horticulturae

MDPI

Article

Exploring Community Garden Coordinators' Perceptions of Climate-Smart Adaptations to Support Local Food Systems

Olivia M. Erskine [1,*], Alexa J. Lamm [1], Catherine E. Sanders [2] and Kevan W. Lamm [1]

[1] Department of Agricultural Leadership, Education and Communication, University of Georgia, Athens, GA 30602, USA; alamm@uga.edu (A.J.L.); kl@uga.edu (K.W.L.)
[2] Department of Agricultural and Human Sciences, North Carolina State University, Raleigh, NC 27607, USA; catherine_sanders@ncsu.edu
* Correspondence: oliviaerskine@uga.edu

Abstract: Extreme weather events, increased intensity of droughts and floods, and changes to growing seasons are results of climate change that impact horticulture, agriculture, and food systems. In the United States, Georgia, North Carolina, and South Carolina experience similar impacts caused by climate change such as rising sea levels and extreme heat. In these states, community gardens can be a source of local, fresh foods, especially in areas experiencing food insecurity. The goals of this study were to identify garden coordinators' perceptions of the need for climate change adaptation, perceptions regarding the five perceived attributes of climate change adaptation, and where community garden coordinators stand in the innovation–decision process when it comes to climate change adaptation. The findings show that participants valued relative advantage and low levels of complexity when adopting and implementing climate-smart practices into their gardens. This study found that the community gardens were all implementing some form of climate-smart adaptations even if implementation was not for climate-related reasons. All participants noted that the largest barrier to adopting new practices was a lack of extra money. The findings from this study should be used to inform environmental education and communication strategies that encourage adoption of climate-smart practices.

Keywords: climate-smart; climate adaptation; community gardens; horticulture; food system; local food; Diffusion of Innovations

Citation: Erskine, O.M.; Lamm, A.J.; Sanders, C.E.; Lamm, K.W. Exploring Community Garden Coordinators' Perceptions of Climate-Smart Adaptations to Support Local Food Systems. *Horticulturae* **2024**, *10*, 601. https://doi.org/10.3390/horticulturae10060601

Academic Editors: Mirjana Ljubojevic and Tijana Narandžić

Received: 30 April 2024
Revised: 2 June 2024
Accepted: 3 June 2024
Published: 7 June 2024

1. Introduction

Climate change is happening, and it is significantly impacting humans, the environment, and the economy [1]. The world's climate is rapidly changing at a pace quicker than natural variations, with the average global temperature rising approximately 1.8 °F from 1901 to 2016 [2]. A global temperature change of one or two degrees can cause potentially devastating shifts in both climate and weather [1]. Evidence for this increase in temperature has consistently pointed to human activities and evidence lacks natural explanations [2]. Impacts and changes caused by climate change include more frequent and intense floods, droughts, and rain and more frequent and severe heat waves [1]. Agriculture requires the use of land, water, and other natural resources and is very sensitive to climate and weather [3]. Climate change will lengthen some growing seasons and allow some crops to be grown in different regions, but it will also make agricultural practices more difficult in other regions [3]. For example, major commodity crops like corn, oats, and rice will have lower yields in years to come compared to a world without climate change [3].

The southeastern United States' (U.S.) coastal plain has a rapidly growing population that is extremely vulnerable to climate change impacts [4]. Without adaptation strategies, the effects of extreme rainfall events and sea level rise are predicted to result in daily high tide flooding by the end of the 21st century [4]. The state of Georgia is expected to have unprecedented warming this century, causing an increase in heat wave intensity

and soil moisture loss, leading to intense droughts and more competition over water resources [5]. North Carolina is also expected to have unprecedented warming this century as temperatures in the state have risen over 1 °F since the beginning of the 20th century [6]. North Carolina has a high variability of hurricanes from year to year, and storm intensity and rainfall associated with hurricanes are predicted to increase as the climate warms [6]. Extreme precipitation is expected to increase in South Carolina along with extreme heat events increasing the intensity of droughts [7]. These three coastal states are all vulnerable to sea level rise, with North Carolina's northern coastal plain especially susceptible due to its low elevation and subsidence of land [5–7]. Because of the changing climate and increase in extreme weather events, community gardens connected to the food system in these states will need to adopt climate-smart practices to ensure longevity and sustainability in their gardens.

Community gardens are collaborative spaces usually implemented on public land where participants share in the maintenance and production of the garden [8]. They can serve as a space to bring communities together, create green space, tackle food insecurity [9]. Participants in community gardens may grow their own food because they can control food safety or food procurement, or participants may enjoy the community and physical activity that pairs with community gardening [10]. These gardens are usually operated by communal entities like counties, schools, neighborhoods, churches, and nonprofits. Community gardens have existed for over a century, but they have risen in popularity over the past twenty years and exist to produce fruits and vegetables to eat, share, and/or sell in a community ([11–13]. Most research studies have focused on social, health, and communal benefits of community gardens [11,14–16] as well as how community gardens can aid in adapting communities to climate change [17–19], but there is a gap in the literature that explores how community gardens are preparing for climate change specifically, through the lens of those who make the decisions in a community garden. Although community gardens can aid in fighting climate change through water retention, food security, and carbon capture [20], they are susceptible to climate change impacts such as drought, flooding, heat waves, soil damage, and freezes [5]. Because of the changing climate and increase in extreme weather events, the agricultural industry, including community gardens, will have to adopt climate-smart practices to ensure sustainability of the global food supply [3]. The goals of this study were to identify garden coordinators' perceptions of the need for climate change adaptation, perceptions regarding the five perceived attributes of climate change adaptation, and where community garden coordinators stand in the innovation–decision process when it comes to climate change adaptation.

2. Theoretical Framework

The theoretical framework for this study was based on Rogers' [21] Diffusion of Innovations (DOI) theory. Rogers [21] defines an innovation as, "an idea, practice, or object that is perceived as new by an individual or another unit of adoption". Something is an innovation if it is new to a person, or if they have not yet formed a favorable or unfavorable attitude toward it or have not yet adopted or rejected it [21]. Climate change adaptation is not a new idea, but it served as the innovation in the current study as it can be seen as new to some groups or individuals. DOI theory has been used extensively to guide agricultural and environmental research, and it can be used to effectively communicate about these topics [22–26].

DOI theory identifies many variables that affect the adoption rate of innovations including opinion leadership, which is defined as the degree to which someone can influence people's attitudes or behaviors with a high frequency [21]. In the current study, a community garden coordinator is defined as the person in a community garden who makes decisions about what to plant and what gardening practices and methods to use serving as opinion leaders. As climate change issues continue to enter public discussions, policy makers and educators should consider the important role opinion leaders can play

in advocating for climate-smart practices while emphasizing self-efficacy to their opinion leaders [27].

Furthermore, Rogers [21] identified five perceived characteristics of innovations including relative advantage, compatibility, complexity, trialability, and observability. Relative advantage is how people view an innovation, superior or inferior, compared to the precedent; compatibility is how adopters see the innovation as aligning with their needs and experiences; complexity is the perception of how difficult or easy to use the innovation is; trialability is the degree to which the innovation can be tested or experienced; and observability is how visible the results of the innovation are to the potential adopters or general public [21].

Previous studies have examined how the perceived attributes of DOI impact adoption of an innovation. Hasin and Smith [22] analyzed how farmer's market managers perceived the implementation of electronic benefit transfer (EBT) as a form of payment at the markets. They found market managers may be more willing to implement EBT when it is perceived as better than other food stamp systems and is less complex, and relative advantage and complexity were found to significantly predict EBT adoption in the study ([22]. Warner et al. [26] examined perceptions of urban landscape water conservation innovations in Florida. The study found relative advantage and complexity to predict adoption of water conservation innovations in certain groups [26].

Additionally, the innovation–decision process in DOI theory can lead to adoption or rejection of an innovation and includes a sequence as follows: knowledge, persuasion, decision, implementation, and confirmation [21]. Types of innovation decisions include optional, meaning the audience has a choice in whether or not they want to adopt the innovation; authoritative, meaning the audience is forced to adopt the innovation (e.g., wearing seat belts in cars is required); and collective, meaning a social system as a whole decides to adopt the innovation (e.g., members of Congress come to a consensus to pass a law; [21]. This process is significant for climate-smart practices in community gardens as researchers explore whether community gardens are choosing to prepare for climate change or if they will be forced to adapt in the future to sustain food supply from their gardens.

DOI theory is a tool that can be used to study the adoption process in community gardens because it allows for the discovery of perceptions, knowledge levels, and reasons for adoption or rejection directly from those who make decisions in community gardens. There is a gap in the literature on if and how community gardens in the U.S. are preparing for climate change, and using interviews guided by DOI theory enables researchers to engage directly with decision makers in community gardens. Determining how climate-smart practices are being diffused and adopted across the U.S. should continue to be explored in future studies using DOI theory.

3. Purpose and Research Questions

The purpose of this study was to explore community garden coordinators' perceptions of climate change adaptation, the adoption process, and their current climate-smart practices. The results should be used to inform effective environmental education and communication strategies that encourage community gardens to adopt climate-smart practices. The following research questions guided this study:

1. What are community garden coordinators' perceptions of the need for climate change adaptation?
2. What are community garden coordinators' perceptions regarding the five perceived attributes of climate change adaptation?
3. Where are community garden coordinators in the innovation–decision process when it comes to climate change adaptation?

4. Materials and Methods

A qualitative research design was used to address all three research questions. The research presented here was part of a larger, mixed-methods study designed to explore

how community gardens are preparing for climate change. The larger study sought to understand community garden participants' and community garden coordinators' perceptions of climate change and adopting climate-smart adaptations within the DOI theory to further explore relationships between the variables.

4.1. Participant Selection and Data Collection

The target population was community garden coordinators in Georgia, North Carolina, and South Carolina. A garden coordinator was identified as the decision maker for plant selections and gardening methods and practices. The operational definition of a community garden was a plot of land cultivated by a group of individuals that is owned, accessed, or democratically controlled in some way by the public in diverse settings (ex. schools, churches, neighborhoods, city blocks, prisons) that exists to produce fruits and vegetables for eating, sharing, or selling in a community [11,28–30]. The community gardens were required to be connected to the food system either by (a) distributing some produce (free or discounted) in their community or (b) donating some produce to a local food bank or charity. Community gardens connected to the food system were explored to determine if being an affordable source of fresh foods to their communities led to more concern for climate change adaptation.

Participants were recruited in October 2023 using purposive sampling methods. Social science researchers use purposive sampling because it uses limited resources, purposefully selects participants who will yield the most appropriate information, and aims to increase the depth of understanding of the topics [31]. Purposive sampling techniques rely on the researcher's experience in the field of study and rapport with the targeted groups, and this method is popular among social science researchers [32,33]. The number of participants is determined by data saturation in purposive sampling [34,35]. Data were continually collected until the researcher began to receive the same information and see similar patterns from the participants, known as data saturation [36].

Community garden coordinators were identified in Georgia, North Carolina, and South Carolina through internet searches and professional connections. The three states were selected due to similarities between the states' predicted experiences with climate change including unprecedented warming, changes in rainfall, and rising sea levels [5–7]. Additionally, the states share similar geographical configurations, including the Blue Ridge Mountains, part of the Appalachian Trail, that run through the three states [37]. The states are categorized as water-rich states due to substantial precipitation [38]. Further, Georgia, North Carolina, and South Carolina have coastal plains on the Atlantic Ocean that have rapidly growing populations which are extremely vulnerable to climate change impacts like flooding, storm surge, and salt-water intrusion [4].

An attempt to identify garden coordinators was made by searching the internet for community garden websites and then for contact information. If a contact for the garden coordinator could not be identified, any email or phone number on the website was used for recruitment. Additionally, professional connections at universities and Extension offices were used as sources to identify potential participants. University and Extension professionals sent emails and phone numbers of individuals they believed would match the operational definition of a garden coordinator, or they forwarded this study's information to potential participants. Potential participants were contacted, and if the contact did not match the operational definition of a garden coordinator, the contact usually provided the name of the person at their garden they believed most closely matched the operational definition. Additionally, when participants were contacted, they were told the garden had to be connected to the food system either by (a) distributing some produce (free or discounted) in their community or (b) donating some produce to a local food bank or charity to participate in this study.

4.2. Instrumentation and Data Analysis

Semi-structured interviews were conducted with participants to answer all three research questions. Interviews were conducted in person, via Zoom, or over the phone based on researcher and participant availability. Interviews conducted in-person can sometimes yield richer conversations and information due to non-verbal cues [39]. Interview questions were guided by Rogers' [21] DOI theory; specifically, the five perceived characteristics of innovations: relative advantage, compatibility, complexity, trialability, and observability. Other constructs in the interview protocol related to garden coordinators' educational backgrounds, experience with climate change in their community garden, current level of adoption, and definitions and examples of climate-smart adaptations. Examples of climate-smart adaptations were adapted from the University of Maryland Extension [40]. The interview protocol consisted of five broad questions and additional sub-questions to guide the interview. Questions were developed and reviewed by a committee of social scientists in agricultural and environmental communication and education. The content accuracy and face validity of this study were determined by one pilot interview and by a panel of faculty members in natural resource conservation, social science, and communication studies. The [University] Institutional Review Board (IRB #00008095) approved the study design. The primary author conducted 17 interviews in October 2023: five in Georgia, six in North Carolina, and six in South Carolina.

Interviews were audio-recorded and lasted an average of 35 min. If the interviews were conducted via Zoom, they were transcribed verbatim with Zoom version 5.16 audio transcription and revised for errors. If the interviews were conducted in person or over the phone, the interviews were transcribed by RiversideFM's artificial intelligence (AI) transcription tool and revised for errors by the researcher. Interview transcripts were then coded with MAXQDA 24 qualitative analysis software. Codes and themes were determined a priori using deductive content analysis. Deductive analysis applies pre-existing theoretical frameworks, in this case, DOI theory, to similar problems, and the theories aim to explain current behavior or behavioral changes [41].

Data points, or interview quotes, were color-coded by the predetermined themes of DOI's five perceived attributes. The primary author developed a codebook with quotes and their subsequent themes. Peer debriefing followed as recommended by Lincoln and Guba [42] to establish trustworthiness and credibility. Pseudonyms were assigned to each participant to ensure anonymity.

4.3. Reflexivity Statement

As the primary researcher of these studies, I have certain experiences and biases that may have impacted the research. Reflexivity is an essential component of qualitative research and involves a continual self-evaluation by the researcher to understand and acknowledge their background and experiences can influence the participants studied, questions asked, and interpretation of results (Berger, 2015). Reflexivity enhances the rigor and ethics of a study [43–45]. I am a white, cisgender, female who grew up in South Carolina and who currently lives in Georgia. I am a graduate student in agricultural and environmental education and my research focuses on agricultural and environmental issues and science communication. My studies in agricultural and environmental spaces may have impacted my views and perceptions surrounding community gardens. I do not have experience gardening or experience participating in a community garden. I am interested in environmental justice and sustainability, which led me to choose this topic for my thesis research. As a researcher in qualitative studies, I acknowledge my potential bias and influence on this study.

5. Results

The predetermined deductive themes examined were the five perceived attributes of DOI theory: relative advantage, compatibility, complexity, trialability, and observability.

Results were based on participants' perceptions of climate-smart adaptations described by the five attributes. A summary of results can be found in Table 1.

Table 1. Summary of qualitative results.

Theme	Description	Representative Quotation
Relative Advantage	Advantage to climate-smart irrigation	"We have finite resources. And because of that, we have to implement strategies that can help us combat that. We use drip irrigation. We go low and slow". (Michael, SC)
	Advantage to using compost	"It's what makes our veggies grow. . .Our beds [pH] are like eight, and you need like 6.5 to grow vegetables, so if we didn't have the compost we would not be growing vegetables in those beds". (Mary, NC)
Compatibility	Incompatible with cultural food preferences	"No one wants the purple okra that can handle the heat, and no one wants the basil that smells like licorice. So, I think that's just not a huge priority of ours for the next couple of years. . .Our area really prioritizes what they grew up with. That's always gonna be the first thing that people think about as well". (Katie, SC)
	Incompatible with garden location	"We have an irrigation system that's hooked up to the town water system. It runs six months out of the year and then it's shut off. . .it's not a system that was set up for freezing. . .it's just not an option". (Maggie, NC)
Complexity	Preference for low levels of complexity	"If we planted something new we would hand water it just for maybe the first two weeks whenever it looked like it needed it. But I was kind of on the like, if it wants to survive, let it survive, and if it wants to die, let it die. . . Because that's a lot more realistic for people in the [name of area] community. They're not going to be out there every day watering their garden. They want something that can kind of be like set it, forget it, and harvest when it's ready". (Katie, SC)
Trialability	Necessary to trial in their own garden	"I think trying it in our own garden is gonna be the most helpful in our scenario because we do kind of face some specific restrictions". (Lily, SC)
	Influence from other gardeners	"That would have the biggest impact on me and probably many of the other gardeners. . . would be if somebody had like a reason for doing it this way and they tried it, and it was successful". (Clarke, NC)
Observability	Observing another farmer/gardener	"I would say hearing and seeing success from another farmer. . .if I see it in practice working, I'm much more likely to take the jump and try and invest in it, than having read in just a scientific publication". (Jackson, GA)

5.1. Relative Advantage

Participants needed to see a relative advantage over what they were currently implementing to adopt new practices. One of the climate-smart adaptations presented to participants in the interview guide was the use of rain barrels to collect rainwater for watering their gardens. A few participants relayed disadvantages to using rain barrels in their community gardens including the limited capacity of rain barrels even if they used more than one. For example, Mary from North Carolina said, "We did have a rain barrel, but it was just such a low flow thing. . . One little rain barrel wasn't cutting it". The problem with rain barrels being low flow and not holding enough water was repeated by multiple participants including Mark from North Carolina:

> We would not have an advantage to using rain barrels. . .drip irrigation would take us 71 gallons per minute, roughly, and the well will produce 100 gallons per minute. And so, you could have a lot of rain barrels and just not get any benefit out of that.

Time was also mentioned as a disadvantage to using rain barrels. Many garden coordinators had full-time jobs apart from working in the garden, so they wanted a watering

system that would not take up a lot of their day even if alternate methods were less sustainable. For example, Julie from South Carolina said, "Sometimes I just use the hose because it's a lot faster and saves time".

Stagnant water was another disadvantage to using rain barrels. Water infested with mosquitoes can be an issue caused by stagnant water, and cleaning the water collected by rain barrels just adds extra effort and expense. Katie from South Carolina said, "A big problem we have at our site is mosquitoes and I think a big thing that people don't realize is standing water equals mosquitoes". Daniel from North Carolina discussed the issues that arose and effort was needed to clean stagnant water:

> We don't want to put chlorine in, or anything like that, so we don't try to sterilize the water, or UV is too expensive to try to keep it clean at this point. So that's something we did try. And there's just, you know, water lines get clogged. . .algae kind of tends to grow. So it's just more of a pain in the butt.

Climate-smart irrigation (e.g., drip irrigation) was another adaptation presented to participants. Most participants were already using some form of irrigation in their gardens. Water conservation was mentioned by participants as an advantage to using irrigation as opposed to sprinkler systems or hoses. Water conservation was noted as a strategy to decrease use of already limited resources. Michael from South Carolina stated, "We have finite resources. And because of that, we have to implement strategies that can help us combat that. We use drip irrigation. We go low and slow". Another advantage mentioned was convenience. Using irrigation systems can save time and effort as noted by Emma from Georgia:

> I live 35 min away, so a lot of times when I'm thinking through different products, it's what's gonna survive when I go home for a weekend and I'm not in the county watching after it. . .just the ease of the garden maintaining itself where I'm not having to be out there every single day.

Cost was another disadvantage mentioned by participants. Some seemed unsure about the actual cost of setting up an irrigation system, but they perceived it to be too expensive to start, maintain, and/or replace their current system with. Mary from North Carolina said, "So no, we weren't gonna ask to do any sort of irrigation like that. It would have been too much expense, I think". Macie from South Carolina agreed that she was not sure but thought irrigation would be too expensive for their garden, "Potentially cost. I don't really know. I'm not super familiar with irrigation, but the initial setup and the supplies, and then like whatever upkeep is involved with it".

Composting was another climate-smart adaptation discussed with participants. Many garden coordinators were already either using compost in the gardens or composting garden scraps. Saving money was a noted benefit of composting in the gardens. Many gardens were restricted by budgets, so composting was a way to enrich the soil without spending a lot, or any, money. Anna from South Carolina stated, "In 10 months. . .if I don't have a new grant in place, then we're gonna be in a different situation than we are right now, which is part of the reason I'm trying to work on that sustainability. So that it won't cost as much to run".

Another advantage of composting was increased nutrients for the gardens' soil. Jane from Georgia explained how her team transformed their garden's soil by using compost:

First thing we did was to work on the soil for probably a good two years. We use a lot of compost that we make ourselves that helped enormously and gave us the nutrients that we needed to loosen that soil so it wouldn't be so compact.

Mary from North Carolina also praised their compost as what really makes their vegetables grow, "It's what makes our veggies grow. . .Our beds [pH] are like eight, and you need like 6.5 to grow vegetables, so if we didn't have the compost we would not be growing vegetables in those beds".

A noted disadvantage of composting was mismanagement. Participants mentioned that composting could be tricky, especially when it takes communal contributions. Garden

coordinators said they must make sure certain things are not placed in their compost systems. Deci from Georgia explained their issues with mismanagement, "Composting is a chore all on its own. . .You tell people that they do it wrong, they don't wanna help. You don't tell them they did it wrong, and then, you become overwhelmed with the amount of correcting, so it's tricky". Jacob from Georgia mentioned similar issues concerned with spreading diseases within their composting system, "We've tried that, and I just haven't perfected that yet. If you don't do it exactly right, you can introduce diseases and stuff into your garden".

Climate-resilient plants were another adaptation presented to participants. Many gardens were already implementing climate-resilient plants even if the selection of plants was unintentional. Some coordinators said they had selected certain plants that were more tolerant to weather events but did not necessarily know or use the term 'climate resilient.' Heat and drought tolerance was a major advantage noted by participants. For example, certain tomato species are bred to be more tolerant to heat to ensure survival. Katie from South Carolina explained her experimentation with climate-resilient plants, "I did try to experiment a bit this year with different types of plants, either ones that would have staggered harvest or could maybe handle a little bit more heat and drought". Deci from Georgia also said she changed the tomatoes in their garden because of heat and drought, "The extreme dry heat forced me to look at what tomatoes would do better, so I changed the next year, the types of tomatoes that we grew". Maggie from North Carolina echoed this theme, "We're definitely researching on the plants. More, we're looking at . . . heat and drought-resistant plants".

Participants mentioned climate-resilient plants were advantageous for disease and pest resistance. Jackson from Georgia mentioned pest and disease resiliency in relation to a changing climate, "I haven't done a lot of varietal selection yet, but. . .a lot of our stuff is probably more selected around disease, disease and pest resistance, but I would say that disease incidence is probably tied to temperature and climate". Jacob, another participant in Georgia, mentioned how the heat and humidity play a huge role in disease in his area. He added an advantage of using disease-resistance plants is using less agrichemicals:

> Generally, what I try to select for are disease resistance in plants. Just because in south Georgia, the disease issue is. . .it's just so humid, hot here. I mean, every kind of plant disease you can have, we have down here. When you plant a resistant plant, you don't have to use fungicides and things like that. It's better for the environment and better for you eating it too. . .you don't have all these pesticides on your plants.

Other participants noted disadvantages to climate-resilient plants including cost and working with limited resources. For example, Mary in North Carolina said, "I'm not doing that level of research on the plants because we get them donated and we'll take what we can get". Amy from North Carolina repeated this theme stating, "Probably the disadvantage would be. . . just for our sake, the money. Trying to buy those plants".

Taste was also mentioned as a perceived disadvantage to using climate-resilient plants. Participants noted these types of plants may not be what their community members are familiar with growing, cooking, or eating. Katie from South Carolina addressed this issue:

> I think sometimes more resilient plants are maybe hairier or tougher, and I don't know if that's quite as tasty. . .at least in my experience with more of the resilient plants. They're usually tougher to harvest, in my opinion. I always get a little bit like a skin rash or you need to space out the plants a little bit more so you're not, I don't know, like they have a little bit of a different set of rules that we would need to learn for the community.

5.2. Compatibility

Community garden coordinators placed high emphasis on the compatibility of climate-smart adaptations within their gardens. Three subthemes emerged from discussion on compatibility. The first was financial restraint such as working with a budget and having

limited resources. Many community gardens were funded through grants, which sometimes come with a set of rules and stipulations. Anna from South Carolina explained problems with their grant funding:

> The deer have been our biggest issue because our grant will not provide for fencing. . .So our grant is a 70/30. So, for every dollar that we spend, the [garden's organization name] has to come up with 30 cents of that, and the grant pays 70 cents of that. So, we're still working on donated funds at all times and have to always look at the stewardship of everything we do.

Amy from North Carolina explained their struggle with grant funds ending and having to work with what is left over, "The garden was kind of funded from two different grants. So now those cycles have both ended. So now we just try to work off of what we have".

Many coordinators said their biggest barrier in their community gardens was finances. Most, if not all, gardens had to raise or find money through donations, renting out personal garden beds, small grants, and sponsorships. Daniel from North Carolina said, "That's always been our biggest barrier being a community garden. . .I guess you could say there's people in the community that support the garden, but financially, we're always very dependent on specific fundraisers that we do". Lily from South Carolina agreed their gardens' biggest issue was money, "I would say our biggest one [barrier] is finances".

Cultural incompatibility was a concern for participants including issues surrounding the how the community gardens operate. Some community gardens rented garden beds to community members, and renters were able to choose what plants to grow even though they had to donate a portion of their produce to charity. Daniel in North Carolina explained how he does not regulate members on what plants they grow, "Unfortunately, with the community garden people want to grow the fast turn and burn crops which aren't necessarily more resistant. So, I don't necessarily limit that when it comes to. . .planning out the garden".

Incompatibility with cultural food preferences was another disadvantage noted by participants. Many garden coordinators said they try to be aware of what they grow to match the needs of their recipients. For example, Deci in Georgia explained certain climate-resilient plants may be unfamiliar to the people receiving food from charities her garden donates to, "I don't know who we're feeding. They might not look like me. They might not eat like me. They might be from other countries, and this might be a little sense of home for them". Katie from South Carolina similarly discussed the reasons their garden does not always select climate-resilient produce for their donations:

> No one wants the purple okra that can handle the heat, and no one wants the basil that smells like licorice. So, I think that's just not a huge priority of ours for the next couple of years. . .Our area really prioritizes what they grew up with. That's always gonna be the first thing that people think about as well. 'This is what I've known for 60 years. Why would I trust this other technique when this has worked for multiple generations?' So, I think that's going to be a big part of it.

Interviewees addressed adaptations that they had tested or implemented and found to be incompatible. Some adaptations will not work for some gardens due to circumstances that are unable to change. Maggie in North Carolina explained how their water source is connected to their town's water system for only half the year, "We have an irrigation system that's hooked up to the town water system. It runs six months out of the year and then it's shut off. . .it's not a system that was set up for freezing. . .it's just not an option".

Many participants noted a major incompatibility with the missions of their organizations. Climate-smart irrigation was seen as incompatible because it reduced participation within the garden. Some garden coordinators wanted community members and volunteers to spend time in the garden and provide an easy task (hose watering) to those that needed tasks with less mobility involved. Macie from South Carolina explained, "Our mission of

our organization is to connect people with their parks, and people really love watering in the gardens. It's less rigorous than some of our other volunteering opportunities. It's on their own schedule." Daniel from North Carolina echoed this sentiment and added he wanted garden members to be held accountable, "I want the community to be accountable. And so with that, going to water every day if you need to, or 3, 4 times a week. . . gives them that sense of. . .at least having to check in at the garden".

A few aspects of climate adaptation behavior were compatible. Composting worked well in many community gardens as a way to create fertilizer and provide natural remedies for disease. For example, Michael in South Carolina explained their unique composting system:

> We then feed our compost to worms, the worms then produce their byproduct, which is worm manure. And then we use that to create sprays for the plants and for fertilizers. Their actual gut biome in a worm is a fascinating thing. When we make it into a spray, it actually helps to fight off a lot of the diseases that are readily available, or in our area.

Clarke from North Carolina explained the use of a composting system in their garden for recycling kitchen scraps and fortifying their soil with the end product, "We do have a compost system in our garden, and we encourage people to. . .bring their kitchen scraps and put them in there. So, by the time it comes out the other end we have some awfully good compost".

5.3. Complexity

Higher levels of complexity were identified as a barrier to climate-smart adaptations. Many of the participants relied on volunteers to help in the garden, had other full-time jobs apart from their gardens, and wanted to teach others how to grow their own food with ease. Some adaptations, like automated irrigation, were less complex and offered participants more time for other practices. For example, Deci from Georgia made a statement about trying to be as environmentally conscious as possible, "There's a balance between saving all that you can, saving the planet, and killing yourself in the process".

Garden maintenance also needed to have a low level of complexity. For example, in Katie's community in South Carolina, garden maintenance needed to be simple for community members because that is what is realistic for them. Community members do not always have extra time to tend to their gardens every day. Katie stated:

> If we planted something new we would hand water it just for maybe the first two weeks whenever it looked like it needed it. But I was kind of on the like, if it wants to survive, let it survive, and if it wants to die, let it die. . . Because that's a lot more realistic for people in the [name of area] community. They're not going to be out there every day watering their garden. They want something that can kind of be like set it, forget it, and harvest when it's ready.

5.4. Trialability

Participants had varying preferences on how they would like to trial climate-smart adaptations. Some preferred to try new practices in their own garden to determine if the practices would meet their specific requirements. A few gardens had very specific regulations implemented by funding or location institutions. For example, Lily in South Carolina stated, "I think trying it in our own garden is gonna be the most helpful in our scenario because we do kind of face some specific restrictions".

Other coordinators preferred to learn if other gardens had success with certain practices before implementing them into their own gardens. Visiting and learning from other gardens was a popular idea among participants. For example, Jacob in Georgia said, "If I'm visiting someone else's garden, and they're doing something I think is pretty cool and it's working, then, I'll adopt certain things". Mary from North Carolina mentioned a resource to learn about new ideas and practices was their local extension community garden. She stated:

> Our extension has a demonstration garden, and so they are constantly doing little research projects there. Like they did the downy mildew study for the basil, and I think they're going to start looking at different hybrids of tomatoes. So, we go to the extension once a month for our meetings, and we get up to date on that.

Clarke from North Carolina gave a simple explanation of implementing new practices. If he and the other members could hear about and understand new practices that would benefit their garden, they would adopt them. Clarke explained:

> That would have the biggest impact on me and probably many of the other gardeners. . . would be if somebody had like a reason for doing it this way and they tried it, and it was successful. I mean, I think most of us would say, 'Okay, if I'm growing Cherokee purple tomatoes, and they did a whole lot better than these celebrities that they grew in the garden next to me, then yeah, I'm probably gonna grow whatever grows the best.'

5.5. Observability

Observability was viewed as a positive reinforcer of climate change adaptation behaviors. Participants wanted to be able to lay their eyes on successful implementations of adaptations. Visualizing successful practices in someone else's garden or farm was a popular sentiment. Jackson from Georgia said, "I would say hearing and seeing success from another farmer. . .if I see it in practice working, I'm much more likely to take the jump and try and invest in it, than having read in just a scientific publication".

Participants also noted observing success in their own garden was important and had impact on their decision making. For example, Clarke in North Carolina addressed the effort it took to implement a garden bed layering technique, "You'd have to see a whole lot of payoff for the effort that you put in. But I saw that last year, so I was willing to put in the effort this year to do another one".

Another aspect of observability mentioned was transparency. Being able to see success is one thing, but trusting the source of that success is also important. Anna in South Carolina said she wanted to hear success stories from those that are not incentivized to promote the practices, "Even talking to someone who's actually used it. Who isn't getting paid to use it. Things like that would be great. Seeing it in person is always helpful".

6. Discussion

Local agricultural production is being affected by droughts, changes in rainfall patterns, heat waves, and subsequently, increased pest and disease pressure [1,3]. Climate-smart adaptations in community gardens may be necessary to ensure a continual supply of local, affordable produce. This study explored community garden coordinators' perceptions of climate change adaptations through DOI theory to inform effective environmental education and communication strategies that encourage community gardens to adopt climate-smart practices.

The results of this study suggest relative advantages and low levels of complexity are needed for adoption. Participants emphasized these two attributes as being the most important for what they need to change their current systems and adopt climate-smart practices. These results support the findings of Hasin and Smith [22] who found farmers' market managers were more likely to implement new payment technology when they perceived it as better than the previous system and simple to implement. The results of this study also support Warner et al. [26] who found relative advantage and complexity to predict adoption of water conservation innovations.

Proving an innovation has a relative advantage over old practices is necessary because garden coordinators do not have the time or resources to adopt something that is not going to better their current systems. Relative advantage of an innovation would have to be shown in many categories such as efficiency, cost-effectiveness, and management. Garden coordinators are not the only ones working in their gardens, so the innovations need to be easy to teach to other garden members as well. This low level of complexity also

needs to translate to the everyday use of the innovation. The new practice must be easy to implement and teach as well as easy to manage. Garden coordinators and other members usually have other jobs and responsibilities apart from their gardens, so adaptations must be easy to manage on a variety of schedules. In other words, the adaptations need to be low maintenance for community gardens to implement them.

Furthermore, Rogers [21] portrayed the five perceived attributes as distinct and separate from one another, but this study found the opposite. Many attributes and subsequent themes overlapped each other and were directly tied to one another. For example, a relative advantage of climate-smart irrigation could be its low level of complexity, which was relayed by multiple participants. Compatibility was another characteristic that participants overlapped with other attributes. Compatibility was also seen as a relative advantage for garden coordinators because innovations had to be compatible for adoption, both within the garden and within the community, to be desired. Further, some gardens considering adopting an innovation wanted to trial the innovation in their own garden to determine if it was specifically compatible in their own space. Some gardens had unique restrictions that meant they could not adopt an innovation just by seeing it in another garden because they needed to know if it would work under their restrictions (i.e., institutional, grant, and geographic regulations and restrictions). Participants closely related observability and trialability because they wanted to determine the success of an adaptation by physically seeing it whether that was in their own garden or someone else's garden. These results suggest the perceived attributes of DOI are not always separate from one another. In this case, perceived attributes were highly interrelated and dependent on one another suggesting environmental educators and communicators should tie characteristics of innovations together to encourage adoption.

In addition, this study found most participants were already implementing some climate adaptations even if their use of adaptations were not because of climate change experience. Some climate adaptations were implemented because of characteristics like cost-effectiveness and ease of management. For example, drip irrigation uses less water, which means lower costs, and it can operate automatically without someone attending to it every day. On the other hand, some participants were implementing adaptations as a direct result of their climate change experience. Many participants selected certain varieties of plants that were more heat and drought resistant because of previous experience with losing plants to extreme heat and drought.

Additionally, most, if not all, of the garden coordinators mentioned financial barriers to implementing innovations. Some gardens were funded through grants that came with stipulations, and the funding only lasted a certain amount of time. Other gardens had to raise money through fundraisers, donations, and sponsorships. These gardens budgeted their money and tried to save what they could because none of them had endless or substantial resources. Financial restrictions limited garden coordinators' adoption of innovations even if they wanted to implement something new. Community gardens need additional funding from local, state, and/or federal governments or other agencies if they want community gardens to continue to support local food systems and survive the impacts of climate change. For example, the U.S. Department of Agriculture invested over USD 3 billion in 141 projects from small and underserved producers of climate-smart commodities [46]. Applications had to be submitted for this type of funding, which poses issues to community gardens because garden coordinators and members may not have the time or knowledge to tackle an application like this.

Limitations of this study include the nature of qualitative research, which can rely on a small number of participants with the aim of studying their experiences in depth [35]. This research purposefully selected participants who were able to give the type of information desired. The results of this study should not be generalized due to these restrictions of qualitative research [35]. This limitation was supplemented by requiring community gardens to be connected to the food system, which is a characteristic that can be identified across the U.S. Additionally, a limitation to deductive coding is the restrictions with deter-

mining themes a priori. Some subthemes emerged under the predetermined themes during analysis possibly due to the overlap of data within the five DOI attributes. Similar research using DOI attributes in thematic analysis may benefit from using abductive analysis to find a middle ground between deductive and inductive analysis to address this limitation [47].

Future research should explore community garden coordinators' perceptions of climate-smart adaptations in different areas, potentially studying coordinators across the entire U.S. Variations in geographic areas like rurality, political majority, socioeconomic status, and culture could be explored to determine their impact on perceived attributes and adoption rate. This study focused on community gardens in the southeastern U.S., which can be culturally different from other areas in the U.S. The southeastern U.S. has historically associated with the Republican Party which views environmental protection as harmful to the free market and economic growth [48]. Regions with different political affiliations should be studied to determine if their perceived attributes of climate adaptations differ, which would impact communication messaging. A case study on an individual community garden could also be studied. Researchers could study a garden over the course of a few years to determine what variables impact the rate of adoption over time along with the impact of the changing climate. The case study could explore how individual adaptations are perceived and adopted within the context of a single garden. This type of study would be beneficial because, as the current study found, community gardens even within the same region have varying needs, beliefs, and desires when it comes to adaptations. A study of a single garden could show how time impacts these variables.

7. Conclusions

Moreover, this study aimed to explore community garden coordinators' perceptions of climate change adaptation, the adoption process, and their current climate-smart practices. This research should inform environmental communication strategies that encourage community gardens to adopt climate-smart practices through emphasis of relative advantages and low complexity of innovations. Communicators should also initiate two-way communication with community gardens. These community gardens already have knowledge of a variety of gardening practices and innovations, so they would not benefit from additional education from communicators on topics in which they are already familiar. Two-way communication would allow community gardens to talk to environmental researchers, educators, and communicators about what parts of these adaptations are not working for them. For example, many participants noted issues with stagnant water within rain barrels. They do not need education on how to use rain barrels, but they need information on techniques that would prevent or eliminate mosquitoes and algae from contaminating the water. The techniques would also have to align with many of their desires of not using chemicals to treat the water. Additionally, communicators should also focus on creating resources to aid garden coordinators with grant applications. Financial barriers were mentioned by all participants, and garden coordinators do not always have the time, knowledge, or personnel to find and apply for funding. Another helpful resource would be a way for community garden leaders to connect and share ideas. This could be through social media platforms, newsletters, or a website dedicated to coordinators across the U.S. This could allow them to connect, share their struggles and successes, and help each other solve problems. Overall, this exploratory study is just the beginning of informing communication to encourage climate-smart adaptations in community gardens. Creating communication channels and participation between researchers, communicators, and garden coordinators is a start to ensuring the resilience of local, fresh foods.

Author Contributions: Conceptualization, O.M.E., A.J.L., C.E.S. and K.W.L.; methodology, O.M.E., A.J.L., C.E.S. and K.W.L.; software, O.M.E., A.J.L., C.E.S. and K.W.L.; validation, O.M.E., A.J.L., C.E.S. and K.W.L.; formal analysis, O.M.E.; investigation, O.M.E.; resources, A.J.L., C.E.S. and K.W.L.; data curation, O.M.E.; writing—original draft preparation, O.M.E.; writing—review and editing, O.M.E., A.J.L., C.E.S. and K.W.L.; visualization, O.M.E., A.J.L., C.E.S. and K.W.L.; supervision, A.J.L., C.E.S.

and K.W.L.; project administration, O.M.E., A.J.L., C.E.S. and K.W.L.; funding acquisition, A.J.L. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Data Availability Statement: The data are not publicly available due to confidentiality restrictions. Please reach out to the corresponding authors for questions related to data availability.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. United States Environmental Protection Agency. Climate Change Impacts by Sector. 2023. Available online: https://www.epa.gov/climateimpacts/climate-change-impacts-sector (accessed on 5 September 2023).
2. Hayhoe, K.; Wuebbles, D.J.; Easterling, D.R.; Fahey, D.W.; Doherty, S.; Kossin, J.; Sweet, W.; Vose, R.; Wehner, M. Our changing climate. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment*; U.S. Global Change Research Program: Washington, DC, USA, 2018; pp. 72–144. [CrossRef]
3. United States Environmental Protection Agency. Climate Change Impacts on Agriculture and Food Supply. 2023. Available online: https://www.epa.gov/climateimpacts/climate-change-impacts-agriculture-and-food-supply (accessed on 5 September 2023).
4. Carter, L.; Terando, A.; Dow, K.; Hiers, K.; Kunkel, K.E.; Lascurain, A.; Marcy, D.; Osland, M.; Schramm, P. Southeast. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*; U.S. Global Change Research Program: Washington, DC, USA, 2018; pp. 743–808. [CrossRef]
5. Frankson, R.; Kunkel, K.E.; Stevens, L.E.; Stewart, B.C.; Sweet, W.; Murphey, B.; Rayne, S. Georgia State Climate Summary 2022. NOAA Technical Report NESDIS 150-GA. National Oceanic and Atmospheric Administration. 2022. Available online: https://statesummaries.ncics.org/chapter/ga/ (accessed on 5 September 2023).
6. Frankson, R.; Kunkel, K.E.; Stevens, L.E.; Easterling, D.R.; Sweet, W.; Wootten, A.; Aldridge, H.; Boyles, R.; Rayne, S. North Carolina State Climate Summary 2022. NOAA Technical Report NESDIS 150-NC. 2022. Available online: https://statesummaries.ncics.org/chapter/nc/ (accessed on 5 September 2023).
7. Runkle, J.; Kunkel, K.E.; Stevens, L.E.; Frankson, R.; Stewart, B.C.; Sweet, W.; Rayne, S. South Carolina State Climate Summary 2022. NOAA Technical Report NESDIS 150-SC. 2022. Available online: https://statesummaries.ncics.org/chapter/sc/ (accessed on 5 September 2023).
8. United States Department of Agriculture. Community Gardens. 2020. Available online: https://lod.nal.usda.gov/nalt/68415 (accessed on 5 September 2023).
9. Fisch, V.K. Beyond the Human—Garden Communities in Community Gardens. *Soc. Work. Soc.* **2023**, *21*.
10. Rombach, M.; Dean, D.L.; Baird, T. Exploring key factors determining US consumer preferences for growing over buying fruit in pre-covidian and covidian times. *Horticulturae* **2021**, *7*, 575. [CrossRef]
11. Berg, A.C.; Padilla, H.M.; Sanders, C.E.; Garner, C.T.; Southall, H.G.; Holmes, G.; Ashley, H.; Crosson, L.; Twilley, B.; Everson, D.D.; et al. Community gardens: A catalyst for community change. *Health Promot. Pract.* **2023**, *24*, 92S–107S. [CrossRef] [PubMed]
12. Sykes, V.R.; Bumgarner, N.R.; Keadle, S.B.; Wilson, A.; Palacios, F. Citizen science in vegetable garden cultivar evaluation in Tennessee. *Horticulturae* **2021**, *7*, 422. [CrossRef]
13. Ward, J.; Symons, J. Optimising crop selection for small urban food gardens in dry climates. *Horticulturae* **2017**, *3*, 33. [CrossRef]
14. Narandžić, T.; Ružičić, S.; Grubač, M.; Pušič, M.; Ostojić, J.; Šarac, V.; Ljubojevič, M. Landscaping with fruits: Citizens' perceptions toward urban horticulture and design of urban gardens. *Horticulturae* **2023**, *9*, 1152. [CrossRef]
15. Odera, E.; Lamm, A.J.; Owens, C.; Thompson, S.; Carter, L. The impact of extension gardening programs on healthy attitudes and behaviors. *J. Hum. Sci. Ext.* **2013**, *1*, 5. [CrossRef]
16. Zutter, C.; Stoltz, A. Community gardens and urban agriculture: Healthy environment/healthy citizens. *Int. J. Ment. Health Nurs.* **2023**, *32*, 1452–1461. [CrossRef]
17. Frantzeskaki, N.; Ossola, A.; Bush, J. Nature-based solutions for changing urban landscapes: Lessons from Australia. *Urban For. Urban Green.* **2022**, *73*, 127611. [CrossRef]
18. Ossola, A.; Lin, B.B. Making nature-based solutions climate-ready for the 50 °C world. *Environ. Sci. Policy* **2021**, *123*, 151–159. [CrossRef]
19. Ossola, A.; Jenerette, G.D.; McGrath, A.; Chow, W.; Hughes, L.; Leishman, M.R. Small vegetated patches greatly reduce urban surface temperature during a summer heatwave in Adelaide, Australia. *Landsc. Urban Plan.* **2021**, *209*, 104046. [CrossRef]
20. Tomatis, F.; Egerer, M.; Correa-Guimaraes, A.; Navas-Gracia, L. Urban gardening in a changing climate: A review of effects, responses and adaptation capacities for cities. *Agriculture* **2023**, *13*, 502. [CrossRef]
21. Rogers, E.M. *Diffusion of Innovations*, 5th ed.; Free Press: New York, NY, USA, 2003.
22. Hasin, A.; Smith, S. The diffusion of electronic benefit transfer (EBT) technology at Illinois farmers' markets: Measuring the perceived attributes of the innovation. *J. Hunger Environ. Nutr.* **2016**, *11*, 354–369. [CrossRef]
23. Mascia, M.B.; Mills, M. When conservation goes viral: The diffusion of innovative biodiversity conservation policies and practices. *Conserv. Lett.* **2018**, *11*, e12442. [CrossRef]

24. Oumarou, D.; Bryant, C.; Akkari, C. Social networks and the diffusion of innovations, towards a critical partnership for a successful adaptation strategy to climate change: A case study of agriculture in southwestern Quebec. *Int. J. Clim. Chang. Impacts Responses* **2015**, *6*, 37–58. [CrossRef]
25. Rumble, J.N.; Ruth, T.K.; Owens, C.T.; Lamm, A.J.; Taylor, M.R.; Ellis, J.D. Saving Citrus: Does the Next Generation see GM Science as a Solution? *J. Agric. Educ.* **2016**, *57*, 160–173. [CrossRef]
26. Warner, L.A.; Lamm, A.J.; Silvert, C. Diffusion of water-saving irrigation innovations in Florida's urban residential landscapes. *Urban For. Urban Green.* **2020**, *47*, 126540. [CrossRef]
27. Dalrymple, K.E.; Shaw, B.R.; Brossard, D. Following the leader: Using opinion leaders in environmental strategic communication. *Soc. Nat. Resour.* **2013**, *26*, 1438–1453. [CrossRef]
28. Draper, C.; Freedman, D. Review and analysis of the benefits, purposes, and motivations associated with community gardening in the United States. *J. Community Pract.* **2010**, *18*, 458–492. [CrossRef]
29. Ferris, J.; Norman, C.; Sempik, J. People, land and sustainability: Community gardens and the social dimension of sustainable development. *Soc. Policy Adm.* **2001**, *35*, 559–568. [CrossRef]
30. Kwartnik-Pruc, A.; Droj, G. The role of allotments and community gardens and the challenges facing their development in urban environments—A literature review. *Land* **2023**, *12*, 325. [CrossRef]
31. Campbell, S.; Greenwood, M.; Prior, S.; Shearer, T.; Walkem, K.; Young, S.; Bywaters, D.; Walker, K. Purposive sampling: Complex or simple? Research case examples. *J. Res. Nurs.* **2020**, *25*, 652–661. [CrossRef] [PubMed]
32. Barratt, M.J.; Ferris, J.A.; Lenton, S. Hidden populations, online purposive sampling, and external validity: Taking off the blindfold. *Field Methods* **2014**, *27*, 3–21. [CrossRef]
33. Guarte, J.M.; Barrios, E.B. Estimation under purposive sampling. *Commun. Stat.—Simul. Comput.* **2006**, *35*, 277–284. [CrossRef]
34. Etikan, I.; Musa, S.A.; Alkassim, R.S. Comparison of convenience sampling and purposive sampling. *Am. J. Theor. Appl. Stat.* **2016**, *5*, 1–4. [CrossRef]
35. Tuckett, A. Qualitative research sampling: The very real complexities. *Nurse Res.* **2004**, *12*, 47–61. [CrossRef] [PubMed]
36. Saunders, B.; Sim, J.; Kingstone, T.; Baker, S.; Waterfield, J.; Bartlam, B.; Burroughs, H.; Jinks, C. Saturation in qualitative research: Exploring its conceptualization and operationalization. *Qual. Quant.* **2018**, *52*, 1893–1907. [CrossRef] [PubMed]
37. Encyclopedia Britannica. Blue Ridge. 2023. Available online: https://www.britannica.com/place/Blue-Ridge-mountains (accessed on 9 January 2024).
38. National Integrated Drought Information System. Southeast. (n.d.). Available online: https://www.drought.gov/dews/southeast (accessed on 9 January 2024).
39. Johnson, D.; Scheitle, C.P.; Ecklund, E.H. Beyond the in-person interview? How interview quality varies across in-person, telephone, and Skype interviews. *Soc. Sci. Comput. Rev.* **2019**, *39*, 1142–1158. [CrossRef]
40. University of Maryland Extension. Sustainable Gardening: Solutions to Climate Change. 2023. Available online: https://extension.umd.edu/resource/sustainable-gardening-solutions-climate-change (accessed on 14 August 2023).
41. Hurley, E.; Dietrich, T.; Rundle-Thiele, S. Integrating theory in co-design: An abductive approach. *Australas. Mark. J.* **2021**, *29*, 66–77. [CrossRef]
42. Lincoln, S.Y.; Guba, E.G. *Naturalistic Inquiry*; Sage Publications: Los Angeles, CA, USA, 1985.
43. Berger, R. Now I see it, now I don't: Researcher's position and reflexivity in qualitative research. *Qual. Res.* **2015**, *15*, 219–234. [CrossRef]
44. Bradbury-Jones, C. Enhancing rigor in qualitative health research: Exploring subjectivity through Peshkin's I's. *J. Adv. Nurs.* **2007**, *59*, 290–298. [CrossRef] [PubMed]
45. Gibson, K.E.; Lamm, A.J.; Woosnam, K.M.; Croom, D.B. Engaging the public in water policy: Do political affiliation and ideologies matter? *J. Contemp. Water Res. Educ.* **2021**, *173*, 13–28. [CrossRef]
46. Pillow, W.S. Confession, catharsis, or cure? Rethinking the uses of reflexivity as methodological power in qualitative research. *Int. J. Qual. Stud. Educ.* **2003**, *16*, 175–196. [CrossRef]
47. Thompson, J. A guide to abductive thematic analysis. *Qual. Rep.* **2022**, *27*, 1410–1421. [CrossRef]
48. United States Department of Agriculture. Partnerships for Climate-Smart Commodities. (n.d.). Available online: https://www.usda.gov/climate-solutions/climate-smart-commodities (accessed on 5 September 2023).