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A feasibility study of the community health worker model for garden-based food systems programming

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Abstract

Underserved communities, including those of Black, Indigenous, and people of color, experience

unequal access to food systems resources and programming. Community health workers are lay public health workers from underserved communities who provide basic health services and culturally sensitive education while bridging social services and community needs. The objective of this study

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Conflict of Interest Statement

Author team members ES, MC, and SM were employed by Virginia Cooperative Extension during the project.

Author Note

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was to determine if a community health worker model was feasible to deliver garden-based food systems programming with underserved Black, Indigenous, and communities of color for Virginia Cooperative Extension (VCE). Twenty-nine individuals from different programming areas and positions within VCE participated in semi-structured interviews using video-conferencing (Zoom) in 2021. Interviews were coded and analyzed with thematic analysis. The study found that the community health worker model is feasible for garden-based food systems programming for VCE. Themes identified include the fit of the community health worker model for VCE, cultural humility, and logistics. The community health worker model has potential to expand culturally relevant food systems programming and increase inclusion in VCE. Garden-based food systems programming with a community health worker model may create opportunities for interdisciplinary collaboration. The community health worker model is fit to advance the community well-being values of VCE through inclusive food systems programming. Food systems community organizations can use this study as a template to evaluate potential new community health worker positions for expansion of inclusive food systems programming.

Keywords

community health workers, health equity, food systems programming, feasibility study

Abbreviations

BIPOC: Black, Indigenous, and people of color

CHW: Community health worker

VCE: Virginia Cooperative Extension

Introduction and Literature Review

Food systems encompass the networks and interactions of processes that span food production to food disposal and include political, environmental, and social influences on processes in the food system (High Level Panel of Experts on Food Security and Nutrition [HLPE], 2017; Neff et al., 2009). Food systems are an important influence on population health; however, the distribution of and access to food systems resources are unequal. In the United States, communities of Black,

Indigenous, and people of color (BIPOC) are often marginalized by the food system (Greene et al., 2022; Hines et al., 2022; Jernigan et al., 2017; Neff et al., 2009; Odoms-Young & Bruce, 2018; Satia, 2009). Disproportionate access to food systems resources can contribute to diet-related health disparities among BIPOC communities (Aaron & Stanford, 2021; Kris-Etherton et al., 2020; Warren et al., 2022). Despite examples of food systems programs that are inclusive to BIPOC communities (Mejia et al., 2020), the dominant food system and programming structures often exclude BIPOC communities (Conrad, 2020).

Community-serving institutions, such as Cooperative Extension (hereafter called Extension), deliver food systems programming as one approach to advance inclusion and health equity in the food system. Extension, the outreach branch of the land-grant university system, is a national network of state-administered outreach systems that translate research into information and programs to advance the well-being and prosperity of communities (National Institute of Food and Agriculture, n.d.). However, BIPOC communities often experience unequal engagement with food systems programming that may prevent the advancement of health equity goals and overall prosperity (Clark, Freedgood et al., 2017; Kumanyika, 2019; Lyson, 2014).

The resources, staff technical expertise, and social network integration of Extension in local communities can strengthen local and community food systems (Clark, Bean et al., 2017; Dunning et al., 2012; Morgan & Fitzgerald, 2014). Extension can increase access to and availability of food, increase community food security, and address health and wellness goals by supporting food systems education and programming at a community level (B. Braun et al., 2014; Gwin, 2019).

Garden-based programming has many health benefits and is an effective platform for launching food systems programming (Alaimo et al., 2016; Gregis et al., 2021). Garden-based programming also builds on a strong internal infrastructure and expertise on gardening within Extension that can translate into programming where community members learn about each food system process from production to disposal from Extension

employees or trained volunteers. The Extension Master Gardener program, founded in 1972, is a rigorous volunteer program that trains community members in gardening and horticulture knowledge and practice. The trained community members, or Master Gardeners, then reciprocate that training through a predefined number of community volunteer hours (Meyer, 2007). Master Gardener activities vary greatly across states and communities, and while a traditional role of Master Gardener volunteers is to assist in community gardening education, Extension professionals recognize that Master Gardener volunteers and programs can also advance community health (Dorn et al., 2021; Kowalski & Barrett, 2020). Participants in a pilot study in Alabama learned an adapted Master Gardener curriculum, then used their knowledge to work on food access projects in underserved communities (Randle, 2015). Master Gardener programs often do not represent the diversity of the communities they are meant to serve (Dorn et al., 2018) and this may be a reinforcing factor in the disparate access to Extension food systems programs by BIPOC communities.

Across the U.S., state Extension systems implement other master volunteer programs that are modeled from the Master Gardeners. Examples of master volunteer programs include Food (Bloom et al., 2021), Climate (Pathak et al., 2014), Compost (Tedrow, 2018), Wellness (Washburn et al., 2017), Financial Coach (Ehmke, 2020), Naturalist (Hildreth & Mengak, 2016), and Beekeeper (Breece & Sagili, 2019). Extension master volunteer programs benefit the community and the volunteers themselves (Washburn et al., 2017; Wilson & Newman, 2011). Master volunteers are important to Extension's outreach and can be partners in program planning and implementation (Washburn et al., 2020).

Master volunteer program evaluations also reveal a lack of diversity among volunteers as categorized by race, age, and socioeconomic status. Extension master volunteers, regardless of program area, are likely to be white, identify as female, hold a bachelor's degree or higher, and have an income of at least middle-class earners (Cunningham et al., 2021; Dorn et al., 2018; Hildreth & Mengak, 2016; Wilson & Newman,

2011). The Extension system recognizes that the current demographics of the master volunteer programs often do not match the demographics of many of the communities they serve (Washburn et al., 2017), and that the structure of master volunteer programs—extensive training requirements that conflict with full-time employment, costly applications, and rigorous certification requirements—exclude many underrepresented communities. It is imperative to increase volunteer diversity to fully realize the potential of Extension master volunteers for equitable outreach and community education.

This formative study includes the Master Gardener and Master Food volunteer program because food gardening programs could partner with the Master Food Volunteers to deliver food systems programming that addresses food production, preparation, and basic nutrition information. Lay outreach individuals have previously conducted garden-based food systems programming to bridge social service systems and underserved communities (Barnidge et al., 2015; Stluka et al., 2019).

The community health worker (CHW) model is a lay health outreach position that most commonly provides basic health services, health education, and health promotion to reach underserved communities in the U.S. (Olaniran et al., 2017; Scott et al., 2018). CHW programs often work with diabetes education, cancer screening, and health promotion to mitigate chronic disease such as hypertension (Campbell et al., 2020; Liu et al., 2021; Pasha et al., 2021). During the COVID-19 pandemic, CHWs conducted outreach in BIPOC communities to connect families with contact tracing, social services, and home care for COVID-19 (John et al., 2022; Moir et al., 2021; Rosenthal et al., 2020). CHWs are unique within public health because many CHWs are members of the communities they serve, giving them a deep understanding of the sociocultural characteristics of their priority populations (American Public Health Association, 2009). This cultural knowledge positions CHWs to advance health equity for vulnerable populations by connecting their communities to health systems and services (Olaniran et al., 2017; Perry et al., 2014). While CHWs in the U.S. most often work in health education and promotion, the CHW model

has also been used in food systems programming to expand access to food systems resources within vulnerable communities (DeNunzio et al., 2022).

Improved inclusion of BIPOC communities in Extension programming will also advance Extension's efforts to expand its impact in community change and health promotion (Farella et al., 2021; Fields & Nathaniel, 2015; Linnell et al., 2020; Webster, 2021). Expanding equitable access to Extension services for all community members requires an exploration of new approaches to inclusive programming. Given the need for Extension to promote health equity for BIPOC communities (Farella et al., 2021; Fields & Nathaniel, 2015), and given the proven success of the CHW model to connect with BIPOC communities (Liu et al., 2021; Pasha et al., 2021; Rosenthal et al., 2020), a feasibility study of using a CHW model for VCE for garden-based food systems programming was warranted.

Purpose of Study

The purpose of this evaluation was to determine if a CHW model was a feasible model for future implementation in VCE to expand reach to underserved audiences for garden-based food systems programming. The four objectives were to explore:

1. How the CHW model aligns with VCE values and programming goals;
2. Potential CHW training integration into the current structure of VCE Master Gardener and Master Food volunteer training;
3. Programming logistics of garden-based food systems education through a CHW model;
4. Specific populations that VCE professionals believe are suitable to engage with CHW-delivered programming.

Methods

The feasibility study was a formative evaluation conducted using qualitative semi-structured interviews in 2021.

Study Design

This qualitative evaluation project explored the feasibility of the CHW model for VCE garden-based

food systems programming. The findings are specific to VCE. The Virginia Tech Institutional Review Board designated the project as "not research" in May 2021. We refer to the project as a feasibility study throughout the manuscript. Semi-structured interviews were the qualitative method used to answer the study objectives.

Data Sources

Participants in the semi-structured interviews generated the data for the qualitative project. Semi-structured interview participants shared perceptions on the feasibility of the CHW model for garden-based food systems programming for VCE and those perceptions were captured in recorded Zoom sessions and then analyzed using the procedures detailed below.

Recruitment of Participants

The first author conducted 29 semi-structured interviews with VCE stakeholders from June to October 2021 via video-conferencing (Zoom). Interviews were scheduled according to participant availability. There was often a period of days or weeks in which no interviews were conducted due to the snowball sampling method. Each new participant had to agree to participation and have availability for the interview. The data collection period was five months due to the busy schedules of the Extension professionals who participated in the study.

Key stakeholders were defined as any VCE professionals with a position or knowledge relevant to understanding the feasibility of a CHW model for garden-based food systems programming for VCE. Author team members, many of whom are VCE program administrators, identified initial key stakeholders ($n = 19$) for interview participation. The first author emailed each of the 19 pre-identified stakeholders between June and August 2021 to request participation in a semi-structured interview. Twelve participants completed interviews following the initial recruitment email. Two of the pre-identified stakeholders declined to participate and five did not respond to two recruitment emails.

An additional 42 potential participants were identified using snowball sampling. Of these 42

potential participants, the first author emailed 24 participants with the standardized recruitment email. Individuals were recruited to represent each planning district, programming area, and urban, rural, and suburban areas of Virginia. One individual declined, seven were nonrespondents, and 16 participants completed interviews. Recruitment and data collection occurred concurrently, as interviews were scheduled based on participant availability. All participants were recruited via a standardized email and each participant gave verbal permission to record the Zoom video interview. The author team included Master volunteer program administrators as key stakeholders because of their positions as statewide leaders for the Master Food and Master Gardener volunteer programs, both of which were identified during study design as important for garden-based food systems programming within VCE. Supplemental Nutrition Assistance Program-Education (SNAP-Ed) administrators, agents, and program assistants were recruited for similar reasons. SNAP-Ed is the nutrition education arm of SNAP, and VCE SNAP-Ed stakeholders were included in the initial list and subsequent snowball suggestions by participants because VCE administers SNAP-Ed programming in Virginia. The author team included family and consumer science agents in the initial participant list. Initial interview participants suggested that agriculture and natural resources agents participate in semi-structured interviews during the snowball sampling. Table 1 lists the number of participants in each stakeholder group interviewed.

Table 1. Number of Participants from Eight VCE Stakeholder Groups Who Participated in the Semi-Structured Interviews

Stakeholder group	Number of participants
VCE master volunteer program administrators	3
Virginia SNAP-Ed administrators	3
VCE specialists with relevant expertise	3
VCE state leadership	3
Family and consumer science agents	5
Agriculture and natural resources agents	8
SNAP-Ed agents	3
SNAP-Ed program assistants	1

Instrumentation

The author team designed the semi-structured interview scripts for the administrators of the Virginia Master Gardener Volunteer, Master Food Volunteer, and SNAP-Ed programs using a five-phase process (Kallio et al., 2016). The following paragraphs describe the five phases.

Phase 1: Identify the prerequisites for using semi-structured interview

The authors selected the semi-structured interview method because the perceptions of the interviewees were important to understand the study objectives (Barriball & While, 1994).

Phase 2: Retrieve and use previous knowledge

The author team includes experts in food systems, health equity, and Extension, and applied this collective knowledge to develop the semi-structured interview guide.

Phase 3: Formulate the preliminary semi-structured interview script

The interviewer asked participants in each stakeholder group open-ended, participant-oriented questions that were framed with who, what, where, when, how, and why to answer the study objectives. Follow-up questions and probes were both included in the script and arose naturally during the interviews.

Phase 4: Pilot testing of the semi-structured interview script

Author team members who are Extension specialists conducted an internal review of the semi-structured interview scripts for the Master Food and Master Gardener volunteer program administrators. The first author, who was responsible for recruitment and data collection, conducted a mock interview with a VCE program administrator using the Master Food volunteer program administrator script. Pilot testing demonstrated the appropriateness of the interview question content, length of script, and reading level of questions. Through the pilot testing

process, the author team decided to use a conversational approach in the interviews.

Phase 5: Presenting the complete semi-structured interview script

VCE specialists approved the scripts for the master volunteer program administrators prior to participant recruitment. Two authors (MD and SM) adapted the program administrator scripts for agents, specialists, program assistants, and state leadership throughout the recruitment and data collection process.

Table 2 shows a sample of key questions with selected probes included in the interview scripts. Each script included six primary questions with three or four probes per question, as well as a brief explanation of the project and a definition and examples of CHWs. The interview questions varied slightly in wording between stakeholder groups, such as asking Extension agents about support needed from program administrators. Agents are field faculty responsible for Extension program implementation and partnership development. Each script concluded with the interviewer asking the participant if there was anything else they would like to share.

Data Collection

Interviews were conducted via Zoom. Participants

gave verbal permission to record the Zoom session. Interviews began with informal greetings and verbal permission for recording. The interviewer then read a short script describing the project and the CHW model and asked if the participant had any questions. The interviewer proceeded to ask each of the questions included in the interview script. The tone of the interviews was conversational, and the tempo of the interview was participant-driven. The interviewer was trained to probe for additional details and to allow reflection by the participant. Interviews lasted an average of 42 minutes.

Data Analysis

The Zoom recording auto-generated a transcript from each video interview. The first author (MD) edited the Zoom-generated transcripts by listening to the recording and correcting the Zoom-generated transcript to match the recording. Contextual and nonverbal communication, such as pauses and punctuation, were added during transcription using a denaturalized approach (Azevedo et al., 2017; Bucholtz, 2000). The first author removed or re-named identifying information during transcription, such as names and places (e.g., northern area of Virginia).

Two authors (MD and SM) conducted data analysis using methods adapted from Creswell and

Table 2. Selected Key Questions Included in the Semi-Structured Interview Scripts

	Question stem	Selected probes
Q1	What are your goals for food systems programming in the coming years?	N/A
Q2	How do you see a CHW model integrating into your current food systems work?	How could a CHW model work with the Master Gardener program? How could a CHW model work with the Master Food volunteer program? How could a CHW model work with the existing program assistant structure?
Q3	How can food systems programming be more accessible and marketable to diverse populations? In this project, diverse populations represent the communities I mentioned earlier: racial and ethnic minorities, immigrants and refugees, and families and individuals with low income.	How can the local knowledge carried by a CHW be leveraged and valued in Extension programming?
Q4	What populations are difficult to engage in food systems programming? And why?	N/A

Poth (2018) and Braun and Clarke (2006). The study objectives guided the development of an initial deductive codebook ($n = 15$ codes). Two authors independently coded two transcripts with the initial codebook, then refined the initial codebook in an iterative process on multiple passes and transcripts until agreement was reached on the final eight codes. Deductive codes represent the variables of interest from the study objectives and inductive codes were agreed by the two coders as emergent from the data. Table 3 displays the final eight codes and their definitions: intention, participatory development, cultural relevancy, logistics, community partners, participants, accessibility and inclusivity, and terminology. The coding was performed in Microsoft Word using memo-ing techniques adapted from Creswell and Poth (2018). The first author (MD) coded all 29 transcripts. A second author (SM) independently coded 11 transcripts, including at least one from each stake-

holder group. Consensus determined intercoder agreement and the two authors discussed disagreements. A similar intercoder agreement process was applied during the codebook creation to generate agreeable code names and definitions. The coded Word documents were uploaded to Taguette, an open-source qualitative research tool (Rampin & Rampin, 2021) for data analysis.

The coded extracts were organized in Microsoft Excel into themes and subthemes identified from the data. Following the procedures of (V. Braun & Clarke, 2006), two authors (MD and SM) discussed how the coded extracts represented inductive themes and collaboratively determined the three major themes listed in the results section. Two authors determined themes by reading the coded extracts and noting potential themes, then reviewing themes and combining and renaming where necessary.

Table 3. Final Codebook with Codes and Definitions Applied to the Interview Transcripts

Codes	Definitions
Intention	Purpose of VCE in the community, including goals, objectives, and intention of new and existing programming. VCE organizational messaging. Approach to work and direction of efforts by both organization and individuals.
Participatory Development	Opportunities to integrate local knowledge from CHW, to co-create programming.
Cultural Relevancy	How a CHW may influence factors in ensuring that a program and environment is comfortable and welcoming to underserved populations.
Logistics	How a CHW for garden programs fits into VCE structures, including collaborations, support, and supervision for the CHW. CHW work topics, job description, and position expectations. Training and compensation considerations for the CHW and VCE professionals. Needs of VCE professionals to work with CHW, including skills, resources, or capacity-building. How a CHW model may influence factors on the establishment, implementation, and sustainability of a garden-based program for food systems.
Community Partners	Community organizations or individuals not employed by VCE that are relevant to the feasibility of a CHW model. May be mentioned in the recommendations of potential participants in programming.
Participants	Communities, individuals, or groups that may be suitable to engage in programming delivered by CHW, to serve as CHW for VCE or who may be missed by current VCE efforts.
Accessibility and Inclusivity	How the CHW model may affect or relate to structural inequities in the food system and how the effect of paternalism in food systems work can affect the CHW model. Cultural competency of current VCE programming. Factors, both internal and external to VCE control, that influence accessibility of current VCE programs, including socio-cultural demographics of VCE professionals and volunteers and the public image of VCE.
Terminology	Thoughts about the title of community health worker and the implications of the term “community health worker.”

Author Positionality

The author team includes several Extension professionals who are state-level faculty for Extension programs included in this feasibility study. We believe that Extension has an important role in community well-being and work to ensure that Extension services are equitably accessible within communities. We believe that community assets are important to strengthening the role of Extension in promoting community well-being. The first author conducted recruitment and data collection and did not have previous professional connections with the participants. The authors who developed the codebook and conducted data analysis, including coding of interview transcripts, are white women with advanced degrees who work at a large university.

Results

Thematic analysis of the stakeholder interviews generated three major themes: (a) fit of the CHW model within VCE; (b) cultural humility; and (c) logistics. Each theme partly addresses some or all of the four objectives. The discussion and conclusions section contains overall findings and conclusions. Although eight stakeholder groups participated in interviews, the quotations included in this article are attributed to the broad categories of state faculty, agent, and SNAP-Ed to protect interview participant identities.

Theme 1: Fit of the CHW model within Virginia Cooperative Extension

Participants recognized disproportionately low access to programming by populations underserved by the current food system and the CHW model as a potential avenue for extending the reach of VCE programming to new audiences. Participants were receptive to a CHW model in part because they viewed VCE as a credible community-health serving organization, especially to improve food access and address food insecurity. Participants referenced food systems teams and initiatives within VCE and alluded to their goals to advance inclusion in food systems programming and to develop food systems that more equitably serve community needs:

We have food systems goals, one of which is

to not just deliver new programming, but to build understanding and collaboration across Extension to do food systems programming better. ... What we need to do is think more about systems work and values-based work, meaning it's not just about the technical work. ... How do we address issues like food security and social justice and fairness in our communities. —*State faculty*

Participants shared examples of their current food systems programming and how a CHW model could extend the impact of current efforts to be more attentive to and inclusive of underserved audiences. One agent shared, “Another layer so [that] communities won’t be left out ... that this community health worker would pull the net tighter where it’s kind of loose right now.”

Participants stated that the CHW model serves the mission and values of VCE and can advance the connection of VCE programming to the needs of underserved communities. Participants welcomed the CHW model as an avenue to learn about diverse cultures and design programming to serve the community needs, in alignment with the mission of Extension:

This idea of the teach back ... where it’s not just a one way street of communication ... [We are] capturing the stories of food. In a way that highlights resilience and different ideas of health, capturing all that cultural stuff. —*SNAP-Ed*

The term “community health worker” led participants to unclear expectations about the potential job responsibilities of a CHW within VCE, as participants presumed that the CHW would work in a healthcare-focused position and program to address health promotion and disease prevention or management.

Coming from a healthcare worker and dealing with how food can act as ... medicine. ... Helping the people ... see that it’s better to eat a butternut squash instead of a pop tart ... understanding the importance of what you’re eating and your health. —*Agent*

Some participants suggested that a terminology change from “community health worker” as a job title could assist with the integration of the CHW model into the VCE system programming structure:

The term would require clarification to recruit somebody. To call somebody a health worker implies that they are either trained or certified in some form of health education or are going to receive extensive education that will protect them from liability, particularly if they are giving advice about health. The name is problematic. —*Agent*

Theme 2: Cultural humility

VCE professionals were confident in their technical skills to deliver garden-based food systems programming; however, there was widespread recognition that integration of the CHW model into programming must include cultural humility (Tervalon & Murray-Garcia, 1998).

Participants recognized that the CHW model is an opportunity to expand their own learning about ethnically and racially diverse cultures to better serve all Virginia residents:

That community health worker has got the knowledge that we don’t have ... that cultural knowledge ... if we want to be successful, we need to be open to being educated by that individual as these are the things that my community enjoys and these are the things that they don’t enjoy...it doesn’t do us any good to provide education on growing X, Y, Z crop if we learn from that community health worker, that culturally, that’s not a big part of their diet. What it boils down to is utilizing the wisdom of those community health workers out in their communities ... and in turn, they can help us develop programs that are more likely to meet their needs. —*Agent*

Participants recognized that the lack of representation within VCE and its master volunteer base affects both the inclusion of participants from BIPOC communities and the capacity of current volunteers and professionals to program with all

members of their communities.

It is a challenge to take individuals and volunteers from my program into ethnic communities where they look different from the majority of the people who work, who live there, who participate in those activities. ... Sometimes I have a harder sell that way to promote our programs to what we call underserved audiences. —*Agent*

Agents and state-level staff were confident in their abilities to build partnerships and listed several examples of partners that could connect VCE to communities well suited for CHW-delivered programming, such as faith-based organizations, low-income housing managers, and cultural community center directors. Leaders of these organizations were often identified as champions of the communities they serve, and interview participants recognized that authentic relationships with community champions are key to impactful and culturally appropriate programming.

Having people that are connected within those communities, where they could have those one on ones.... A lot of times you have that trusted person who can really speak the language ... not even like a language dialect, like they live there, so they know who they are and you know that they are trusted. —*Agent*

VCE professionals were reflective on how they work with diverse audiences. Participants acknowledged their own biases and privilege and expressed desire to improve cultural competency, accessibility of programming, and connections with diverse audiences.

Why, if you’re a member of a minoritized segment of the local community, why is it that they do not feel like they can see themselves as an Extension Master Gardener volunteer, because, from our perspective, we do want it to be available to anybody that has an interest. But there are obviously some barriers either unseen ... that are impeding people’s willingness to participate or join in, and if there are things that we

can do to remove those barriers, that's what we are attempting to do. —*State faculty*

Participants suggested the use of participatory methods in program planning and evaluation and the co-creation of curricula with CHWs to ensure cultural relevancy, especially as it relates to food and gardening.

I would co-create with this person, what do we want, what do you feel is misunderstood. And what do I feel is misunderstood by your population. ... Where are the gaps in both of our knowledge, so that we can create a curriculum together around what is not understood ... cooking, tasting different things, identifying things that are not accessible or are really strong pillars of that [culture] ... like celebrations, when are these foods eaten. ... There's a whole spectrum of knowledge that could be touched on, to make it more exciting.
—*SNAP-Ed*

Theme 3: Logistics

Agents and state leaders were receptive to working with a CHW to serve as a garden champion and especially welcomed the additional staff time a CHW would provide to extend the programming capabilities of agents. Participants agreed that the CHW model should primarily be in the purview of family and consumer science programming. Agriculture and natural resources professionals were amenable to be a technical resource for gardening information and to collaborate in planning; however, state administrators and field faculty recommended that family and consumer science agents should work most closely with CHWs. Family and consumer science and agriculture and natural resource agents all supported the CHW model as an interdisciplinary connector between traditionally separate programming areas.

A lot of us are identified by agriculture and natural resources, family and consumer science, 4H, SNAP-Ed, so those themselves are really siloes. And we have specific programs that we're trying to do so, I could see that health worker really helping bridge

the gap and working with all four of those agents ... and the volunteers that already exist and agents going with the health workers to reach a specific community.
—*Agent*

When asked how they envisioned a CHW fitting into the VCE structure, interview participants recommended that the CHW be an equal partner in program design and evaluation and be included in VCE leadership.

We have something already in place Extension Leadership Councils, boards, committees. These folks certainly need to serve on, so their voice can be heard there, so they bring concerns, as well as recommendations from their community base. —*Agent*

Agents and state leaders expressed that Master Gardeners and Master Food volunteers are well suited to assist with CHW-led programming and to serve as training aides for the CHW. Participants believed the CHW model could effectively integrate into the Virginia SNAP-Ed structure. Peer educators, titled program assistants, already deliver SNAP-Ed programming, so a CHW could fit as a gardening-specific peer educator. SNAP-Ed professionals agreed that there must be delineation between responsibilities of existing program assistants and the CHW. SNAP-Ed agents and administrators expressed support for partnering CHWs and master volunteers in training and program delivery.

They could be a different type of program assistant, could be like a gardening program assistant. ... Or we could hire it under the SNAP-Ed agents and agent may supervise them if it's a part-time person, and that person works mainly just with gardening programming in the community. —*SNAP-Ed*

SNAP-Ed participants stated specific resource assets and needs that may influence the integration of the CHW model into the SNAP-Ed program:

We can provide more than adequate

gardening training for [the CHW]. I can see Master Gardeners helping provide that training and possibly even Master Food volunteers helping to train. The compensation model, I would assume they may be a staff position within the university and they would be compensated at a pay band similar to a program assistant, or the one above it.
—*SNAP-Ed*

Participants stated that training elements for the CHW should include technical aspects of gardening and the expectations of the position within VCE, including the resources available to support the CHW. Training must be delivered in a setting that is accessible to potential CHWs: consider the time of day, the setting, the language of delivery, methods of instruction, and the cultural competency of the training administrators. Participants recognized their own need to increase cultural humility and expressed that they would need diversity and inclusion or cultural competency training to better collaborate with a CHW and apply participatory methods in program planning and evaluation.

You can get all kinds of information on how to grow tomatoes or peppers or fruits. ... Where our energy is going to be best spent is trying to develop a genuine relationship with those community health workers that's based on trust. ... From our perspective, we would be well served as an organization to come into these things with a lot of humility versus us coming in, as the so called experts and we're going to train you, community health worker, so that you can go out there and help your community, we would do well to listen more than we speak and take it from there. —*Agent*

Participants either asked about the compensation range for the CHW or stated that it may not be feasible to recruit and retain individuals from underserved communities and train to the level required for a successful garden-based food systems program without compensation. A part-time paraprofessional with a flexible work schedule was widely recommended.

Offering it as a paid position ... the pool would be greater, and you could retain somebody in the position a little bit more.
—*SNAP-Ed*

If it were done so that CHWs ... it was their job and they are 80% time or something, that could work, ... but there would have to be formative work to be sure that it's not going to negatively affect our volunteer program.
—*State faculty*

Participants identified a need for programming and materials to be available in languages other than English. Spanish-language programming was identified as the most widespread need. Some participants rely on community partners to aid in non-English programming; however, there was recognition that internal Extension resources for diverse language options would expand inclusivity and accessibility of programming:

We really need folks that can speak the language. That's helpful if there is someone who is bilingual to serve as that community health worker to help interpret. Same thing for translation of our materials, that can be really challenging to get materials translated into the languages that we need. We're seeing an increase in requests for materials to be translated into languages we haven't worked with before.
—*State faculty*

Discussion

The purpose of this formative study was to determine the feasibility of the CHW model for garden-based food systems programming within VCE. The results demonstrate that the CHW model is a feasible model for VCE to implement for inclusive garden-based, food systems programming. The author team prepared a short report of the results and shared it with interview participants in March 2022.

The history of the CHW model working with underserved audiences (Kim et al., 2016) provides additional support to the assertions of VCE stakeholders that the CHW model can be a tool for inclusive food systems programming. VCE partici-

pants immediately recognized the importance of food as culture and the potential of food to connect marginalized communities, thus extending previous findings by Cachelin et al. (2019) and Eggert et al. (2015). Although the work of Gonzalez et al. (2021) was focused on opioid prevention programming, many of the same best practices shared for engaging BIPOC communities in Extension programming were expressed by interview participants: understanding the needs within each community, recognizing and examining personal biases, and nurturing meaningful relationships. This overlap in recommendations for inclusive practices suggests that the CHW model and the integration of local knowledge is a good fit for the values of VCE. The recognition of food as culture and the amenability to participatory programming aligns with calls to shift Extension programming from traditional direct education to a collaborative partnership with community members (Strong et al., 2015; Washburn, 2017).

Cultural humility is a long-term commitment to learning with and from people with identities different than one's own, working to combat power differentials, and building mutually beneficial partnerships across identity divides (Tervalon & Murray-Garcia, 1998). Cultural humility is distinct from cultural competence in that cultural humility recognizes power structures between identities, acknowledges racism and discrimination, and is focused on learning and collaboration (Foronda, 2020; Gopalkrishnan, 2019). Cultural competence generally refers to a skill set that allows individuals to work within and across cultural identities in a respectful and understanding manner (Betancourt et al., 2003). The concept of cultural humility best represents the emergent theme from the stakeholder interviews in this evaluation.

Food systems are complex and span many different VCE programming areas. If the CHW model were to be implemented throughout Virginia, VCE should consider integration of existing training materials across agriculture and natural resources and family and consumer science programs. State leaders should construct a foundational training package but allow for some modifications at the local level, especially pertaining to

specific plants and foods to ensure cultural relevancy. The Master Gardener Volunteer, Master Food Volunteer, and Urban Agriculture Certificate programs are positioned to provide training and curricula support. Many participants reflected on the opportunity that garden-based food systems programming provides for interdisciplinary collaboration, and recognized the need for teams to work on solutions to complex problems, such as those found in the food system. Extension is an important and relevant stakeholder for designing community solutions to complex societal problems. The frameworks for interdisciplinary programming within the Extension literature (Guion, 2010; Holland et al., 2019) are a testament to the growing demand for integrated programming. The needs of garden-based programming varies across local contexts, and the CHW model may provide a mechanism to address representative leadership needs (Gilbert et al., 2020).

Across the Extension system, professionals are developing methods to formalize diversity and inclusion efforts and build capacity for Extension to equitably partner with diverse constituencies of the community (Bertsch et al., 2020; Chazdon et al., 2020; Walcott et al., 2020). In recognition of the structural barriers that often exclude underserved communities from volunteering (Southby et al., 2019), the prevailing recommendation among VCE stakeholders was that a CHW model should be implemented as a paid paraprofessional position. VCE stakeholders recognized that current master volunteer groups lack racial and socioeconomic diversity, and this internal recognition is supported by a 2016 national survey of Master Gardener volunteers in which 93.7% of respondents identified as white and more than 70% of respondents reported an annual household income of more than US\$50,000 (Dorn et al., 2018). The CHW model has potential to connect racial and socioeconomically diverse audiences to VCE; however, participants stated that the CHW model will have more likelihood of success if it is implemented with monetary compensation. As food systems organizations conduct feasibility studies and design CHW positions, they should assess appropriate compensation for the positions. Some participants offered suggestions for compensation packages, but each

organization should design compensation packages to fit their specific needs and resources. Within VCE, the expectations of the CHW position must be clearly established so they are not competitive with the master volunteers or paraprofessional program assistants. Program planning for a CHW position should assess how implementation of a compensated CHW position may affect recruitment of master volunteers, and should take care that the CHW position does not compete with master volunteer recruitment. VCE should explore funding models that are appropriate for the local expectations and context of the CHW position.

While this project was specific to VCE, it provides an example for other community-serving food systems organizations. Given that the CHW model has been used in food systems programming (DeNunzio et al., 2022), food systems organizations can use this assessment to guide their own feasibility studies as they consider the creation and hiring of food system practitioner positions or initiatives to advance inclusive programming. Findings from this study and recommendations for food justice gardening programs (Porter, 2018) should be considered as organizations determine the feasibility of the CHW model for food systems programming within their individual structures, values, and goals.

The title of “community health worker” was misleading for participants, and it was recommended that a different job title be applied to the position for implementation in food systems programming. Interview participants assumed that the CHW model would be implemented to conduct programming on health education, disease prevention, and healthcare navigation, rather than the intended implementation to expand food systems programming in underserved communities. While these perceptions demonstrate a real or perceived need for VCE to provide health and disease programming, they also demonstrate that VCE must use a title other than “community health worker” for the CHW model to alleviate confusion on work expectations. Further research should explore the coupling of a CHW model to Extension health programming, especially as Extension expands efforts in community health and systems change (Harden et al., 2020; O’Hara-Tompkins et al.,

2021). Future research could also explore how Extension could partner with other community-serving organizations to develop and deliver CHW-led food systems programming. This research could include investigations into how partnerships can work to conduct programming in languages other than English, as an important role for the CHW may be to serve as a translator.

Limitations

The qualitative nature of this project limits the generalizability of the findings and thus it is important that other community-serving food systems organizations conduct their own tailored feasibility studies. Despite recruitment efforts, state-level leadership for VCE did not participate and share input. Youth-focused professionals were excluded from this evaluation *a priori*, but many interview participants stated that garden-based programming is a good fit for youth and can easily extend to families with children. Likewise, initial interviews excluded school gardens from the scope of questions, yet school gardens were repeatedly mentioned by participants as established community settings that could be a programming area for the CHW. Expanding this formative work to include youth-focused programming efforts is a potential next step for practitioners and researchers.

The finding that the title of “community health worker” was not acceptable for a food systems focused individual may have influenced the perceptions of VCE interview participants on how to best integrate a CHW position. Interview participants suggested that the CHW model fits with family and consumer science programming; however, the inclusion of the word “health” in interview questions may have biased answers, because current health programming is within family and consumer sciences. Food systems and garden-based programming may fit within agriculture and natural resource structures, and VCE should explore how a title other than “community health worker” for a food-systems focused individual may change the integration of the CHW model.

Conclusions

The CHW model for garden-based food systems programming is an appropriate fit for the values

and structure of VCE, provided the model is implemented with different terminology. Food systems is an interdisciplinary programming area that can improve the inclusion of underserved BIPOC audiences and advance equity through participatory programming. The values and structures of VCE are unique to Virginia. Other state Extension systems, as well as community-serving food systems organizations, should explore the feasibility of a CHW model within their own values and structures. Programs that contain elements of the CHW model, such as deploying educators who share socio-cultural characteristics with the priority pop-

ulation, already exist in Extension throughout the United States for health promotion topics such as diabetes management, healthy lifestyles, and anger management (Hardison-Moody et al., 2011; Kaiser et al., 2009; Kaufman et al., 2017; Tiret et al., 2018). The implementation of a CHW model for garden-based food systems programming would integrate outreach and programming efforts already occurring across the Extension system, in order to use a best practice for inclusion of underserved populations so that disparities in food systems can be addressed.



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