons during interviews or focus groups which "could have resulted in different quantitative balance of reasons for not participating" (Loopstra & Tarasuk, 2013, p. 58).

More recently, in rural western Pennsylvania, a survey of 124 households—85 of which were classified as low-income—showed that the main barriers facing the study population were space and time to garden (Darby et al., 2020). This study noted that "the scarcity of literature regarding the barriers to household gardening is remarkable" (Darby et al., 2020, p. 56) and concluded that "more qualitative, place-based studies like this are needed to understand how to better support gardening practice in diverse settings" (Darby et al., 2020, p. 65).

A place-based study in Hobart, Australia, in 2022, targeted barriers to urban residential gardening with 301 participants of varied incomes. The researchers noted a global dearth of research in this area (Goodfellow & Prahalad, 2022) and found that

> Key factors to growing more food include control over property, available land, and gardening experience and know-how. Our findings highlight the need for policy, programs, and resources, especially at the level of local governments, that can contribute to an increase in the amount of local, home grown food in cities. (p. 1).

When academic research is connected to hands-on work in community food systems, it is best to seek direct input from the affected community members—including non-academics—and especially when addressing disparities (Pendergrast et al., 2019; Taylor & Lovell, 2014). Rural policymakers should have access to data showing accurate reasons for lower gardening rates among lower-income rural households. Research should be done with a holistic approach to gardening including residential, container, and anything else that study participants consider to be gardening. Our project seeks feedback directly from the community and aims to inform policymakers of the challenges faced by their constituents. We include a larger sample size of low-income, rural individuals (N = 205) than most previous studies, specifically targeting the barriers they face.

Previous Research at the Study Location

Bemidji, Minnesota (MN), had a population of 14,574 as of 2020 (U.S. Census Bureau, 2020). Located centrally between three major American Indian Reservations, the Bemidji area is a hotbed of tribal food sovereignty projects and other food security efforts. Bemidji is also a critical shopping hub in the northern Minnesota region, regularly drawing residents from rural areas from up to an hour away for their weekly grocery shopping trips (Lawrence, 2010).

The Bemidji Community Food Shelf (BCFS) hosted this study. BCFS is the only food pantry in Bemidji, and shared 550,000 pounds (249,000 kg) of food to 6,200 households in 2021 (BCFS, 2022). This site was chosen because of its aggressive initiatives to broaden community access to gardening and fresh produce. This food pantry operates a 4-acre (1.6 hectare) farm project, which in 2021 produced and distributed 21,500 pounds (9,750 kg) of produce (BCFS, 2022). Access to this food pantry is income-based, and therefore food pantry customers are representative of low-income Bemidji area residents.

Prior to our study, other researchers had already performed studies at this food pantry (Cairns, 2019; Montgomery, 2018). Our research drew insights from their structure, results, and findings. The studies explored customers' experi-

ences with gardening, fresh produce, and the BCFS farm project. This included a set of focus groups (Montgomery, 2018), and a set of questionnaires (Cairns, 2019). These studies helped to inform our questionnaire, logistical setup, and expectations for our research.

The Montgomery, 2018, study was intended to explore BCFS customers' thoughts and knowledge about fresh produce, gardening, and the Food Shelf Farm project. Ten individuals participated in two focus groups. According to the report, six Native Americans, three white Americans, and one Black American participated. Other circumstances were noted that shed light on the diversity of the individual BCFS customers and their circumstances:

> One (1) was an elder, two (2) represented small families of three or less and seven (7) represented larger families. Eight (8) were Bemidji residents, while two (2) lived in smaller communities or rural settings. Although it was not a variable that was targeted, two (2) had major mobility issues. (Montgomery, 2018, p. 6)

These participants expressed that they had previous garden exposure, interest, and knowledge, but lacked access to space, tools, seeds, and other supplies, and desired education in specific topics such as container gardening. Space seemed to be the most frequently mentioned barrier, with several participants living in rented housing or apartment buildings (Montgomery, 2018). This study had a very small sample size of just 10, so our study built on their findings while including a much larger sample of BCFS customers.

A set of questionnaires was administered at BCFS in 2018 (n = 215) and 2019 (n = 200) to evaluate customer produce usage (Cairns, 2019). The questionnaires were readily accessible to BCFS food pantry customers and reached a broader audience than the focus groups, consequently garnering a larger sample size of individuals who would be affected by policy changes. Cairns' study helped to guide the logistical setup of our study, specifically that questionnaires were offered at a particular counter in the waiting room of the food pantry, and that they were offered during the wait time between the pantry's entrance interview and shopping. Cairns' study also helped to set our expectations for an approximate number of participants in a questionnaire-based research project at this location, demonstrating that a sample size of around 200 individuals was realistic and repeatable.

Research Methods

The questionnaire-based study took place in Bemidji, Minnesota, USA at the local food pantry. The Texas A&M University-Commerce Institutional Review Board granted approval for this study on September 20, 2021.

Data Collection

The researcher distributed and gathered 205 questionnaires from food pantry customers at the BCFS from September 22, 2021, through October 22, 2021. The researcher was available in the waiting room of the food pantry during open hours, 10:00 AM until 3:00 PM, each day that data were collected. The food pantry's standard protocol is that customers are interviewed and approved by food shelf staff and then seated to await access to the food pantry shopping area. Their average expected wait time is approximately 15 minutes, but this varies from no wait time at all up to 30 or more minutes, depending on the day's traffic. It is during this wait time that the researcher solicited food pantry customers for the study from a station in the waiting room.

The questionnaire was administered to any interested adult BCFS customer. Setup was designed to not be disruptive to normal food pantry operations. There was no incentive offered for participation. If an individual expressed interest in participating, they were provided with a consent form, a paper questionnaire, a clipboard and a pen. Two participants expressed a desire for help completing the questionnaire, so assistance was given in the manner requested.

For the confidentiality of participants, no names were recorded, and no audio or visual recording took place. The consent form was separate from the questionnaire and was placed in a different pile, which was occasionally shuffled to ensure anonymity. All clipboards and pens were sanitized between uses. The researcher wore a

mask in accordance with food pantry policy.

During the data collection period, customers were allowed two visits to the food pantry each month. This is different from BCFS' typical policy of only once per month and made it more challenging to prevent duplicates than had been originally anticipated. The policy was changed only weeks before data collection began. To counter this, the researcher asked customers whether they had already participated, before offering the questionnaire. Approximately 200 participants were anticipated, due to other researchers' previous studies in the same location (Cairns, 2019).

The total number of customers each day is always recorded by BCFS, and this information was provided to the researcher. The total number of questionnaires collected each day was recorded, and each questionnaire was dated. These data recorded the ratio between the population *N* and the sample *n*.

Data Analysis

The questionnaire contained multiple-choice questions as well as open-ended questions. In one particular set of multiple-choice questions, participants were expected to select the option that best matched their experiences. Instead, participants circled as many options as they felt might apply to them, summarized in Table 1 below. This, and other multiple-choice nominal data, were coded and analyzed through descriptive statistical analysis. Open-ended questions were usually answered with only a few words. Many of these were identical phrases or phrases with very similar meaning. As such, the answers to these questions were categorized by the researcher into consistent groupings, and then analyzed by descriptive statistics. In summary, multiple-choice results were statistically compiled, answers to open-ended questions were manually analyzed for reoccurring themes, and descriptive statistics were applied to all. Non-answers were not frequent and therefore generally ignored. Numbers presented in the results are typically based on the total number of questionnaires collected, unless stated otherwise.

Results

A total of 205 questionnaires were collected. During that same time, no more than 562 unique customers visited the food pantry during active data collection. Our sample represents 36.5% of the total customers to the food pantry during the study period. Most respondents (62%) were between 31 and 64 years of age, but 20% were 18–30, and 17% were 65 or older. The BCFS has income guidelines based on 300% of the federal poverty level. All study participants are assumed to be below 300% of the federal poverty level as screened by the food pantry. Due to the sensitive environment of the study location, racial demographics were not collected. Tribal leadership is encouraged to make their own analysis of the study location and the researcher, to assess the relevance of this study for their needs.

Table 1. Level of Gardening Experience as Self-Reported by Food Pantry Customers (No Garden = NG)

Response	*f*	% *f*	NG	% NG
I have never gardened before	29	15.10	28	96.55
I gardened as a child/youth	48	25.00	45	93.75
I gardened as a child/youth & I sometimes help a relative or neighbor in their garden	11	5.73	10	90.91
I gardened as a child/youth & I have gardened as a hobby	11	5.73	6	54.55
I gardened as a child/youth & I sometimes help a relative or neighbor in their garden & I have gardened as a hobby	3	1.56	2	66.67
I sometimes help a relative or neighbor in their garden	14	7.29	12	85.71
I sometimes help a relative or neighbor in their garden & I have gardened as a hobby	3	1.56	2	66.67
I have gardened as a hobby	22	11.46	9	40.91
I garden all the time, whenever I have the opportunity	51	26.56	16	31.37
All respondents	192	100.00	130	67.71

Approximately 90% of participants stated that they would plant food if they had access to a garden. In response to the question "What would you plant in your garden?" 184 of the 205 respondents circled "Food," 102 circled "Flowers," and 50 circled "Cultural Plants." "Other" responses included medicinal plants, berries, native species, succulents, herbs, and rocks. (Rocks are a joke among gardeners and farmers in northern Minnesota, since the winter frost brings up a new "crop" of rocks to pick every spring. This joking response demonstrates familiarity with the challenges of gardening in this region.)

It is worth noting that the non-gardening rate among study participants was 67.71% even though only 15.10% had never gardened before and 93% circled "Yes" in response to the prompt "In a perfect world, would you want a garden?" This indicates that over half of the participants had experience gardening and yet did not garden at the time of the study. Those who expressed more experience gardening were more likely to have a garden, yet 31.37% of those who reported a strong lifetime interest in gardening still did not have a garden. When asked if they would like to learn more about gardening, 53% responded affirmatively. Figure 1 demonstrates more clearly how few study participants were gardening, despite their interest level and past experiences.

Figure 1. Gardening Rate Among Study Participants

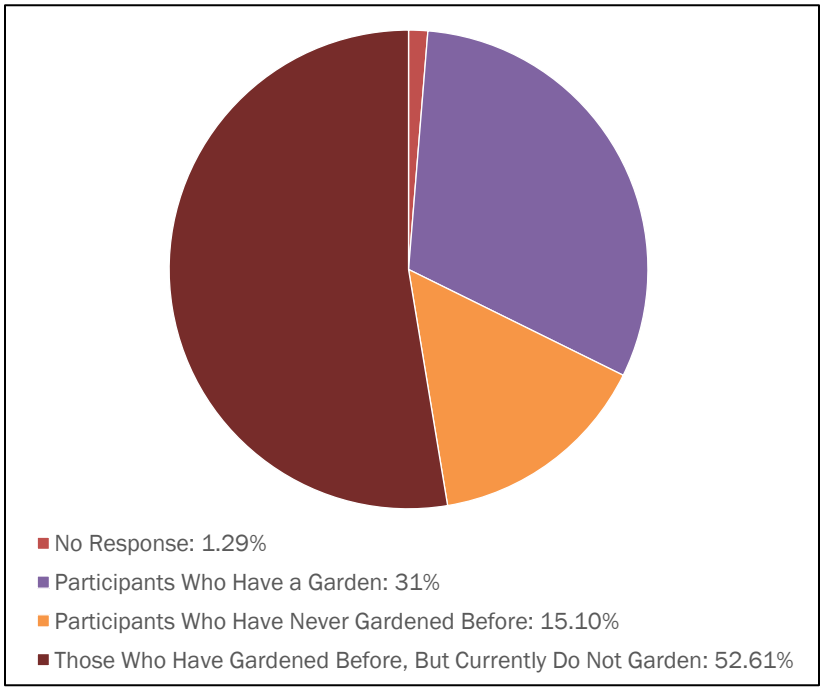


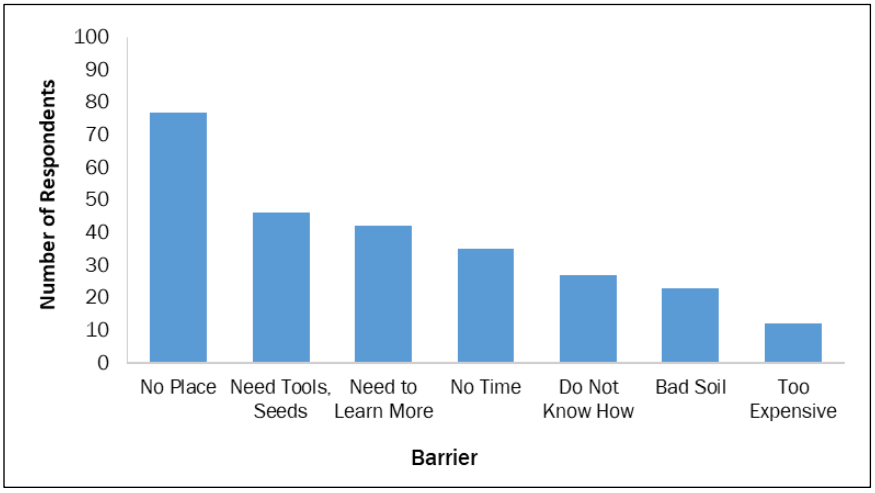
Table 1 depicts the contrast between past gardening experiences and current involvement in gardening. Respondents were asked in a multiple-answer question to "Circle the option that tells us how much you garden," to indicate their past gardening experiences. In a separate yes/no question, they were asked whether they currently garden. Some participants chose more than one option, and therefore several responses in Table 1 include these options separated by an ampersand (&). The number of questionnaire participants who responded in a certain way is indicated by *f*, and the number of these who do not have a garden at the time of the study is indicated by NG (No Garden). The variable %*f* displays the percentage of individuals who gave each response, while the variable %NG displays the percentage of individuals who gave that response and also did not have a garden at the time of the study.

Barriers to gardening were collected quantitatively in the multiple-response section of question 6 of the questionnaire. Respondents could select more than one of these options, and self-reported nongardeners selected a total of 262 responses for why they were unable to garden. "No place to put a garden" and "need tools and seeds" were the top two responses. Some participants expressed a desire to learn more about certain gardening topics before they felt fully comfortable gardening, and others indicated a lack of time. There were two potential responses given in relation to knowledge of gardening, and some people circled both. These responses included "I don't know how to garden" or "I need education on certain parts of gardening before I'll feel comfortable doing it myself." The results are summarized in Figure 2.

Qualitative data were additionally gathered from question 3

and the open-ended section of question 6 to ascertain the deeper reasons behind the barriers cited. A total of 120 individuals who did not have a garden responded to these questions. Of the 64 individuals who reported insufficient space to garden, 19 additionally mentioned that they lived in an apartment, six in a trailer park, five renting, and six were homeless. Mobility issues were behind 6 of the 12 references to poor health. Five of the seven money-related responses were specific: two needed a tiller, two needed running water, and one needed a raised bed. These results are broken down in Figure 3.

Figure 2. Barriers to Gardening as Reported Through a Multiple-Option Question by Food Pantry Customers Who Did Not Have a Garden



When asked in an open-ended question "What would make these problems go away," 106 nongardeners responded. The most frequent suggestions presented by nongardeners to overcome the barriers they face were moving their residence (to provide a place for a garden), access to resources, some form of garden education, or more time to garden. Some responses were less common, but more specific and innovative: landlord permission to garden, access to any space to garden including community gardens or container gardens, a way to fix the soil, or a gardening companion for motivation and education. The summary of all responses given by nongardeners is found in Figure 4.

More specific written solutions for the barrier of no place to garden were addressed by 35% (n = 46) of nongardening respondents. Moving to a house, a place with a big yard, or just not living in their current situation was the main solution

Figure 3. Barriers to Gardening as Reported in an Open-Ended Written Question by Food Pantry Customers Who Had No Garden

Variable "no place" is separated by the specific reason given, if any

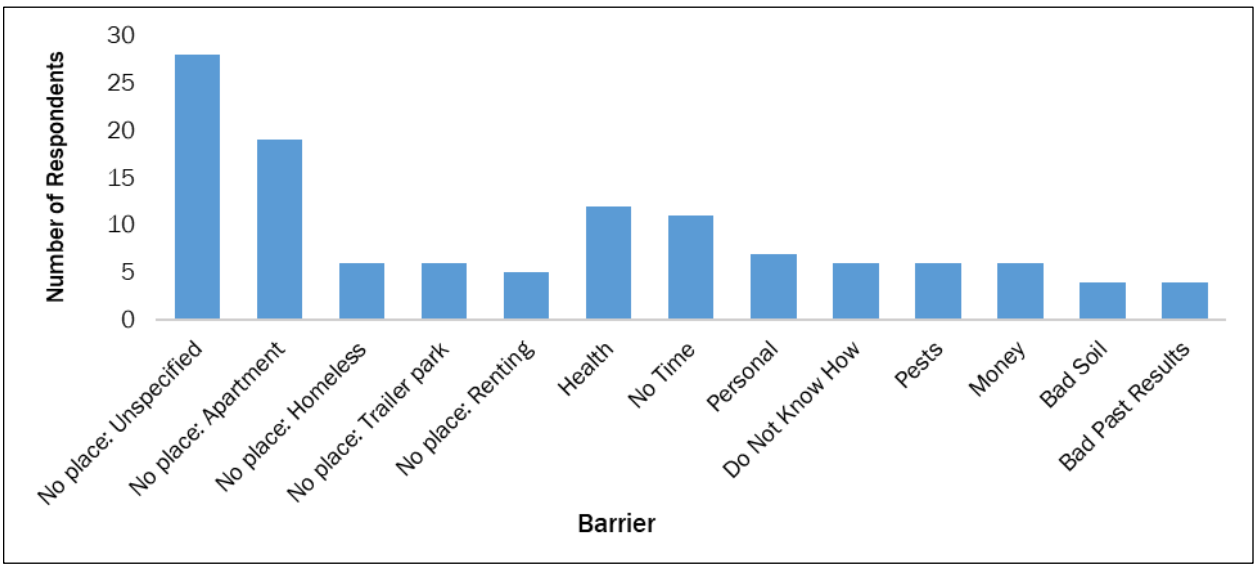
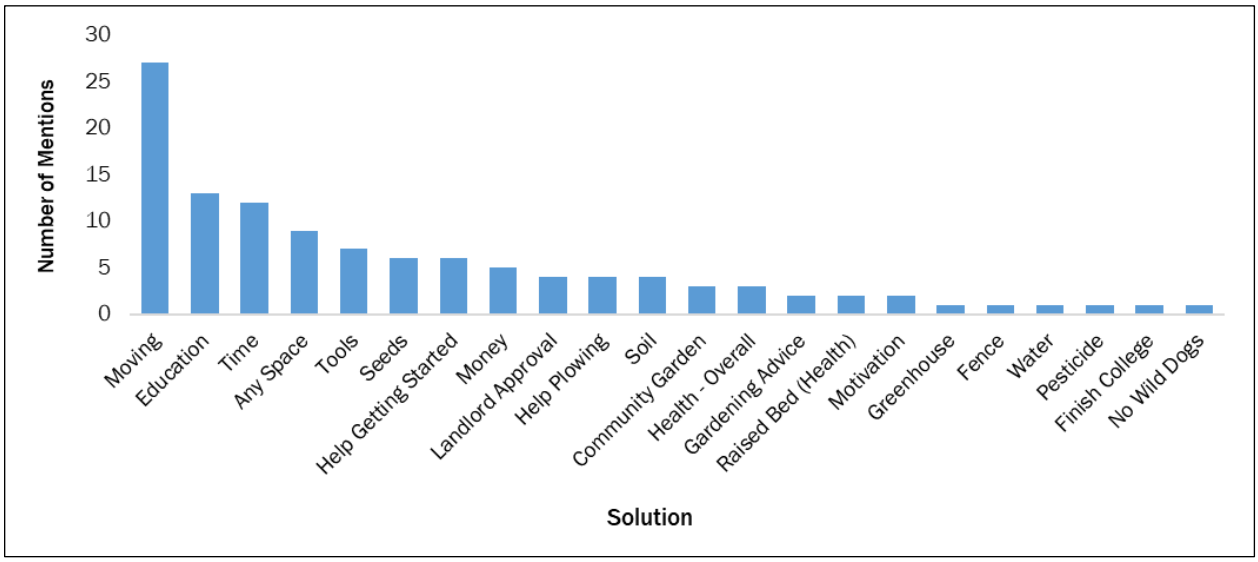


Figure 4. Solutions to Overcome the Barriers to Gardening, as Reported in an Open-Ended Response by Food Pantry Customers Who Did Not Have a Garden

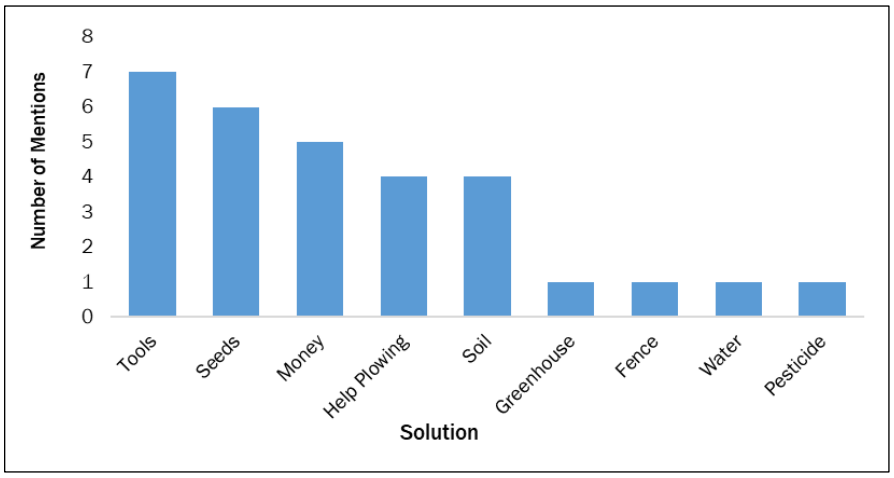


offered by 27 of the 130 individuals who responded to the survey and reported that they did not currently have a garden. Any viable space to garden was requested by nine individuals. Community or collaborative garden access was specifically mentioned by three individuals, and four suggested that landlord approval for a garden would enable them to garden.

Solutions to the barriers of finances or resources were suggested by 28 people. A summary of these responses is in Figure 5. One specific tool was mentioned: a shovel. Help with soil was requested in the form of amendments, fertilizer, black dirt or compost. The pesticide requested was for quack grass. Regarding seeds, one person commented that "stores in our area throw seeds away every year, they need to donate to people in need. Home Depot, Menards, etc."

In summary, we saw that 31% of those who reported a strong lifetime interest in gardening were not active gardeners at the time of the study. Less than one-third of all questionnaire respondents had a garden, although nearly all expressed that they would like to garden. Many stated that their primary barrier was the lack of a place to put a garden, especially those who were renting or facing homelessness. Finances were also commonly cited, whether to purchase basic garden supplies or to fund situational items such as a water spigot, a fence, or a raised bed for those with mobility challenges. Time and garden education were also mentioned.

Figure 5. Solutions to Overcome the Financial Barriers to Gardening, as Reported in an Open-Ended Response by Food Pantry Customers Who Did Not Have a Garden



Discussion

Most respondents (91%) expressed that they would garden—in a perfect world. This agrees with our hypothesis that lower rates of gardening among low-income households are caused by barriers rather than lack of desire. Although many barriers were identified, 85% of respondents had gardening experience and 27% had extensive gardening experiences. Still, 68% of respondents did not have a garden at the time of the study, and 31% of those with extensive gardening experiences did not have a garden. The barriers recorded by those who did not have a garden at the time of the study should give us insights into the reasons why they were unable to garden.

This concurs with the conclusion from previously held focus groups (performed by a different research team) at the same location: most participants "had positive past experiences with gardening, but very few are currently gardening" (Montgomery, 2018, p. 5). This previous study held two focus groups with 10 BCFS customers who had the time and interest to participate. Only two participants had never gardened before (Montgomery, 2018), which is comparable to the 15% of participants who reported on the questionnaire that they had never gardened before. Despite the dramatic difference in sample size and assumed interest level of participants, both the 2018 study and this study revealed similar attitudes toward gardening, and similar past garden experiences.

Barrier #1: Place to Garden

Of participants who did not have a garden at the time of the study, 53% reported in the short-answer section that their main barrier was the lack of space to put a garden, often due to their living situation such as an apartment or rental. For example, one respondent stated that 2021 was the "first year I haven't had a garden in over 35 years" because "I had to move into town, landlord won't allow" a garden. Space to garden was also a major concern among participants in the 2018 focus groups. A yard, a home of their own, permission from the landlord, or education about container gardening were all suggestions posed to solve their lack of access to gardening (Montgomery, 2018). This same challenge is echoed in other studies that discuss barriers to gardening. In rural western Pennsylvania, 54% of respondents (n = 137) reported lack of space to garden, and 20% cited their landlord's gardening restrictions (Darby et al., 2020). In Madison, Wisconsin, there was a disparity in gardening resources—especially community garden placement—between low-income and high-income neighborhoods (Smith et al., 2013). In rural New York, rented housing, poor soil, and fear that the land was contaminated all contributed to a lack of garden space (Webber & Dollahite, 2008). Resolving this one barrier is likely to greatly increase access to gardening in the Bemidji area.

Study participants proposed ways to create garden space. Landlord permission was often cited, and a program to work with landlords to facilitate garden access for their tenants would likely be well-received among tenants. Other options included increased community garden access or simply moving to a home with a yard. It is interesting that bureaucratic resistance, waitlists for community garden space, and low policymaker awareness were also major issues cited among community gardeners in Toronto (Wakefield et al., 2007). The same study found that "Community gardens that were situated near the homes of the gardeners involved seemed to be used regularly and consistently, whereas gardens in areas not immediately adjacent to the housing of participants were not frequented as regularly" (Wakefield et al., 2007, p. 95). If new community gardens are created in Bemidji, these factors should be kept in mind. Another study recommended a program to create "relationships with landlords and encourage creating lease language that allows gardening" (Darby et al., 2020, p. 66). An initiative in Bemidji to network with local landlords would boost garden access for tenants.

If BCFS goals still include "greater engagement [by BCFS customers] with the Farm" (Montgomery, 2018, p. 6), then BCFS leadership could re-address the option of making personal garden spaces available at the Farm, assuming that transportation is also available. This would solve the barrier of place to garden, as well as naturally solving the issues surrounding soil amendments, raised beds, and tilling. If gardeners had access to the Farm's available seeds and tools while working their personal plots, then even more barriers would

be relieved. This would also get customers on-site at the Farm and could build interest in the greater Farm operation. Personal-plot gardeners would have expanded access to learn-by-doing opportunities and extra produce if they chose to accompany Farm staff in seasonal tasks on the Farm itself. However, since transportation to the garden space is a significant barrier, practitioners should balance the needs of organizational success and involvement with the success of the individuals being served. If the end goal is to promote personal engagement with gardening, then an initiative designed to support personal garden plots in home rental situations or nearby community gardens would be accessible to a greater number of community members.

Barrier #2: Gardening Supplies

The second most frequently cited barrier was a need for gardening supplies. Tools, seeds, soil amendments, tilling, and other resources were requested by gardeners and nongardeners alike. This still concurs with the prior focus groups done at BCFS, where participants expressed a need for starter plants, soil, tools, and materials for container gardening (Montgomery, 2018). Notably, one participant in this 2018 study suggested a tool rental program (Montgomery, 2018). Tools and seeds were the most mentioned resources by BCFS customers who responded to this questionnaire. One participant pointed out that the Bemidji Public Library is already equipped to rent books and some household equipment, and perhaps a garden tool rental program could be arranged there. Finally, several questionnaire respondents needed raised beds to solve mobility factors preventing them from gardening; several others needed a water spigot or a fence; others suggested soil amendments, a greenhouse for starting seeds, or help with tilling. A scholarship program could make these resources available to applicants with specific requests. Potential programs in any locality could look to the gardening program available through 4-Directions Development in Red Lake Nation for guidance and inspiration; this resource was mentioned by several respondents as a valuable resource providing materials, seeds, education, and help with tilling.

Barrier #3: Time

Lack of time was another factor for some BCFS respondents, and several specifically suggested that time-management skills would be useful. Time, although mentioned, was not a major factor for most participants, which contradicts many other studies. The study in Toronto found that time was a primary barrier for those interested in community gardening (Loopstra & Tarasuk, 2013), and other studies also factored time as an important barrier (Darby et al., 2020; Webber & Dollahite, 2008). Kortright and Wakefield (2011) suggest that garden skills and education can alleviate the time barrier, since "some interview participants were able to spend very little time on their gardens and still enjoy a substantial harvest. With their knowledge of gardening practices, they were able to focus their efforts more effectively. Others spent similar amounts of time with far less success" (p. 50). Perhaps garden education at BCFS could highlight efficiency techniques and time-saving methods so that participants have a backup plan when spare time is infrequent. However, any program designed for Bemidji residents should keep in mind that a place to garden and the tools to garden were much more prominent barriers for study participants.

Barrier #4: Education

It is worth noting that during the planning stage of this research, input from the BCFS Farm Committee suggested a belief that their nongardening customers would not know how to garden and that they simply needed more education. To accommodate their belief, a portion of the survey focused on educational issues. However, our findings did not support the assumptions. On the contrary, we found that many customers at the BCFS have motivation for and knowledge of gardening, but do not have a place to put the garden and/or gardening tools. This is important information to further investigate and confirm. Since much literature focuses on community gardening alone and not gardening as a whole, and/or focuses on urban populations as opposed to rural populations, the data is possibly misleading. In addition, practitioners commonly assume that their constituents do not garden because they are uneducated, and programs are designed to focus on garden education

and training. Darby et al. (2020) discuss this common misconception and dub it the "information deficit falsehood" (p. 65). If future studies are still consistent with our findings in rural Minnesota and with the findings of Darby et al. in rural Pennsylvania, these data are crucial to disseminate to practitioners to facilitate a better use of resources when planning programs among low-income, rural residents.

Limitations

We only began collecting data on time constraints and nonparticipation a little over halfway through the study. Ideally, this should have been done from the start for the most accurate representation of the population. These data showed that the sample size of our study was limited primarily by time, as approximately half of food pantry customers went straight from the interview room to the shopping area with little to no wait time. Approximately 10% of the population did have time, but still were not interested in completing the questionnaire. This, in turn, may have influenced our data on how many BCFS customers are truly interested in gardening.

Duplicate surveys were possible, since the food pantry changed its policy on frequency of visits shortly before data collection commenced. Although study participants were asked whether they had already completed the questionnaire, there is a chance that some duplicates occurred.

Our study did not differentiate between home gardening, community gardening, or other forms of gardening. We focused on the participants' access to gardening in any form. There is still a dearth of research addressing home gardening and its accessibility for low-income households.

This study is additionally limited by its place-based nature. The unique cultures and history of the Bemidji area cannot be extrapolated to other areas. However, our findings agree with other place-based studies on rural populations. More research needs to be done on rural garden access as a whole.

Conclusions

Overall, this study found that customers at the BCFS food pantry are interested in gardening, and the majority have substantial gardening experience. Resolving two key factors (a place to garden and access to gardening supplies) could resolve many of the greatest barriers to gardening that exist for BCFS customers. Gardening education in specific, targeted areas could fill in the gaps for others. Programs can be designed to relieve the barriers to gardening that low-income Bemidji area residents face.

The wealth of gardening knowledge held by low-income individuals should not be discounted, nor should their motivation to garden be in question. Most know how to garden but are prevented from gardening by a lack of space and resources. An assumption by policymakers that people simply do not want to garden, or do not know how to garden, may very well be damaging their organizations and patronizing the individuals they are attempting to serve.

Future research should seek to further understand the barriers faced by individuals who want to garden, especially where the research can inform the policies and programs surrounding garden access. Similar data collection should be carried out in other communities—especially before new programs or initiatives are launched—to avoid assumptions that lead to a waste of resources.

Community garden research is limited by the tendency of community gardens to fill to capacity, and therefore does not investigate more nuanced reasons why people may lack space for any form of garden—community, residential or otherwise. We hope to see more solid research conducted on the barriers to gardening, including gardening in any of its many forms—residential gardening, container gardening, community gardening, etc.—so that policymakers can create better programming with a more complete understanding of their participants.

Future research should add to the body of literature on residential gardening and other less-studied forms of gardening, especially in rural areas. More data is needed to determine whether low-income households are more likely to participate in residential gardening as opposed to community gardening, and whether this potential trend is connected to rural populations alone. Special attention should be given to the barriers faced by those experiencing food insecurity in both rural and urban settings, especially to ascertain whether

space and resources are ubiquitously more important than garden education. Research could note the barriers to the continued use of residential gardens after the first year. More solid research should be conducted with policymakers and community leaders in mind, to provide data for better programming and a more complete understanding of the food-insecure population's access to gardening in any of its varied forms. 

Acknowledgments

Gratitude is extended to Michael Olson and Mary Mitchell, current and former directors of the Bemidji Community Food Shelf, for their support of this project, advice to ensure its success, and grace in enabling the research to take place even in the midst of their transition of leadership.

Gratitude is extended to Debbie Johnson, the volunteer coordinator at the BCFS, for her helpfulness and cheerfulness in ensuring that all the little logistical details were smoothly provided for.

Gratitude is extended to the members of the BCFS Farm Board of Directors for their input in the early stages of this project and especially their ideas for specific areas of research that would benefit their policymaking and future projects.

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