Improving Occupational Performance and Accessibility in Boston Metro Community Gardens for Community-Dwelling Older Adults (Age 60+)

A recommendation report synthesizing stakeholder input with existing information.

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Report Purpose

This recommendation report is intended to provide a resource and guide for improving the accessibility of community garden spaces in the Boston Metro Area for older adults. This report was developed from an occupational therapy framework by a Tufts University student as a part of their Doctoral Experiential Component in the Entry-Level Occupational Therapy Doctoral program. Using occupational therapy theories and models, this report approaches the topic of accessibility through the context of improving occupational performance. This approach allows for an expansive perspective of accessibility that considers both the physical environment and the social/cultural factors that may impact older adults' participation in community gardens.

Additionally, this report will summarize stakeholder perspectives gathered from community-dwelling older adults (age 60+) in the Boston Metro Area and local community garden organizers. These perspectives will be used alongside existing evidence to make applicable and meaningful recommendations for community garden spaces in the Boston Metro Area. These recommendations are developed with a specific focus on the older adult population, but they consider aspects of universal design to account for the wide range of users in these spaces.

Individuals or organizations may use this report to inform the development of community garden spaces, develop elder-friendly programming, or modify existing spaces and programs. Additionally, information in this report may support gardeners or organizers in advocating for grants, funding, and changes for these spaces.

Message from the Authors

This report and project would not have been possible without the support and assistance of community stakeholders from a range of Boston Metro community gardens. We are exceptionally grateful for the time and expertise these community members provided to this exploration. The level of community advocacy and passion that members of these communities embody was genuinely inspiring. This project was also supported through the generous contribution of the Virginia Auty Nedved-Cook, BSOT 52 Endowed Student Research Award.

If you have any questions about this report please contact Sydney Gill at sydgillak@gmail.com

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Key Terms and Definitions Used in this Report

Accessibility: According to the Centers for Disease Control and Prevention (2020) accessibility is "when the needs of people with disabilities are specifically considered, and products, services, and facilities are built or modified so that they can be used by people of all abilities."

Occupation: Everyday activities, specific to the individual or group, that bring meaning and value to their lives. Occupations are centered on personal experiences and occur within a context. Individuals may participate in occupations alone, with family, or as part of a wider community (American Occupational Therapy Association [AOTA], 2014).

Activity: More general than occupations, activities are observable actions that are culturally defined and understood. An occupation may include the execution of many activities (Pierce, 2001).
Example: Within the occupation of gardening at a community garden, members may complete many activities, including planting seeds, picking berries, and turning compost piles.

Context: The social and physical context in which the individual participates in occupation. This includes the physical environment and the larger social/cultural context (AOTA, 2014).

Occupational Participation: The act of engaging in an occupation (work, play, activities of daily living) within an individual's context.

Occupational Performance: The result of the interplay between a person, the environment, and the occupation. This concept concerns the quality of participation in an occupation. Occupational performance can be improved by creating "best fit" between a person, environment, and occupation (Law et al., 1996).

Barrier: Any factor or obstacle that prevents or limits an individual's ability to participate in an activity or access a space (Centers for Disease Control and Prevention, 2020a).

Facilitating Factor: For the purpose of this report, facilitating factors are defined as any factor that improves participation in a community garden space.

Community-Dwelling: Individuals living outside of residential or institutional settings, including assisted living, nursing facilities, or in-patient settings (O'Grady et al., 2022).

Community Garden: The American Community Garden Association provides a broad definition of what a community garden is. They state that community gardens can be in urban centers like Boston or in suburban/rural locations. These gardens can be located in hospitals, schools, nursing homes, or in a neighborhood's spare land. These gardens can grow edible produce or flowers. Community gardens can be designed to have individual plots or larger community plots that are jointly cared for by members of the community (American Community Garden Association, 2022).

Lowercase "n": A lowercase n refers to the sample size. For example, n=12 means there are 12 individuals in the sample.

Section One: Background

In order to exemplify the importance of this topic, this report will start by summarizing some of the existing literature and information available. The following section will provide an overview of community gardens in Boston and summarize existing demographic data about older adults in the area. This section will also summarize some of the barriers to participation that exist in the literature, alongside some of the potential benefits that older adults may experience from participation in community gardening. Finally, this report will provide background on the application of occupational therapy to this exploration to provide readers with an understanding of how this report approached this topic.

Community Gardens in the Boston Metro Area

The Boston Metro Area has a long and rich history surrounding community garden spaces. From the start of the community garden movement in Boston, an emphasis was placed on the engagement of older adults in these spaces. This movement began in Boston in 1895 when the Industrial Aid Society for the Prevention of Pauperism established a Committee for the Cultivation of Vacant Lots. This committee

formed the first community garden in Boston by leasing a local farm on the city's edge. The plots of this first community garden were allocated explicitly to older adult community members, signifying an early focus on engaging this population in these spaces (City of Boston, 2023).

Throughout the 20th century, the popularity of community gardens continued to rise. In December of 1941, the National Garden Conference set out to create the World War II Victory Garden Program to increase the nation's supply of produce and improve morale for those on the home front (Springate, 2023). Today, the Fenway Victory Gardens are the oldest continuously operating Victory Garden in the nation. With over 500 plots, they are also the largest community garden in the Boston Metro Area (Boston Public Library, 2024).

Moving into the 1970s, community gardening in Boston continued to build in popularity due to various factors. These factors included a decrease in the city's population, the community empowerment movement, and nutritional recommendations from medical professionals (City of Boston, 2023). During this time, prominent community activist Mel King brought forward legislation that would allow the community to use vacant public land for agricultural purposes (The Trustees of Reservations, 2024). This legislation stated that "priority in the allotment of vacant public land for farm and garden purpose shall be given to elderly persons of low income (Massachusetts Gardening and Farm Act, 1974)". This legislation allowed for a blossoming of community gardens in the area and documented a political priority to engage older adults in these spaces.

Today, the Boston Metro Area has over 175 unique community gardens. These spaces are managed primarily through private or non-profit groups, with a scattering of publicly managed spaces (Boston Public Library, 2024). Some community gardens in the Boston Metro Area are run on an allotment model, where individual plots are assigned to members. Alternatively, some gardens are run using a community model with shared garden plots.

Older Adults in the Boston Metro Area: Demographic Data

Older adults in the Boston Metro Area represent a diverse population sector. Understanding demographic data about older adults in the area may assist in identifying ways to improve the accessibility of Boston Metro community garden spaces. The "Boston Metro Area" and "Greater Boston Area" have variable geographic definitions. To summarize demographic data, this report utilizes data from the United States Census Bureau that positioned a metropolitan statistical area around Boston encapsulating the Boston-Newton-Cambridge (MA-NH) area. According to the United States Census Bureau, older adults age 60 or older make up 23.9% of the population in this area, representing approximately 1.17 million older adults age 60+ (US Census Bureau, 2022).

This Census data additionally provides critical information regarding the health challenges and disabilities that older adults in the Boston Metro Area experience. By understanding the profiles of disability within this population, we can better design spaces that account for the needs of older adults in this area. The Census Bureau provides estimates for the prevalence of different disabilities for older adults age 65+ in the Boston-Newton-Cambridge (MA-NH) statistical area. They report that 19.6% of seniors age 65-74 and 42.9% of seniors age 75 or older report at least one disability (US Census Bureau, 2022a).

This data set reflects that ambulatory disabilities are the most common, with 17.7% of older adults over the age of 65 reporting a disability impacting ambulation. Other commonly reported disabilities are hearing difficulties (11.4% of older adults age 65+), vision difficulties (4.7% of older adults age 65+), cognitive difficulties (7.6% of older adults age 65+), self-care difficulties (6.9% of older adults age 65+), and independent living difficulties (12.7% of older adults age 65+) (US Census Bureau, 2022a). This data signifies a diverse set of needs that should be considered when designing programming and spaces that older adults access.

Barriers to Participation in Gardening for Older Adults

Community gardens can be physically inaccessible to individuals with disabilities, leading to a critical issue where there is unequal access to these spaces. The demographic data pertaining to older adults in the Boston Metro Area shows that a significant portion of this population reported a disability (US Census Bureau, 2022a). York and Wiseman (2012) explain that individuals who may already be more at risk for "community-based isolation" due to physical disability or other limitations, may have difficulties accessing a garden environment. It is important to consider the ways in which the characteristics of this sector of the population may be experiencing barriers to participation due to disability status or other age-related changes.

Furthermore, a range of studies document additional factors that may impact older adult's access to outdoor spaces, including community gardens. Van Heezik and colleagues (2018) outlined some barriers that can impact an older adult's engagement with nature and outdoor spaces: diminished physical ability to walk on uneven surfaces, difficulties engaging in strenuous activity, and the ability to keep pace with a group. It is important to note that not all older adults may experience barriers to participation. Some "younger" older adults may find increased opportunities to engage with nature spaces given more available time in retirement (Freeman et al., 2019). Regardless, consideration of the potential barriers is important to ensure equal access to community garden spaces.

Benefits from Participation in Gardening for Older Adults

Existing literature and evidence exhibit the importance of engaging older adults in gardening. Seniors choose to take part in gardening for a variety of reasons. A study by Wang and Glicksman (2013) found nine main themes about why seniors choose to take part in gardening; mental health, available produce, a continuation of past life, something to do, connection to nature, connection to others, physical health, continued learning, and helping their community.

The benefits of gardening have been well-documented. A meta-analysis by Soga and colleagues (2016) about the effects of gardening on human health found that, overall, participation in gardening activities has a significant positive impact on health. This meta-analysis found four main pathways in which gardening improves health: cognitive restoration, increased social participation, physical activity through gardening, and access to a healthy diet rich in produce. They stated that these pathways are not mutually exclusive (Soga et al., 2016). This study exemplifies how occupational participation in gardening can lead to positive health outcomes for a range of individuals.

Existing research on the impacts of gardening specific to older adults further exemplifies the benefits of gardening for this population. A study focusing on the physiological and psychological effects of gardening activities for older adults found that older adults' blood pressures were significantly lower after a plant activity than participants in the control group. This study also reported that individuals who participated in a plant activity were more "comfortable and relaxed" than the control group (Hassan et al., 2018). An additional study looking at the effects of community gardening at a senior center found a general trend towards lower scores on the Dartmouth COOP Functional Health Assessment Charts, which signifies improved functional health outcomes from participation in community gardening. This same study reported decreases on the Geriatric Depression Scale and a greater distance walked on the Six-Minute Walk Test following participation in a community gardening program (Austin et al., 2006). These studies exemplify that the physical activity from gardening, tied with the benefits of nature engagement, makes gardening a viable option for improving health and wellness in older adult populations.

To further demonstrate the impacts that community gardens may have on health and wellness for older adult members, we created a wheel of wellness about this topic. Figure 1 provides a theoretical background about wellness, and Figure 2 demonstrates how community gardens can impact the different domains of wellness with a specific focus on older adult members.

Figure 1: *Wheel of Wellness:* *Understanding The Dimensions of Wellness*

Description: Participation in gardening at community garden spaces can positively impact the wellness of older adults. Wellness is an active process in which individuals strive to achieve a state of well-being that allows them to reach their full potential. An individual's ability to achieve this state is impacted by their actions and the community support they receive (University of New Hampshire, 2024). Figure 1 outlines the eight dimensions of wellness.

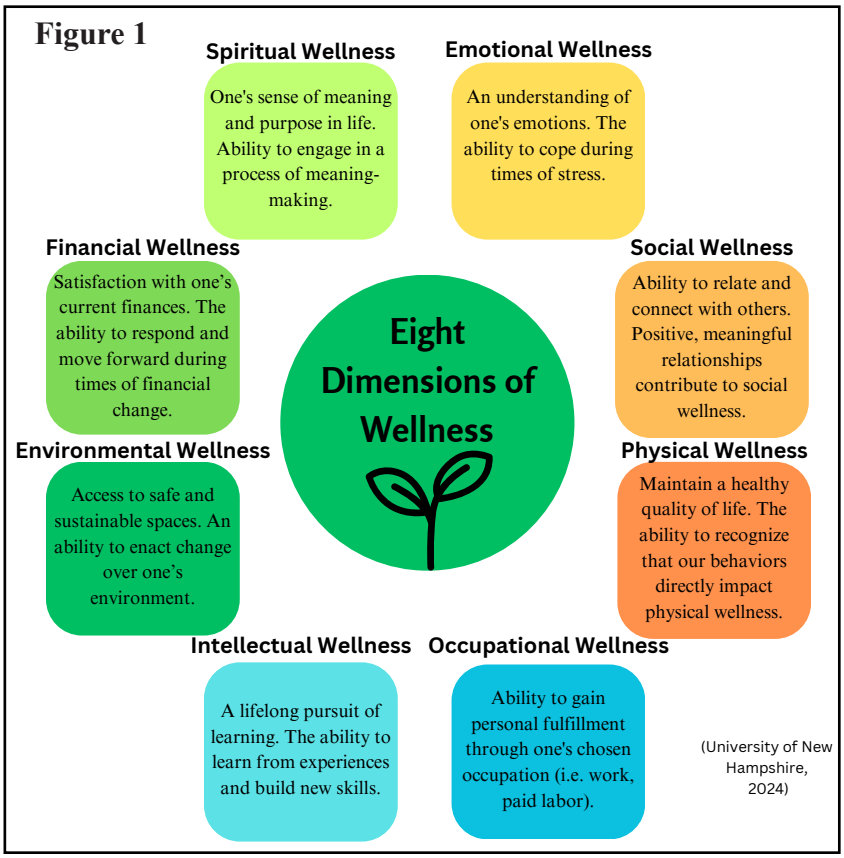
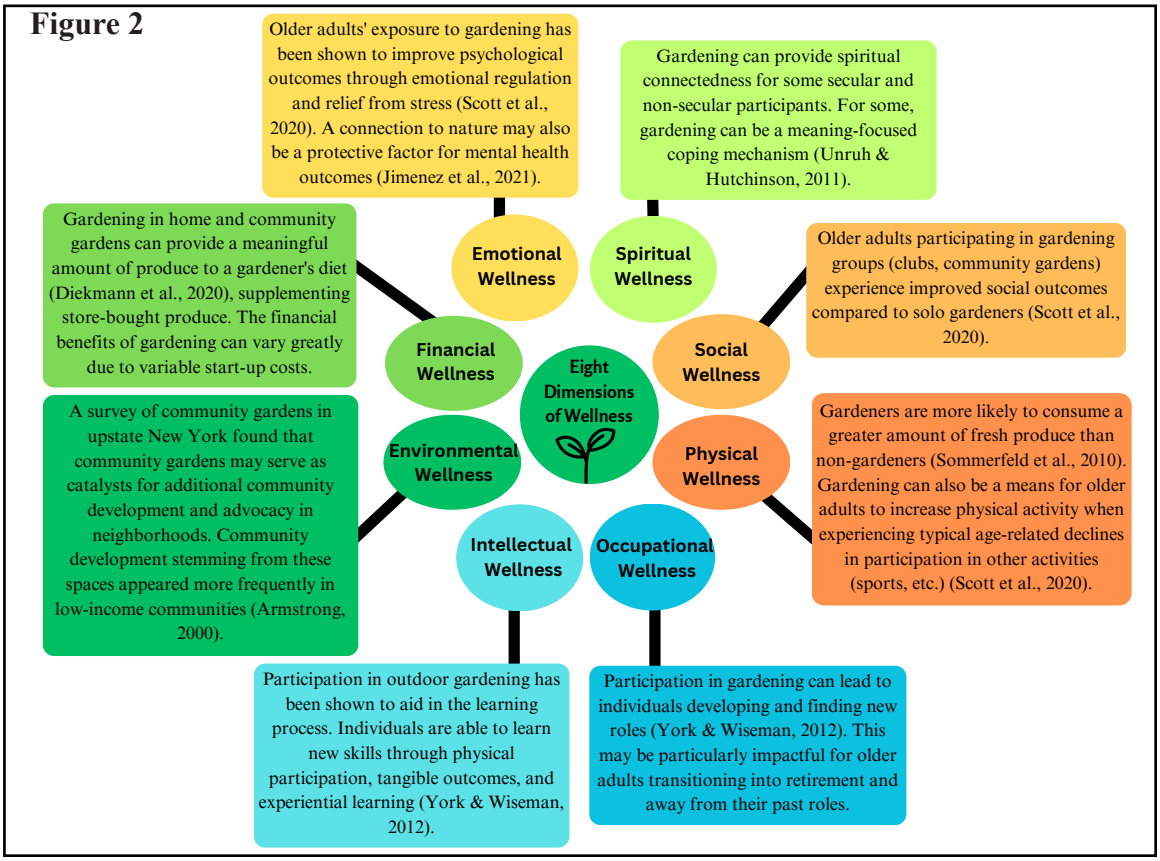


Figure 2: *Wheel of Wellness:* *Community Gardens' Impact on Wellness*

Description: Figure 2 demonstrates how participation in community gardening directly connects to the dimensions of wellness, focusing on older adult participants. These models can help us better understand some potential pathways to well-being that may be achieved through community gardening.



Background; Occupational Therapy

The accessibility of community gardens is a topic that has long-reaching impacts on individuals of all ages and abilities. Stakeholders from many disciplines have explored the different factors that can impact the participation of various populations in community spaces like community gardens. Occupational therapists bring a unique and holistic perspective to conversations surrounding different populations' participation in gardening in community spaces and beyond. Occupational therapy is defined as using occupations to enhance or improve participation for individuals, groups, or populations. The profession of occupational therapy is built on the belief "that active engagement in occupation promotes, facilitates, supports, and maintains health and participation (AOTA, 2014)".

Gardening as an Occupation and Impacts on Occupational Therapy Practice

Occupational therapists utilize a range of occupations to target wellness for individuals and communities. One potential occupation that occupational therapists may use as a therapeutic tool is gardening. The benefits of engaging in the occupation of gardening have been well-documented (Soga et al., 2016). Despite the well-documented benefits of participation in gardening, the therapeutic use of gardening as an occupation has undergone minimal exploration, particularly in the field of occupational therapy. In 2011, York and Wiseman published a critical review on gardening as an occupation. This review utilized existing research to document the therapeutic benefits of gardening and to identify implications that can better inform occupational therapy practice in this area.

These authors identified three main implications for occupational therapy practice within the context of gardening as an occupation. First, York and Wiseman (2011) concluded that gardening is a beneficial occupation that increases wellness. The authors state that "the occupation of gardening in the natural environment was shown to increase wellbeing amongst individuals. Being in the outdoors offered a calming, neutral, destigmatized platform, where people felt connected to something real." Despite the benefits of this occupation, they noted that the environment's accessibility remains a consideration. They stated that the accessibility of gardens could further isolate those who are already at risk for community-based isolation, including those with mobility difficulties or disabilities (York & Wiseman, 2011).

The second implication identified in this critical review, is that professionals have the opportunity to promote social inclusion and community development through this occupation. They found that occupational participation in gardening can have a transformative effect, where individuals shift away from individuality into a realm where they act as a social agent of change. Simply put, individuals participating in gardening found that they were able to make a wider impact on their community. Professionals working with gardening have the opportunity to recognize this shift and encourage community development and inclusion through occupational participation. Finally, the authors stated that occupational therapists have a unique perspective regarding occupational participation in gardening. They recommend that occupational therapists collaborate with local organizations within the community and nonprofit sector to utilize our unique perspective and skill set (York & Wiseman, 2011).

Occupational Therapy's Emerging Involvement in Community Gardening

As York and Wiseman (2011) state, occupational therapists have a unique perspective regarding this occupation, and there may be additional benefits that can be gleaned from their involvement in the community and non-profit sector. One potential area for occupational therapy involvement in gardening is at community garden spaces.

Currently, there is only a small pool of examples of occupational therapy being involved in community garden spaces, many of which are specific to a clinical population. Some examples include clinical populations with mental health conditions (Joyce, 2016; Tsotsoros et al., 2022; Whatley et al., 2015), the post-stroke clinical population (Ekelman et al., 2021), and adults with learning disabilities (Jones et al., 2024). Other explorations from an occupational therapy perspective have been greatly related to the process of meaning-making and wellness facilitated through community gardening (Genter et al., 2015).

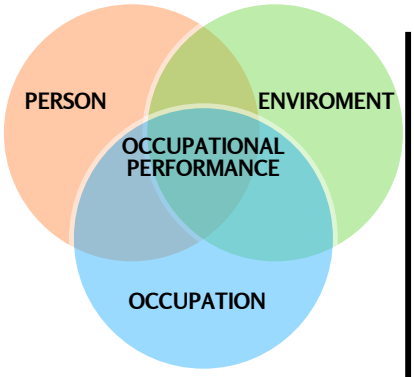
It is within the domain of the profession to address occupational performance at the community level (in this case, the community garden community). Despite the growth and emphasis on community-based practice in the profession, occupational therapies' role and processes in community development are greatly undefined (Gerlach et al., 2018; Lauckner et al., 2019). There has been a call for occupational therapy to move away from individualism and increase involvement in community-level health initiatives (Gerlach et al., 2018).

In order to demonstrate the occupational therapy approach to improving occupational performance and accessibility for local older adults in Boston Metro community gardens, we present a figure adapting the Person-Environment-Occupation Model (PEO). The PEO model was developed to analyze the complexities of occupational performance through understanding the interplay between the person, environment, and occupation. This model can be applied on both the micro level (individuals) and the macro level (communities) (Strong et al., 1999). This makes this model a good fit for assessing the factors that influence the accessibility of community gardens by examining the occupational performance of this population. Figures 3 and 4 apply the PEO model to community gardening and provide a theoretical background on this report's approach to this topic.

Figures 3: ***People-Environment-Occupation Model:*** *A Macro Perspective of the Occupational Performance of Boston Metro Community-Dwelling Older Adults (age 60+) in Community Gardening*
Description: The following figure provides a theoretical background for assessing the occupational performance of older adults who participate at a community garden using the PEO model.

Figure 3

Person - Environment - Occupation Model (PEO)



This model provides a means to assess occupational performance and identify strategies to create the "best fit" for participation. Occupational performance results from interactions between people, the environment, and their occupations. This model emphasizes the dynamic interactions between these three concepts (Law et al., 1996). This model can be used to analyze the occupational performance of community-dwelling older adults (age 60+) in community gardens and identify recommendations that foster meaningful occupational performance.

Person (P): Community-dwelling older adults age 60+ in the Boston Metro Area
Occupation (O): Gardening
Environment (E): Boston Metro community garden spaces
Occupational Performance (OP): The quantity and quality of community-dwelling older adults' occupational participation in community garden spaces

Through increasing our understanding of these three areas and how they interact, we can target the occupational performance of this population.

Person: Community-Dwelling Older Adults (age 60+) in the Boston Metro Area

Factors to consider:

- Values and meaning
- Habits and routines
- Person factors
  - Health conditions
  - Disability status

Environment: Community Garden Spaces in the Boston Metro Area

Factors to consider:

- Natural environment
- Built environment
  - Pathways, garden beds, lighting, etc.
- Cultural environment
- Social environment

Occupation: Gardening

Factors to consider:

- Community garden model
  - Individual plot vs shared community space
- Activities offered
  - Gardening, social events, community events, etc.
- Purpose of activities or tasks in community gardening
- How information is shared about participation

(Law et. al., 1996)

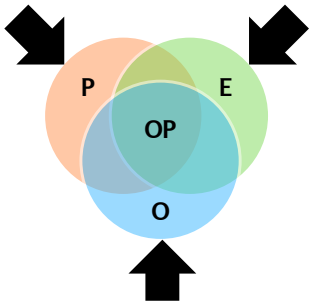
Figure 4: *People-Environment-Occupation Model:* *A Macro Perspective of the Occupational Performance of Boston Metro Community-Dwelling Older Adults (age 60+) in Community Gardening, Part 2*
Description: The following figure applies the PEO model to this topic and describes how we can use it to identify strategies for improving occupational performance.

Figure 4

Maximizing Occupational Performance Through the PEO Model

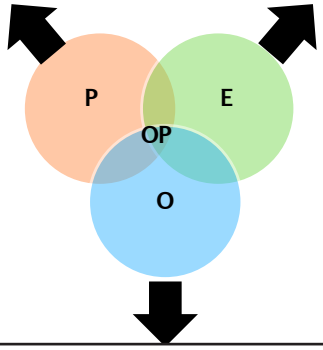
By better understanding this population, the occupation they are engaging in, and the environment of local community gardens, we can work towards the "best fit" of occupational performance for this population.

Best Fit (Maximize Occupational Performance)



Conversely, we can utilize this model to understand barriers to occupational performance. This model allows us to understand the interactive nature of these concepts and how there may be an "insufficient fit" for occupational performance.

Insufficient Fit (Minimize Occupational Performance)



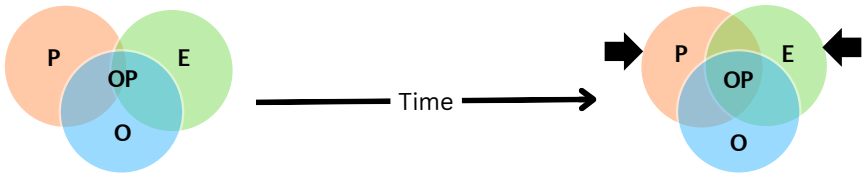
(Law et. al., 1996)

Theoretical Examples of How This Model Can Be Applied in Practice to this Topic

Example 1: A community garden has inaccessible pathways for mobility devices, and some older adults are unable to access the space (insufficient fit between person and environment).

Action: The community garden builds ramps and expands its pathways to meet accessibility standards.

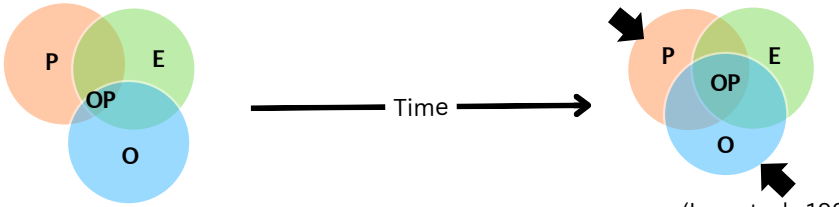
Outcome: Occupational performance is maximized. This group of older adults is able to more easily access and engage in gardening (the environment and person have improved fit).



Example 2: A group of older adults greatly values social engagement and collaboration while participating in community gardening. However, the community garden only offers options for individual gardening plots (insufficient fit between person and occupation).

Action: The community garden creates a shared garden space for community members to jointly care for.

Outcome: Occupational performance is maximized. This group of older adults increases their participation in community gardening as they are better able to engage in meaningful activities (the occupation and person have improved fit).



(Law et. al., 1996)

Section Two: Recommendations and Stakeholder Perspectives

Introduction

The following sections will provide recommendations aimed at improving accessibility and occupational performance in Boston Metro community gardens for community-dwelling older adults (age 60+). These recommendations include stakeholder perspectives from community-dwelling older adults in the Boston Metro Area and local community garden organizers. The Internal Review Board (IRB) of Tufts Social, Behavioral, and Educational Research reviewed and approved this study's protocol. Participants were recruited through outreach to community gardens and the organizations overseeing these spaces in the Boston Metro Area.

Key Informant Survey with Older Adults: Older adults were recruited to complete an online survey that included questions about their abilities to access community gardens and various factors that may impact their participation. Thirteen older adults participated in this survey, including two partial responses. Eligibility requirements for this survey were as follows: age 60 or older, residing in the Boston Metro Area, English-speaking, community-dwelling, and experience or an interest in participating in community gardening.

Semi-Structured Interviews: Five community garden organizers from a sample of Boston Metro community gardens participated in a semi-structured interview about this topic. These interviews included questions about the organizers' perspectives on the factors that improve or create barriers to community-dwelling older adults' participation in community garden spaces. These interviews also asked about local organizers'/organizations' strategies or initiatives for engaging this population. Individuals with an organizer, manager, leadership, or coordinator role for a Boston Metro community garden were eligible for this aspect of the study.

This recommendation section consists of two sections. The first section provides the information we collected relevant to understanding this population's current participation in Boston Metro community gardens. This information provides the context used to inform the recommendations.

The second section will provide recommendations aimed at improving accessibility and occupational performance for community-dwelling older adults in community gardens in the Boston Metro Area. To account for the needs of older adults in this specific region, each category of this section will include data collected from the older adult stakeholders. Given the diverse range of community garden spaces in the Boston Metro Area, not all the recommendations will be applicable or realistic for each community garden. To account for this, we included a wide range of recommendations, some of which can be implemented easily through community actions and some that require a more significant commitment.

Recommendation Section One:

Stakeholder Perspectives: Understanding Community-Dwelling Older Adults Current Participation In Community Garden Spaces

Stakeholder Perspective: Reasons Older Adults Choose to Participate in Local Community Gardens

As previously stated, participation in gardening can bring various benefits to the older adults who participate (Soga et al., 2016; Hassan et al., 2018). By understanding why local community-dwelling older adults choose to participate in Boston Metro community gardens, we can better target recommendations to improve occupational performance. In an open response question, the older adult stakeholders were asked what motivates them to participate in community gardening. Twelve stakeholders responded to this question. Four themes were identified about factors that motivate community-dwelling older adults to participate in community gardening.

Motivating Factors

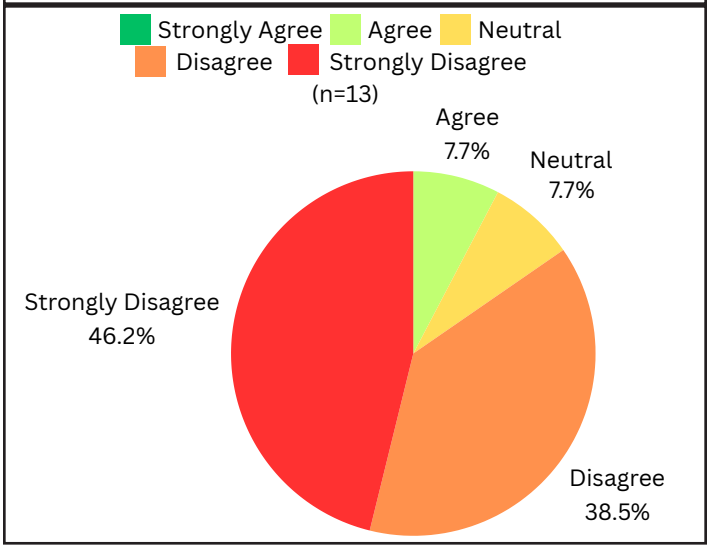
1. Connecting with other gardeners (75%, n= 12)
2. Access to fresh-grown produce (58.3%, n=12)
3. A connection to nature (50%, n=12)
4. Personal enjoyment of gardening activities (33.3%, n=12)

These themes represent a sample of reasons local community-dwelling older adults choose to participate in community gardening. By understanding these motivating factors, community gardens can create programming that fosters environments that empower older adults to participate in a way that brings meaning to their lives. This is essential for improving occupational performance, as meaning is vital to positive occupational participation.

Stakeholder Perspective: Older Adults Self-Perceived Ability to Physically Access Local Community Garden Spaces.

To understand community-dwelling older adults' current views on the accessibility of local community gardens, we asked the older adult stakeholders to reflect on their physical ability to access community garden spaces. Figure 5 provides a visualization of the responses collected.

Figures 5: Local community garden spaces are a difficult environment for me to physically access.



Stakeholders' responses suggest that community-dwelling older adults do not find community garden spaces physically inaccessible, as 84.7% of the older adult stakeholders disagreed or strongly disagreed with this statement. This is a positive finding, but it is crucial to consider the limitations and outliers in this data.

7.7% of the older adult stakeholders agreed with this statement, suggesting that some community-dwelling older adults may find Boston Metro community garden spaces to be physically inaccessible. Additionally, it is important to consider that 100% of the older adult stakeholders shared that they had previously participated in activities in a community garden space. This sample may not represent the broader population of community-dwelling older adults in the Boston Metro Area who may want to participate but have difficulties accessing the environment.

Stakeholder Perspective: Community Garden Organizer's Perspectives on the Engagement of Community-Dwelling Older Adults in Boston Metro Community Gardens

To better understand community-dwelling older adults' current participation in Boston Metro community gardens, we asked community garden organizers about their experiences engaging older adults in these spaces. We identified four main themes from these interviews that provide context about the current occupational participation of community-dwelling older adults' in Boston Metro community gardens.

Theme One: From an organizer's perspective, it is not difficult to engage community-dwelling older adults in community garden spaces (100%, n=5).

Overall, local community garden organizers did not report difficulties engaging this population in community gardening. This is a very positive finding, given that gardening participation benefits older adults' well-being. The following three themes provide additional context to this initial finding.

Theme Two: Older adults make-up a significant portion of community garden members (100%, n=5).

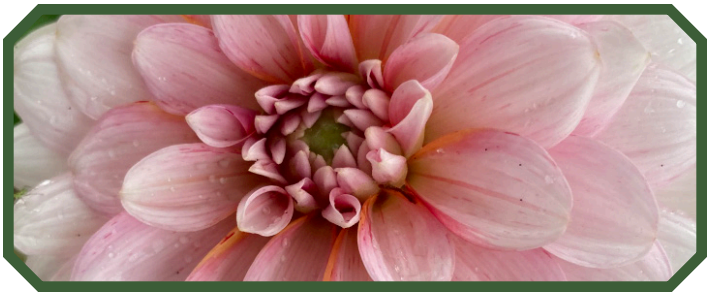
This theme suggests that community-dwelling older adults seek opportunities to participate in community gardens in the Boston Metro Area.

Theme Three: Many of the garden members are long-term members; in some cases, members have been involved for decades (80%, n=5).

This theme is vital to consider as it highlights that Boston Metro Area community gardens may be an environment where older adults can age in place and continue to achieve meaningful occupational participation.

Theme Four: Organizers do not target engagement (recruitment) at any particular demographic group (40%, n=5).

This theme is essential to consider from an equity and community wellness perspective, as some portions of the population may be missed without targeted recruitment. Around 24% of community-dwelling older adults in the US are socially isolated (National Academies of Sciences, Engineering, and Medicine, 2020). It is vital to consider how older adults with fewer community connections may have additional barriers to finding out about these spaces and programs. Community gardens may consider taking on more targeted recruitment and engagement strategies to consider this portion of the population.



Stakeholder Perspective: Strategies or Initiatives Used by Community Garden Organizers/Organizations to Improve Accessibility and Participation for this Population

Additionally, we asked organizers to comment on the strategies or initiatives they, or their organization, have used to improve accessibility and occupational performance for this population. Given the favorable themes regarding the engagement of older adults in these spaces in the last section, these initiatives are important to consider as they may have contributed to the high levels of engagement reported by community organizers. Additionally, these themes were used to inform the recommendations in this report by identifying effective strategies that have been used and gaps for additional recommendations. Five main themes summarized the strategies and initiatives shared by organizers to improve accessibility and occupational participation for older adults in Boston Metro community gardens.

Theme One: The inclusion of raised beds in the community garden space (80%, n=5).

One common strategy used by organizations/organizers was the inclusion of raised beds in community garden spaces. 100% of community organizers who mentioned the inclusion of raised beds stated that an older adult community garden member had requested a raised bed before or after construction. This suggests that raised beds may have beneficial effects on the occupational performance of community-dwelling older adults in these spaces.

Theme Two: Assign gardeners to specific plots based on needs or trade plots to better accommodate older adults' accessibility needs (80%, n=5).

From an organizational standpoint, this is a very effective strategy as it ensures that garden plots with the most accessibility features are given to the members who will experience the most benefits to their occupational performance. Of course, this strategy can have limitations based on the plots available when an individual registers to participate in a community garden.

Theme Three: Changes to pathways and walkways to become compliant with ADA standards for accessibility (40%, n=5).

Given the prevalence of mobility challenges in the older adult population, this would likely benefit their accessibility and participation in community garden spaces. 100% of organizers who mentioned a strategy included in this theme stated that this has improved the participation of community-dwelling older adult members in their community garden.

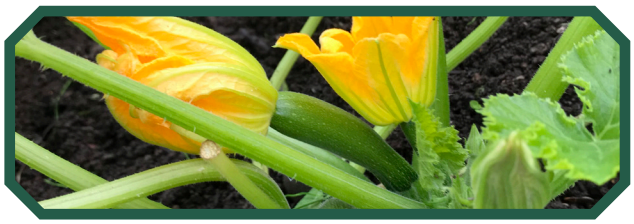
Theme Four: Informal systems for members to ask for help or assistance when they experience a barrier to participation (may include messaging groups, email lists, or interpersonal communication between members) (40%, n=5).

This strategy can benefit community-dwelling older adult's occupational performance through being a part of a community that has a culture of mutual assistance.

Theme Five: Organizers assisting in identifying activities that are accessible for community-dwelling older adult members of the community garden (40%, n=5).

This theme highlights the vital role that organizers play in community garden spaces. Depending on the organizer and leadership structure of the community garden, community garden organizers may have many responsibilities. Community garden organizers are crucial in facilitating programming that fits the participation and accessibility needs of diverse members (Kim, 2020). Community garden organizers are often individuals who volunteer and donate their time to these roles. It is essential to highlight the value and care these individuals bring to these spaces and how they act as change-makers in their communities.

Overall, the organizers reported a range of initiatives and strategies used to improve accessibility and occupational performance for older adults. Some strategies focused on the environment (raised beds and pathway modifications), while others involved fostering a community of support (informal systems to ask for assistance). Both approaches have the potential to improve the accessibility of these spaces and could improve the occupational performance of community-dwelling older adults in community gardening.

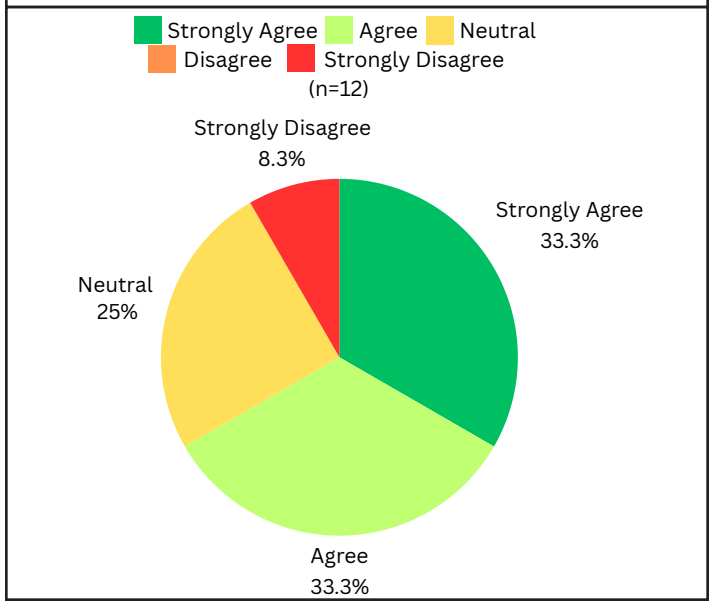


Recommendation Section Two:
Recommendations

Pathways and Sidewalks

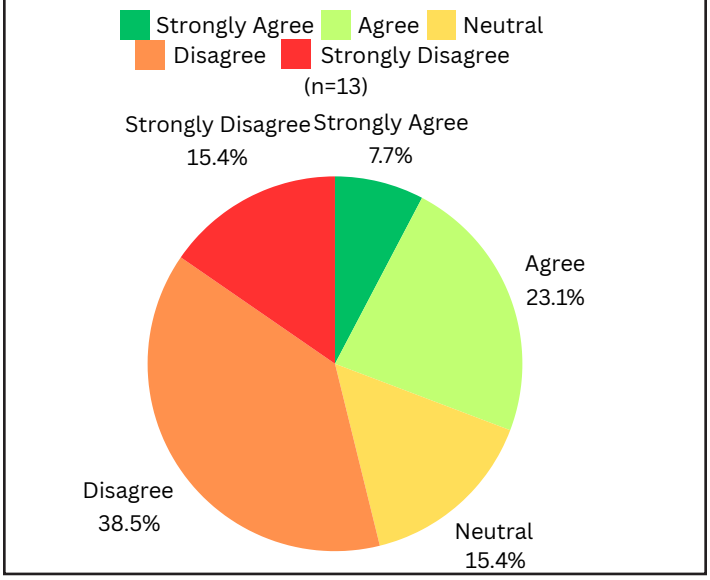
Considering that 17.7% of older adults over 65 report a disability impacting ambulation in the Boston Metro Area (US Census Bureau, 2022a), it is logical that the pathways of gardens may present an accessibility barrier. Older adult stakeholders were asked two questions regarding pathways and sidewalks in community garden spaces. First, these stakeholders were asked if accessible sidewalks and pathways, that allow for the use of mobility devices, improves their participation. Figure 6 provides a visualization of the stakeholder responses.

Figures 6: Sidewalks and pathways that are accessible for mobility devices (cane, wheelchair, standard walkers, etc.) improve my ability to participate in community garden spaces.



66.6% of the older adult stakeholders stated that they either agreed or strongly agreed, suggesting that accessible walkways and pathways that allow for the use of mobility devices could improve the occupational performance of community-dwelling older adults in these spaces. Next, the older adult stakeholders were asked if rocky and uneven terrain in the pathways of community gardens was a barrier to their participation in community gardening. Figure 7 provides a visualization of the stakeholder responses.

Figure 7: Rocky and uneven terrain in the pathways of community gardens is a barrier to my participation in community garden spaces.



Rocky and uneven terrain presented a challenge for a significant portion of the older adult stakeholders as 30.8% agreed or strongly agreed. While this may not have been an barrier for the majority of the older adult stakeholders, this result suggests that rocky and uneven terrain can hinder occupational performance for some. The stakeholder responses to these two questions exemplify the importance of considering accessibility needs when designing or modifying community garden pathways.

Recommendations: Pathways

Ideally, from an accessibility standpoint, the pathways and sidewalks entering and inside a community garden space should meet the US Access Board guidelines for accessible routes. Given that the development and construction of new pathways in community gardens can be costly and disruptive, gardens without accessible pathways may want to consider making changes over time, or modifying a portion of the pathways. Below are some considerations for designing or modifying pathways.

1. Avoid slopes in garden pathways. Areas without a ramp should have less than a 5% slope (1:20) to account for manual wheelchair users (U.S. Access Board, 2010).

2. Consider the width of pathways and turns to account for wheelchair users and other mobility devices.
   - Width of pathways: At least 36 inches.
   - Width around turns: At least 48 inches at the turn and 42 inches approaching the turn.
   - Width of entrances: At least 32 inches (U.S. Access Board, 2010).
   - Ideal Width: Five-foot wide pathways can allow two people to walk together, a 180-degree turn in a wheelchair/rolling walker, and adequate space for passing (York, 2009). Considering the benefits of social participation in community gardens, more expansive pathways may also serve as spaces for members to engage in casual conversation.

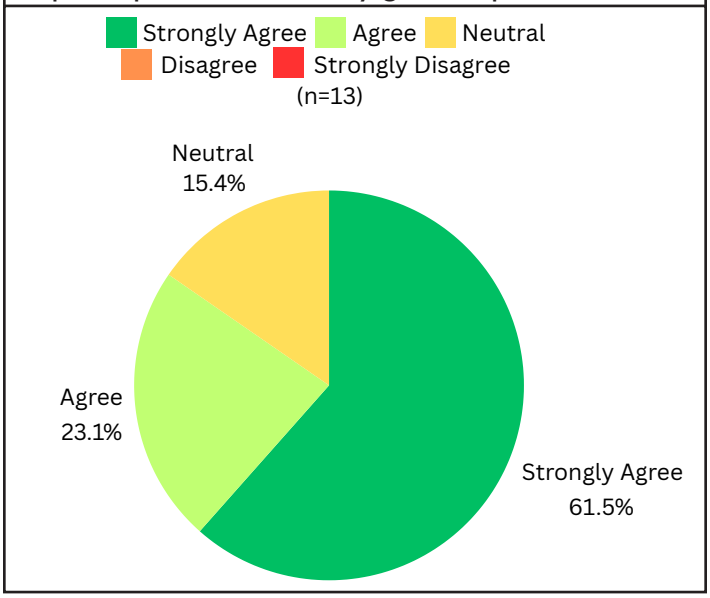
3. Consider the pathway surface material. At a minimum, pathways should be firm, stable, and slip-resistant (U.S. Access Board, 2010).
   - Grass, wood-chips, and similar materials can be difficult for mobility devices.
   - Concrete, asphalt, and brick can be excellent pathway materials for mobility devices. These materials can be costly to install, and may be less aesthetically desirable to some.
   - With proper installation, decomposed granite, some gravels, and crushed stone can be adequate for wheelchair mobility and more cost-effective than concrete or asphalt. Unfortunately, these materials can be difficult for members who use canes. (Region of Waterloo Public Health, 2019).

4. Avoid placing objects in pathways, including hoses and gardening equipment, as this can present a tripping hazard.
   - To maintain safe pathways, consider creating community systems (posted friendly reminders, systems to check pathways and remove obstacles) to monitor for potential safety hazards.

Shade in Community Gardens

Gardening can be a means for older adults to participate in physical activity at variable intensities, depending on the task (Nicklett et al., 2016). With any physical activity, especially outdoor activities, it is important that older adults have an area for rest when needed. Shaded areas can provide a space for rest and to cool down when artificially cooled environments are not immediately available. Shade also reduces harmful UV rays (CDC, 2022), which is important for all community garden members. The older adult stakeholders were asked if access to shaded areas improves their ability to participate in community garden spaces. Figure 8 provides a visualization of the stakeholder responses.

Figure 8: Access to shaded areas improve my ability to participate in community garden spaces.



84.6% of the stakeholders agreed or strongly agreed, suggesting that shade is an essential aspect of the environment that can improve occupational performance. The built and natural environment can provide access to shaded areas. Community gardens should assess and consider the shade at their specific location to meet the needs of older adults.

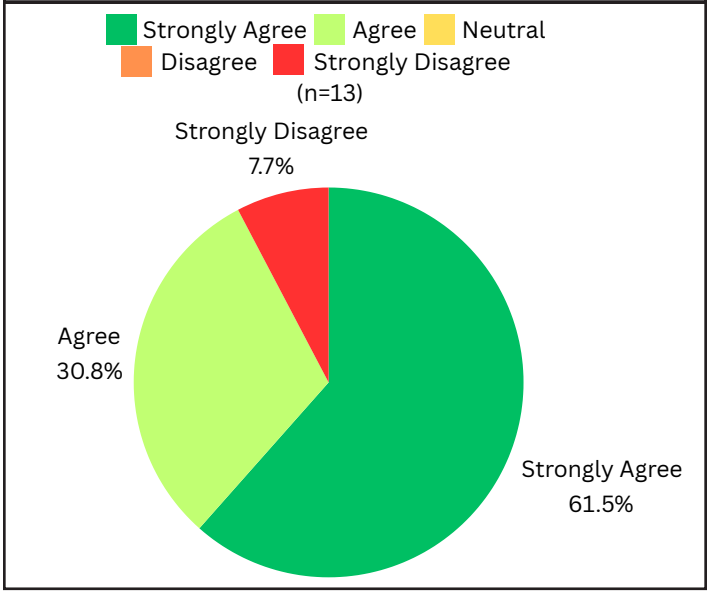
Recommendations: Shade

1. Ensure access to a shaded area with seating in the community garden space. This is important to ensure that older adults have a place to escape the heat and rest during peak gardening season.
   - Consider investing in built structures like shade sails, tables with umbrellas, pergolas, and other similar structures. These structures can also serve as places for social participation and gathering in the community garden space.
   - Assess the garden's natural shade sources (trees) and ensure they are protected and integrated into the space's design. If relying on natural sources for shade, ensure that seating is placed with consideration to the shade patterns in the warmer months.

Access to Seating

Access to benches has been shown to aid older adults' mobility, social cohesion, and enjoyment of green spaces in neighborhood environments (Ottoni et al., 2016). Older adult stakeholders were asked if access to benches, chairs, and other seating options improves their ability to participate in community garden spaces. Figure 9 provides a visualization of the stakeholder responses.

Figure 9: Access to benches, chairs, and other seating options improves my ability to participate in community garden spaces.



92.3% of stakeholders agreed or strongly agreed, suggesting that seating is an essential component of an accessible community garden for this population.

Recommendations: Seating

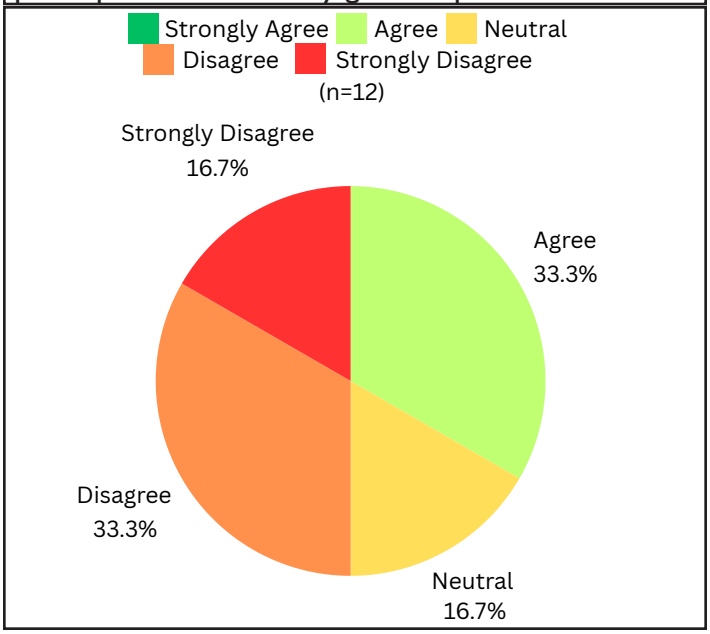
1. Permanent seating (benches) can be a great addition to community garden spaces, providing a stable place to rest when needed. If seating is limited, prioritize placing seating in the shaded regions of the garden and areas with high foot traffic. If seating is placed along pathways, ensure that the pathway is still at an adequate width for members who use mobility devices.

2. Alternatively, community gardens may consider investing in portable seating (foldable garden benches, lightweight chairs) as part of the garden's shared equipment. This can be more cost-effective than installing permanent seating. One additional benefit of providing portable seating is that garden members can move it to where it will be most useful for their participation in gardening activities. Ensure all seating options have a stable base and can support a wide range of users' body weights.

Artificial Lighting in Community Gardens

Age-related vision changes are common, with visual impairments increasing with age, particularly for those 75 years or older (Lu et al., 2019). Artificial lighting in community gardens may improve the accessibility of these spaces for older adults with vision difficulties, particularly during times of the day with low natural light levels (dusk and dawn). Lighting can also increase the times of the day that members are able to access the space, potentially leading to increased opportunities for socialization. The older adult stakeholders were asked if artificial lighting improves their ability to participate in community garden spaces. Figure 10 provides a visualization of the stakeholder's responses.

Figure 10: Artificial lighting (built fixtures: pathway lights, spotlights, etc.) improves my ability to participate in community garden spaces.



This question received mixed responses, as 33.3% of respondents agreed and 50% disagreed or strongly disagreed. To better inform the need for artificial lighting in community garden spaces, it is important to consider when members participate in gardening and social gathering activities.

Recommendations: Artificial Lighting

1. Consider placing artificial lighting in the pathways and entrances of the gardens to account for times with low natural light.

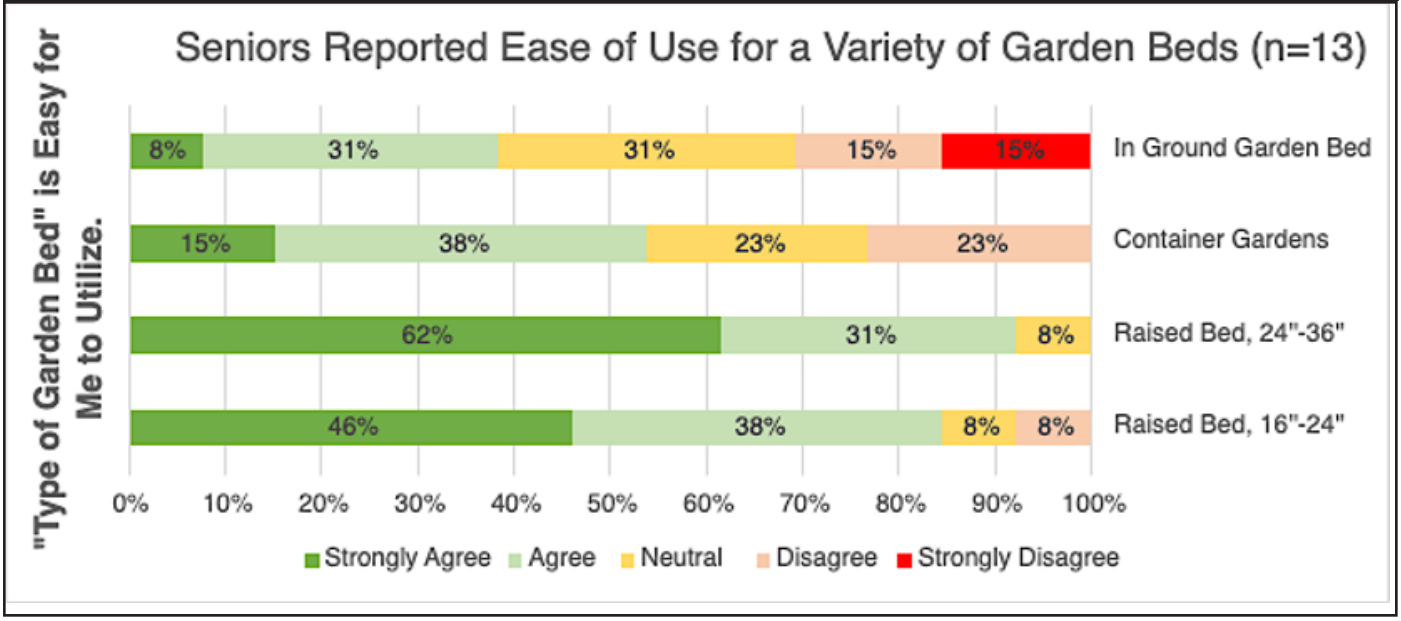
2. If installing lighting, consider motion-activated lights or lighting on timers, as artificial lighting at night can reduce the number of nighttime pollinators visiting the garden.
   - ▷ Consider the color of the light; warmer color light bulbs with a temperature of no more than 3000 kelvins are better for nighttime pollinators, while violet-blue lights are more disruptive to pollinator species (Gilkeson, 2023).

3. Consider investing in handheld flashlights and headlamps as part of the community garden's shared equipment. This may be more cost-effective than permanent light fixtures and less disruptive to pollinators visiting the garden.

Accessible Garden Plots/Beds

The set-up of garden plots can significantly impact the accessibility of a community garden space and older adults' occupational performance. Around 24% of community-dwelling older adults experience difficulty stooping, crouching, or kneeling (Taylor et al., 1998, as cited in Hernandez et al., 2008). The type of garden plot or bed can significantly impact the movements required to participate in gardening. The older adult stakeholders were asked various questions about their perceptions regarding the ease of use of different garden beds. Figure 11 provides a visualization of the stakeholder responses.

Figure 11: Question format for each bar- "Type of garden bed" is easy for me to utilize.



Older adult stakeholders showed a clear preference for raised beds, notably taller raised beds (24-36 inches), compared to container gardening (grow bags and pots) and in-ground garden beds. Community gardens should consider how the plots available impact the occupational performance of older adult members in community gardening.

Recommendations: Garden Plots/Beds

1. Ensure that community garden spaces have a range of garden beds to account for individual preferences/accessibility needs.

2. Consider developing and constructing raised beds if they are not already available.
   - ▹ See Supplemental Resource #1 about raised beds for more information on accessible raised beds.
   - ▹ Consider investing in or constructing a table garden designed for wheelchair users.

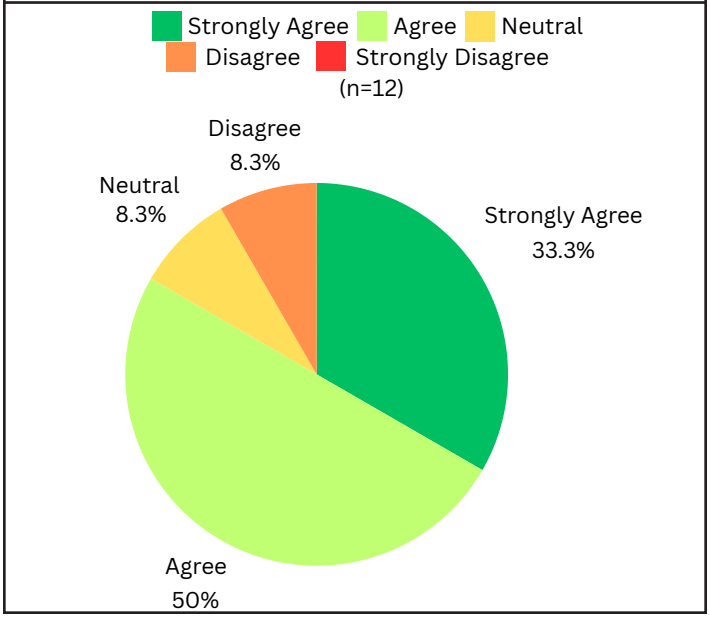
2. Assign members to specific plots based on their preference of garden beds. If raised beds are limited, prioritize them for older adults and community garden members with disabilities.
   - ▹ Consider implementing a questionnaire asking individuals about their preferred plot type when new members register to participate in the community garden.

Access to Information

Access to information is crucial to consider for creating accessible community garden spaces. Community garden members may need to access information for many reasons, including but not limited to registering for the garden, understanding garden policies, and participating in activities. Unequal access to information can significantly impact the occupational participation of older adults in community gardening. Generational differences resulting in a digital divide have been documented, with older adults finding cell phones and websites

more challenging to navigate than younger generations (Van Volkom, 2012). With many community gardens sharing information about participation and registration online, it is essential to consider how this may impact accessibility for older adults. Older adult stakeholders were asked three questions about their ability to access the information needed to participate in community garden spaces. First, the older adult stakeholders were asked if they are able to easily access the information required to participate in community garden spaces. Figure 12 provides a visualization of stakeholder responses.

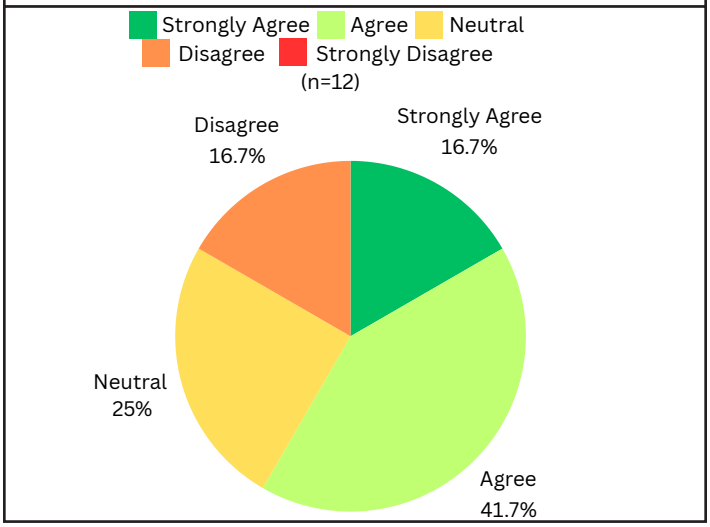
Figure 12: I can easily locate the information needed to participate in local community garden spaces.



83.3% of the stakeholders agreed or strongly agreed that they are able to easily locate the information needed to participate in a community garden space. This may suggest that access to information is not impacting community-dwelling older adults' access to community garden spaces in the Boston Metro Area. It is important to note that 100% of the older adult stakeholders had participated in a community garden in the past. It is possible that community-dwelling older adults who find it difficult to locate the information needed to participate may not have been represented in this sample.

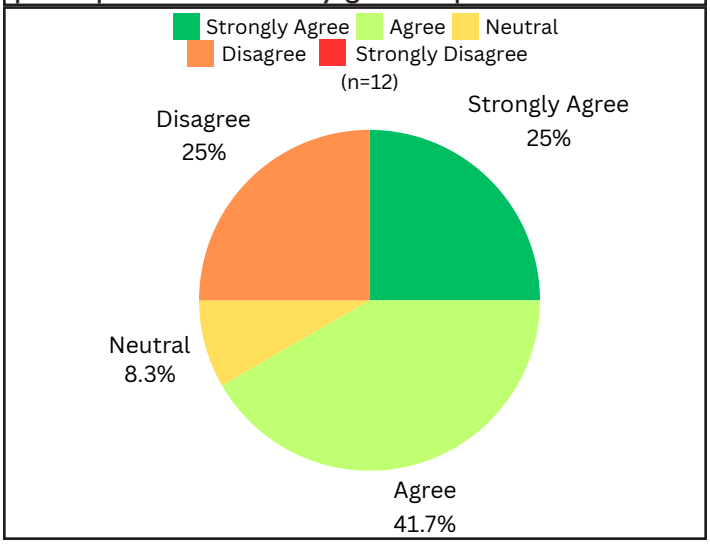
Next, the older adult stakeholders were asked if information shared about community gardens on online platforms was easily accessible to them. Figure #13 provides a visualization of the stakeholder responses.

Figure 13: Information shared about local community garden spaces on online platforms is easy for me to access.



Responses to this question were still predominantly positive, as 58.4% of the stakeholders agreed or strongly agreed. This suggests that information posted online is not an accessibility barrier for the majority of this sample of older adults. It is vital to note that the survey was facilitated online, which may have led to a sampling bias where the older adults surveyed were more comfortable with online media delivery methods than the general population. Finally, older adults surveyed were asked if comprehensive instructions and policies posted in community gardens improves their ability to participate in community garden spaces. Figure 14 provides a visualization of the stakeholder responses.

Figure 14: Comprehensive instructions and policies posted in community gardens improve my ability to participate in community garden spaces.



66.7% of the stakeholders agreed or strongly agreed with this statement, suggesting that community gardens may want to invest in a physical space to post information to complement online delivery methods.

Recommendations: Access to Information

1. Consider posting garden instructions and policies on a community board in community garden spaces. This can be helpful for older adults who experience difficulties accessing information through online delivery methods.

2. Weigh the advantages of creating an additional system for registration outside of online platforms.
   - ▹ One potential system is placing a physical drop-box at the community garden where community members can fill out and leave a form to register for an individual plot or to take part in a shared community plot.

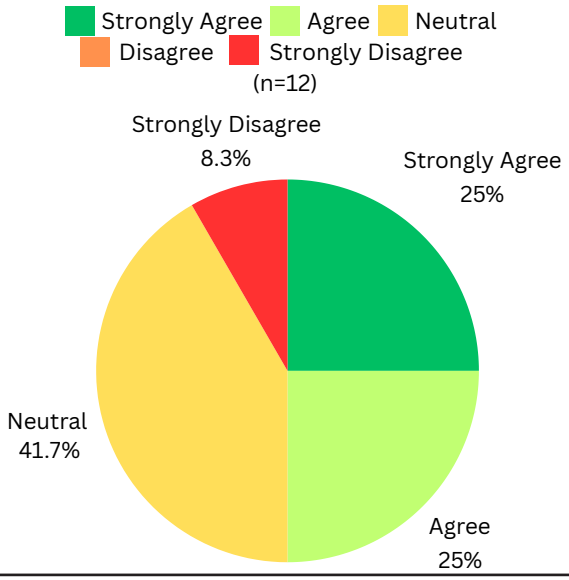
2. Consider posting information about the community garden on public bulletin boards in local community spaces to reach local community-dwelling older adults who may not know about community garden programs in their area. Additionally, consider reaching out to local senior centers/services.

3. Consider the languages spoken in the region and translate garden documents to improve access for community members.

Transportation

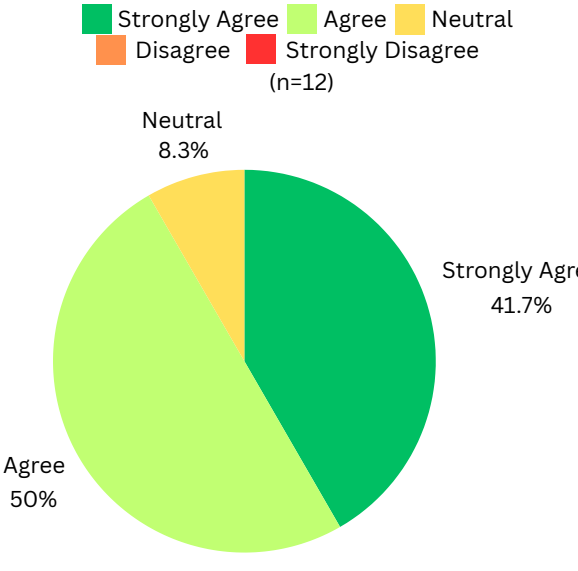
Access to transportation can be a significant challenge for older adults and can impact their ability to utilize community services (National Council on Aging, 2023). We asked the older adult stakeholders two questions about how transportation affects their ability to participate in community garden spaces. First, we asked them if access to nearby public transit, within .25 miles of the community garden, improves their ability to participate in community gardens. Figure 15 provides a visualization of the stakeholder responses.

Figure 15: Access to nearby public transportation (within .25 miles of the community garden) improves my ability to participate in community garden spaces.



Next, the older adult stakeholders were asked if access to parking for private vehicles improves their ability to participate in community garden spaces. Figure 16 provides a visualization of the stakeholder responses.

Figure 16: Reliable parking for private vehicles improves my ability to participate in community garden spaces.



The responses to these two questions suggest that access to public transit and access to parking for private vehicles can both be beneficial for improving the accessibility of community gardens for this population. That being said, a more significant portion

of the older adult stakeholders agreed or strongly agreed that access to parking for private vehicles (91.7%) improves their ability to participate compared to access to public transit (50%). This may indicate that a significant portion of community-dwelling older adults rely on their private vehicles to get to and participate in community garden spaces in the Boston Metro Area. With the understanding that existing community gardens cannot change public transportation routes and may need access to land for parking, this factor is most important to consider when selecting locations for new community gardens.

Recommendations: Transportation

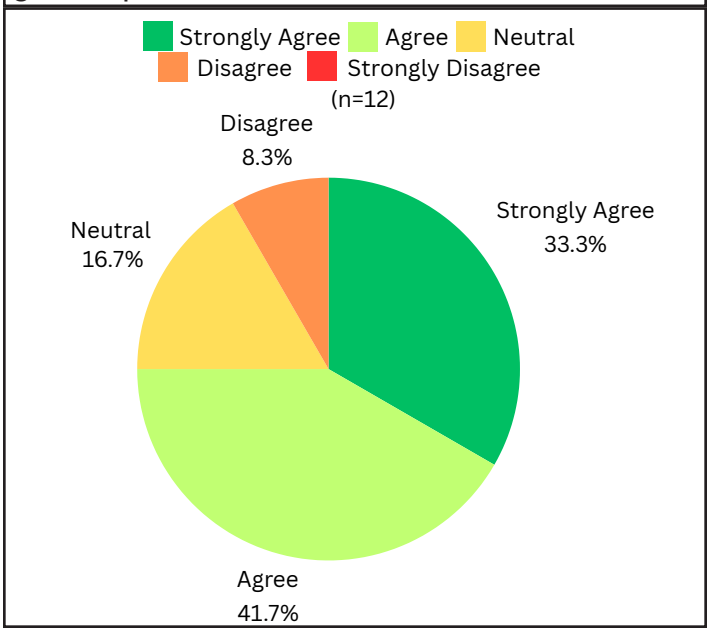
1. Institutions or organizations that play a part in developing community garden spaces should consider access to public transportation and parking when selecting locations for community gardens.

2. Existing community gardens may consider building relationships with nearby businesses/ parks to provide members access to private vehicle parking.

Bathroom Facilities

Bathrooms are an age-friendly feature in community spaces. Specifically, well-maintained bathrooms that can be used by a range of users, including those with disabilities (Choi, 2020). Considering that urinary incontinence increases with age, particularly for individuals with female anatomy (Nitti, 2001), it is important to consider how this may impact older adults' participation in community garden spaces. Community garden members often spend prolonged periods of time taking part in activities in these spaces. The scarcity of bathroom facilities can increase stress for members and impact occupational performance if members need to limit participation due to frequent bathroom trips. The older adult stakeholders were asked if access to a nearby public bathroom improves their ability to participate in community garden spaces. Figure 17 provides a visualization of the stakeholder responses.

Figure 17: Access to a nearby public bathroom improves my ability to participate in community garden spaces.



75% of stakeholders agree or strongly agree that access to public bathroom facilities improves their ability to participate in community garden spaces. This exemplifies the importance of having an option for community-dwelling older adult members to access a bathroom in or near the garden.

Recommendations: Bathrooms

1. Ideal: Include built bathroom structures in community gardens. Consider the accessibility features including the height of the toilet, lighting, and grab bars. Compost toilets may be an option.

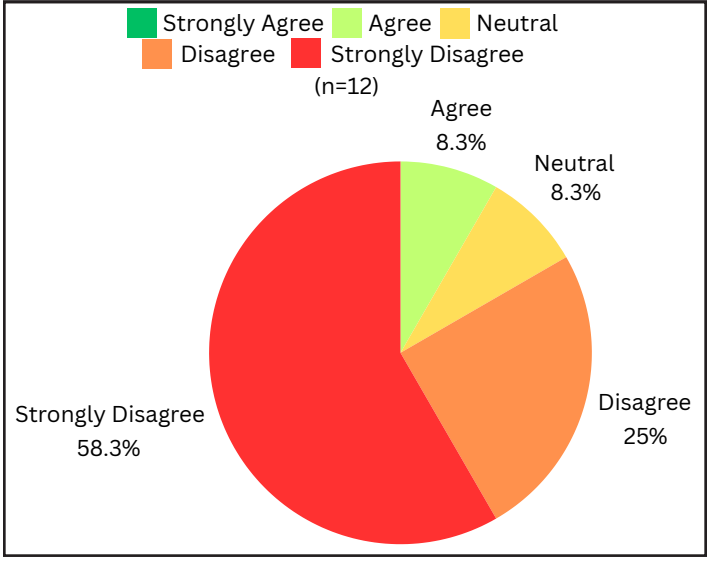
2. Alternative: A semi-permanent portable toilet structure can also improve access to bathrooms in community garden spaces. Portable toilets can be more cost-effective for installation but require upkeep and continued financing. Unfortunately, they can be less modifiable and may not meet the accessibility needs of a diverse range of users. Wheelchair-accessible portable toilets do exist. They can be more difficult to source but are well worth the effort.

3. Community gardens may also consider building partnerships with nearby businesses to provide garden members access to bathroom facilities.

Financial Considerations

Community garden members, including older adults, may have to invest in gardening supplies and equipment to participate in community garden spaces. Gardening, especially vegetable gardening, can provide a financial benefit if the cost of supplies is less than the value of food produced (Athearn et al., 2021). Despite this benefit, the initial cost of supplies may pose a barrier to participation for some. The older adult stakeholders were asked if the personal financial cost of community gardening (gardening supplies, transportation, etc.) is a barrier to their participation in community garden spaces. Figure 18 provides a visualization of the stakeholder responses.

Figure 18: The personal financial cost of community gardening (gardening supplies, transportation, etc.) is a barrier to my participation in community garden spaces.



83.3% of the stakeholders disagreed or strongly disagreed, suggesting that the personal financial cost of participation is not a significant barrier to participation. It is crucial to consider outliers in these responses, as 8.3% of participants agreed with the statement, suggesting there are financial barriers to participation for some. We did not collect data on the older adult stakeholder's socioeconomic status, which is likely to impact these results. Community gardens may want to consider strategies to reduce financial barriers, particularly for community-dwelling older adults who are financially disadvantaged.

Recommendations: Financial Barriers

1. Consider implementing a sliding scale system for registration fees if not already in place.

2. Community garden organizers and organizations may consider implementing systems for garden members to share, source, or trade gardening supplies. This could include a donation box or online systems for members to trade and request supplies.

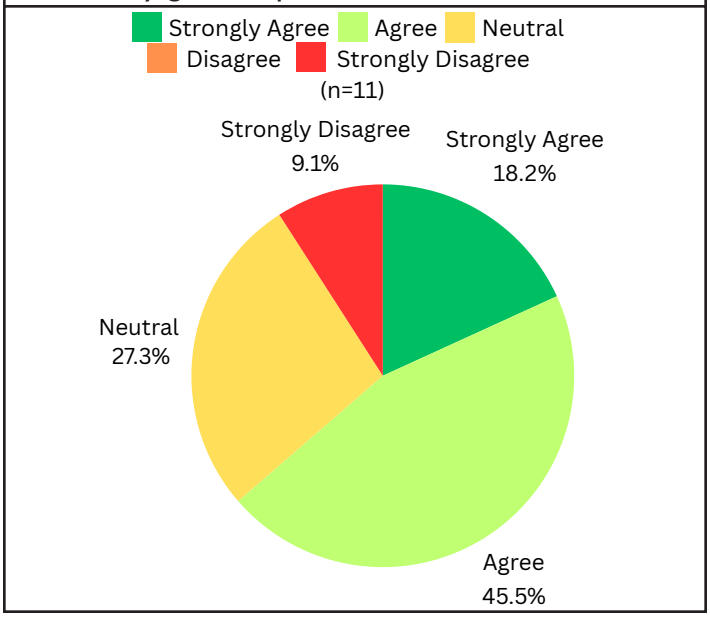
3. To reduce the initial costs of participation in community gardening, consider having a shared supply shed with common gardening equipment for members to use.
   - Understanding that theft can be a concern, community gardens may consider placing a lock on this location. If a lock is used, consider the gardeners' accessibility needs. See Supplemental Guide #2 for more information on accessible locks.

4. Community gardens should consider systems to proactively share information about local seed exchanges and donation programs with their members. Garden members could volunteer to complete this role.

Access to Adaptive Gardening Tools

Gardening can involve the use of a range of equipment and tools. Depending on individuals' needs, there is a range of adaptive gardening equipment and tools that can improve occupational performance. The older adult stakeholders were asked if access to adaptive gardening tools for community use improves their ability to participate in community garden spaces. Figure 19 provides a visualization of the stakeholder responses.

Figure 19: Access to adaptive gardening tools for community use improves my ability to participate in community garden spaces.



63.7% of the stakeholders agreed or strongly agreed with the statement suggesting that access to adaptive gardening tools may improve the occupational performance of community-dwelling older adults in local community gardens. If provided, community gardens should carefully consider the types of shared tools and gardening equipment available to account for the needs of a diverse range of users.

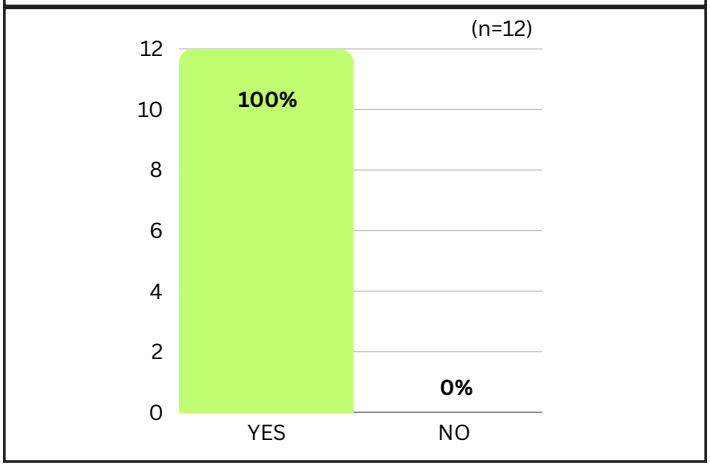
Recommendations: Adaptive Tools

1. Consider investing in shared tools for members to utilize in the community garden space. The tools that provide the best fit for participation are likely to depend on the individual and their needs. Having various options for standard tools (trowels, shears) give members the flexibility to select a tool that best fits their needs.
   - ▷ See Supplement Resource #2 for more information on accessible gardening tools and equipment.
   - ▷ Consider investing in a place for members to store their equipment/tools (shed, etc.).

Social Environment and Community Garden Program Models

Social Environment: Given the benefits of community engagement and social participation in community garden spaces, the older adult stakeholders were asked three questions about how the social environment and structure of programming in community gardens may impact their occupational performance. First, the older adult stakeholders were asked if they found community gardening spaces adequately welcoming to older adults. Figure 20 provides a visualization of the stakeholder responses.

Figure 20: If you have taken part in community gardening in the past: Did you find that the community garden was adequately welcoming to older adults?



The stakeholder responses strongly suggest that community-dwelling older adults find the social culture of local community gardens to be welcoming. This indicates that Boston Metro community gardens have a strength in fostering elder-friendly spaces.

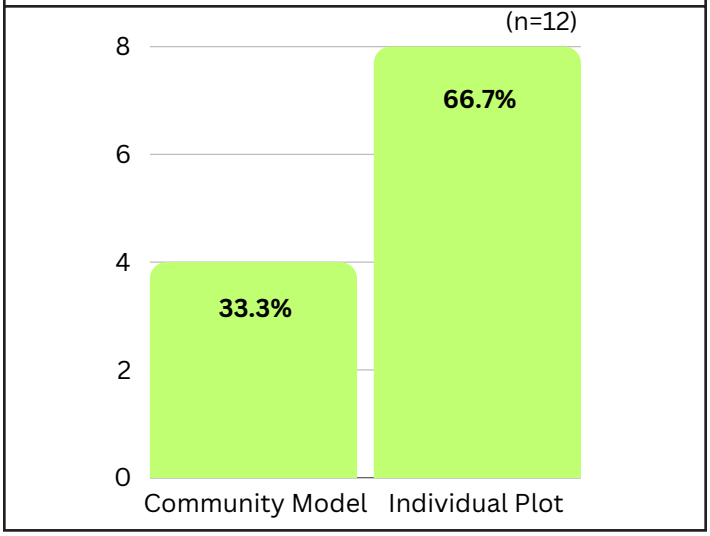
Community Garden Model: Given the diversity of community garden programming offered in the Boston Metro Area, we asked a question about the model of programming available in these spaces. We asked the older adult stakeholders what community garden model they would prefer to participate in. They were provided two options to select from.

Option 1: Community Model: Members care for a shared garden space/plot. The group defines individual roles and responsibilities for caring for the shared space.

Option 2: Individual Plot (Allotment model): Members care for their own individual garden plot in a community garden space. The individual is responsible for the care and upkeep of their plot.

Figure 21 provides a visualization of the stakeholder responses.

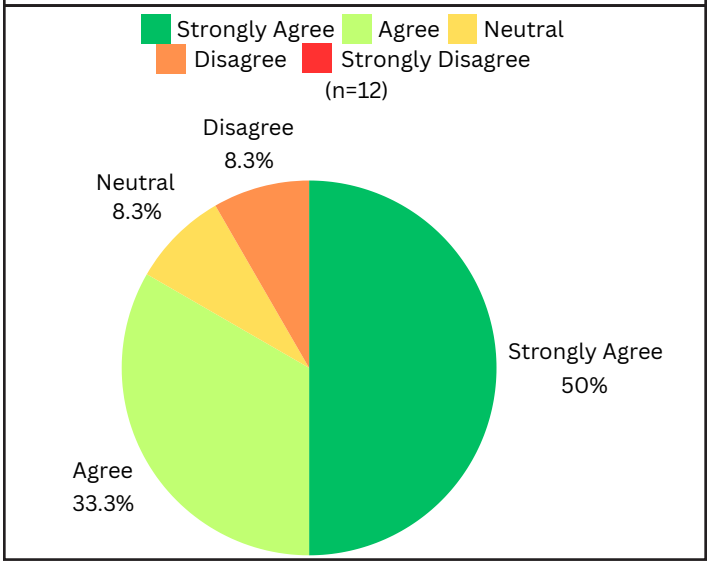
Figure 21: Please select which model of community gardening would be your ideal to participate in if given the option (select one).



The older adult stakeholders showed mixed preferences between these two options. More older adult stakeholders (66.6%) preferred individual plots over the community model (33.3%). A hybrid model, with options to participate in an individual plot or a shared community space, may best fit the preferences of community-dwelling older adults in the Boston Metro Area by introducing varied options for participation.

Group Activities: In many allotment model gardens, members care for their garden plots on their own individual schedules, aside from planned community garden clean-up or maintenance days. We were curious if additional opportunities to participate in group activities would impact community-dwelling older adults' participation in these spaces. The older adult stakeholders were asked if opportunities to participate in group activities would increase their participation in community garden spaces. Figure 22 provides a visualization of the stakeholder responses.

Figure 22: Opportunities to participate in group activities increases my participation in community garden spaces.



83.3% of the stakeholders agreed or strongly agreed that group activities would increase their participation in community garden spaces. This result can be connected back to the motivating factors stated by these older adult stakeholders, as 75% stated that connecting with other garden members is one of the reasons they are motivated to participate in community gardening. Community gardens may consider expanding their planned group activities to offer increased opportunities for social participation for the community-dwelling older adult members.

Recommendations: Social Environment and Community Garden Models

1. Consider facilitating a hybrid model in community gardens that includes individual plots and opportunities to participate in a shared gardening space.

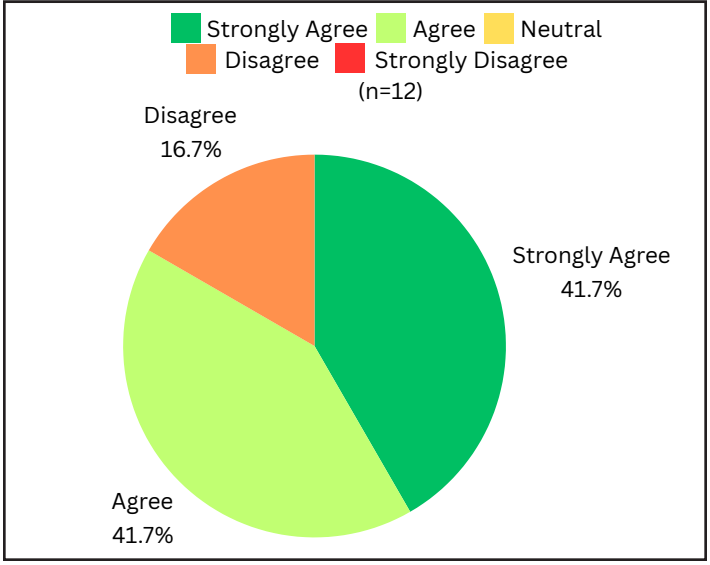
2. Community gardens that exclusively offer individual plots may consider implementing a system for members to sign up for "shared plots," where they are matched with other members who want to split the labor and upkeep of a plot.

3. Consider offering additional group activities.
   - ▷ Set specific "social hours" for the community garden, where members are invited to come to the garden to meet and connect with other community members.
   - ▷ Offer a community garden "skills workshop series" led by members for other members.

Considering the Impact of Individuals' Skills and Knowledge on Participation

From an occupational performance perspective, an individual's skills and knowledge can directly impact their ability or motivation to participate in an occupation. If an individual does not have the skills or expertise (perceived or actual knowledge gap) to participate in community gardening, their occupational performance may be negatively affected. The older adult stakeholders were asked if their subjective level of knowledge and skills related to gardening is adequate for their participation. Figure 23 provides a visualization of the stakeholder responses.

Figure 23: My knowledge and skills pertaining to gardening are adequate for my participation in community gardening.



83.4% of the stakeholders agreed or strongly agreed, suggesting that community-dwelling older adults felt they had adequate skills and knowledge to participate in community garden spaces. Once again, it is crucial to consider the outliers in this data, as 16.7% disagreed with the statement, signifying that a knowledge gap may impact the occupational performance of some community-dwelling older adults in community gardening.

Recommendations: Skills and Knowledge

1. Host or connect community garden members to gardening workshops and classes. Various gardening workshops are available in the Boston Metro Area throughout the year. It may be beneficial for community gardens to actively share information about these workshops with their members, particularly for members who are new to gardening activities.

2. Consider creating an optional mentorship program where experienced gardeners are paired with other members to share skills and knowledge.

3. Create a messaging system where garden members can seek advice and guidance from others in the community garden.

Additional Barriers Impacting Accessibility and Occupational Performance Reported By Stakeholders

To ensure we addressed a broad range of barriers impacting accessibility and occupational performance in community gardens for this population, we asked the older adult stakeholders to respond to an open response question about any additional barriers they experience related to participation in community gardening. Organizers were also asked to comment on any barriers they have observed related to the participation of community-dwelling older adults in these spaces. Both groups' responses underwent thematic analysis to identify common themes about barriers impacting this population's participation in community gardening.

Additional Barriers Reported by Older Adult Stakeholders

1. The time commitment required to participate in a community garden (25%, n=12).
   - ▷ Recommendation: See the section on community garden models (Pg.24). Offering opportunities to participate in a shared space may allow for more variable participation if the time commitment required to upkeep an individual plot is too significant for a member.

2. Challenges with the registration/sign-up process required to participate in community garden spaces (16.7%, n=12).
   - ▷ Recommendation: See the section on access to information (Pg. 18). Offering a variety of ways to sign up/register to participate may mitigate this barrier.

3. Community garden activities scheduled at times that are difficult for members to attend (16.7%, n=12).
   - ▷ Recommendation: Consider facilitating a survey at regular intervals (monthly, quarterly) to collect data on the best times for community garden clean-up days and other community activities.

4. Pain or fatigue resulting from participation in community gardening activities (16.7%, n=12).
   - ▷ Recommendation: This can be difficult to address as it is specific to each member's experience. The best way to account for diverse needs is to offer flexibility in the ways that members can participate. Community gardens can introduce this flexibility by offering a variety of garden beds and tools. Flexibility can also be introduced by having options for individual plots and shared community plots.

Additional Barriers Reported by Community Garden Organizers

1. Difficulties accessing garden plots due to a physical barrier (60%, n=5).
   - ▷ Recommendation: See the section on pathways and sidewalks (Pg. 14).

2. Older adults experiencing difficulties participating in physically demanding tasks (40%, n=5).
   - ▷ Recommendation: See the recommendation listed under barrier four from the older adult stakeholders.

3. Difficulties with online registration or online communication from the community garden (40%, n=5).
   - ▷ Recommendation: See the section on access to information (Pg. 18). Offering a variety of ways to sign up/register to participate may mitigate this barrier.

4. From an organizational perspective, 40% (n=5) of organizers mentioned a challenge with the institutions responsible for maintaining the land coming in and implementing (or planning to implement) changes that did not fit the community's needs.
   - ▷ Recommendation: Institutions that oversee community gardens or the land on which they are located should include community garden members and organizers in all decisions regarding changes to the shared space. Each community and space is different, and institutions must consider the specific community's needs and preferences when making changes.

Additional Factors that May Improve the Occupational Performance of this Population Reported by Stakeholders

To ensure we addressed a comprehensive range of factors that may better facilitate positive occupational performance for community-dwelling older adults in community gardening, we asked the older adults surveyed to respond to an open response question about any factors that make it easier for them to participate in community gardening. Organizers were also asked to comment on any additional facilitating factors that they have observed that improved older adults' participation in these spaces. Both groups' responses underwent thematic analysis to identify common themes regarding facilitating factors to meaningful participation for this population in community garden spaces.

Additional Facilitating Factors Reported by Older Adult Stakeholders

1. Access to raised beds (33.3%, n=12)
   - ▷ Recommendation: See the section on accessible garden plots and beds (Pg.18).

2. Physically accessible pathways into the garden and within the space (25%, n=12)
   - ▷ Recommendation: See the section on accessible pathways and sidewalks (Pg.14).

3. More community gardens to account for older adults living in areas with fewer local programs (16.7%, n=12).
   - ▷ Recommendation: Organizations and institutions involved in overseeing community garden spaces should consider the locations in the Boston Metro Area with a significant population of older adults for the future development of community gardens.

4. Assistance from others for compost management (16.7%, n=12).
   - ▷ Recommendation: Compost management may be difficult for many older adults. Community gardens may want to speak to older adult members to identify strategies to address these difficulties. This would likely need to be done on a case-to-case basis to meet the individual's specific needs.

Additional Facilitating Factors Reported by Community Organizers

1. A community culture with an emphasis on mutual assistance and aid to enable participation for all members (60%, n=5).
   - ▷ Recommendation: Community organizers may want to consider ways to encourage this type of culture.

2. Older adults in leadership and mentorship positions in the community garden (40%, n=5).
   - ▷ Recommendation: Older adults should have opportunities to take on leadership roles as they best understand and can advocate for the needs of their age group.

3. The presence of younger members and intergenerational participants at community gardens (40%. n=5).
   - ▷ Recommendation: Community gardens may want to consider more targeted recruitment aimed at the generations not represented in their current membership.

Discussion

Stakeholder perspectives from the older adults and community organizers showed that community gardens in the Boston Metro Area have many strengths in creating spaces that enable the participation of older adults. In particular, stakeholders reflected an incredible strength in these spaces; the community culture of care and mutual assistance. We hope the recommendations outlined in this report provide community gardens with ideas to build upon their already strong programming.

Reflecting on the recommendations, one continuing theme across the board is the need for flexible programming and environments. The older adult stakeholder perspective's emphasized the importance of flexible programming and environments to meet the needs of a diverse population of community-dwelling older adults. Additionally, the responses of the older adult stakeholders suggest that spaces that are accessible for members with disabilities, also benefit older adults. This includes factors like accessible pathways and access to seating.

These recommendations may be a starting point, but ultimately, community gardens should consult their members to find out what would be most meaningful for their occupational participation in community gardens.

Supplemental Resource #1

Raised Garden Beds

Raised beds, constructed at the right heights, can increase access to gardening activities for gardeners with mobility challenges, individuals who use rolling/standard walkers, and wheelchair users.

Raised Bed Material	**Wood:** Consider the type of wood used. Hard wood varieties are best for raised beds, while soft and composite wood varieties may not withstand the elements. ◦ Hard Wood Varieties: Cedar, oak, pine, fir, cypress, and redwood ◦ Sealed or pressure-treated wood is likely to last longer than non-treated wood but may not be safe for growing produce. ◦ Avoid wood treated with chromate copper arsenate as this can transfer into the soil. **Steel Raised Beds:** Often come in a kit and are generally easy to assemble. Steel raised beds will likely last longer than raised beds made of wood. ◦ Acidic soil or peat moss mixes will likely erode this garden bed material. ◦ Steel beds may take up less garden space as they have very thin sides. ◦ Most steel raised bed kits do not include a wide ledge around the edges. This limits opportunities for gardeners to sit while engaging in gardening. ◦ Steel beds may get hot in the warmer seasons. **Brick or Concrete Block:** These materials can be easily sourced secondhand and are very modifiable for raised bed use. ◦ Long-lasting and able to withstand cold seasons. ◦ Concrete can have toxins that will leach into the soil. (Jay, 2024)
Height of the Raised Bed	**Minimum Height:** Most garden crops require at least 10 inches of soil. **Height to Avoid Excessive Bending:** Raised garden beds over 36 inches off the ground can limit the need for excessive bending. **Height for Wheelchair Users:** Raised garden beds built for wheelchair access should be around 24 inches in height. This height is also accessible for members who use their rolling walker as a seat to garden from. (Berle & Westerfield, 2022)
Width of the Raised Bed	**Raised Beds with Access on Two Side:** A width no greater than four feet wide for adults. For wheelchair access, limit the width to three feet. **Raised Beds with Access on One Side :** A width no greater than 2.5 feet for adults. Consider reducing the width down to two feet for wheelchair access. (Berle & Westerfield, 2022)

Supplemental Resource #1

Length of the Raised Bed	**Length:** This is not as crucial as width and height, and is ultimately up the needs of the gardeners and the space.
Raised Bed Ledge	**Width of the Ledge on a Raised Bed:** One benefit of raised beds is that they can have a ledge around the edges that allows gardeners to sit and rest, or place tools. To account for this use, consider installing a ledge that is 8-18 inches wide on the edges of raised beds. (Region of Waterloo Public Health, 2019)
Irrigation	If garden policies allow, consider adding drip irrigation or raised sprinkles to raised garden beds located in community garden spaces. This will reduce the need for members to carry hoses or heavy watering pails to the raised bed. (Berle & Westerfield, 2022)
Placement of Raised Beds in Community Gardens	If irrigation is not allowed, consider placing the raised garden beds at or near the gardens' water sources. This can reduce the physical labor required to care for the garden bed. Additionally, consider the accessibility of the pathways leading up to and around the raised bed. • Are the pathways wide enough for mobility devices (at least 36 inches)? • Are the pathways level, firm, and free of physical obstacles? (Berle & Westerfield, 2022; U.S. Access Board, 2010)
Table Top Garden	**Description:** Tabletop gardens are modified raised beds placed on legs. These garden beds are great for gardeners who use wheelchairs because they can push their wheelchair underneath the bed while gardening. **Construction:** Generally, the garden bed should not exceed the height of the gardener's ribcage (approximately 26-28 inches in height). The planting bed should be 8-10 inches deep. Avoid a width of more than three feet across the bed if there is access on both sides. Ensure that the structure can support the weight of the soil (consider lightweight soil varieties) (Bawden-Davis, n.d)

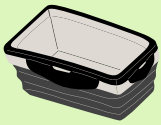
Supplemental Resource #2

Accessible Gardening Tools and Equipment

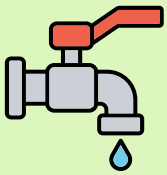
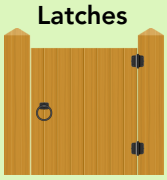
Gardening is an occupation in which participants may require a range of tools and equipment. Adaptive tools can help meet the needs of diverse gardeners, particularly those with disabilities. To account for members' needs, community gardens may want to consider the accessibility of the tools and equipment available in these spaces. Many adaptations can be achieved by modifying existing equipment or building accessible features, which can reduce the cost that can incur from purchasing equipment.

	Adaptive Gardening Tools
Long-Handled Tools 	**Description:** Many common garden tools are available with extended handle lengths. Generally, long-handle tools allow for an extended reach and minimize the need for gardeners to bend over or crouch. These tools also provide better leverage for gardening tasks like digging and cutting. **Who Might Benefit:** • Gardeners who have difficulties bending and reaching. • Gardeners who participate from a seated position. • Gardeners who experience fatigue from gardening activities. (West Virginia University Center for Excellence in Disability, 2011)
Gardening Tools with Modified Handles 	**Description:** There are a variety of garden tools avalible with modified handles that can make gardening more accessible. This includes tools with bent or curved handles, and tools with built up handles. Built up handles can be created affordably by adding foam tubing or wraps to existing tools. Built-up handles are generally easier to hold and manipulate compared to smaller handles. Built-up handles also lead to less pressure and strain on the smaller joints of the hand potentially reducing pain and fatigue. **Who Might Benefit:** • Gardeners with limited range of motion in their hands and wrists. • Gardeners who experience pain or fatigue in their hands or wrists. • Gardeners with arthritis. (McDonald et al.,2016)
Hand Tools with a Forearm Brace 	**Description:** Some gardening hand tools are available with a connected forearm brace. These tools can reduce strain on the hand and wrist, allowing the larger muscles in the forearm to do more of the work. **Who Might Benefit:** • Gardeners with limited range of motion in their hands and wrists. • Gardeners who experience pain or fatigue in their hands or wrists. (West Virginia University Center for Excellence in Disability, 2011)

Supplemental Resource #2

	Garden Equipment
Garden Benches and Rolling Carts 	**Description:** Currently, a range of portable garden benches (foldable) and rolling garden carts (individual sits and self-propels with legs) are available on the market. These benches and rolling garden carts can provide gardeners with places to rest or garden from when seating is unavailable. **Who Might Benefit:** • Gardeners who experience fatigue, which impacts their participation. • Community garden members who do not have access to other seating in the space. • Gardeners with adequate trunk stability to support sitting without a backrest.
Lightweight Plastic and Metal Chairs 	**Description:** Community gardens without permanent seating may consider investing in lightweight chairs for members to use. Ideally, chairs should be lightweight but not foldable, as this can reduce the stability of the seat. Armrests are also important for members going from a seated to a standing position. It is also important to consider the weight limits for any seating to account for a range of users. **Who Might Benefit:** • Gardeners who experience fatigue, which impacts their participation. • Community garden members who do not have access to other seating in the space. • Gardeners who benefit from a backrest to maintain seated participation.
Gardening Buckets/ Baskets 	**Description**: It is important that members have a way to carry and transport gardening tools/produce. A variety of options can meet the needs of different members. For example, a collapsable bucket allows for additional flexibility, as gardeners can collapse it and store it on their mobility devices. **Who Might Benefit:** • Gardeners who have difficulties with walking when carrying items. • Gardeners who use mobility devices and wheelchairs.
Garden Hose Reels 	**Description:** It is important to keep garden hoses off the ground for fall prevention in community gardens. Garden hose reels can both improve the lifetime of the hose and improve individuals' abilities to access watering equipment. These reels keep hoses off the ground, reducing the need for bending or crouching, and minimize tripping hazards. **Who Might Benefit:** • Gardeners who experience fatigue, which impacts their participation. • Gardeners who have difficulties bending and reaching.

Supplemental Resource #2

Water Faucet Features 	**Description:** Access to water is essential for maintaining a garden space. A faucet extender and easy grip handles on faucets can allow for a greater level of participation by a range of users. An accessible faucet may include: • A faucet extender, including free-standing faucets, that allows for easier access. • A large handle that allows for easy manipulation to turn the water on and off. Large-level style handles are generally easier to manipulate than twist handles. • A bright-colored handle to provide visual contrast against the environment. **Who Might Benefit:** • Gardeners who have difficulties bending and reaching. • Gardeners who participate from a seated position. • Gardeners with limited range of motion in their hands and wrists. • Gardeners who experience pain or fatigue in their hands or wrists. • Gardeners with visual Impairments.
Accessible Garden Gate Latches 	**Description:** If a community garden has a gate, it is important to consider how the latch may impact accessibility. There is a range of latches available on the market to choose from. An accessible latch should strive to: • Be able to be used with one hand. • Take less than 5 pounds of force to manipulate. • Be able to be used without twisting the wrist or requiring a pinch grasp. **Who Might Benefit:** • Gardeners who experience fatigue, which impacts their participation. • Gardeners with limited range of motion in their hands and wrists. (Groenier, 2012)
Accessible Locks 	**Description:** Community gardens may use a push-button or combination lock to secure gardening equipment or limit access to the garden at certain times. If the garden locks are used by members, it is important to consider accessibility needs. An accessible combination or push-button lock should include the following: • Tactile features that can be used to identify the buttons/numbers. • Numbers in a contrasting color to the background of the lock. • For the size of the buttons or dials, larger is generally better. **Who Might Benefit:** • Gardeners with limited range of motion in their hands and wrists. • Gardeners who experience pain or fatigue in their hands or wrists. • Gardeners with visual Impairments.

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