

Factors that Influence Engagement in Home Food Production: Perceptions of Citizens of Trinidad

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Abstract

Home food production plays a critical role in food security for residents of Trinidad and Tobago and around the world. The purpose of this study was to examine barriers and benefits that influence residents' engagement in or rejection of home food production to inform social marketing programs. To address study objectives, interviews were conducted with 40 participants who represented five distinct Habitat for Humanity communities. Four subthemes emerged among the benefits associated with engaging in home food production: economic benefits, food safety, sharing and reciprocity, and personal well-being. Among the barriers, subthemes included: monetary expenses associated with start-up, lack of nonmonetary resources, lack of experience, generational disconnect, and barriers beyond human control such as the weather. While findings revealed many factors may hinder residents growing food around homes, there were high perceived social and financial values associated with this practice. Implications point to strategies that agricultural education professionals can use to encourage home food production among Trinidadians and in other locations.

Keywords: behavior change, barriers and benefits, home food production, social marketing, value exchange

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Introduction

Food security is among the most pressing complex problems facing global communities today (Roberts, Harder, & Brashears, 2016). In Trinidad and Tobago, the high cost of imported food is a major challenge to food security (Food and Agriculture Organization [FAO], 2013), while an aging population, changes in diet, and urbanization have caused an increase in diet-related health risk factors and related diseases (Pan American Health Organization, 2012; World Bank, 2016). Food production for Trinidad and Tobago is a high priority (Ministry of Food Production, Land, and Marine Affairs [MFPLMA], 2012), but a lack of fertile lands for farming has led to intensive

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small-scale production characterized by high use of chemicals, which may cause adverse human health and environmental consequences (Sarkar, Aronson, Patil, Hugar, & vanLoon, 2012).

Increased home production of healthy food is considered the “most fundamental and direct pathway” (World Bank, 2007, p. xii) to increased food availability. Home gardens are small cultivated areas of land located near homes that contain a range of food plant materials to supplement families’ food supply and meet a wide breadth of household needs (Galhena, Freed, & Maredia, 2013; Landon-Lane, 2011; Taylor & Lovell, 2014). Gardening is one of the most essential sources of food for many people in the developing world and home food production can improve the nutritional status of the household (Girard, Self, McAuliffe, & Olude, 2012; Mutsotsi, Sigot, & Onyango, 2008; Talukder et al., 2000). Home gardens could also decrease food import costs and combat pressing food production and health and food safety issues (Inter-American Institute for Cooperation on Agriculture, 2012).

While home gardening may be a hobby for some, it “can be vital for a family’s survival” (Eigenbrod & Gruda, 2015, p. 486) and potentially provide “most of the non-staple foods that a family needs every day of the year” (FAO, 2010, para. 3). Additionally, moderate “production in home gardens can generate as much revenue per unit area as field crop production” (Galhena et al., 2013, p. 7).

In Trinidad and Tobago, the MFPLMA encourages home gardening through programs established to promote home food production and increase citizens’ quality of living, enhance household finances, benefit schools, and encourage food security (Government of the Republic of Trinidad and Tobago, 2017; MFPLMA, 2012 Moya, Mohammed, & Sookram, 2010). Extension services provide support to help residents learn to produce food around their houses on limited land spaces to increase access to safe, nutritious food, and a potential income stream (Ganpat, 2005). In one large initiative, Ministry has been promoting growboxes as a way to increase home food production (Ganpat, 2005). The 4-H programs teach youth about growing food at home and in the community. Extension services have recently partnered with Habitat for Humanity to further promote their home food production goals. Habitat for Humanity (2016) pursues a vision of “[a] world where everyone has a decent place to live” (p. 1), which appears through community building and complementary initiatives, such as programs that help people to produce their own food.

Agricultural education professionals play a critical role in food security because they educate today and tomorrow’s youth, consumers, and agricultural workforce (Beckman & Smith, 2008; Brown, Roberts, Whiddon, Goossen, & Kacal, 2015; Mukembo, Edwards, Ramsey, & Henneberry, 2015). In an environment of limited resources, agricultural education organizations must maximize impact and efficiently work toward their mission. Organizations are most likely to be successful when they consult the local communities in which they work and tailor their approach based on residents’ needs. Therefore, this research was conducted to gain an understanding of how residents perceived home food production, with the vision that this knowledge could be used to help communities engage more in growing their own food.

Theoretical Framework

This study was guided by the social marketing concept of value exchange, which posits that target audience members “will choose a behavior in exchange for receiving benefits they consider valuable and/or reducing barriers they consider important” (Lee & Kotler, 2011, p. 18). The ability to bring about change relies on an agricultural education professional’s understanding of what will motivate target audiences to adopt a desired behavior and what barriers prevent their action (McKenzie-Mohr & Schultz, 2014). Importantly, even people who have positive perceptions

and attitudes may not make behavior changes if barriers exist (Bunch, Blackburn, DanJean, Stair, & Blanchard, 2015). It is the audience's perception of barriers that is most important, and they can be external (e.g., a policy that makes a change difficult) or internal (e.g., lack of skill needed to adopt a practice; Lee & Kotler, 2011; McKenzie-Mohr, 2011).

Social marketing applies traditional marketing principles to accomplish some social change that may center on environmental concerns, public health issues, or other social problems (Lefebvre, 2011; McKenzie-Mohr, Lee, Schultz, & Kotler, 2012). When applying social marketing, the agricultural education professional first selects a specific behavior to promote. Then, the practitioner conducts audience research to identify perceived barriers and benefits associated with that behavior. Third, findings are used to develop strategies incorporating social marketing tools, such as removing barriers, offering incentives, or developing social norms. Social marketing campaigns should be pilot tested, after which the strategy can be broadly implemented and evaluated (McKenzie-Mohr, 2011). Social marketing is different from other educational methods because of its use of value exchange along with use of audience insights to position the desired behavior relative to the target audience (Andreasen, 2006; Lee & Kotler, 2011; Lefebvre, 2011; Rogers, 2003). Comprehensive audience analysis is an important commonality between traditional agricultural education program planning and social marketing (Warner & Murphrey, 2015). Adoption or non-adoption of a behavior is explained through the perceived cost of adoption, and social marketing strategies are successful because they enhance benefits while removing barriers to change (McKenzie-Mohr et al., 2012).

Much attention has been given to different audiences' perceived benefits and motivations, along with perceived barriers in the context of home gardening and food security. People may engage in home gardening to increase access to fresh produce and increase their household vegetable consumption (Kortright & Wakefield, 2011; Subair & Siyana, 2003; World Bank, 2007). In California, Gray, Guzman, Glowa, and Drevno (2014) found that people engaged in a home gardening program for unemployed and low-income families primarily to produce food, but the authors emphasized that gardens could also enhance cultural identity and link social capital. While their study focused on the environmental benefits of home gardens in Mexico, Angel-pérez and Martín Alfonso (2004) found the primary motivation for home gardening was "subsistence of the family group" (p. 341).

Subair and Siyana (2003) reported two primary motivators to engage in home gardening in Botswana were to supplement the household food supply and raise money. Others have reported home gardens can contribute substantially to a household's income (Eigenbrod & Gruda, 2015). Schupp and Sharp found that people in Ohio who were experiencing economic difficulties were more likely to grow their own food (2011). Gray et al. (2014) found that more than half of home gardening participants were saving around \$500 U.S. dollars or more annually.

Home food production provides a means for a family to control their diet and ensure the access to foods they deem as safe (Kortright & Wakefield, 2011; Taylor & Lovell, 2014). Home gardens can increase gardeners' well-being and health (Kortright & Wakefield, 2011), and they can serve as a hobby or for aesthetic pleasure (Kortright & Wakefield, 2011; Subair & Siyana, 2003). Others garden to reduce the household's environmental impact (Galhena et al., 2013; Kortright & Wakefield, 2011; Schupp & Sharp, 2011).

Some may garden as a means for educating children about food and gardening (Kortright & Wakefield, 2011), and home gardens can provide learning opportunities comparable to supervised school gardens (Okiror, Matsiko, & Oonyu, 2011). American adults who participated in one urban gardening program reported one of most important outcomes was interacting with

youth (Krasny & Doyle, 2002). Beyond the immediate family, some garden to share produce and medicinal plants (Buchmann, 2009; Taylor & Lovell, 2014) while others engage to “connect with others, through reciprocal giving and as a mutual occupation that links neighbors through shared experience” (Kortright & Wakefield, 2011, p. 47).

Despite the many benefits to home food production, there are barriers to achieving well-developed home gardens (Inter-American Institute for Cooperation on Agriculture, 2012). Training is needed to support home gardening, and a lack of knowledge and skills can be a major barrier to home gardening (Larsen, & Barker-Reid, 2009; Lineberger, n.d.; Subair & Siyana, 2003), but there are many other constraints. In a pilot program of what became a large and successful home gardening program in Bangladesh, Talukder et al. (2000) described inconsistent access to inputs such as seeds, water, and fencing among the program’s major barriers. The authors supported the use of social marketing to increase the success of a large-scale gardening program (Talukder et al., 2000). Faber et al. (2011) reported the ability to purchase gardening supplies and inconsistent access to seeds, plants, and a reliable water source were prohibitive in South Africa.

Along with lack of adequate rainfall to ensure ample food supply from a home garden (Eigenbrod & Gruda, 2015), plant pests and diseases and animal pests can be major problems (Faber et al., 2011; Kortright & Wakefield, 2011; Subair & Siyana, 2003). In some places, inadequate land can prevent people from growing their own food (Eigenbrod & Gruda, 2015). In their qualitative study of Toronto food gardeners, Kortright and Wakefield (2011) found access to land along with a lack of gardening skills were primary barriers to home food production.

The identification of the target audience’s perceived barriers and benefits to change is critical to a successful social marketing campaign and usually begins with a literature review and observations, followed by focus groups or interviews (McKenzie-Mohr, 2011). Barriers can differ drastically among different potential audiences and even among very similar behaviors, and thus it is important to conduct behavior-specific formative research with the target audience (McKenzie-Mohr & Schultz, 2014; McKenzie-Mohr et al., 2012).

Purpose and Objectives

The study aligned with the National Research Agenda of the American Association for Agricultural Education priority *Addressing Complex Problems*, one of which is food security in a time of unprecedented population growth (Roberts et al., 2016). This priority area challenges the profession to identify innovative strategies to address food security by integrating behavioral sciences into new solutions. This research applied an innovative approach, social marketing, to inform a strategy to encourage participation in home food production. The purpose of this study was to identify motivations and constraints influencing Trinidadians’ participation in home food production in Habitat for Humanity communities to inform potential social marketing strategies to encourage engagement in gardening. The specific study objectives were to identify residents’ perceptions of: (a) benefits associated with home food production and (b) barriers that prevent home food production.

Methods

We used a basic qualitative research design (Merriam & Tisdell, 2016) to investigate the study objectives. Dooley (2007) noted basic research designs are “the most common type of qualitative method used in agricultural education” (p. 34); Merriam and Tisdell (2016) similarly noted basic designs are highly common in the broader education discipline as well. Basic designs “seek to discover and understand a phenomenon, a process, or the perspectives and worldviews of

the people involved' Merriam & Tisdell, 2016, p. 11). Basic designs are distinct from other types of qualitative research, such as grounded theory research or case studies. This is an important distinction as our research team sought only to explore perspectives as an initial step towards understanding the complexity of home food production in Trinidad.

The target population was residents living in five communities where Habitat for Humanity had interest in promoting home food production. Communities C, D, and E were located in the northeast corner of Trinidad while Community A was in the northwest and Community B was in the west-central region of the island. Some had residents living in Habitat for Humanity houses, while others did not. While the communities were unique in several ways, one commonality was that they were pioneer communities, meaning they were developed by people building homes on land that they did not own. All of the communities had stable running water except for Community D, and all five had adequate roads and electricity. Four were semi-urban while Community D was more rural.

The communities had variable experiences with gardening. Many Community D residents' occupations were related to agriculture. Some had large or small farms, while some raised animals and others sold saplings. Community A had just opened a new community center and playground. It had a thriving community garden, a fenced-in collection of about ten grow boxes with various vegetables that were split among residents and sold at the market to fund garden operations. Community A residents who had attempted growing without fences had since given up because of the damage caused by cattle that are driven through the community by their owners who lived nearby. Community B had considerably less success with their community garden, and a grow box here was disassembled sometime between its assembly in January and the research period starting in May. Innovation existed throughout Community E, such as the use of discarded refrigerators as grow boxes and buckets and tires to form a kitchen garden. Community C did not have a community garden, but many homes had individual or kitchen gardens where residents planted commonly used items, such as tomatoes and spices.

One of the researchers conducted semi-structured interviews between May and July 2015. The researcher made initial contact with potential participants by accompanying Habitat for Humanity personnel as they conducted deliveries or workshops within each community. Subsequent participants were identified through snowball sampling. Interview questions explored residents' perceptions of the benefits and barriers to home food production and their interest and experience with training in home food production. Probing questions were used to gain a deeper understanding of participants' responses. The following are examples of some of the questions included in the interview guide:

- What does home gardening mean to you?
- What experience do you have with gardening?
- Where do you currently obtain the food that you consume at home?
- What benefits would you associate with establishing a garden at your home?
- What do you consider the possible challenge to gardening at home?
- Have you ever received training for gardening? Where? From whom?

In total, we conducted 40 interviews (8 interviews per community). There were nearly equal numbers of men and women interviewed, with 18 men and 22 women agreeing to participate in the study. The interviews ranged from approximately 10 – 45 minutes in length. We audio recorded the interviews and later created written transcriptions to facilitate the use of constant comparative analysis (Merriam & Tisdell, 2016). We assigned pseudonyms to participants to maintain anonymity. We used constant comparative analysis as suggested by Merriam and Tisdell (2016) as a technique for developing “categories, themes, or other taxonomic classes that interpret the meaning of the data” (p. 192). Specifically, we examined the data for emergent categories that appeared to relate to the theoretical focus on benefits and barriers of home food production. Our research team conducted an internal debriefing following initial analysis of the data to discuss findings and develop the final interpretation (Anzul, Ely, Freidman, Garner, & McCormack-Steinmetz, 2003).

We took several steps to improve the trustworthiness of the research, taking into consideration the importance of transferability, dependability, confirmability, and credibility (Lincoln & Guba, 1985). We have provided a detailed description of Habitat for Humanity’s home production initiative and the five communities that served as the context for the research, while protecting the confidentiality of participants. Additionally, we shared this manuscript with the key contact at Habitat for Humanity who facilitated our research to ensure details and descriptions of each community and our portrayal of the data collection processes were reported accurately. We used quotes extensively in the findings section to contribute to thick description (Merriam, 2016) so the reader will be able to make transferability judgments. We address dependability and confirmability by creating an audit trail, which includes: (a) raw data in the form of audio recordings, (b) transcriptions of the audio recordings, (c) data reduction and analysis products organized in Excel, and (d) written correspondence between the research team during data collection.

We ensured credibility of our research through engagement, triangulation, and peer debriefing (Dooley, 2007; Lincoln & Guba, 1985). The researcher responsible for data collection lived in Trinidad for nearly three months in 2015 and had multiple exposures to each community, including conducting community scenario workshops and observing volunteer work days. Creswell and Miller (2010) noted “in practice, prolonged engagement in the field has no set durations, but ethnographers, for example, spend from 4 months to a year at a site” (p. 128). A basic research design does not call for the same depth of sociocultural understanding as an ethnographic design, therefore it is reasonable to believe three months was an appropriate duration for engagement in the communities studied.

Triangulation occurred through the recommended “use of multiple and different *sources, methods, investigators [sic]*” (Lincoln & Guba, 1985, p. 305). The inclusion of multiple participants from each community, participant-generated maps and pictures, and researcher-developed field notes and photographs satisfied the use of multiple and different sources. Only one researcher conducted the interviews but that researcher engaged in regular peer debriefings with the other members of the research team to reflect upon the data collection process and more deeply explore assumptions and working hypotheses (Lincoln & Guba, 1985).

Addressing the researchers’ biases during qualitative research is also important (Merriam & Tisdell, 2016). Collectively, our research team is biased towards believing home food production is a worthwhile activity and various agricultural education programs, including extension education (both public and privatized), can be an effective strategy for increasing the adoption of home food production. One research team member had no experience with gardening, while the rest had horticultural experience ranging from minimal to extensive. Our research team was comprised of

two females and three males. Four team members were Americans and one was Trinidadian. We employed techniques recommended by Lincoln and Guba (1985) to guard against our possible biases, as described in the preceding text.

Findings

Data analysis revealed major themes of perceived benefits and barriers associated with home food production. Within the identified benefits, four subthemes were identified: economic benefits, food safety benefits, sharing and reciprocity, and personal well-being. Barriers to home food production included the monetary expenses associated with start-up, lack of skill and experience, lack of nonmonetary resources, and barriers beyond human control such as weather.

Benefits to Home Food Production

Economic benefits. The majority of participants discussed economic benefits as an advantage of home food production, and some discussed selling produce that they had grown to generate income. Community E members were more likely to explicitly state income as an economic benefit to growing. Heather stated, “If you do it in a big scale, then you [are] able to sell [and] you will have some income.” Natasha made a similar remark by saying her main reason for growing was “because it allows you [if you take it up seriously], to have an income.” Earning income was not only for those who invested a lot of time into growing. Rodney shared, “Sometime I sell, so I get a little income.” Members of Community D and Community B also mentioned selling products as a benefit to home food production. Sharmila stated, “The profit is your own when you sell the products.” Other participants expressed a sense of community stewardship involved with selling products. Amirah said it was possible to “sell back the product to help the community.” Krishna enthusiastically shared,

You make your money, you sell to the community, outside the community, so it brings a passion for you to bring it and a passion to sell to other people so they know well yes, every time I see [him] he’s coming with something and he always have something so I will give him the seal because he living and he trying.

Not only did growing food provide an opportunity to generate some profit, but participants perceived financial benefits in the form of cutting costs associated with purchasing food. Members of all communities expressed growing certain foods allowed more flexibility with money to address budget constraints and cost of living. Nestor said, “[The] cost of living [is] so high it helps with your finances.” Rosalind said growing assisted her with “being able to save money and put into other things for bills [and] make it spread a little more.” Marva viewed food production as a means to financial stability stating, “Sometimes you can grow things at home that will fluctuate in the market.” Edward explained, “If you are growing your food, it enhances you to go along because you grow something and [you] don’t purchase it.” Delicia emphasized the importance of food production for “cutting down expense, because food is really expensive. I went to Arima, just past the market, pak choi [cost] \$4 for one, and at the grocery, two for \$8.99, so the price of [food] is very expensive.” Cynthia believed that because her children were learning to garden they would “know how to cut costs and how to save.”

Health benefits and food safety. Participants in all communities perceived home food production as a healthy alternative to purchasing food at the market. Residents discussed the desire to “know what you are eating” (Kathleen) and “decide for ourselves... what we [are] going to put into the food, how we [are] going to use pesticides” (Jacqueline). Growing food that had few or no chemicals was important due to concerns about pesticides. One resident recalled, “I know people

who have gotten sick because farmers spray the stuff [with pesticides] the day before they brought it to the market” (Jacqueline). Residents of Community B described the health benefits of home food production more frequently than other communities. Nazeema, James, and Harriman all used the term *healthier* to compare home food production to purchasing food at the market. Harriman explicitly stated home food production was “healthier than at the market.” Gerald explained why he prefers home food production,

It matters what you eat. The more you eat healthy in a sense and not sodium food. You eat plant food...better than all the package food. And all the grocery places, you can't get better than this place. This is the best place for it...we don't have no winter. We could just live.

Members of Community C also expressed their desire to have a healthier food source by producing at home. Nandranie suggested growing at home could lead to “better health.” Rajdaye expressed very positive feelings toward home food production by explaining,

It is natural food, no chemical in it. When you plant dasheen and you use your water, no chemical, you are more healthy. More natural food. But when they put [food in] the grocery . . . it's chemical. If you plant your own, plenty much better.

Using pesticides or chemicals was perceived as a negative aspect of food production, and a desire for fewer chemicals emerged from all communities. Members of each community expressed that a benefit of home food production was to be able to monitor what goes into food. Ramnarine said, “You know what you are planting and eating” when asked about the benefits of growing food. Likewise, Chandrika noted, “I know what I am eating because I am growing it.” Sharmila assertively stated, “See, when you buy from the market, sometime the people selling you the products have chemicals in the food and it don't last long, so when you grow your own food, you are sure they will last how you want it to last.” Cynthia added, “I don't want too much of salt, chemicals to grow my plant. I want to grow without chemicals. Chemicals is no good.”

Sharing and reciprocity. Respondents from Communities B, D, and E indicated that home food gardening was a way to connect with their families and their community. Home food production was a way to share with family members and neighbors. Kathleen offered, “I find you benefit more when you grow for yourself. Mostly, when we growing, not me alone, my sister too, there is plenty of us, so we share . . . we garden at home and we share.” Rajdaye made a similar remark, “If all the neighbors have a portion where they can grow something in their yard, they can exchange. Life would be much, much better.” Sharing extended beyond food and included sharing knowledge. Several participants indicated they had learned about gardening from other family members, such as parents (Kathleen, Harriman, Karen, Sharmila, Jhagru) or siblings (Dyanand). Shafik proudly described how he had learned from his elders, and declared, “Nobody can fool me in agriculture.” Cynthia emphasized an obligation to teach youth to garden, stating, “They will have to show one another what to do. They will continue it.”

Personal well-being. Growing food was also associated with fun and exercise for some residents from Communities A, B, C, and D. Marva described the wellness benefits of gardening as a “nice form of therapy.” Chandrika stated, “I love gardening” and Amritha said, “I do it for fun.” Delicia said, “When you plant at home it come like a hobby, especially for people who love doing it.” Harriman replied, “[Home food production] gives you an opportunity to sweat and move around.” Virginia also stated, “I will get some exercise.”

Barriers to Home Food Production

Monetary expense. Participants from all communities discussed expense as a barrier to home food production. Residents described the costs of inputs, including the tools, plants, soil, manure, and chemicals as prohibitively expensive. Rosalind explained,

Finance. I have that problem. I can get the plants, but I need to build the grow box, and get the stuff. It is hard to get started. I know what I want to do, but it is kind of hard to get started. I have the know-how, I have the time, but I don't have the materials to get started.

Nigel also went into detail about the expense associated with home food production,

This settlement, I think money is a challenge. If you want to crop in a big way, you need to have chemicals, you need to have spray, the necessary things. Any time you plant something small and the insect come and destroy, you may not feel it. When you have a big place, you going to feel it because money down the drain. Having chemicals and things in place is one of the biggest challenge.

Lack of experience. Many residents shared they had little experience gardening, no formal training, or both. Additional sources of information that were identified included the garden shop and chemical company representatives who serviced the shops (Natasha, Ranjass, Rodney). Ranjass relied upon the Caribbean calendar provided at the garden shop and his own “trial and error” for learning about gardening. Learning by doing was also mentioned by several other residents.

Some residents had received formal training in home food production, particularly in Community C where six of the eight residents interviewed had attended some type of course or program, and one was the president of an agriculture group. In Community A, 21 women had been certified in grow box production. The community also received support “from the agriculture unit” (Jacqueline) and indicated the residents could take sick plants to the agriculture unit and receive advice for treating issues such as fungus. A resident in Community C (Delicia) also remembered attending a grow box training offered by the Ministry of Agriculture in a neighboring community. While residents tended to share positive perceptions of trainings, describing them as “very useful” (Nandranie, Rosalind), Virginia noted, “When I went to the course, everything was different. Their [the ducks] huts, their housing, their feeding. Everything was totally strange to me. Even the ducks. Changing technologies.” A Community D resident complained, “I went to YTEPP [Youth Training and Employment Partnership Programme], but too much paperwork. So I left it” (Pamela).

Still, “lack of knowledge” (Nestor) was a barrier to home food production. Rodney hoped for “help with money and know-how.” One community housed a former agricultural teacher with a willingness to teach others (Edward), who offered, “My aim was to teach others about agriculture and I am willing now for people out there who want to learn, I can do the facilities right here and train them for free.” Ironically, another resident specifically hoped for “someone who went into university doing agriculture in a step-by-step basis” to provide training so that he would “have a better idea of how to economize, and how to produce better things” (Nigel). Nigel further explained, “Doing it from your head is not at all.”

Lack of commitment. A number of respondents from each of the communities revealed they lacked strong commitment to growing food at home or that gardening was not among their priorities. Residents identified lack of time (Marlon, Marva, Nandranie, Simon) and motivation (James, Nestor, Chandrika, Heather) as barriers. Community A residents tried grow boxes in their backyards but eventually shifted to a community garden approach because of the time requirement. Jacqueline shared,

You will appreciate the garden need round the clock care. Plants really need attention, especially with the kind of climate we have. You have to wet them several times throughout the day because it is so hot. So that was one of the challenges, persons balancing their work life with the kitchen garden, and so we decided to do it as a community project so we could actually employ person in the community to attend to the garden every day ...

Other residents were more forthcoming, describing the major challenge as *laziness* (James, Nestor) or simply that some people are intrinsically lazy (Chandrika, Heather).

Generational disconnect. A few respondents had noticed a lack of interest among youth. One Community A resident complained, “The younger generation just thinks we can buy these things instead of growing them” (Marva). The concern about a lack of interest from youth was shared by Nigel, of Community E, who worried, “Everyone [is] growing up with the fast food business. If it continues, you won’t see people planting gardens.” Nigel noted his concern with youth having less connection to gardening and shared, “It is something that we can educate the younger ones into ... to show that is a part of your life to have something in your back yard.”

Lack of space. Residents primarily from Communities B, C, and E (Cynthia, Amirah, Delicia, Virginia, Simon, Natasha, Rodney) shared a lack of space was a barrier to growing food for them. Natasha stated, “What prevents me from growing more here is I don’t have enough land space; that prevent me from growing the volume of stuff that I would like to grow.” While lack of space was a barrier for several respondents Ranjass perceived innovative solutions to not having land and noted that people who did not have the space could “put it in pots. You can put it in buckets. If you have a fence, you can grow your cucumbers on a fence.”

Weather. Weather was among the most noted barriers from most communities. Ranjass stated, “The most challenging is the weather.” Water and/or rainfall was perceived as the most significant weather-related issue (Ramnarine, Edward, Krishna, Shafik, Heather). Rajdaye explained the dry season was a barrier because there was no way to water without rain; this sentiment was supported by Edward who noted, “There is a water shortage right now for the humans. Much less for the plants.” However, Jhagru felt, “both rainy season and dry season” were barriers, and Jacqueline specifically identified the hot climate as a challenge. A former agriculture student in Community D shared concern about the need for agricultural practices to adapt to climate change, suggesting, “We really need to network now because different ideas coming out and we need to put these ideas into practice so we can correct the mistakes.”

Loose animals. Several residents discussed loose animals as a persistent problem in Community A, B, C, and E. When asked about a barrier that prevents home food production, Kathleen replied, “Animals.” A Community C resident agreed, “I have a problem with the neighbor and some of his fowls. I told him a few times, but they are still there” (Virginia). In Community A, two residents were frustrated because “cows walk through and ruin anything we plant” (Brenda, Christine). Residents described the challenges of protecting their gardens and identified the need for fences (Cheryl). Virginia felt, “I don’t want no animals or anybody in there. Have a fence, with

a little gate to enter, so no chicken going into your kitchen garden.” However, Wendy noted the limitations of fencing, and explained, “I would like to plant some cabbage. Even if you put fence, [the dogs] will jump over.”

Praedial larceny. Theft of crops was mentioned repeatedly by residents (Delicia, Amritha, Krishna) in Community C and Community D as a barrier to home food production. One explained that thieves steal “mangos in your garden or take things when you are not there. You have a problem with that. Certain individuals just do these things. I don’t know for what reason” (Krishna). Similarly, a resident described the potential to “have a problem with persons coming in and reaping before you reap . . . You are putting down that labor, and when it comes time to reap, someone has already taken it. That could have you frustrated” (Delicia).

Conclusions

Barriers and benefits exist that positively and negatively influence perceptions of home food production among Trinidadians living in Habitat for Humanity neighborhoods. Given that people will only adopt home gardening practices when they receive benefits they value and when important barriers are removed, home gardening programs are not likely to be successful in these communities if they do not incorporate these barriers and benefits (Lee & Kotler, 2011). There is agreement on key benefits to home food production: (a) the need to supplement financial resources by earning extra income and reducing the household food budget; and (b) the desire to control what chemicals are applied to the household’s food supply, and these are important starting points for agricultural education programming. This implies participants place considerable value on producing food at home, which aligns with reports that people around the world garden for access to fresh vegetables, to help with household finances, and to increase control over food sources (Eigenbrod & Gruda, 2015; Kortright & Wakefield, 2011; Landon-Lane, 2011; Schupp & Sharp, 2011; Subair & Siyana, 2003; Taylor & Lovell, 2014; World Bank, 2007).

That Trinidadians living in Habitat for Humanity communities grow food as a hobby, for pleasure and well-being, and to share with neighbors and educate family, also aligns with previous research (Buchmann, 2009; Kortright & Wakefield, 2011; Subair & Siyana, 2003; Taylor & Lovell, 2014). Unlike others, participants in our study do not garden to reduce their environmental impact (Kortright & Wakefield, 2011; Landon-Lane, 2011; Schupp & Sharp, 2011).

Despite perceiving substantial benefits, these residents perceive numerous barriers that may prevent home food production, and notably, there is more dissimilarity in barriers compared to the relative agreement surrounding benefits. Expense of inputs is the most common reason individuals do not garden, and the financial cost associated with start-up along with lack of resources such as land is universally prohibitive. This is consistent with disadvantages identified by the Trinidad & Tobago Extension Training and Information Services Division (Ganpat, 2005). Lack of knowledge is nearly as common. Trinidadians living in Habitat for Humanity communities face other barriers similar to gardeners globally: inadequate space, inputs, knowledge and skills; weather conditions; plant pests and diseases; loose animals; and praedial larceny (Eigenbrod & Gruda, 2015; Kortright & Wakefield, 2011; Subair & Siyana, 2003).

Recommendations and Implications

Globally and locally, agricultural education professionals need knowledge of the technical aspects of agriculture and also the non-technical barriers that prevent adoption. Lack of engagement in home food production can be explained through residents’ perceived cost of adoption (McKenzie-Mohr et al., 2012). Initiatives to promote sustainable food production will be most

successful when designed to enhance the target audience's perceived benefits and decrease the barriers. Agricultural education professionals should recognize residents associate strong benefits with home food production and develop strategies to enhance them. There is an opportunity for agricultural education professionals to encourage more home food production by working with residents through extension programming, to prepare future agricultural education professionals to address the complex issue of food security, and to prepare future home food growers through 4-H and other school-based programs.

To engage more people in home food production, agricultural education professionals should design programs that help residents to see an overall net benefit to gardening by reducing or removing the barriers while enhancing the benefits to home food production (Grier & Bryant, 2005; McKenzie-Mohr & Schultz, 2014). Agricultural education professionals working in Trinidad may design social marketing strategies around these findings, while United States practitioners may use the identified barriers and benefits to better understand their own target audiences. To bring about change, it is important to conduct behavior-specific formative research with the target audience, and therefore this study provides information that can inform social marketing strategies to increase engagement in food production (McKenzie-Mohr & Schultz, 2014; McKenzie-Mohr et al., 2012).

To enhance financial benefits, educational initiatives could include best practices for market growing and demonstrate the financial savings residents may realize by growing their own food. Residents may also appreciate education on marketing strategies and selling to increase financial returns. Programs should convey how to produce home food crops using fewer and less toxic inputs to appeal to the preference for produce with fewer chemicals.

Programs can appeal to the sense of responsibility for passing along knowledge to youth and desire to share food and information among family and community members by ensuring that programs are inclusive. Educational programs should be held at times convenient for all of the family to attend and should be designed to provide opportunities for everyone to participate – especially children. Because Trinidadians living in Habitat for Humanity communities value gardening for the benefit to their communities, planning and leadership of these efforts should closely involve community members. For example, agricultural education programs could employ a train-the-trainer approach so classes and demonstrations can be given by community members. By engaging community members, home gardening initiatives may find “new avenues for collaboration and communication” (Gray et al., 2014, p. 199). Agricultural education professionals can also play a role in helping communities and their leaders to identify governmental and non-governmental resources that provide assistance wherever they are in the process of home food production initiatives.

Agricultural education professionals can appeal to leisure and health benefits by promoting gardening for fun and well-being. Gardening demonstrations could be incorporated into community events and festivals. Additionally, gardening should be treated as a public health intervention and integrated into local wellness initiatives (Alaimo, Beavers, Crawford, Snyder, & Litt, 2016). Partnerships should be made between agricultural education professionals and health information providers to include nutrition as well as information for producing food at home. Agricultural education professionals can provide access to affordable garden materials to reduce the barrier of startup costs. Additionally, educational programs could promote less costly ways to start a garden, such as through seed saving or community seed sharing, and composting household food scraps for nutrients as opposed to purchasing fertilizers. As lack of adequate land was a barrier, residents may be motivated if they are provided with gardening strategies that use minimal space, such as vertical or container gardens. Although the focus of this work was promoting home gardens, community

gardens may play a role in the solution to this barrier. In cases where shared land may be available, agricultural education professionals can develop resources to guide communities through the steps that may be taken to establish community gardening spaces (Schupp & Sharp, 2011).

Agricultural educational programs should provide the skills and information needed to successfully produce food at home with locally-available resources, and incorporate site-specific growing conditions, locally-appropriate fruits, vegetables, and spices. To address challenges with producing food during the dry season, programs should focus on how to grow crops that require minimal water, and emphasize rainwater harvesting, microirrigation, and mulching to conserve water. Strategies for preserving foods for consumption during less productive seasons may also reduce this barrier. Agricultural education professionals may help residents design gardens that discourage people and animals from entering to prevent theft and damage, perhaps with fences or security plants with thorns, and perimeters of inedible plants to camouflage home food crops.

Findings reveal opportunities for agricultural teacher preparation and school-based programming to play a role in encouraging home gardening. There is a natural fit for 4-H as most 4-H programs target food production around the home and community spaces. Incorporating gardening into curriculum can benefit schools and encourage students' families to start gardening at home (Christou, 2014). To reduce the generational disconnect and inspire the next generation of gardeners, agricultural education professionals, with the help of 4-H coordinators, should collaborate with primary schools and early education centers through the 4-H movement to deliver programs. In one community, the head school teacher had been trained in grow box development and planted gardens around her school where children were growing their own vegetables. Agricultural education professionals can provide support for other teachers to do the same.

Future research should include a broad survey to confirm these findings on a larger scale (McKenzie-Mohr, 2011). Researchers should examine relationships between educational initiatives and perceptions surrounding home food production to reveal where programs are successful. Success would be indicated by decreases in perceived barriers and increased engagement in home food production. Finally, we agree with others and suggest there is an opportunity to engage residents in developing solutions to the constraints to home food production and to conduct participatory research using home gardens as experimental sites (Gray et al., 2014; Taylor & Lovell, 2013).

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