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Public Engagement in Community Gardens: Communicating to Prepare for a Changing Climate

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Public Engagement in Community Gardens: Communicating to Prepare for a Changing Climate

Abstract

Climate change threatens human health, the environment, and the global economy. Extreme temperatures, intensifying droughts, and changes in rainfall patterns and growing seasons are all results of a changing climate. Adaptations to climate change will need to be implemented in the agricultural sector to ensure the longevity and sustainability of the global supply of food. Community gardens are one part of the agricultural sector that provide access to fresh and affordable foods. The purpose of this study was to determine U.S. adults' motivations for engagement and level of importance associated with climate-smart adaptations in community gardens. The study found respondents engaged in community gardens primarily for health and social reasons, and respondents assigned some level of importance to climate-smart adaptations in their community gardens. Environmental communicators should develop messaging that encourages adaptation in community gardens by emphasizing the risk of losing health or social-based benefits the gardens provide. The findings can inform effective communication strategies which encourage community gardens to prepare for climate change to ensure a sustainable supply of and access to fresh foods. Future research should explore the impact of rurality, food accessibility, and socioeconomic status on reasons for engaging in a community garden and associated level of importance related to climate-smart adaptations.

Keywords

community gardens, climate change, diffusion of innovations, public engagement, climate-smart adaptations

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Introduction

Climate change is a real threat to the environment, economy, and human health (U.S. Environmental Protection Agency, 2022) but presents a communication challenge as its existence continues to be rejected or doubted (Merzdorf et al., 2019; Rohling et al., 2016; Sanders et al., 2022). Impacts of climate change include warmer temperatures that increase the intensity and frequency of heat waves, increase in extreme weather events, worsening air and water quality, changes in rainfall patterns, and changing ecosystem lifecycle events including migration and reproduction (U.S. Environmental Protection Agency, 2022). The world's climate is changing more quickly than the pace of natural variations in climate that have occurred throughout the Earth's history, and the evidence for this rapid change in climate consistently points to human activities (Hayhoe et al., 2018). Water quantity and quality are decreasing across the globe (Devineni et al., 2015). Variable precipitation and increased temperatures are intensifying droughts and heavy downpours, and reduced snow-to-rain ratios are leading to significant differences between the timing of the water supply and demand (Lall et al., 2018). Increased stress from diseases, pests, and weeds will cause a decrease in crop production in many areas, which will have consequences for food security (Hatfield et al., 2014). The agricultural industry will likely have to adopt climate-smart practices to ensure longevity and sustainability of the global food supply because of the changing climate and increase in extreme weather events (U.S. Environmental Protection Agency, 2023).

One part of the agricultural industry that supports access to local food in many rural and urban areas are community gardens. Community gardens are usually operated by communal entities like neighborhoods, schools, nonprofits, and churches. They provide access to fresh produce and can help establish food and health security (Draper & Freedman, 2010). Community gardens can alleviate or supplement food deserts, which are areas that lack access to healthy, affordable food and are usually located in lower-income areas without grocery stores or that are far away from grocery stores (Jang & Kim, 2018; Moore, 2021). Community gardens also face many issues due to climate change. For example, community gardens can be directly impacted by climate change through soil and plant damage, drought, flooding, heat waves, and freezes (Frankson et al., 2022). Previous research studies have focused on the social, health, and communal benefits of community gardens (Berg et al., 2023; Odera et al., 2013; Zutter & Stoltz, 2023) and how community gardens can mitigate climate change impacts (Frantzeskaki et al., 2022; Ossola & Lin, 2021; Ossola et al., 2021). However, a gap in the literature exists that explores if members of the public growing food in community gardens in the U.S. are preparing for climate change. Garden adaptations to climate change could include using climate-smart practices such as reducing water use, capturing rainwater to use in the garden, only watering early or late in the day, using climate-resilient plants, using cover crops, and diversifying crop varieties (Tomatis et al., 2023).

There are many reasons members of the public choose to grow food in community gardens. Lack of access to food, rising food prices, or general food insecurity may all be motivating factors. Seventeen million households in the U.S. were food insecure at least some time during the year 2022 (U.S. Department of Agriculture, 2023) and community gardens have been shown to help alleviate food access issues in food deserts because they provide access to low-cost, fresh produce (Moore, 2021). Community gardens are typically owned and operated by members of the public. Therefore, determining motivations for public engagement in U.S.

community gardens may aid in developing effective environmental messaging that will ensure those involved in community gardens are prepared for the impacts of climate change.

Literature Review

Community Gardens

Community gardens differ from private gardens in the sense of ownership, access, and democratic decision-making (Draper & Freedman, 2010). Public gardens provide food for their communities and help establish food, financial, and health security (Draper & Freedman, 2010). Community gardens have existed in the United States since the 1890s with some suggesting the practice dates to communal lands associated with American frontier towns (Draper & Freedman, 2010; Lawson, 2005). In the 1890s, vacant lots in cities like New York, Philadelphia, and Detroit were turned into communal gardens to provide land and technical assistance to the jobless, and during this time, school gardens were rising in popularity (Lawson, 2005). Community gardens have aided in times of war (e.g. World War I and II) and in recessions (e.g. the Great Depression in the 1930s; Lawson, 2005).

The issue of sustainable development was identified in the second half of the 20th century by the United Nations, and they identified urban agriculture as a strategy for sustainable urban development because of the provision of fresh foods and composting (Dobele & Zvirbule, 2020). Urban agriculture entered a renaissance from this time until the present fostered by technological development and social initiatives (Dobele & Zvirbule, 2020). Specifically, urban agriculture has been associated with grassroots efforts to fight social and environmental justice with community organizing since the 1970s (Aptekar & Myers, 2020). Today, community gardens are still used to address food injustice, educate youth, beautify vacant lots, increase environmental awareness, and much more (Aptekar & Myers, 2020). Gardens can be located in cities, rural areas, schools, neighborhoods, prisons, hospitals, nursing homes, and other areas (Draper & Freedman, 2010). Community garden practices can vary based on a multitude of factors (Erskine et al., 2024). There are no standard practices or rule books for community gardening. Practices and purposes can depend on the community, leaders and participants, geographic location, and/or time of year.

Community gardens provide many benefits to communities and individuals. Social, health, and financial benefits include fostering community engagement, exercising through gardening, providing access to affordable produce, or simply providing people with an opportunity to enjoy the outdoors (Armstrong, 2000; Berg et al., 2023; Odera et al., 2013; Zutter & Stoltz, 2023). Americans growing food in community gardens increased by 200% between 2008 and 2016, and there are currently over 29,000 community gardens in the 100 largest U.S. cities alone (Moore, 2021; NC State College of Agriculture and Life Sciences, 2023).

Motivation

Motivation for engaging in certain behaviors have been studied throughout the literature across disciplines. Researchers have studied the impact of motivation on pro-environmental behavior and communication in the environmental space. For example, Barbarossa and De Pelsmacker (2016) analyzed motivations for purchasing eco-friendly products across different consumer groups (green versus non-green consumers). The study found significant differences between the consumer groups' motivations and found both positive (i.e., green self-identity and morals) and negative (i.e., perceived inconvenience of purchasing eco-friendly products) ego-

centric motives were at least as important and relevant as altruistic (i.e., care for the environmental consequences of purchasing) motives (Barbarossa & De Pelsmacker, 2016). Additionally, Stea and Pickering (2019) analyzed motivational factors that underpinned red meat consumption in Canada. The study found taste and quality were the most important motivators for eating meat, while moral/ethical factors were the least important (Stea & Pickering, 2019). The findings from this study can aid in informing environmental messaging and potentially segment audiences based on their most important motivations behind consuming meat.

There is a lack of research in the United States exploring motivations behind participating in community gardens. Most, if not all, research in this area has been conducted in other countries (Kingsley et al., 2019; Pascoe & Howes, 2017; Roberts & Shackelton, 2018; Shahida et al., 2024). Studies have found a variety of reasons for participation in community gardens including overarching themes of social, health, and financial motivations.

Kingsley et al. (2019) interviewed community garden participants in Australia and found motivational themes like gardening as a family/childhood activity, building social connections, community and civic action, self-identity, and stress relief. Roberts and Shackelton (2018) surveyed community garden participants in South Africa and found motivational themes like gardening as an income supplement, a necessity for growing food in the community, and for an overall healthy lifestyle. Armstrong (2000) surveyed 20 community garden program coordinators and found access to fresh/better tasting food, the enjoyment of nature, and health benefits were the most common motivations for participating in a community garden. There were some differences in motivations between urban and rural garden program participants including the garden providing food for low-income households in urban areas and gardening serving as a traditional cultural practice in rural areas (Armstrong, 2000). Pascoe and Howes (2017) interviewed community garden participants in Denmark and Australia and grouped the resulting motivational themes into three categories: *individual, community, and gardening*. The *individual* category included motivations like personal enjoyment and learning, educating children, and retirement activities (Pascoe & Howes, 2017). The *community* category included socializing, civic action, and growing food for charity (Pascoe & Howes, 2017). The *gardening* category included being outdoors, enjoying nature, and growing food plants (Pascoe & Howes, 2017).

Broad themes and specific reasons for participating in a community garden can be attributed to intrinsic or extrinsic motivations. Intrinsic motivation relates to doing something because of self-enjoyment, curiosity, and the satisfaction of doing the activity itself (Ryan & Deci, 2000). Intrinsic motivations for community gardening can include self-provision of food, health and well-being, and achieving competence (Audate et al., 2021). Extrinsic motivation is doing something to attain a separable outcome, which is in direct contrast to intrinsic motivation (Ryan & Deci, 2000). Extrinsic motivations for community gardening can include economic benefits and social capital (Audate et al., 2021).

Theoretical Framework

Diffusion of Innovations

Rogers' (2003) Diffusion of Innovations (DOI) theory assists in understanding behavioral change, especially related to the adoption of innovations, defined as "an idea, practice, or object that is perceived as new by an individual or another unit of adoption" (p. 12). An idea, practice, or object can be an innovation if it is new to a person if they have not yet formed a favorable or unfavorable attitude toward it or if they have not yet adopted or rejected it (Rogers, 2003).

Although climate change adaptation is not a new idea, it can be seen as novel to those who have not yet adopted. In the current study, climate change adaptation practices, such as composting, implementing rain barrels, and using climate-smart irrigation, are the innovations studied. Rogers' (2003) DOI theory, and research that uses DOI, provides evidence of how a variety of factors can affect the rate at which an innovation diffuses.

Rogers (2003) argued that there are five types of adopters – innovators, early adopters, early majority, late majority, and laggards that adopt the innovation at a certain stage because of many influential factors. DOI theory identifies many variables that affect the adoption rate of innovations including perceived attributes, communication channels, and nature of social systems (Rogers, 2003). Perceived attributes include relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). Relative advantage determines if the innovation has an advantage over the predecessor; compatibility is how well the innovation matches adopters' needs or current systems; complexity how difficult the innovation is to learn, teach, or implement; trialability is the ability of the innovation to be tested; and observability is visibility of results to potential adopters (Rogers, 2003). A communication channel is the means of how an innovation travels from one person to another, and for example, channels can be through mass media, the internet, and interpersonal relationships (Rogers, 2003). Effective communication between diffusion agents and farmers and the types of channels extension agents choose to use were crucial for increasing technology adoption rates in a study on the dissemination of agricultural information in Nigeria (Akinbile & Otitolaye, 2008). Rogers (2003) described a social system as units that are engaged in joint problem solving to achieve a common goal, and units of a social system can be individuals, informal groups, organizations, or subsystems. Factors in a social system can affect the rate of diffusion including social structure, norms, the roles of opinion leaders and change agents, types of innovation-decisions, and the consequences of an innovation (Rogers, 2003).

Motivations behind engagement in community gardens can be impacted by perceived attributes, communication channels, and social systems and vice versa, so it is important for educators and communicators to understand both motivation and DOI variables. For example, a person could be motivated to use climate-smart adaptations in their community garden because their neighbors, in their social system, use adaptations. Additionally, climate-smart practices may diffuse in a community because someone with pro-environmental beliefs (motivation) may communicate to others about the benefits of these practices in community gardens. It is crucial to survey potential adopters of an innovation to determine which attributes to emphasize, clarify, and adapt to the audiences' needs when communicating because different attributes affect the diffusion differently.

Purpose and Research Objectives

The purpose of this study was to determine U.S. adults' motivation behind engagement in community gardens and the level of importance they associate with climate-smart adaptations in community gardens across the U.S. The results can inform the development of effective communication strategies that encourage community garden participants to prepare for climate change to ensure a sustainable food supply for the future. The study was guided by the following research objectives:

1. Describe public engagement in community gardens;
2. Describe motivations for public engagement in community gardens;

3. Describe the level of importance associated with climate-smart adaptations in community gardens;
4. Determine if motivations for engagement in community gardens predict level of importance associated with climate-smart adaptations in community gardens.

Methods

A quantitative research design was used to address all four research objectives. The research presented here was part of a larger study designed to explore perceptions related to environmental issues including climate change perceptions and the use of plastic.

Data Collection

The target population for the study was U.S. residents who were 18 years of age or older. This population was chosen for this study to fill the gap in the literature that explores how Americans are using climate-smart adaptations to prepare their community gardens and their livelihoods for climate change. Understanding the motivations and needs of community garden participants in relation to climate change can aid environmental educators and communicators in developing training and messaging materials. Respondents were recruited in September 2023 using non-probability opt-in sampling via Qualtrics. Non-probability opt-in sampling is well accepted in communication research and public opinion research, although it poses several limitations, such as limiting respondents to individuals with internet access and attracting specific types of people due to the nature of online surveys (Baker et al., 2013; Lamm & Lamm, 2019). Responses were collected from 1,010 respondents found to be representative of the U.S. adult population based on quotas set *a priori* and weighting conducted based on the U.S. Census data *ex post facto*.

Instrumentation

The survey instrument contained demographic and Likert-type questions. To address the first research objective, respondents' engagement in a community garden was measured by selecting “yes” or “no” to the question “Do you or someone in your household engage in a community garden?” Engagement included volunteering, financially supporting, or receiving produce from a community garden. Only respondents that selected “yes” were part of the study’s sample and were further analyzed.

For research objective two, respondents were asked to indicate their level of agreement or disagreement with a set of statements adapted from Armstrong (2000) regarding their motivations for engaging in a community garden. These statements were originally used to measure reasons for participating in a community garden to inform a study that aimed to facilitate health promotion and community development (Armstrong, 2000). All statements from the original instrument were used along with a few added statements to capture a broader range of motivations. Responses were on a five-point Likert-type scale (1 = *Strongly Disagree*; 2 = *Somewhat Disagree*; 3 = *Neither Agree Nor Disagree*; 4 = *Somewhat Agree*; 5 = *Strongly Agree*). Responses were averaged to create three separate scales for motivation to engage in a community garden: social (five items), financial (four items), and health (four items). Items were grouped into these three categories to better understand the overarching themes of motivations behind engaging in a community garden. Grouping of items can be seen in Table 3. Scale

reliability was calculated using Cronbach's alpha, and all scales were deemed reliable (social scale $\alpha = 0.78$; financial scale $\alpha = 0.72$; health scale $\alpha = 0.84$).

For research objective three, respondents were asked to indicate the level of importance they associated with each of the following items associated with climate-smart adaptations in community gardens adapted from a survey conducted by the University of Maryland Extension (2023). . Respondents ranked their level of importance with eat item on a five-point Likert-type scale (1 = *Not Important At All*; 2 = *Slightly Important*; 3 = *Important*; 4 = *Fairly Important*; 5 = *Very Important*). All 14 items were averaged to create one scale to measure importance associated with climate-smart adaptations in community gardens. The scale was found to be reliable ($\alpha = 0.96$).

Table 1

Instrument Items

Variable	Description
Motivations for engagement (Obj. 2)	It is my hobby It keeps me busy I get exercise from gardening It helps/improves my mental health It is a good family/children's activity I enjoy nature/open space It is a tradition/cultural practice I consume the produce I grow Fresh food is/tastes better There is a lack of fresh produce in my area It is less expensive than buying fresh produce It is an income supplement (from sale of grown foods) I want to know what is used (pesticides, fertilizer, etc.) to grow the produce I consume
Climate-smart adaptations (Obj. 3)	Keep climate change and its impacts in mind when working in my community garden Keep climate change and its impacts in mind when planning my community garden Using sustainable practices in my community garden Using compost in my community garden Collecting rainwater to water my community garden Using gray water or recycled water in my community garden Using water conservation practices in my community garden Using climate-resilient plants in my community garden Using native plants in my community garden

Variable	Description
	Growing my own food in my community garden because climate change can impact produce availability
	Growing my own food in my community garden because climate change can impact produce prices
	Growing my own food in my community garden to reduce carbon emissions from produce transportation
	Adapting my community gardening methods because of climate change impacts (warmer weather, flooding, droughts, or other extreme weather events)
	Adapting the produce I grow in my community garden because of climate change impacts (warmer weather, flooding, droughts, or other extreme weather events)

The survey was reviewed for content accuracy and face validity by a panel of faculty members in natural resource conservation, survey design, and communication studies. The University of Georgia Institutional Review Board (IRB # 00008095) approved the study design. The instrument was pilot tested for content validity with 50 individuals who were representative of the sample. The resulting Cronbach alpha coefficients were all above 0.70 and, therefore, the scales were deemed reliable (Cortina, 1993) and no changes were made following the pilot test.

Data Analysis

Data were analyzed descriptively, using means and standard deviations, to address objectives one through three. Descriptive statistics are used to illustrate characteristics of a group of observations, summarize data, and provide a description of the sample (Marshall & Jonker, 2010). A multiple regression analysis was used to address objective four. Multiple regression is utilized in the social sciences to analyze how several independent variables predict a single dependent variable, and it can help predict factors that result in an effect or trend (Gibson et al., 2022; Sheposh, 2023). In the regression model, the dependent variable was the overall scale of importance associated with climate-smart adaptability in community gardens. The independent variables were motivations for engaging in a community garden that were grouped into three scales: social, health, and financial. The independent variables were used to predict importance associated with climate-smart adaptations in community gardens. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) 29 (Chicago, IL, USA).

Results

Respondents were asked to indicate if they or someone in their household engaged in a community garden. Out of 1,010 respondents, 172 respondents answered yes, which equates to 17% of the sample. Detailed demographics of both the entire set of respondents and those indicating they engaged in a community garden can be seen in Table 2. Men were more likely to engage in community gardens than women. Respondents engaged in community gardens were

younger than the overall set of respondents, had a higher level of family income, and were more likely to be a registered Democrat.

Table 2

Demographics of Respondents

Variable	Overall respondents (N = *1,010)*		Respondents who garden (*N* = 172)	
	F	%	*F*	%
Sex				
Male	490	48.5	98	57.0
Female	520	51.5	74	43.0
Age				
18-34 years	291	29.1	80	46.5
35-54 years	271	27.7	61	35.5
55+ years	442	44.2	31	18.0
Race*				
White	771	76.3	120	69.8
Black or African American	138	13.7	37	21.5
Asian or Pacific Islander	62	6.1	11	6.4
American Indian or Alaska Native	22	2.2	6	3.5
Other	40	4.0	6	3.5
Ethnicity				
Hispanic	184	18.2	48	27.9
Non-Hispanic	826	81.8	124	72.1
Rurality				
Within the city or town limits	765	75.7	148	86.0
Outside the city or town limits	245	24.3	24	14.0
Education				
Less than 12th grade	27	2.7	4	2.3
High school diploma	257	25.4	46	26.7
Some college	251	24.9	29	16.9
2-year college degree	129	12.8	18	10.5
4-year college degree (Bachelor's, etc.)	229	22.7	47	27.3
Graduate or professional degree	117	11.6	28	16.3
Political affiliation				
Democrat	266	26.3	51	29.7
Republican	371	36.7	76	44.2
Independent	268	26.5	30	17.4
Non-affiliated	105	10.4	15	8.7
Total family income				
Less than $24,999	233	23.1	32	18.6
$25,000 to $49,999	314	31.1	40	23.3
$50,000 to $74,999	215	21.3	43	25.0
$75,0000 to $149,999	180	17.8	38	22.1
$150,000 to $249,999	54	5.3	14	8.1
$250,000 or more	14	1.4	5	2.9

*Note: Respondents were allowed to select more than one race.

Respondents indicating they engaged in a community garden (n = 172) were asked to indicate their level of agreement on their motivations for engaging in a community garden. Items were grouped into three scales representing motivation for engaging in a community garden. Motivations related to health had the highest mean score (M = 4.09) while the financial motivation scale had the lowest mean score (M = 3.83). Detailed results can be seen in Table 3.

Table 3.

*Motivations for Engaging in a Community Garden (*N = *172)*

Motivation for engagement	Strongly disagree %	Somewhat disagree %	Neither agree or disagree %	Somewhat agree %	Strongly agree %
Social					
It is my hobby	3.5	6.4	16.3	40.1	33.7
It keeps me busy	2.9	7.6	9.3	47.7	32.6
It is a good family/children's activity	2.9	5.2	14.0	36.6	41.3
It is a tradition/cultural practice	4.1	9.3	20.9	29.7	36.0
I enjoy nature/open space	1.2	2.3	11.6	30.8	54.1
Health					
I get exercise from gardening	3.5	5.2	15.7	36.6	39.0
It helps/improves my mental health	2.9	5.8	14.0	30.2	47.1
Fresh food is/tastes better	0.6	7.0	10.5	27.3	54.7
I want to know what is used to grow the produce I consume	4.7	5.8	19.2	31.4	39.0
Financial					
It is less expensive than buying fresh produce	2.3	7.0	14.5	37.2	39.0
I consume the produce I grow	2.3	4.7	13.4	34.9	44.8
There is a lack of access to fresh produce in my area	8.7	12.8	22.1	26.2	30.2
It is an income supplement	11.6	9.9	19.2	27.3	32.0

Respondents were asked to indicate their associated level of importance related to climate-smart adaptations in community gardens. The items were combined into a single construct. The overall mean was M = 3.74. Detailed results can be seen in Table 4.

Table 4

*Respondents' Associated Level of Importance Related to Climate-Smart Adaptations in Community Gardens (*N = *172)*

Adaptation	Not important %	Slightly important %	Important %	Fairly important %	Very important %
Keep climate change and its impacts in mind when working in my community garden	4.7	8.7	24.4	26.7	35.5
Keep climate change and its impacts in mind when planning my community garden	5.8	10.5	26.7	25.0	32.0
Using sustainable practices	2.9	9.9	25.6	23.3	38.4
Using compost	5.8	7.0	27.9	23.3	36.0
Collecting rainwater	4.1	12.8	25.0	22.1	36.0
Using gray or recycled water	11.0	14.0	20.3	26.2	28.5
Using water conservation practices	4.7	7.6	29.1	18.0	40.7
Using climate-resilient plants	5.2	10.5	23.3	25.6	35.5
Using native plants	4.7	8.7	22.7	26.2	37.8
Growing my own food because climate change can impact produce availability	8.1	9.9	20.9	23.3	37.8
Growing my own food because climate change can impact produce prices	6.4	12.8	23.3	20.9	36.6
Growing my own food to reduce carbon emissions from produce transportation	6.4	9.3	23.8	25.0	35.5
Adapting my gardening methods because of climate change impacts	5.2	12.2	24.4	22.1	36.0
Adapting the produce I grow because of climate change impacts	5.8	11.0	22.1	23.3	37.8

A multiple regression analysis was used to determine if motivations for engagement in community gardens predicted the level of importance associated with climate-smart adaptations in community gardens. Overall, motivations for engagement explained 42.2% of the variance in

importance associated with climate-smart adaptations. Together, the motivations for engagement significantly predicted importance associated with climate-smart adaptations $F(3,168) = 40.81$, $p < .001$ (Table 5). The health variable was a significant predictor indicating for each one unit increase in health motivation, there was a 1.33 unit increase in associated level of importance of climate-smart adaptations in community gardens. The social motivation variable was also significant indicating for each one unit increase in social motivation, there was a 0.96 unit increase in associated importance of climate-smart adaptations in community gardens. The financial motivation variable did not significantly predict importance associated with climate-smart adaptations.

Table 5

Motivation Predictive Capacity on Level of Importance Associated with Climate-Smart Adaptations in Community Gardens

	b	*p*
Health	1.33	.001
Social	0.96	0.02
Financial	0.44	0.18

Discussion and Conclusions

The study evaluated motivation for engaging in a community garden, the level of associated importance related to climate-smart adaptations in a community garden, and if certain motivations predicted associated levels of importance of climate-smart adaptations for community gardens. Over 58% of respondents indicating they engaged in a community garden reported a total family income of $50,000 or more. This may be a reason the financial motivations scale had the lowest mean score. These respondents may not be motivated to garden to supplement their income or save money because they have higher discretionary income. As stated previously, Armstrong (2000) found urban residents participating in community gardens, compared to rural residents, were motivated by the gardens providing food for low-income households. In this study, 86% of respondents indicating they engaged in a community garden lived within their city or town limits. This study found contradicting results to Armstrong (2000) because even though most of the respondents lived within the city limits, the financial motivations were the least popular. Overall, respondents somewhat agreed social, financial, and health motivations were motivations for engagement in a community garden. Results indicated both health and social motivations for engagement in a community garden significantly predicted associated level of importance related to climate-smart adaptations. These results are broadly similar findings to Barbarossa and De Pelsmacker (2016) and Stea and Pickering (2019) in which underlying motivations impacted pro-environmental behaviors. These two studies do contradict this study which found health and social reasons to be the top motivators for engaging in a community garden indicating pro-environmental behavior. Barbarossa and De Pelsmacker (2016) found the highest mean construct for motivations to be care for environmental consequences, and Stea and Pickering (2019) found cost as the third most important and health as the fourth most important, out of 13 motivations, for respondents' motivations for pro-environmental behavior.

The findings could be used by policy makers communicating about the importance of climate-smart adaptations to the public who is often skeptical or doubtful climate change is a real

issue they need to address (Sanders et al., 2022). Effective communication should be developed from a health or social lens to encourage adaptations in community gardens to ensure a sustainable food supply from the gardens as climate change continues to have a global impact. For example, a health message could state, "Ensure your mental health can be exercised for years to come in your community garden. Adapt now to a changing climate to ensure you can receive the mental health benefits the gardens provide." Another message could address underlying social motivations for engaging in a community garden. For example, "Ensure you and your family can engage outdoors together for years to come in your community garden. Adapt now to a changing climate."

Previous studies have segmented audiences based on differences in opinions and beliefs related to environmental behaviors (Gibson et al., 2021; Taylor et al., 2018). Perhaps, given how different those that garden were from the general population sample, audience segmentation would be an effective strategy. For example, developing a message showcasing visuals of people younger than 35 growing their own food in a community garden because it is their hobby should be different from a message for people who grow their own food in a community garden because it is less expensive than buying fresh produce because they are motivated by different reasons. Acknowledging these motivational differences when developing education and messaging strategies is crucial to the diffusion of climate-smart practices in community gardens. Rogers (2003) DOI theory and variables should be considered by environmental communicators in tangent with the results from this study. Perceived attributes, communication channels, and social systems all overlap with the motivational themes related to community garden participation.

The results suggest agricultural and environmental communicators should use health and social motivation underpinnings in their messaging to encourage climate-smart adaptations in community gardens. Those who engage in a community garden may increase their climate-smart practices in their garden if communication about needing climate-smart adaptations is conveyed as necessary to ensure the continual health and social support the garden provides them and their communities. For example, if a person engages in a community garden because there is a lack of fresh produce in their area, they need to be made aware that the produce they grow could be impacted by climate change, so they need to adopt climate-smart practices to sustain their personal food supply.

Additional research is needed to ensure effective climate-smart messaging is reaching those engaging with community gardens. Exploring the impact of location and rurality on motivations behind engagement in a community garden and associated level of importance related to climate-smart adaptations would further segment the audience allowing for specific communication messages to be developed. Location, whether regional or country-specific, could also be further explored to determine if areas outside the U.S. have the same motivations and level of importance associated with climate-smart adaptations in community gardens.

Rurality may impact motivations for engagement in a community garden including reasons related to food accessibility and distance to the nearest community garden. Other demographics such as socioeconomic status should be analyzed to determine its impact as well given those engaged in community gardens in this study were of higher socio-economic status than the general public. Socioeconomic status may impact motivations for engaging in community gardens as well as climate-smart adaptation adoption decisions due to financial barriers including expense and accessibility.

Climate change is impacting food security as it relates to reduced access to fresh foods. In many cases community gardens are necessary to ensure resilience through adaptation. Community gardens can only contribute to food security if they survive the issues resulting from a changing climate. The findings implied the public engaged in community gardens already see the importance of climate-change adaptation. Communicators have an opportunity to capitalize on this by developing strategies to increase participants' associated levels of importance and encourage widespread adoption. Agricultural educators and communicators should also target participants who perceive adaptations as less important through education by placing an emphasis on their motivations for engagement. Understanding how those engaged in community gardens view the importance of climate-smart adaptations can contribute to how communicators relay messaging to further encourage climate-smart adaptation to ensure access to fresh, local foods.

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