

FORMATIVE EVALUATION OF A FOOD ACCESS ENHANCED NUTRITION EDUCATION  
PROGRAM

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of Nutrition in the Gillings School of Global Public Health.

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## **ABSTRACT**

Jared Thomas McGuirt: Formative Evaluation of a Food Access Enhanced Nutrition Education Program  
(Under the direction of Alice Ammerman)

Many low-income populations have limited access to healthful foods, which is associated with poor health outcomes. Federal nutrition education programs often do not address access to healthier foods. Integrating an affordable Community Supported Agriculture (CSA) program within these nutrition education programs may increase program impact. There is a need to understand how this program should be designed to meet customer needs and be successfully delivered through existing federal nutrition education programming.

As part of a larger randomized trial testing a CSA program delivered through an Extension model in four US states, this mixed-methods formative evaluation included: 1) survey of low income adults (n=262) participating in federal nutrition programs across North Carolina, 2) choice experiment to determine program preferences among a low income population (n= 42) in four US states, and 3) in-depth interviews of Extension community nutrition educators (n=20) in four states followed by focus groups to understand perceived barriers and facilitators to implementing the proposed program.

Nutrition Educators showed strong interest in the idea of a CSA plus education program. Making the program convenient, educational, and involving children was important, with staff time and program logistics being potential issues. The choice experiment indicated that the ideal CSA program would be a large mixed variety box, distributed 2 times per month, less than \$15, no more than 10 minutes further than the supermarket from their home, and less expensive but

no more than 20% more expensive than supermarket prices. There were statistically significant differences in willingness to participate given certain program scenarios across race and household size. The survey indicated high overall interest (85%), and more interest in the nutrition education program if there was a CSA (84%). There were statistically significant differences in willingness to participate by Race ( $p=.03$ ), but not by Age ( $p=.70$ ) or BMI ( $p=.057$ ).

Adaptations of the typical CSA disbursement frequency and price points may be needed to be attractive to low income populations. Results of this research were used to inform the larger randomized trial of CSA program impact on dietary intake and economic opportunity for farmers.

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I would also like to thank the USDA AFRI Cost Offset CSA team for their help with my research, and Lorelei Jones and the NC EFNEP and SNAP-Ed programs for their help in disseminating surveys across North Carolina.

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## **LIST OF ABBREVIATIONS**

AFRI	Agriculture, Food, and Research Initiative
CSA	Community Supported Agriculture
CO-CSA	Cost-Offset Community Supported Agriculture
EFNEP	Expanded Foods and Nutrition Education Program
F&V	Fruit and Vegetable
GIS	Geographic Information Systems
M-RFEI	Modified Retail Food Environment Index
NC	North Carolina
NY	New York
SNAP-Ed	Supplemental Nutrition Assistance Program- Education
USDA	United States Department of Agriculture
VT	Vermont
WA	Washington (state)

## **CHAPTER 1: OVERVIEW**

### **Introduction**

Many low-income populations have limited access to healthful foods, and may lack the self-efficacy and perceived benefits needed to create healthy behavior change. Together, these factors likely contribute to the disproportionately worse health outcomes experienced by these population groups, including high rates of obesity, cardiovascular disease, diabetes, cancer, and lower life expectancy. Fruit and vegetable (F&V) consumption lowers the risk for many of these negative health outcomes. Without access to affordable fruits and vegetables, improving the dietary patterns among low-income populations remains challenging.

Two of the largest nation-wide nutrition education programs, the USDA funded Expanded Foods and Nutrition Education Program (commonly known as EFNEP) and Supplemental Nutrition Assistance Program-Education (SNAP-Ed), represent important resources to help overcome these challenges. These programs are integrated into county level Cooperative Extension programs, and include nutrition education available to limited resource audiences, reaching a total national audience of hundreds of thousands of people per year. While these programs impact individual level factors (e.g. knowledge and self-efficacy) they do not directly address the problem of limited access to healthier foods, a problem many EFNEP or SNAP-Ed participants face. Without access to the healthy foods needed to support the diet being promoted in the EFNEP or SNAP-Ed curriculum, the program's potential effectiveness is limited. One approach to deal with limited healthy food access is the development of local food aggregation and distribution systems, including a Community Supported Agriculture (CSA)

produce box (e.g. weekly cost-offset produce boxes). We propose the integration of a produce box distribution system (cost offset customer purchase, where low income customers boxes are subsidized to make them more financially accessible) within the existing EFNEP or SNAP-Ed infrastructure, an approach which will address multiple levels of the social ecological model in order to maximize program impact. An added benefit of these programs is to provide market opportunities for smaller scale farmers in the region.

In order for this innovative integration to succeed, several questions must first be answered, including how the program should be designed in order to ensure that it is: 1) meeting customer needs and preferences, 2) is administratively feasible and aligned with Extension program structure and goals, and 3) is designed in a way to maximize utilization and effectiveness at increasing fruit and vegetable access and consumption.

The proposed study was a formative evaluation, ancillary to a larger multisite USDA-funded Agriculture, Food, and Research Initiative (AFRI) study (NY, NC, WA, VT) examining cost offset CSAs. In Year 1, the larger study included a formative evaluation phase to inform the implementation phase in Years 2-4, which include a cluster randomized trial to evaluate a cost offset CSA model as a way to reach low income consumers. For the current formative ancillary study, Aim 1 focuses only on North Carolina, while Aims 2, 3, and 4 includes the other study locations.

The following Aims guided this study:

**Aim 1:** Determine interest in the CSA approach using a survey of North Carolina EFNEP participants disseminated through the North Carolina EFNEP and SNAP-Ed program.

**Aim 2:** Understand the perceived barriers and facilitators of the proposed CSA program among Extension staff in 4 states using in-depth qualitative interviews and focus groups.

**Aim 3:** Identify factors influencing willingness to participate in a cost-offset community supported agriculture (CSA) program among low income populations, across four states participating in the larger AFRI grant, using a mixed methods approach.

## **Background and Significance**

### *Burden of chronic disease*

The continued burden of diet related chronic disease in low-income populations in the United States (US) is of great public health concern.<sup>1,2</sup> High rates of obesity, cardiovascular disease, diabetes, cancer, and lower life expectancy are experienced by these populations, with rates disproportionately higher than their higher income counterparts.<sup>1,2</sup> These disparities in chronic disease prevalence and negative health outcomes are partially due to inadequate fruit and vegetable (F&V) consumption<sup>3</sup> and physical activity (PA) rates<sup>4</sup>. Low income populations have particularly low levels of fruit and vegetable consumption and physical activity rates compared to their more affluent counterparts<sup>5</sup>, which is problematic when considering that few US adults meet dietary recommendations.<sup>6-8</sup>

### *Individual and Environmental level Factors*

Both individual and environmental factors have been suggested as determinants of these unhealthy behaviors: 1) low levels of important personal characteristics like self-efficacy, knowledge, and perceived access, and 2) limited access to healthier foods. These populations may have low self-efficacy for FV preparation and consumption, and limited skills needed to prepare and consume FV, as well as limited knowledge of the importance of consumption outcome expectations of performing the behavior, and perceived access to healthy foods, all of which may be important determinants for participating in health promoting behaviors like F&V consumption and PA.<sup>9</sup> Limited access to healthier foods<sup>10-13</sup> is a reality for many low-income

populations, which has been attributed to limitations in community food sources and transportation.<sup>14-17</sup> Limited access to healthier foods has also been shown to be related to overall decreased fruit and vegetable purchase and consumption.<sup>18,19</sup> Given this, there is a need to develop an effective intervention that sustainably addresses multiple levels of the sociological model: both the environmental (food access) as well as individual-level determinants.

### Individual Level Intervention

Two of the largest nation-wide nutrition education programs, the USDA funded Expanded Foods and Nutrition Education Program (commonly known as EFNEP)<sup>20</sup> and Supplemental Nutrition Assistance Program-Education (SNAP-Ed),<sup>21</sup> may be strong resources to address the important individual level factors that influence diet and PA in limited income audiences in both the rural and urban setting. These programs are funded by the United States Department of Agriculture (USDA) and integrated into county level Cooperative Extension programs,<sup>20,21</sup> reaching hundreds of thousands of adults per year.<sup>21,22</sup> The programs provide nutrition education led by peer educators to limited resource audiences.<sup>20,21</sup> The programs are administered at community sites like churches, non-profits, educational facilities, and local Cooperative Extension Offices.

The participants of these programs learn how to make food choices, increase their ability to select and buy food that meets the nutritional needs of their family, learn skills in food production, preparation, storage, food budgeting, and learn about physical activity and health.<sup>20,21</sup> Despite addressing the important individual level factors associated with a healthier diet and PA, these programs generally neglect the problem of limited access to healthier foods, a problem that many program participants face as low income individuals living in areas with limited access to healthy foods.<sup>10-13</sup> No matter how effective the individual level educational/skill building

components are in these education curriculums, without improving access to affordable healthy foods to support the knowledge and skills being learned, the potential effectiveness of these programs will be limited.

*Environmental Level Intervention: Improved Food Access through the produce box model*

A produce box approach may be an effective strategy to improve healthy food access in the EFNEP and SNAP-ED. Due to the relative cost inefficiency of placing new food stores in areas with limited access to healthy foods, recent efforts have focused on more cost efficient, less resource intensive local food aggregation and distribution systems to increase fruit and vegetable access, including produce box style (Community Supported Agriculture(CSA)) models. In this model, fruits and vegetables are collected from local farmers, packed into boxes, and sold/distributed to households. Few CSA programs have been conducted that are designed to reach lower income populations, and most have had inadequate evaluation approaches.<sup>23, 24</sup> In the most strongly designed study to date, Quandt et al 2013<sup>23</sup> completed a randomized study of a CSA program in an under-resourced urban community in North Carolina. This intervention lasted for 16 weeks, with 5 education and skill-building sessions conducted by local NC Cooperative Extension staff. The intervention resulted in a significant increase in the number of fruits and vegetables in the household inventory in the intervention group compared to the control group, and greater increases in fruit and vegetable consumption in the intervention group, although it did not reach significance. A limited sample size and inadequate evaluation measurement (larger sample size or a more sensitive data collection instrument needed for dietary intake) were suggested by the authors for this lack of significance. Overall, limitations of previous studies include limited reach, insufficient power, inadequate evaluation, and inadequate dose of the education/skill building component.

The potential benefits of this coordinated approach are clear: 1) it gives participants increased access to the fruits and vegetables they currently lack access to, enabling them to incorporate the foods being stressed in the class sessions into their diets, and 2) gives participants the tools (through the nutrition classes) needed to prepare the foods acquired through the cost-offset CSA. While addressing the access problem is important, having the supporting educational component is equally important, as simply making available a food product that they do not see the benefits of eating and which they do not know how to prepare, will not likely lead to increased consumption. Thus, this coordinated model is ideal.

### *Developing a more comprehensive model*

#### *Consumer Preferences*

While this innovative approach appears promising, it remains unclear what this model should look like in order to be most effective in a low income population. No published peer reviewed literature has been found which has done a broad or in-depth formative evaluation to gain a better understanding of the preferences of potential participants regarding a cost offset CSA program. Without understanding the needs of potential participants, the program will likely lack uptake, effectiveness, and long term success. Quandt et al<sup>23</sup>, based on their process evaluation, suggested that altering some of the financial and operational aspects of traditional CSA programs will be necessary to improve the impact of CSA participation in a limited resource audience. Thus, a combination of a broad survey of potential participants regarding program preferences, shopping behaviors, and demographics, along with a more in-depth formative evaluation of consumer preferences, is needed to understand low income consumer needs and preferences for the proposed program.



### *Extension Staff*

Also, it is not clear how this type of program might be viewed by Extension staff, who will likely be the primary implementers of such a program if it is deemed effective. It is important to get in-depth feedback from Extension staff on perceptions of the program, the role of extension in conducting these types of programs, potential barriers and facilitators to implementation and sustainability, and how to best integrate it into existing Extension systems. Without this information, the program might be designed in a way that would inhibit its ability to be adequately implemented, resulting in both lost fidelity and effectiveness. A few studies have attempted to ask Extension staff about their needs and thoughts on programming. A study by Murphy et al (1999) conducted in-depth interviews with Extension staff to determine needs to obtain information to drive decision making for programs, resources and training.<sup>25</sup> Dickin et al found that program effectiveness was increased when Extension educators believed in the value of the program.<sup>26</sup> A study by McClelland (1997) conducted interviews with Extension field staff on their role in program evaluation, learning about facilitators and barriers to program evaluation.<sup>27</sup> No published peer reviewed literature has been found where in-depth formative interviews were completed with Extension staff to inform an intervention such as the one being proposed. Extension staff are asked to implement, supervise, and evaluate large scale nutrition educational programming on a regular basis, thus their feedback and interest is likely crucial to ensure program success. We hope to better understand their interests and opinions on the proposed program, which will be beneficial to this effort, as well as future efforts regarding similar programming.

Ensuring access: Determining intervention site locations for a cost offset CSA program

EFNEP and SNAP-ED are currently administered at community sites like churches, non-profits, educational facilities, and local Cooperative Extension Offices. Given that a central aim of a cost offset distribution program is to improve healthy food access, it is important to determine the appropriate locations of distributions sites for this program to ensure that participants will be willing to participate, as well as sustain participation. Even if the program is implemented successfully, if participants aren't able to access the program, the goal of increasing access to and improving consumption of fruit and vegetables will not be met. As with any successful business and program plan, proper site selection is important. Factors like reach, accessibility, and infrastructure are important in site selection, particularly with this new comprehensive model with a produce distribution system component. Rogers (2005) noted that there are multiple important reasons to develop and utilize sound location methods, including avoiding costly locational mistakes and assessing accurately whether there are enough people with the right demographic characteristics for the business.<sup>28</sup>

Non-spatial techniques, including econometric non-market valuation stated preference techniques, can be used to identify the distance, price, and amount of produce needed to influence participant behavior.<sup>34</sup> The stated preference technique is a non-market valuation approach where decisions of individuals in actual markets are used to elicit their preferences for the items of interest. The Contingent Valuation technique and the Choice Experiment technique are the two main methods used. The Contingent Valuation approach concentrates on the non-market service as a whole, whereas the Choice Experiment seeks people's preferences for the individual characteristics or attributes of these goods and services. This approach has been successfully used to determine consumers' willingness to shop at the farmers market versus the

supermarket given certain conditions. That study found that willingness varied given certain conditions. A similar study has not been conducted for a CSA produce box program.<sup>29</sup> The PI of this study developed a method based using these techniques for the purpose of understanding consumers' “stated preference” for participating in an CSA style produce box program, given particular price, food amount, and accessibility conditions.

## **Approach**

The proposed study was a formative evaluation, ancillary to a larger multisite USDA-funded Agriculture, Food, and Research Initiative (AFRI) study (NY, NC, WA, VT) examining cost offset CSAs. The following are the project objectives of the larger study:

- Examine whether CO-CSAs coupled with tailored nutrition education improve dietary intake and quality among children aged 2-19 in low-income households;
- Examine the influence of CO-CSAs and tailored education on attitudes and behaviors related to nutrition, meal planning, and meal preparation;
- Contrast CSA models to understand if and how variability in operational characteristics affect participation and intervention effectiveness in low-income families with children;
- Estimate the economic impact of a CO-CSA program on the local economy;
- Evaluate options for farmers to sustain the CO-CSA, and work with an advisory board, extension, and other stakeholders (e.g. CSA networks) to disseminate findings through development of a tool kit and related electronic resources to maximize impact; and
- Develop and evaluate short-course modules and lectures for undergraduate and graduate students related to local food system innovations that are synergistic with the goal of obesity prevention and designed to enhance human capital relevant to U.S. agriculture.

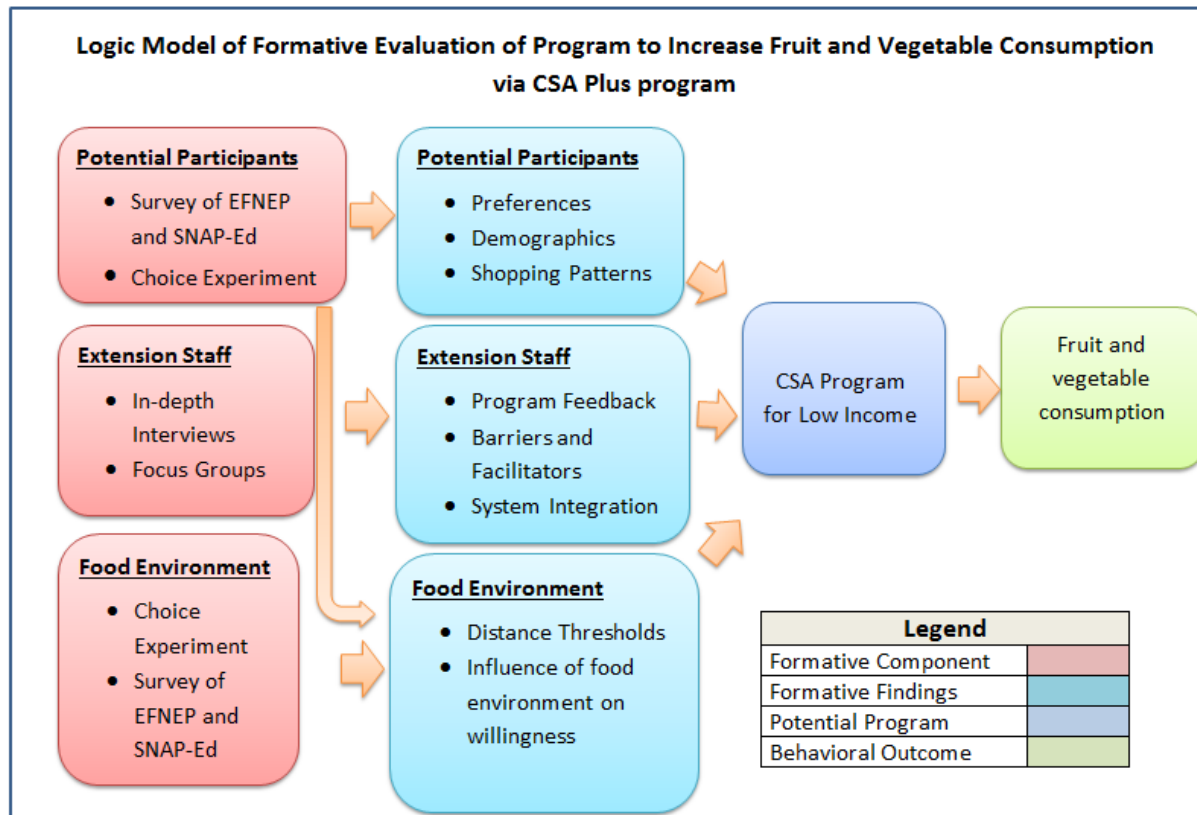
In Year 1, the larger study included a formative evaluation phase to inform the intervention implementation phase in Years 2-4, a cluster randomized trial to evaluate the impact of a CO-CSA intervention on dietary intake and weight status among low-income families with children in rural and micropolitan (populations <50,000) communities in the four geographically diverse states. This ancillary study is built into the larger formative work of the parent multi-site study, which includes interviews with farmers, potential participants, adults and children from low-income households, CSA farmers, current CSA members, and cooperative extension educators. For the current formative ancillary study, Aim 1 focused only on North Carolina independent of the larger study, while Aims 2, and 3 included the other study locations as part of the larger study. All Aims were independently designed, implemented and evaluated by the Principal Investigator (McGuirt), with assistance from his Dissertation Committee and the larger AFRI study team.

For this ancillary study, formative data collection included an EFNEP and SNAP-Ed participant survey in NC, as well as semi-structured interviews with low-income, EFNEP eligible participants, which included a choice experiment to determine program preferences as well as spatial and non-spatial facilitators and barriers to program participation across the four states. There was also an in-depth qualitative interview of Cooperative Extension staff to understand their interest in the proposed program, understanding their perceptions, getting feedback on the components, and understanding the barriers and facilitators of integrating the proposed CSA program (educational component and the integration of the CSA boxes) into Extension.

The Logic Model for the Formative Evaluation can be seen in Figure 1 below. This figure displays the three main focuses of this project: 1) potential participants, 2) Extension staff, and 3) the food environment. Focusing on each of these three targets will lead to new knowledge about

each, which will help inform the development of the proposed produce box/CSA program, which will lead to increased fruit and vegetable consumption through increased access in low income populations.

**FIGURE 1: Logic Model for the Formative Evaluation**



Aim 1. : Determine interest in the CSA approach using a survey of North Carolina EFNEP participants disseminated through the North Carolina EFNEP and SNAP-Ed program.

### *Study setting and participants*

This study was conducted in EFNEP and SNAP-Ed nutrition education programs through county level North Carolina Agricultural Extension offices in 12 geographically diverse counties across North Carolina. Characteristics of the counties can be found in Table 10.

Questionnaires (Appendix 4) were distributed to current participants in EFNEP or SNAP-Ed within North Carolina. Eligible participants were those that were 18 years of age, English speaking, and were participants in the EFNEP or SNAP-Ed. Surveys were distributed out to local program staffs (n=10 counties) that were trained in administering the survey, who then distributed to their classes. Participants were entered into a drawing based on chance in which each subject has equal odds of receiving one of three \$15 gift cards in order to incentivize participation. Informed consent was obtained for all participants. The study procedures and the interview guide received approval from the Institutional Review Board (IRB) at the University of North Carolina at Chapel Hill.

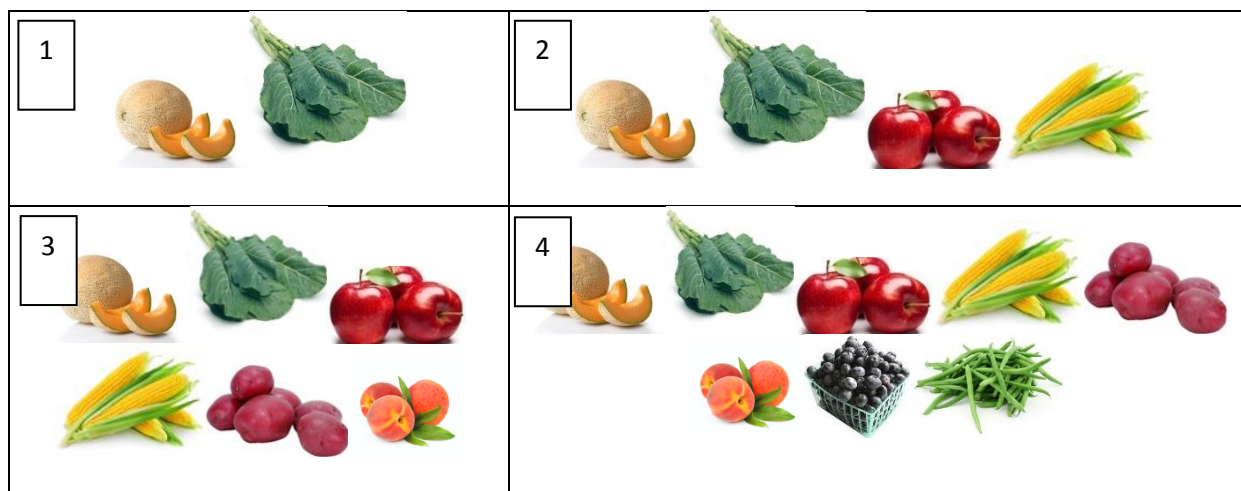
### Methods

Participants were asked a series of closed and open ended questions, including demographic information, residential address, address of supermarket they primarily shop at, address of EFNEP or SNAP-Ed location, current food shopping frequency and expenditures, produce box price points, produce quantity desired, and the desired frequency of receiving the boxes. When asked the highest price they were willing to pay, a picture (Figure 2) was shown of a standard 8 item CSA box. When asked what amount they were interested in receiving each week, they were shown a graphic (Figure 3) of four increasingly larger boxes of produce, and asked to circle the option they would want. Participants were also asked for average daily fruit and vegetables consumed per day (1/2 cup or less, 1/2 cup to 1 cup, 1-2 cups, 2-3 cups, 3-4 cups, 4 cups or more), including an example listing of what a cup would look like for certain vegetables, using the National Cancer Institute Food Attitudes and Behavior Survey.

**FIGURE 2: Highest Price Willing to Pay CSA Box Example**



**FIGURE 3: Amount Willing to Receive Each Week**



### *Quantifying access to supermarket of choice and EFNEP or SNAP-Ed*

A total of 135 (out of 262; 51.5%) participants had complete home address information. Data on distance to supermarket and EFNEP or SNAP-ED location was obtained using information from the survey, a batch geocoder (Batch Geo), and ArcGIS mapping software. The location of the supermarket that participants usually shop at was verified using the Reference USA Business database. For both the class location and supermarket location, if participants were missing or had incomplete street address or city information, and it could not otherwise be determined, it was coded as missing data. The Google API was used to generate values for

distances, and locations and a 10% sample of distances were verified using internet listings and Google Maps.

#### *Determining Modified Retail Food Environment Index (M-RFEI) and Urban/Rural Residence*

The M-RFEI<sup>24</sup> is an index that indicates the ratio of healthy to less healthy food retailers within census tracts based on typical food offerings of specific types of stores. The mRFEI is calculated by dividing the number of healthy food retailers (supermarkets, large grocery stores, supercenters, and produce stores) by the number of health food retailers plus the number of less healthy food retailers (fast food restaurants, small grocery stores, and convenience stores). The mRFEI score for each participant with a complete residential address was determined by spatially linking geocoded participant addresses with census tract level mRFEI values from a shapefile obtained from the US Centers for Disease Control (CDC) using ArcGIS. Urban/Rural classification was determined by spatially joining participant points with a 2010 US Census Bureau urban-rural classification shapefile.

#### Analysis

Questionnaire data was analyzed using descriptive statistics, bivariate statistics, and linear modeling. Fisher's Exact Tests were used to willingness (yes versus no/maybe) by Race (white versus non-white), Gender (Male/Female), and Household Income (<\$30,000 versus ≥ \$30,000). T-tests and the Mann-Whitney-Wilcoxon Test (non-normal distributions) were used to assess for differences in Willingness (yes vs. no/maybe) by Age, BMI, M-RFEI, and Urban/Rural, and for differences in Highest Price Willing to Pay for Standard Box by Household Income level. One-way ANOVA (with effect coding) was used to test for differences in 'Amount Wanted' by 'Age' and 'Household Size', with assumptions of normality, homogeneity of variance and independence of errors assessed and deemed adequate.



Logistic regression was used to understand the factors that predicted willingness to participate in the program (Yes/No), but a random effects model to account for clustering at the county level was not used given sample size issues. For the logistic regression, the primary outcome of interest was willingness to participate in the proposed fruit and vegetable box program. Independent variables of interest included self-reported BMI (derived from participant reported height and weight; height was rounded up to the closest whole inch.), Age, Ease of purchasing fresh fruits and vegetables (Easy/ Hard), and Race (Non-white vs. White). Spatial variables, including distance to supermarket shopped and the MRFEI for each participant, was not included given the amount of missing data creating a sample size that was too small for analysis (n=96), especially given the low variance in the dependent variable.

Aim 2. Understand the perceived barriers and facilitators of the proposed CSA program among Extension staff in 4 states using in-depth qualitative interviews and focus groups.

#### *Study setting and participants*

An a priori, purposive heterogeneous sample of extension educators (n=5 per state, total=20) from non-metropolitan areas of four US states (one in the southeast (SE), two in the northeast (NE1 and NE2), and one in the northwest (NW)) were recruited as part of a larger research project to develop and evaluate the impact of a cost-offset community supported agriculture (CO-CSA) intervention on dietary intake and weight status among low-income families with children in non-metropolitan (populations <50,000) communities.<sup>19</sup> Educators were recruited from each of the four study sites in order to gain a broad understanding from different geographical and cultural perspectives. The goal was to recruit the educator/paraprofessionals who would deliver the educational component of the CO-CSA intervention in each state, plus 2-3 others in different geographic regions of each state. Educators were recruited by phone and e-

mail to participate in the qualitative research, and indicated willingness by completing an online pre-interview survey. The pre-interview survey asked demographic questions (age, race, gender, title), as well as questions regarding years of experience in extension, their direct involvement in educational programming, whether they personally advocate for local foods, and whether they think that local foods should be a priority for extension. Individual in-depth qualitative interviews and focus groups were conducted over the phone,<sup>20,21</sup> with each approach asking distinct questions to elicit answers to questions seeking either individual or group feedback involving an interchange of ideas. The Cornell University Institutional Review and the Vermont University Review Board reviewed and approved the study; the other institutional worked under an official authorization agreement with Cornell as the acting IRB. Informed consent was obtained from all participants.

## Methods

### *In-depth Interviews*

Interviews were conducted by phone with extension educators by trained interviewers in November 2015. Topics included their perceptions of a CO-CSA enhanced nutrition education program, the role of extension in conducting these types of programs, potential barriers and facilitators to implementation and sustainability, and how to best integrate a hypothetical CO-CSA program into existing extension systems. The interviews lasted 30-45 minutes.

### *Focus Groups*

In February 2016, four focus group discussions were conducted over the telephone (5 per group, n=20) among the same sample participating in the interviews, with representation from each state. A trained moderator and note taker led each of the groups. Topics included thoughts on the program, the role of extension in these types of programs, and potential recruitment and

participation strategies. Questions were sent to the participants in advance of the focus group to ensure understanding of the goals of the research and willingness to answer questions, and allow for thoughtful preparation of responses. The focus groups lasted 30-45 minutes.

### Analysis

The interviews and focus groups were audio-recorded, supplemented with detailed hand written notes, transcribed verbatim, independently double coded using a detailed codebook in NVivo11 (QSR International Pty Ltd, 2015), and analyzed for themes and salient quotes. Data rich transcripts were reviewed to develop a codebook for both the interviews and the focus groups, with operational definitions. Transcripts were coded independently using the codebook. Coders (n=2) met to revise the codebook and to resolve disagreements on how to apply the codes, as well as adding and deleting codes. Transcripts were then coded to identify relevant themes and salient quotes. Data reduction was accomplished with deductive (based on study questions) and inductive analysis (on emerging observations), and a code matrix was used for cross tabulation across characteristics (Region (SE, NE1, NE2, NW1) and years of experience (5 or more years; 5 or less years). Summary tables including illustrative quotes were developed to present findings on themes.

Aim 3. Identify factors influencing willingness to participate in a cost-offset community supported agriculture (CSA) program among low income populations, across four states participating in the larger AFRI grant, using a mixed methods approach.

### ***Study setting and participants***

A formative evaluation was completed as part of a larger United States Department of Agriculture (USDA) funded Agriculture and Food Research Initiative (AFRI) research project in North Carolina (NC), New York (NY), Vermont (VT), and Washington (WA). In-depth, in

person interviews were conducted with low-income adults (10-11 per state, total = 42).





Eligibility criteria included: 1) primary caregiver of a child in the household between the ages of 2-19 years, and 2) self-reported income  $\leq$  185% federal poverty level (FPL) or Expanded Food and Nutrition Education Program (EFNEP) eligible. Participants were opportunistically recruited from schools, local health departments and/or social service departments (or similar agencies). This study was approved by the university Institutional Review Board and all participants provided written informed consent.

### Methods

To examine willingness to travel to and participate in the CSA program given hypothetical travel distances and price points, a choice experiment technique (based on McGuirt et al 2014)<sup>21</sup> was developed and utilized (Appendix 3). The instrument was developed based on the existing literature of factors influencing purchase of fruits and vegetables among the low income,<sup>8-10</sup> and on input from topical experts in the AFRI project team. Participants were asked varying hypothetical choice scenarios given certain factors, and were asked to give their stated preference on each choice. Factors were asked about both separately and in combination (e.g. distance and amount). The following scenarios were presented: 1) defined CSA price by share type (including participant stated price willing to pay), 2) incremental distance to pick up CSA in minutes (including mode of transportation: Car, Walking, Bike, Public Transport), 3) distance to CSA pickup and CSA price combined, 4) CSA share frequency and price combined, and 5) CSA share size and frequency combined. A choice experiment was presented to identify preferences to purchase produce from a CSA versus a supermarket (SM), with the two scenarios being: 1) CSA cheaper than SM (same distance and CSA 5, 10, and 15 minutes further), and 2) CSA more expensive than SM (same distance and CSA 5, 10, and 15 minutes closer).

The four CSA example share sizes were constructed based on a typical 6-8 item large CSA share (see Figure 4).<sup>15</sup> Four prices were offered (\$8, \$10, \$15, and \$20) similar to or less than typical weekly CSA share prices.<sup>15</sup> For the “Share Type and Price” scenario, participants were first asked for the price they were willing to pay for each share type. Participants were also asked which share they found “most appealing” for each type, frequency, and price group scenario. For the “Distance willing to travel”, and “Distance and Price” scenarios, the Full Share-Standard Variety share was the example.

**FIGURE 4. CSA Share Examples from Exercises**

Amount	Image
<b>Summer CSA Starter Share</b>	
<b>Summer CSA Half Share</b>	
<b>Summer CSA Full Share-Low Variety</b>	
<b>Summer CSA Full Share-Standard Variety</b>	

Participants were asked to create an ideal share from a sample of produce items available across all study regions, identifying the items they generally wanted, the amount of items they wanted (in units or pounds), and the price they were willing to pay for the share. Amounts were totaled and the mean calculated for each produce type. Probing questions were asked as part of the exercise, including the reasons why certain items and quantities were chosen, whether they could eat all items in one week without them spoiling, and which items they would want that were not pictured.

Interviewers were trained on how to use the instrument across study sites via webinar, and both test takers and interviewers were provided with detailed instructions for completing the exercise. The exercise was audio-recorded with detailed hand written notes and transcribed verbatim. All surveys were independently double tabulated, and researchers met to resolve discrepancies. All audio transcripts were coded using a detailed codebook with inductively and deductively derived codes.

### Analysis

For each scenario, the number of participants willing to participate in the CSA program was summed to obtain a total number of participants interested. “Maybe” was classified as being willing. Percentages of participants willing to participate in the CSA for each price/accessibility situation were generated. Values from nominal and dichotomous categorical variables from the ‘Ideal share’ scenario and ‘Most appealing share option’ were generated.

Results were separated by race (Caucasian versus non-Caucasian), age ( $\leq 33$  versus  $\geq 34$  years; dichotomized to form equal groups to maximize power), total number of household members ( $\leq 4$  people versus  $\geq 5$  people), State (NY, NC, VT, WA) and number of children in the household ( $\leq 2$  children versus  $\geq 3$  children), to examine differences in willingness to participate.

Fisher's exact test (two-tailed) was used to examine associations between these categorical variables. Normality was tested for non-categorical variables of interest, including share type price willing to pay and ideal share produce amounts and price points, using the Shapiro-Wilk Test. Groups were compared for statistically significant differences from one another for the variables of 'Age', 'Total in household', 'Share amount price willing to pay' and 'Ideal share produce amounts and price point', using One-way ANOVA and t-tests for normal distributions and Mann-Whitney-Wilcoxon Test (two-tailed) for non-normal distributions. All quantitative analyses were completed using R Studio. Qualitative findings were analyzed in NVivo 11, and analyzed for themes and salient quotations.

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## **CHAPTER 2: PERSPECTIVES ON A LOCAL FOOD ACCESS AND NUTRITION EDUCATION PROGRAM FROM COOPERATIVE EXTENSION NUTRITION EDUCATORS**

### **Overview**

Introduction: Innovative programming is needed to improve healthy eating behaviors of low-income individuals given disparities in access, knowledge, and skills. Cooperative Extension Educators (herein educators) may be uniquely positioned to inform the development of programming aimed at overcoming these obstacles. Aim: Understand extension educators' perspectives on reduced price (cost-offset) Community Supported Agriculture (CSA) membership paired with tailored educational programming. Methods: Educators (n=20) across four states (1 southeastern, 2 northeastern, and 1 northwestern) participated in both in-depth interviews and focus groups. The interviews and focus groups were audio-recorded with detailed hand written notes, transcribed verbatim, independently double coded using a detailed codebook, and analyzed for themes and salient quotes. Results: Educators had mostly positive initial thoughts on a reduced price CSA membership with tailored education program, and thought low-income families would be interested in participating. Educators suggested that CSA shares be reasonably priced and that pickup and education classes be offered at a convenient location, include food preparation skills and recipes, and involve children. Educators wanted additional training and resources in order to facilitate the program, but thought the existing infrastructure and resources of cooperative extension would help in implementation and sustainability. Discussion: Linking the feedback provided by extension educators (along with other relevant data) with the Diffusion of Innovations model and RE-AIM framework can help guide

approaches to program implementation. Conclusion: The results of this study could be used to inform the development of food access programming within community nutrition education programs.

## **Introduction**

Low-income individuals have comparatively low levels of financial and physical access to fresh produce, and may lack the knowledge and skills needed to successfully integrate these foods into typical food preparation.<sup>1-5</sup> These disparities highlight a need for innovative programming to improve healthy eating behaviors. Community nutrition educators who work with these populations may be uniquely positioned to inform the development of new programming aimed at overcoming these obstacles.

Two of the largest nation-wide nutrition education programs, the USDA funded Expanded Foods and Nutrition Education Program<sup>6</sup> (commonly known as EFNEP) and Supplemental Nutrition Assistance Program-Education (SNAP-Ed),<sup>7</sup> utilize National Institute of Food and Agriculture (NIFA) Cooperative Extension staff as nutrition educators to deliver a series of interactive lessons of evidenced based messages.<sup>8</sup> Unfortunately the effectiveness of these programs is limited by the fact that most programs are not able to address the issue of access to affordable healthy foods, which may prevent the adoption of healthier lifestyles by their participants.<sup>9-12</sup> Thus, there is a need for new approaches that complement the knowledge and skills being learned in the classroom with improved access to fresh fruits and vegetables. One approach may be to link these established educational programs with the local food system, including the use of a Community Supported Agriculture (CSA) model. In this model, members of the CSA pay for the whole season upfront, and receive a weekly share (or portion) of vegetables and fruits from a local farm. A modified version of this model for low-income

participants would include (1) a weekly or monthly payment rather than paying in full at the beginning of the season, (2) the ability to use SNAP benefits, and (3) having a cost subsidy or “offset” to make the produce more affordable.

It is not clear how this type of program might be viewed by extension educators who may be strategic partners in facilitating access to such a program or helping publicize it. Thus, having their input early during program development may improve uptake, fidelity, and effectiveness. This approach is based on the Diffusion of Innovations model,<sup>13,14</sup> where innovation development is based on market input in order to design and implement a new program based on the needs and current attitudes of potential adopters. The important characteristics of innovation that determine diffusion, and their relation to this project, include: 1) relative advantage (is the nutrition education plus CSA program perceived as better than current education-only options?), 2) compatibility (does the new program fill a need for low-income individuals and fit the organizations’ values?), and 3) complexity (is the new CSA plus education program easy to use with participants and implement by the organization?). Our approach is also informed by the RE-AIM framework<sup>15</sup> for public health planning to improve program implementation and sustainability, including the steps of ‘Reach’ (What will get the population of interest to participate in the program?), ‘Effectiveness’ (What is the impact on participants and program implementers?), ‘Adoption’ (How do we develop organizational support to adopt this program?), Implementation (Can the program be implemented with fidelity, and what is the time and cost?), and ‘Maintenance’ (Can the program become institutionalized, and create long term change in participant behavior?).

While a few studies have asked extension educators about their needs and thoughts on general programming,<sup>16-18</sup> to the best of our knowledge, there are no studies in the literature that

have sought nutrition educators' perspectives to inform a new food access intervention. Thus, this research aimed to better understand the interests and opinions of extension educators on a proposed cost-offset CSA program that may partner with community nutrition educators on promotion and linkages for participants.

## **Methods**

An a priori, purposive heterogeneous sample of extension educators (n=5 per state, total=20) from non-metropolitan areas of four US states (one in the southeast (SE), two in the northeast (NE1 and NE2), and one in the northwest (NW)) were recruited as part of a larger research project to develop and evaluate the impact of a cost-offset community supported agriculture (CO-CSA) intervention on dietary intake and weight status among low-income families with children in non-metropolitan (populations <50,000) communities.<sup>19</sup> Educators were recruited from each of the four study sites in order to gain a broad understanding from different geographical and cultural perspectives. The goal was to recruit the educator/paraprofessionals who would deliver the educational component of the CO-CSA intervention in each state, plus 2-3 others in different geographic regions of each state. Educators were recruited by phone and e-mail to participate in the qualitative research, and indicated willingness by completing an online pre-interview survey. The pre-interview survey asked demographic questions (age, race, gender, title), as well as questions regarding years of experience in extension, their direct involvement in educational programming, whether they personally advocate for local foods, and whether they think that local foods should be a priority for extension. Individual in-depth qualitative interviews and focus groups were conducted over the phone,<sup>20,21</sup> with each approach asking distinct questions to elicit answers to questions seeking either individual or group feedback involving an interchange of ideas. The Cornell University Institutional Review and the Vermont

University Review Board reviewed and approved the study; the other institutional worked under an official authorization agreement with Cornell as the acting IRB. Informed consent was obtained from all participants.

### In-depth Interviews

Interviews were conducted by phone with extension educators by trained interviewers in November 2015. Topics included their perceptions of a CO-CSA enhanced nutrition education program, the role of extension in conducting these types of programs, potential barriers and facilitators to implementation and sustainability, and how to best integrate a hypothetical CO-CSA program into existing extension systems. The interviews lasted 30-45 minutes.

### Focus Groups

In February 2016, four focus group discussions were conducted over the telephone (5 per group, n=20) among the same sample participating in the interviews, with representation from each state. A trained moderator and note taker led each of the groups. Topics included thoughts on the program, the role of extension in these types of programs, and potential recruitment and participation strategies. Questions were sent to the participants in advance of the focus group to ensure understanding of the goals of the research and willingness to answer questions, and allow for thoughtful preparation of responses. The focus groups lasted 30-45 minutes.

### Analysis

The interviews and focus groups were audio-recorded, supplemented with detailed hand written notes, transcribed verbatim, independently double coded using a detailed codebook in NVivo11 (QSR International Pty Ltd, 2015), and analyzed for themes and salient quotes. Data rich transcripts were reviewed to develop a codebook for both the interviews and the focus groups, with operational definitions. Transcripts were coded independently using the codebook.

Coders (n=2) met to revise the codebook and to resolve disagreements on how to apply the codes, as well as adding and deleting codes. Transcripts were then coded to identify relevant themes and salient quotes. Data reduction was accomplished with deductive (based on study questions) and inductive analysis (on emerging observations), and a code matrix was used for cross tabulation across characteristics (Region (SE, NE1, NE2, NW1) and years of experience (5 or more years; 5 or less years). Summary tables including illustrative quotes were developed to present findings on themes.

## **Results**

### Participant Characteristics

Characteristics of the participants are displayed in Table 1. The average age was 48 years, with a range of 24-67 years. All were female and most were white (16/20=80%). Participants had, on average, 9 years of experience in extension. Two (2/20=10%) participants did not currently deliver programs directly but acted in a supervisory role. Two (2/19=11%) of the participants did not personally advocate for local foods, and two (2/19=11%) did not believe that the promotion of local foods should be a priority for extension.

### In-Depth Interviews

#### *Initial thoughts about the CO-CSA program concept*

Educators mostly shared positive initial thoughts about the program concept, including the two educators who stated that they did not think promoting local foods should be a priority for extension. The complimentary nature of both learning about healthy eating while also having improved access to local fruits and vegetables was a frequently mentioned positive aspect of the program:



SE PT6- “I think that will fit into what we're already doing...because I think it's important for people to eat healthier and to eat fresh fruits and vegetables. If we can provide a way to get that, and get local, then I think that's great...I'm super excited...”

Educators were also intrigued by the thought of connecting program participants to local foods and eating seasonally: NE2 PT1- “I think it's wonderful...People don't know what's grown locally sometimes. And they don't know how to use it...”. The educators did share some initial concerns about participation due to lack of interest and attendance: NE2 PT3- “More difficult than anything is getting people to attend {these types of programs}...”.

#### *Perceptions on whether low-income clients would be interested in the CO-CSA program*

Most educators thought the low-income participants would be interested in the program because of a general increase in interest in healthier and local foods, interest in fresh produce, and the potential price savings on produce. NE2 PT1: “I think a lot of people are paying more attention to having fresh local foods...the cost-offset part of it is wonderful. They're gonna be getting the fresh, local items at a deal.”

The educators often qualified their answers by saying that this interest would be conditional, based on factors like having the program at a convenient location, the cost of the boxes being affordable: SE PT5-“If that's somethin' that they could afford. Because some folks around here, really they are counting their pennies.” They also mentioned that while there might be interest, getting them to actually utilize the program might be the challenge: NE1 PT1: “Yeah, I think so...it's just a matter of getting those folks to commit, and then to actually follow through.”

### *Perception of factors believed to make low income participation easier*

The top factors that extension educators mentioned to make participation easier for low-income clients were (Table 2): ‘convenient location for pick-ups’, ‘learning preparation skills’, ‘learning new recipes’, ‘offering education on healthy eating’, and ‘SNAP-EBT acceptance’. ‘Convenient location’ was the top factor in every state but NE2, where ‘preparation skills’ was most important. Those with less experience were much more likely to suggest that the program needed to be ‘approachable’ and ‘providing education’, but those with more experience focused more on factors like convenient location and affordability.

### *Perception of factors that make participation difficult for low-income clients*

The most frequently mentioned factors that would make participation in the CO-CSA program difficult for low-income participants were (Table 2): ‘not having enough money/limited finances’, ‘transportation issues’, ‘spoilage of produce’, ‘chaos/unpredictability of life’, and ‘unfamiliar Produce’: SE PT4-“Yeah, most of the folks live...week to week. So having a large amount of cash that they would be investing in for the future would be really difficult.” Limited financial resources and transportation issues were frequently mentioned across all states. Those with 5 years or less experience were much more likely to cite ‘unpredictability of life’ and ‘time’ as a factor, and those with 5 or more years of experience were more likely to cite ‘money’ and ‘transportation issues’.

### *Similar existing programs*

Most of the educators said they did not know of a CO-CSA program. A few educators knew of, or were a part of, similar CO-CSA programs in their community: NE2 PT1: “I would

bring samples and then we would talk about it...Later on in the year when we had the CSA...they would see that and just get excited.”

### *Incorporating a CO-CSA Program into Extension*

A summary of quotations to illustrate themes for incorporating a CO-CSA program into Extension can be found in Table 3. Participants overwhelmingly expressed that they had a high level of organizational support from higher level extension staff for programs like this, including support from supervisors, directors, and state-level staff. The only comments suggesting low organizational support had to do “with having to start the program from scratch”, and ‘communication issues with the state extension office’.

The most commonly mentioned existing extension resources that could enhance the proposed program included the ‘other staff within extension’, the ‘facilities and equipment’ available for use, ‘existing connections with farmers’, and ‘knowledge and experience with nutrition education programs’. Extension educators identified several types of staff members that they thought would be most helpful, including those inside and outside of family and consumer sciences: SE PT6-“... {Having} not just the FCS agent being involved in that piece, but if the county has a horticulture agent, or the ag agent, or small farms agent...Because I could see this being an integrated program for Extension...”

### *Additional Skills Needed by Extension Educators to Implement a CO-CSA program*

Extension educators mentioned several additional skills they thought they would need to successfully implement this type of program. The most frequently mentioned answers included ‘training’ on the program implementation and CSAs in general, a ‘manual/curriculum’ to guide

implementation, and ‘access to new recipes’ to match the new foods participants were being exposed to in the boxes.

*Perceived advantages of running the CO-CSA program within extension*

The ‘current programming being implemented through Extension’ was by far the most frequently mentioned advantage of running the program within Extension. NE2 PT1: “I think it's a continuation of what we're already doing... We're doing nutrition education where we support our farmers. Let's put the two together with our low-income families... it's a natural progression to me.” Other advantages were the ‘existing relationships with farmers and low-income clientele’, and the ‘availability of trained and experienced nutrition educators’.

*Perceived disadvantages of running the CO-CSA program within extension*

The main factors that were stated as disadvantages of running the program within Extension were ‘logistics of running the program’ ‘staff time and availability’, ‘working within the parameters of current federally funded programming’, ‘recruitment’, and ‘attendance’. Educators spoke of the many responsibilities extension staff members have given budget cuts that have reduced the workforce, and that adding another program could be “challenging” and “time consuming”, and they might lack the time and resources required.

The most frequently mentioned incorporation problems varied by state, but ‘logistics of running the program’, ‘time’, and ‘administrative burden’ were frequently mentioned across states. Those with less than 5 years of experience seemed more concerned with attendance and recruitment, whereas those with more than 5 years of experience seemed more concerned with having enough time for the program.

## Focus Groups

A summary of focus group feedback can be found in Table 4.

### *Thoughts on a CO-CSA program*

There were mixed reactions when educators were asked their initial thoughts on the program in the focus group setting. Many liked the idea calling it ‘positive’ and ‘needed’, but a few were concerned that the participants might be overwhelmed by the CSA share, and some thought that the program was nice but not necessarily needed in light of other goals.

### *Suggestions for getting people to participate*

The top suggestions for getting people to participate in the program were the program being ‘accessible or convenient’ with low-income housing communities as “ideal”, ‘child involvement or childcare being provided’ to help parents attend, and ‘surveying potential participants to learn of their interests and desires’ so that we learn what participants want and not what others want for them.

### *Long term sustainability of the CO-CSA program*

The educators had mixed reactions on whether the program is sustainable. Some thought that the program would “absolutely” be sustainable due to its fit with current programming. Others thought that it could maybe be sustainable given certain conditions, including allowing for time for the program to develop and become known. For those that thought it wouldn’t be sustainable, they were concerned that this might be getting ahead of where program participants are at in their movement towards healthier eating.

### *Potential community partners seen as important by extension educators*

The educators mentioned several community partners who they thought could help the program, including food banks, community centers, health department, housing projects, and community development councils. They also stressed the importance of collaborating as an interagency team: NW PT2- “Get everyone to be on board and everyone to promote it, everyone to help educate.”

### *Involvement of children in the program: perspectives from both interviews and focus groups*

Educators frequently mentioned the value of children being involved in the process, or the importance of childcare being provided so that the parents can participate in the educational classes. NW PT1: “...if you can get the children really engaged so that they're nagging their parents to attend and are clearly getting a lot out of the programming, I think that would be really good.”

### Relation to Behavioral Frameworks

A summary of how findings address the concepts and components in the Diffusion of Innovations model and RE-AIM framework is found in Table 5, and a conceptual diagram linking findings to RE-AIM is found in Figure 5. In relation to the Diffusion of Innovations model, educators mentioned that the program needed to be affordable for participants and not overly time consuming for Extension staff (cost), that the new program would enhance existing programming (relative advantage), that the program needed to utilize existing resources to help with program logistics (complexity), and that the program fit well with their current programming/mission (compatibility). In relation to RE-AIM, educators mentioned that the program could reach the target population but had to address needs to ensure participation

(reach), that it would address participant's need for access to healthier foods (effectiveness), that uptake and fidelity would be enhanced through training and having the right people in place (adoption and implementation), and that the program could be sustainable under the right conditions and support (maintenance).

## **Discussion**

Several findings were similar to the existing literature, including common barriers to healthy eating for low-income individuals.<sup>3-5</sup> In terms of specifically accessing local foods, educators mentioned inconvenient locations and times for purchasing food, and the inability to use SNAP-EBT, which is similar to previous findings<sup>3,4,22,23</sup> In the few studies looking participation of low-income consumers in CSAs, financial and physical access were also commonly cited factors.<sup>24-26</sup> Interestingly, in the Quandt et al<sup>26</sup> intervention, items that may have been unfamiliar to participants were emphasized, which was something the nutrition educators in our study discouraged. Overall, the similarities and differences in perceived factors influencing program participation and implementation across geographic areas support the usefulness of both broad and localized programmatic approaches.

Across both in-depth interviews and focus groups, children were commonly cited as important factors in participant's interest in the program. Other research has found the importance of including children in nutrition education.<sup>27,28</sup> Family focused interventions are highly effective because of the reciprocal influence that children have on their parents,<sup>28-30</sup> and that parents have on their children.<sup>31,32</sup> The involvement of children in this type of programming should be thoughtfully considered.

Given the strong initial interest of educator's and possibly their participants in the proposed program, work should be done to critically examine the integration of this type of program into current Extension programming. Linking the feedback provided by Extension nutrition educators (along with other relevant data) with the Diffusion of Innovations model to understand what is needed to achieve widespread dissemination, as well as development and evaluation models such as RE-AIM, should help inform that examination and guide the thinking on design and implementation of such a program (as shown in Table 5). Working with the potential community partners mentioned by the educators, who can assist with program recruitment, implementation, and logistics, will be critical to the success of any efforts given Extension staff and resource constraints.

### Strengths

The use of both in-depth interviews and focus groups allowed for a more complete understanding of the topic, including identifying more skepticism about the program in the focus groups compare to the interviews. The educators were diverse in age, experience, and location. The use of phone focus group potentially created more independent answers and allowed for greater participation.<sup>31,32</sup> In terms of the analysis, the use of thematic matrices allowed for cross-tabulation of ideas across different factors. Linking findings to behavioral theory and frameworks helped frame results to best inform future program implementation.

### Limitations

The inability to witness non-verbal communication in the focus groups was a weakness. Also, the educators were predominantly white, female, and all rural, which may have limited the diversity of experience and perceptions of the program. The sample of educators, while fairly



geographically diverse, may not capture all experiences and opinions from this nationwide program.

#### Implications for theory, policy, and/or practice

This research aimed to better understand the interests and opinions of extension educators on a proposed cost-offset CSA program. The results of this study should be used to inform future food access programming within community nutrition education programs given the informative insights and feedback shared by educators, and should inform a critical examination of the integration of this type of program into current extension programming.

## TABLES AND FIGURES

**TABLE 1. Nutrition Educator Characteristics**

<b>Participant Characteristics</b>	
Number of participants (total)	20
Northeast state 1 (NE1)	5
Southeast state (SE)	5
Northeast state 2 (NE2)	5
Northwest state (NW)	5
Age in average years (range)	48 (24-67)
Race	
White	16 (80%)
Black	1 (5%)
Hispanic	1 (5%)
Asian	1 (5%)
Native American	1 (5%)
Gender	Female (100%)
	Male (0%)

Experience in Extension, Years (avg)	9 years (0.5-40 )
Local Foods Advocate	17/19 (out of 20, with 1 No Answer)
Local Foods a Priority	17/19 (out of 20, with 1 No Answer)
Deliver Educational Program	2/20

**TABLE 2. Nutrition Educators perceived facilitators and barriers to low-income individual's participation in a Cost-offset Community Supported Agriculture program from Interviews**

<b>CO-CSA Facilitators</b>	<b>Illustrative quotes</b>
Convenient Location	NW PT1: "The drop-off point is the most important thing. Getting in your car to pick up a box during a limited time window on a specific day, week after week, definitely gets to be a little bit of an inconvenience...make it extremely convenient...."
Learning preparation skills	NE2 PT3: "It's a matter of can you give them skills in that period of time, that they can truly go home and duplicate it... When we talked to families in homes, we found out that, "I don't know what to do with a cauliflower. I don't even know how to cut it

	up. What am I supposed to do with this thing?"
Learning new recipes	NE1 PT5: "If they had recipes that would help them use what they are getting, [recipes] that are very simple, have very few ingredients."
Offering Education on healthy eating	NE2 PT2: "People feel more and more these days uncertain about how to cook food at home, so if we can address that through the education...with the educational component, with some added support to help them identify the things that they're gonna find in their CSA box"
SNAP-EBT Acceptance	SE PT4: "It might be very important for them to use their SNAP benefits...I think that it needs to be a possibility for folks."
<b>CO-CSA Barriers</b>	<b>Illustrative quotes</b>
Not having enough Money/Limited finances	SE PT3: "I think they would be afraid to commit that much money. What if they realize it wasn't for them, or they could not fit that into their budget, somebody lost their job..."

Transportation issues	NE1 PT1: “Transportation in a lot of different ways impacts people. A lot of people live rurally and it's really hard to get in from somewhere.”
Spoilage of produce	NW PT2: “Possibly a lot of food going to waste especially if people aren't able to utilize the fruits and vegetables that are given to them... And also I would worry about the quality of it if it's going to spoil fast...”
Chaos/Unpredictability of Life	SE PT4: “Many of my participants don't even know where they'll be living in a couple months... Or what their circumstance might be... If they will have a job. So planning that far ahead is something that is really challenging for my participants.”
Unfamiliar Produce	SE PT6: “In the beginning, until they are exposed to different types of produce {through educational sessions}, then they might be hesitant to be involved in it. Because they can go to the grocery store and buy the same thing that they're used to

	<p>having or cooking or eating year round...I think that could be an issue.”</p>
<p>Time and Commitment</p>	<p>SE PT1: “They talk about time a lot when it comes to scheduling classes...it's like, "Well I can't meet until after 5:30, whenever I get off." And it could be an issue as far as pickin' up the boxes, unless it's done in the evening or morning, or a time like that. Or on Saturday.”</p>

**TABLE 3. Summary of Thoughts on Incorporating a Cost Offset-CSA program into Extension**

<b>Organization Support</b>	<b>Illustrative quotes</b>
High Support	SE PT6: “I think we have the support there, as long as Extension is heavily involved...like I've said, local foods is one of our flagship programs with Extension.”
Low Support	NW PT2: “As far as if we were to introduce something to our state office...it's pretty difficult to get a response back if we have questions from them... And there's always communication issues that might be difficult... It's always a little bit hard trying to establish... to see if they're gonna take on another curriculum.”
<b>Additional Skills Needed</b>	<b>Illustrative quotes</b>
Training	NW PT2: “Just be more informed about how CSAs work... how we would collaborate with the farmer on that...If we had a curriculum to follow, and had training on how to teach the curriculum, that would be good to have.”

Manual/curriculum	NW PT2: “Definitely all of the components of the curriculum that we would need to conduct the program successfully... And having it in an organized manner that's easy to follow.”
Access to new recipes	SE PT4: “It's always great to have a good resource for lots of different recipes, so that if you do have different ethnic groups or dietary needs or requirements... You can pull from that. It's also pretty important for those recipes to have few ingredients, or at least have common ingredients that are inexpensive. So developing that I think is going to be key.”
<b>Advantages of Extension</b>	<b>Illustrative quotes</b>
Current programming	NE2 PT1: “I think it's a continuation of what we're already doing... We're doing nutrition education where we support our farmers. Let's put the two together with our low-income families... I mean it's a natural progression to me.”
Existing relationships with farmers and low-income clientele	SE PT4: “We already have a lot of partnerships in our relationships with area



	<p>farmers... We also have relationships with the client base, with the limited resources...</p> <p>So in a lot of ways, it is really easy to connect the provider with the consumer... because we know both”</p>
Trained and experienced nutrition educators	<p>NE2 PT4: “We already have federally funded nutrition education programs, so that's huge. We have the staff who is trained in facilitated dialogue and adult education and nutrition basics, and so that's a huge advantage that we have.”</p>
<b>Disadvantages of Extension</b>	<b>Illustrative quotes</b>
Staff time and availability	<p>SE PT6: “I feel like it would be very time consuming...that could be a huge disadvantage...not being able to put enough of the time into this program that may be required... Starting next year, it's just gonna be one {nutrition educator} for every two counties... {the} need for maybe a program assistant....</p>
Logistics of running the program	<p>NE2 PT3: “It might be a bit challenging, and I'd have to work it out...you might not have enough families near that farmer</p>

	<p>...We'd have to think about how we would connect something with the farmer</p> <p>...there's a lot of things to nutrition programming in our county.”</p>
<p>Working within the parameters of current federally funded programming</p>	<p>NW PT3: “I have one program where I've got pretty strict parameters, {it is} harder to make sure I fall within all those guidelines.”</p>

**TABLE 4. Summary of Focus Group Feedback**

Topic	Illustrative quotes
Initial Thoughts	<p>NE1 PT4: “You're combining the things that we're talking about...farming, agriculture, nutrition education ...having a program that's starting off with education along with access to the foods they're being educated about is a positive thing, and needed at least where we are.”</p> <p>NW PT1: “...{the boxes contain} foods that require a lot of prep just to get them in the fridge...I think that they'll enjoy the education...but ultimately not see the value in participating in the CSA.”</p> <p>SE PT1: “As far as if the program is needed, I don't know if it's needed... we encourage our participants to eat more fruits and vegetables whether its fresh, frozen, or canned...our goal is to increase consumption.”</p>
Suggestions for getting people to participate	<p>NW PT1: “A low-income housing community is the most ideal</p>

	location...because you have to meet people where they are...you have to make it as drop-dead easy as you can.”
Potential community partners	NE1 PT4: “I think gathering together community partners and agencies, all together in a room, is always a very good way to create a movement of similar thinking.”

**TABLE 5. Relation of findings to Diffusion of Innovations model and RE-AIM framework**

<b>Diffusion of Innovations</b>		
<b>Concepts</b>	<b>Definition</b>	<b>Application to the CO-CSA Innovation</b>
Cost	Perceived cost of adopting and implementing the innovative CO-CSA Intervention	<p><u>Participant level:</u></p> <p>SE PT5-“If that's somethin' that they could afford. Because some folks around here, really they are counting their pennies. So I suppose it would probably depend on what the cost of it would be.”</p> <p><u>Organizational Level:</u></p> <p>SE PT6- “The disadvantage is time consumption. I feel like it would be very time consuming.”</p>
Relative advantage	The extent to which the innovation works better than that which it will displace	NE1 PT4- “Having a program that's starting off with education along with access to the foods they're being educated about is a positive thing, and needed at least where we are.”
Complexity	The degree to which the innovation is easy	<p><u>Easy:</u></p> <p>NE2 PT4- “We already have nutrition program...staff who’s trained in adult</p>

	to use	<p>education and nutrition basics...our agricultural program help people get connected to local foods, so we have a lot of resources in place”</p> <p><u>Not Easy</u></p> <p>NE2 PT 3-It might be a little challenging...there are a lot of things...It would take resources and commitment beyond what most associations would have.</p>
Compatibility	The fit of the innovation with the intended audience in order to accomplish desired goal (s)	<p>SE PT6- “I think it fits nicely...it’s an extension of what we are already doing...we teach people this is what we need to be eating, and here is an opportunity for us to actually provide access to those healthy foods.”</p>
<b>RE-AIM</b>		
Reach	What will get the population of interest to participate in the program?	<p>NW PT1- “You have to meet people where they are...you have to make it as drop-dead easy as you can.”</p> <p>NW PT3- “I would say it's also about...what do they want? Not what we want to give them. So, if you can engage</p>

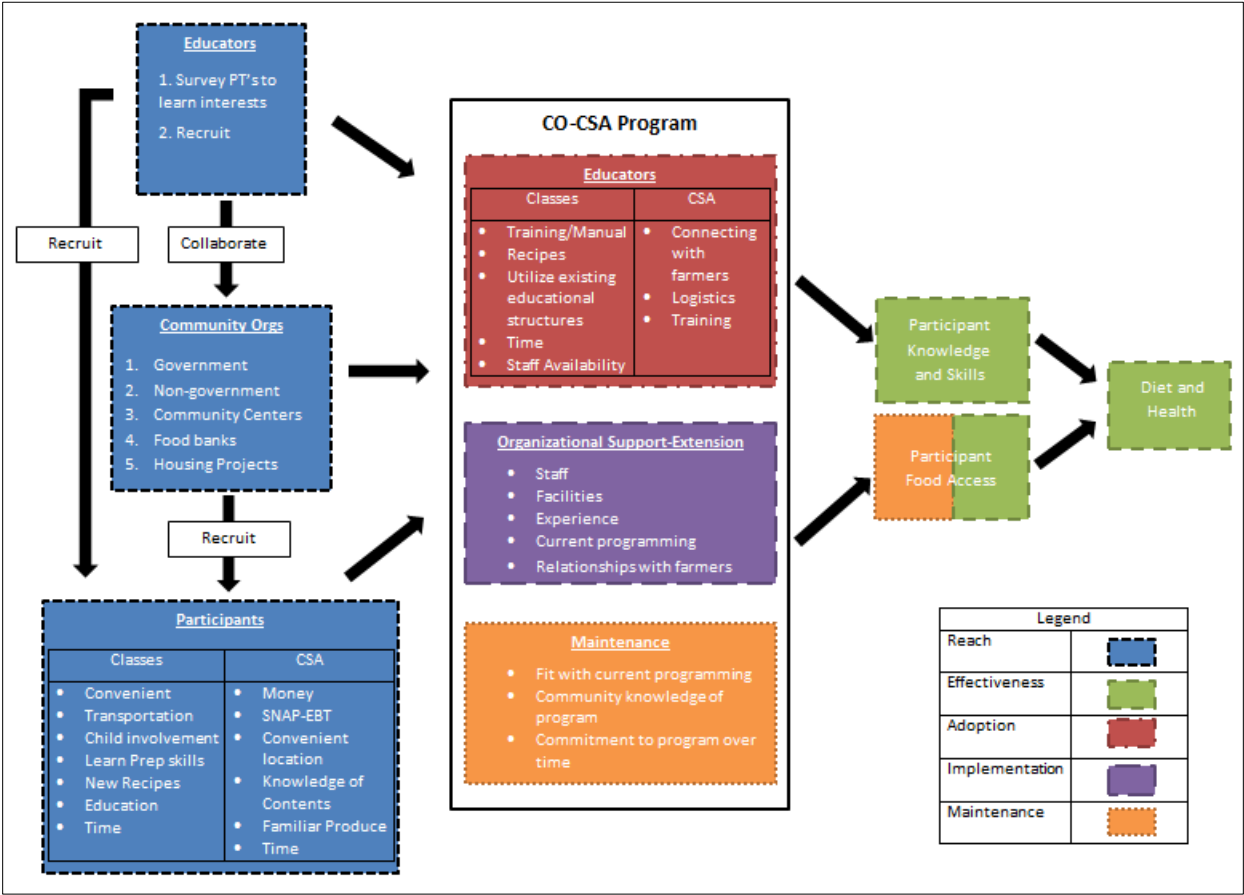
		<p>them at the beginning even before the beginning on what that community wants from you in terms of nutrition education...I think we really have to focus on meeting people where they're at.”</p>
Effectiveness	<p>What is the impact on participants and program implementers?</p>	<p>NE2 PT1- “I think it's incredibly exciting... You are addressing some of the biggest barriers that exist for most families...you're making it cost effective for them...which is a challenge for most families...you're putting together healthy food for them so they don't have to go to the grocery store and kind of be puzzled by what, what should I be buying? What is healthy? This is gonna automatically address that. They're gonna be increasing their fruit and vegetable consumption.”</p>
Adoption	<p>How do we develop organizational support to adopt this program?</p>	<p>SE PT1- “It would be a challenge just because it's something new, you know. But I'm assuming that if I were gonna do this, there would be some kinda trainin' with it for me...I think I would need training on the program. What your expectations are,</p>

		what our goals are.”
Implementation	Can the program be implemented with fidelity, and what is the time and cost?	NW PT3- it making sure you have the right person to do the education piece, and the right space, and are you able to provide child care?...Um, so that, you know, at some point the parents can just be engaged in the education, but then you could bring the kids into the-, to it too. I think you're gonna have to find a day and time that works for your participants, and hopefully then that will also work for the farmer.
Maintenance	Can the program become institutionalized, and create long term change with the participant behavior?	<p><u>Yes</u></p> <p>NE2 PT1- “I absolutely do think it can easily be sustainable and integrated in. I think it's a very natural progression and a natural fit.”</p> <p><u>Maybe</u></p> <p>SE PT1- “You're gonna at least have to have it in place for five years to see a really good impact on that and by then, it will be well known in the community... people know where to access it, how to access it, what it's about... {otherwise} it would just</p>



		<p>be a waste of money and time.”</p> <p><u>No</u></p> <p>NW PT3- “My initial reaction is no...I don't think it's necessarily addressing the true needs... I just think there's something that's gotta happen before this...”</p>
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**FIGURE 5. Conceptual diagram linking findings to RE-AIM**



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### **CHAPTER 3: A CHOICE EXPERIMENT TO EXAMINE FACTORS INFLUENCING WILLINGNESS TO PARTICIPATE IN A COMMUNITY SUPPORTED AGRICULTURE (CSA) PROGRAM AMONG LOW INCOME PARENTS.**

#### **Overview**

Objective: To understand low income consumers' preferences related to participation in a CSA program, given particular price, frequency, food quantity, and accessibility conditions.

Design: Qualitative interviews with quantitative assessment using a choice experiment to examine willingness to purchase a CSA under a variety of conditions. Setting: Rural North Carolina, New York, Vermont, and Washington. Participants: Forty-two low-income adults with at least one child in the household. Phenomenon of Interest: Willingness to purchase a CSA, Ideal CSA share. Analysis: Willingness to participate in the CSA for each condition was summed and compared across conditions. Results were separated by race, age, number of children, and total household members to examine for differences in willingness to participate. Fisher's exact test and t-tests were used to examine for differences in willingness between variables. Salient quotes were extracted. Results: The ideal CSA program for low-income individuals would be a full-sized share of 8-9 items of mixed variety, distributed every other week, priced at less than \$15, no more than 10 minutes further than the supermarket from their home, and preferably less expensive but no more than 20% more expensive than supermarket prices. Conclusions and Implications: Future CSA interventions should take into account these consumer-level preferences.

## Introduction

Lower income individuals consume fewer fruits and vegetables than their higher income counterparts,<sup>1-3</sup> perpetuating disparities in diet-related disease.<sup>4-7</sup> The cause of these disparities is multifactorial, including limited access to foods that are affordable and healthy.<sup>8</sup> This is particularly true in rural areas, where people consume fewer fresh fruit and vegetables than their urban counterparts.<sup>9,10</sup> Thus, there is a need to improve spatial and financial access to healthy foods in rural areas for limited resource populations.

One approach might be using the local food system to increase access to healthy foods, including Community Supported Agriculture (CSA) models.<sup>11-14</sup> In a typical CSA model, consumers buy a share of the farm produce for the upcoming season, with a pre-season lump sum payment. They then receive weekly shares of fruits and vegetables (sometimes called produce boxes) at distribution points throughout the growing season.<sup>15</sup> CSA program participants report healthier dietary behaviors.<sup>16-18</sup> Few CSA programs have been designed for lower income populations,<sup>12,14</sup> as the typical lump sum financial commitment to the farmer before the growing season may be a deterrent for limited resource populations.<sup>13</sup> One possible CSA approach to improve financial access for this population is a cost-offset CSA, where the prices of the shares are subsidized by some mechanism to make them more affordable.

While this approach may be a possible solution, it remains unclear what the CSA features should be in order to be most appealing in a low-income population, such as variety of foods and frequency of distribution. Understanding participant preferences is imperative for program development.<sup>19,20</sup> An adaptation of an econometric non-market valuation stated preference technique,<sup>21</sup> where decisions of individuals are used to elicit their preferences for the items of interest,<sup>22</sup> can be used to identify preferences to influence participant shopping behavior.<sup>21</sup>

No published peer reviewed studies have completed an in-depth formative evaluation to understand preferences of low income participants regarding a CSA program. Without this understanding, this program may lack uptake, effectiveness, and sustainability. Quandt et al<sup>12</sup> suggested that altering some of the financial and operational aspects of traditional CSA programs will be necessary to improve the impact of CSA participation in a limited resource audience. Therefore, this study aims to understand low income consumers' "stated preference" for participating in a CSA program, given particular price, frequency, food quantity, and accessibility conditions.

## **Methods**

A formative evaluation was completed as part of a larger United States Department of Agriculture (USDA) funded Agriculture and Food Research Initiative (AFRI) research project in North Carolina (NC), New York (NY), Vermont (VT), and Washington (WA). In-depth, in person interviews were conducted with low-income adults (10-11 per state, total = 42). Eligibility criteria included: 1) primary caregiver of a child in the household between the ages of 2-19 years, and 2) self-reported income  $\leq$  185% federal poverty level (FPL) or Expanded Food and Nutrition Education Program (EFNEP) eligible. Participants were opportunistically recruited from schools, local health departments and/or social service departments (or similar agencies). This study was approved by the university Institutional Review Board and all participants provided written informed consent.

To examine willingness to travel to and participate in the CSA program given hypothetical travel distances and price points, a choice experiment technique (based on McGuirt et al 2014)<sup>21</sup> was developed and utilized (Appendix 3). The instrument was developed based on the existing literature of factors influencing purchase of fruits and vegetables among the low



income,<sup>8-10</sup> and on input from topical experts in the AFRI project team. Participants were asked varying hypothetical choice scenarios given certain factors, and were asked to give their stated preference on each choice. Factors were asked about both separately and in combination (e.g. distance and amount). The following scenarios were presented: 1) defined CSA price by share type (including participant stated price willing to pay), 2) incremental distance to pick up CSA in minutes (including mode of transportation: Car, Walking, Bike, Public Transport), 3) distance to CSA pickup and CSA price combined, 4) CSA share frequency and price combined, and 5) CSA share size and frequency combined. A choice experiment was presented to identify preferences to purchase produce from a CSA versus a supermarket (SM), with the two scenarios being: 1) CSA cheaper than SM (same distance and CSA 5, 10, and 15 minutes further), and 2) CSA more expensive than SM (same distance and CSA 5, 10, and 15 minutes closer).

The four CSA example share sizes were constructed based on a typical 6-8 item large CSA share (see Figure 1).<sup>15</sup> Four prices were offered (\$8, \$10, \$15, and \$20) similar to or less than typical weekly CSA share prices.<sup>15</sup> For the “Share Type and Price” scenario, participants were first asked for the price they were willing to pay for each share type. Participants were also asked which share they found “most appealing” for each type, frequency, and price group scenario. For the “Distance willing to travel”, and “Distance and Price” scenarios, the Full Share-Standard Variety share was the example.

Participants were asked to create an ideal share from a sample of produce items available across all study regions, identifying the items they generally wanted, the amount of items they wanted (in units or pounds), and the price they were willing to pay for the share. Amounts were totaled and the mean calculated for each produce type. Probing questions were asked as part of the exercise, including the reasons why certain items and quantities were chosen, whether they

could eat all items in one week without them spoiling, and which items they would want that were not pictured.

Interviewers were trained on how to use the instrument across study sites via webinar, and both test takers and interviewers were provided with detailed instructions for completing the exercise. The exercise was audio-recorded with detailed hand written notes and transcribed verbatim. All surveys were independently double tabulated, and researchers met to resolve discrepancies. All audio transcripts were coded using a detailed codebook with inductively and deductively derived codes.

### Analysis

For each scenario, the number of participants willing to participate in the CSA program was summed to obtain a total number of participants interested. “Maybe” was classified as being willing. Percentages of participants willing to participate in the CSA for each price/accessibility situation were generated. Values from nominal and dichotomous categorical variables from the ‘Ideal share’ scenario and ‘Most appealing share option’ were generated.

Results were separated by race (Caucasian versus non-Caucasian), age ( $\leq 33$  versus  $\geq 34$  years; dichotomized to form equal groups to maximize power), total number of household members ( $\leq 4$  people versus  $\geq 5$  people), State (NY, NC, VT, WA) and number of children in the household ( $\leq 2$  children versus  $\geq 3$  children), to examine differences in willingness to participate. Fisher's exact test (two-tailed) was used to examine associations between these categorical variables. Normality was tested for non-categorical variables of interest, including share type price willing to pay and ideal share produce amounts and price points, using the Shapiro-Wilk Test. Groups were compared for statistically significant differences from one another for the variables of ‘Age’, ‘Total in household’, ‘Share amount price willing to pay’ and ‘Ideal share

produce amounts and price point', using One-way ANOVA and t-tests for normal distributions and Mann-Whitney-Wilcoxon Test (two-tailed) for non-normal distributions. All quantitative analyses were completed using R Studio. Qualitative findings were analyzed in NVivo 11, and analyzed for themes and salient quotations.

## **Results**

The 42 participants were an average of 35 years old and the majority were female; 50% were white and 33% were Black (Table 6). There were statistically significant differences by Age (overall  $p=.04$ ; NY (mean=41.3) vs. NC (mean=31.1)  $p=.03$ ) and Total in Household ( $p=.02$ ; (NY (mean=2.9) vs. WA (mean=5.0)  $p=.01$ ), and NY had the only 4 males in the study.

**TABLE 6. Demographic Characteristics of Participants Completing the Choice Experiment (N=42)**

<b>Characteristic</b>	<b>N or mean</b>
<u>Number of participants, Total</u>	42
New York	10
North Carolina	11
Vermont	10
Washington	11
Age, mean years old (Range, SD)	35 (R= 21-63, SD= 9.3)
<u>Race</u>	
White	21 (50%)
Black	14 (33%)
Mixed Race	4 (1%)
Hispanic	2 (<1%)
Native American	1 (<1%)
<u>Gender</u>	
Female	38 (90%)
Male	4 (10%)
Adults in Household, Mean (range, SD)	1.8 (R=1-4, SD=0.7)
Children in Household, Mean (range, SD)	2.3 (R=0-5, SD=1.2)
Children in Household, Ages 2-7, Percent	26/40 ( 2 Missing Data) = 65%
Children in Household, Ages 8-12, Percent	25/40 (2 Missing Data) = 63%
Total in Household, Mean (range, SD)	4.07 (R=1-7, SD=1.39)

### ***Preferences for CSA Type and Price***

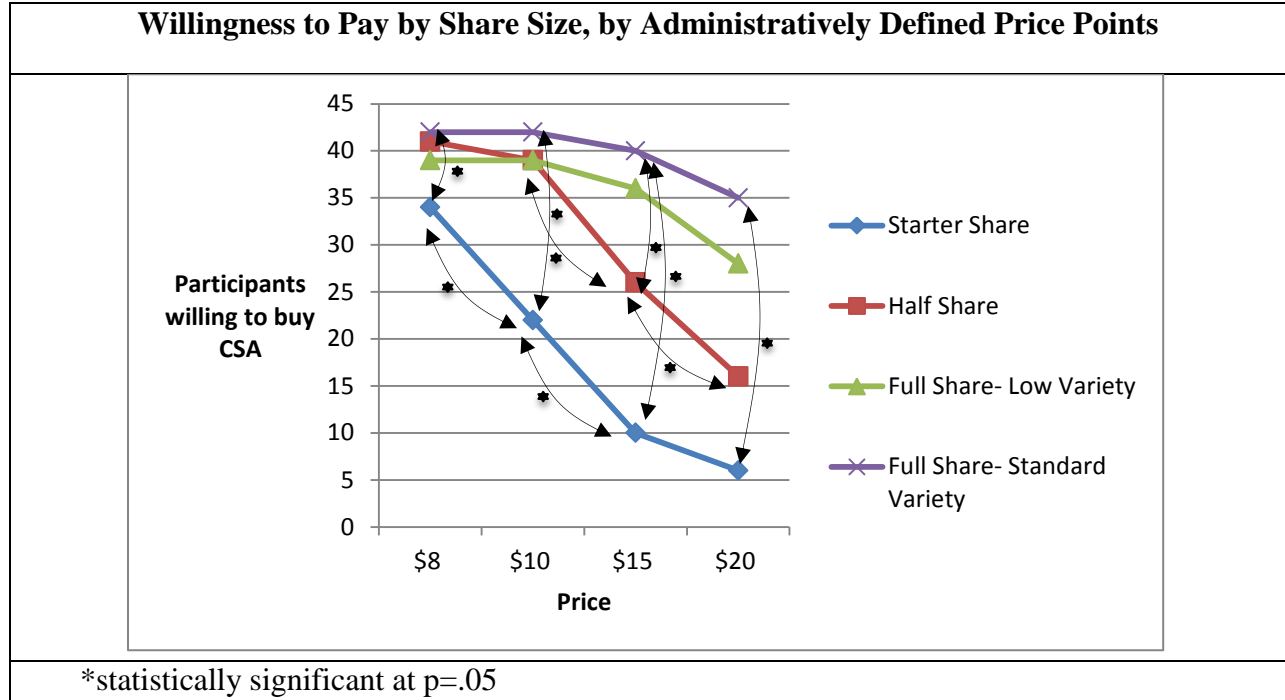
Interest in the CSA and willing to pay increased as the share size became larger, and decreased as the price of the share increased (Figure 6) (Table 7). The highest willingness to participate was for the Full-Standard Variety share at \$8 (n=42), and the lowest was for the Small Share at \$20 (n=6). The smallest overall decrease in interest across increasing price points was for the CSA Full-Share Standard Variety, and the largest overall decrease in interest was for the Starter Share. There were statistically significant decreases in willingness to purchase the Starter Share as price rose from \$8 to \$10 ( $p=0.01$ ), and again from \$10 to \$15 ( $p=0.01$ ). Willingness to purchase the Half Share also significantly declined as price rose from \$10 to \$15 ( $p=0.001$ ), and from \$15 to \$20 ( $p=0.05$ ). There were statistically significant increases in willingness to purchase the Full Share-Standard Variety compared to the Starter Share at all prices – at \$8 ( $p=.005$ ), \$10 ( $p<.001$ ), \$15 ( $p<.001$ ), and \$20 ( $p<.001$ ) -- and also compared to the Half Share at \$15 ( $p<.001$ ) and \$20 ( $p<.001$ ).

Reasons for the share they were most interested in included that they liked the variety and having a larger amount: “It's got a lot of, a different variety of stuff, so yeah it'd be great. If it's all useful, then it's worth every dime.” [WA Participant]; “Just cuz I got more mouths to feed, so it'll last longer.” [NC participant].

**TABLE 7. Participant Defined Price Willing to Pay by Share Size (n=41)**

<b>Participant Defined Price Willing to Pay by Share Size</b>	
Starter Share	Avg.= \$9.48; R=3-30 SD= 5.3
Half Share	Avg.= \$16.24; R= \$0-\$40, SD=8.1
Full Share-Low Variety	Avg.= \$20.17; R=\$0-\$50, SD=10.3
Full Share-Standard Variety	Avg.= \$27.29; R= \$8-\$60, SD= 12.5

**FIGURE 6. Summary of CSA Price and Share Size**



### *Distance Willing to Travel*

The majority of participants would travel by car ( $n=35$ ), though some would walk ( $n=5$ ) or take public transit ( $n=2$ ). For those traveling by car, the mean maximum distance willing to travel for the Full-Standard Variety share was 24 minutes (range of 5-60 minutes), with most (74%, 26/35) willing to drive 15 minutes. For the few who reported walking, the mean maximum distance willing to travel was 32 minutes, with most willing to walk 15 minutes (80%, 4/5). For the two who reported taking public transit, one was willing to travel 20 minutes, and the other 15 minutes.

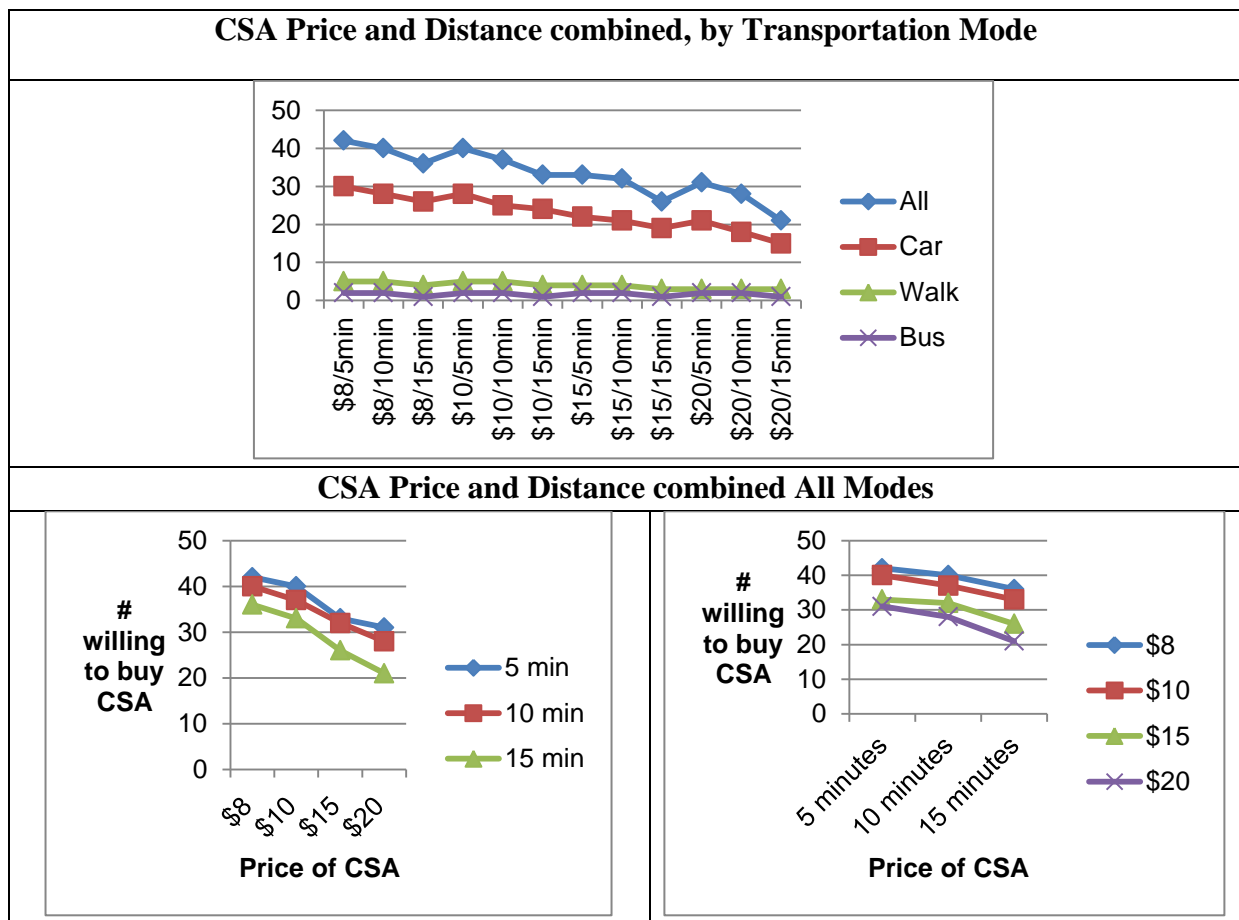
The distance participants were willing to travel was often influenced by their ability to complete other shopping tasks along the way: “Thirty minutes {max distance}, if I know it's gonna be somewhere that's I can get some other shopping done...” [NC Participant]. Distance was particularly a factor for those who walked, as the task of carrying the share long distances

was a concern: “I wouldn't walk too far because I wouldn't wanna carry it all back, so, you know, have a heavy load.” [NY Participant].

### *Distance and Price Preferences*

All participants were willing to get the standard CSA share when at the lowest price and shortest distance (\$8, 5 minutes), but only 50% of participants were willing to get the CSA at the highest price point and distance (\$20, 15 minutes) (Figure 7).

**Figure 7. CSA Price and Distance**

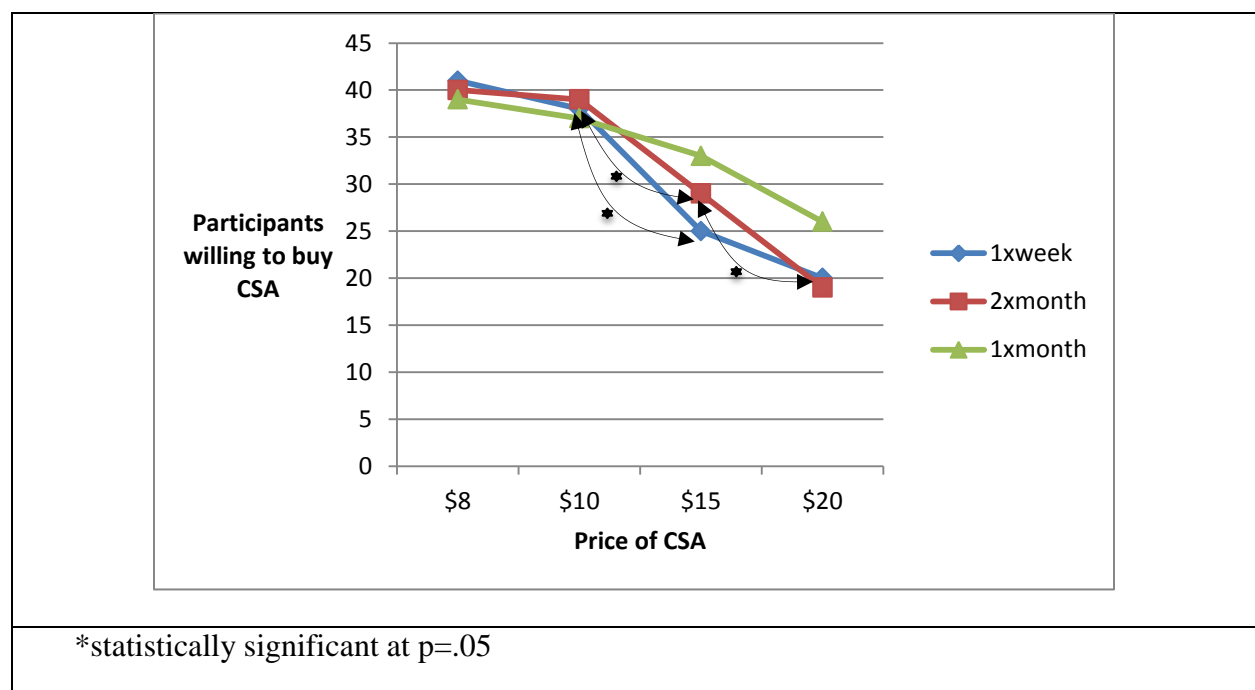


Participants talked about the value of their time and effort as it compared to the cost of the share and the distance traveled: “For 20 dollars, I don't think I would make a 40 minute trip for that. That would be kinda tough.” [NY Participant].

### ***Share Frequency and Price Preferences***

The most popular share was ‘One time per week for \$8’, and the least popular share was ‘Two times per month for \$20’ (Figure 8). Participant’s interest decreased as price increased across all frequency categories. The one time per month share had the highest willingness at the \$20 price point. For the one time per week frequency, only half of the participants were willing to pay \$20, with a statistically significant difference in willingness to pay \$10 and \$15 ( $p=.002$ ). For shares distributed two times per month, there was a statistically significant difference in willingness to pay between \$10 and \$15 ( $p=0.01$ ), and between \$15 and \$20 ( $p=0.05$ ).

**FIGURE 8. CSA Share Frequency and Price**



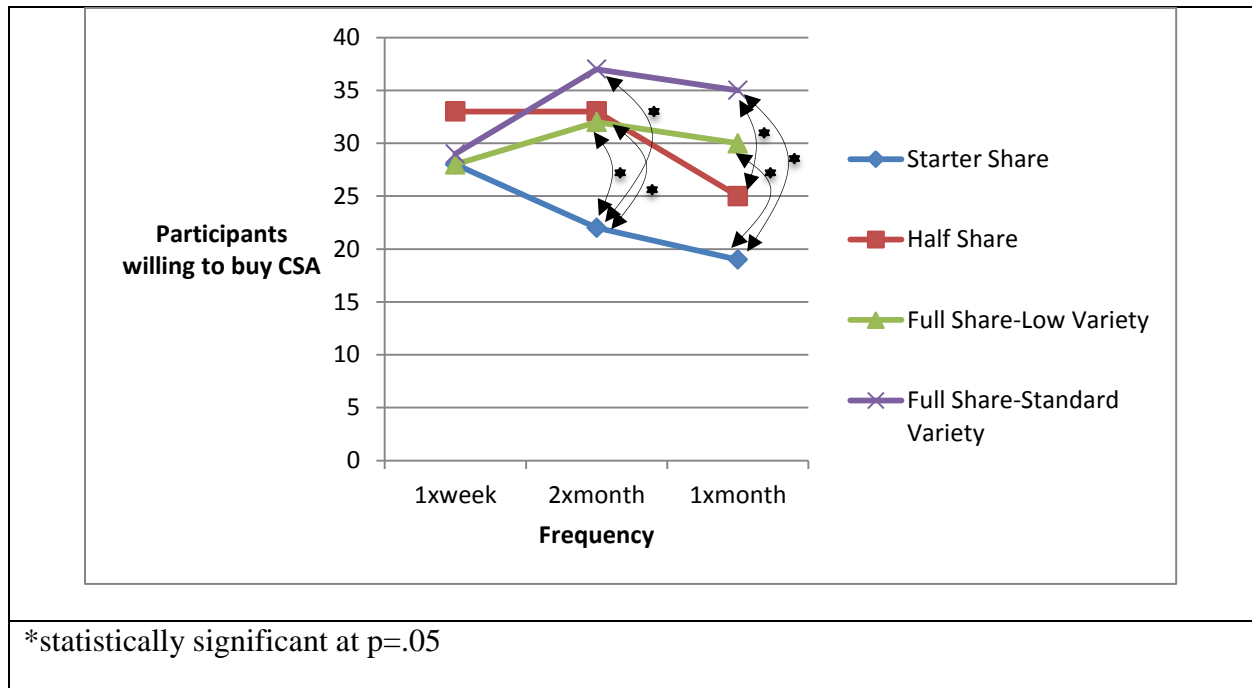


### *Share Size and Frequency*

Participants were most interested in the ‘Full Share-Standard Variety-2 times per month’, and least interested in the ‘Starter Share-1 time per month’. Regardless of frequency, participants were most interested in the Full-Share Standard variety (34), and least interested in the Starter Share (23) (Figure 9). There was fairly equivalent interest in CSA shares available once (27) or twice (31) per month. The largest increase in willingness (+8) was for the Full-Share Standard Variety between one time per week to two times per month, and the greatest decrease (-8) was the Half share from two times per month to one time per month. There were statistically significant increases in willingness at two times per month from Starter Share to Half-Share ( $p=.02$ ), Full-Low Variety ( $p=.03$ ), and Full-Standard Variety ( $p<.001$ ), and at one time per month from Starter Share to Full-Standard Variety ( $p<.001$ ) and Full-Low Variety ( $p=.03$ ), and Half Share to Full-Standard Variety ( $p=.03$ ).

Several participants said that they were concerned about produce spoilage and financial burden with frequent (weekly) large shares, and that spacing the shares out would be appealing. “The timeframe to use it up {would be difficult}. And as far as income...I'm more likely to have the funds to do that every other week than maybe weekly.” [NY Participant]. However, spacing out to one time per month was not frequent enough, and they thought that the produce wouldn't last: “Because those vegetables don't last a month. You have to cook them earlier than that...” [NY Participant]

**FIGURE 9. CSA Share Frequency and Amount**



### *Ideal CSA Share Contents*

The mean number of types of produce wanted was 18.5 ( $R=5-30$ ;  $SD= 7.2$ ) items, and the average number of items wanted in their ideal share was 12.8 items ( $R=5-27$ ;  $SD=5.5$ ). The mean ideal price participants were willing to pay was \$30.70 ( $R=\$8-\$125$ ;  $SD=21.7$ ), and mean highest price they would pay was \$40.13 ( $R= \$10-\$125$ ;  $SD= 23.5$ ). Most thought that they could eat all of the produce in their ideal weekly share ( $33/40= 83\%$ ). Those that did not think they could eat all the produce ( $7/40= 17\%$ ) mentioned storing or freezing the remaining produce. Participants said that they could eat all of the produce because it is how much they normally eat: “Yeah. They (children) love to snack, constantly asking for it. So as far as the fruits and vegetables go... I could do a lot with it. Just using it daily.” [WA Participant]

The top requested items in the Ideal box are listed in Table 8.

**TABLE 8. Ideal box requested items and amounts**

<b>Overall</b>	<ol style="list-style-type: none"><li>1. Apples (33)</li><li>2. Broccoli (32)</li><li>3. Cucumbers (30)</li><li>4. Grapes (29)</li><li>5. Strawberries (29)</li></ol>
<b>Fruits</b>	<ol style="list-style-type: none"><li>1. Apples (37)</li><li>2. Grapes (29)</li><li>3. Strawberries (29)</li><li>4. Peaches (24)</li><li>5. Watermelon (23)</li></ol>
<b>Vegetables</b>	<ol style="list-style-type: none"><li>1. Broccoli (32)</li><li>2. Cucumber (30)</li><li>3. Green beans (25)</li><li>4. Carrots (25)</li><li>5. Bell peppers (24)</li></ol>
<b>Not Pictured</b>	<ol style="list-style-type: none"><li>1. Bananas (9)</li><li>2. Onions (4)</li><li>3. Oranges (4)</li><li>4. Corn (4)</li></ol>
<b>Amount Wanted</b>	<ol style="list-style-type: none"><li>1. Apples (5.7)</li><li>2. Potatoes (3.6)</li><li>3. Peaches (3.2)</li></ol>

Many said they were choosing items based on foods they or their children liked or typically ate: “Those are what we eat more often. Those are what the kids enjoy eating and they can eat on a daily basis.” [NY Participant]. Snacking, using the produce for salad or other specific recipes or dishes, versatility of items, and healthiness of items were commonly mentioned. Items were not wanted because they were disliked or unfamiliar.

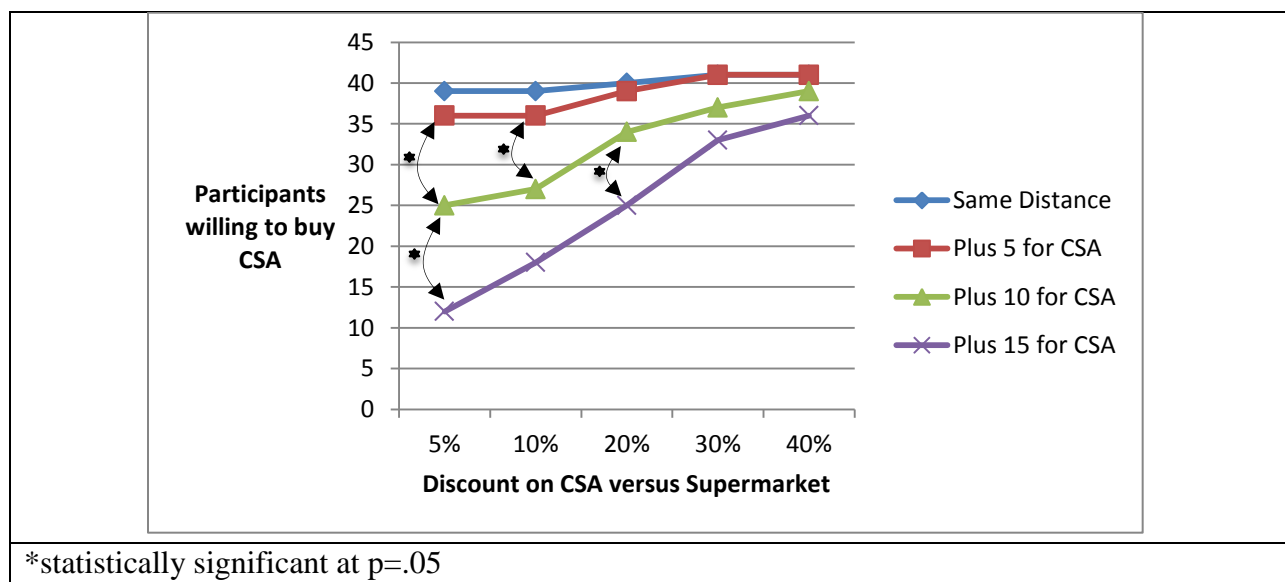
#### ***CSA Less Expensive than Supermarket***

Participants were increasingly willing to purchase a CSA share compared to the supermarket as savings with the CSA increased for all distances (Figure 10). The highest willingness was found for ‘Same Distance’ and ‘5 minutes further to CSA with a 40% discount’,

and the lowest willingness was for the ‘CSA 15 minutes further and 5% discount’. There were 11(11/41=26%) participants who would purchase the CSA no matter what, and zero that would not purchase under any circumstances. Statistically significant differences were found for the 5% discount between 5 minutes to 10 minutes further ( $p=.01$ ) and 10 to 15 minutes further ( $p=.001$ ), for 10% discount between 5 to 10 minutes further ( $p=.03$ ), and for the 20% discount between 10 to 15 minutes further ( $p=.047$ ).

Many were attracted to the monetary discount: “If I could pay this, I don't care how far it is, I'm goin'. For all of 'dem. I love feeling like I'm getting a deal...” [NY Participant].

**FIGURE 10. CSA Less Expensive than the Supermarket**

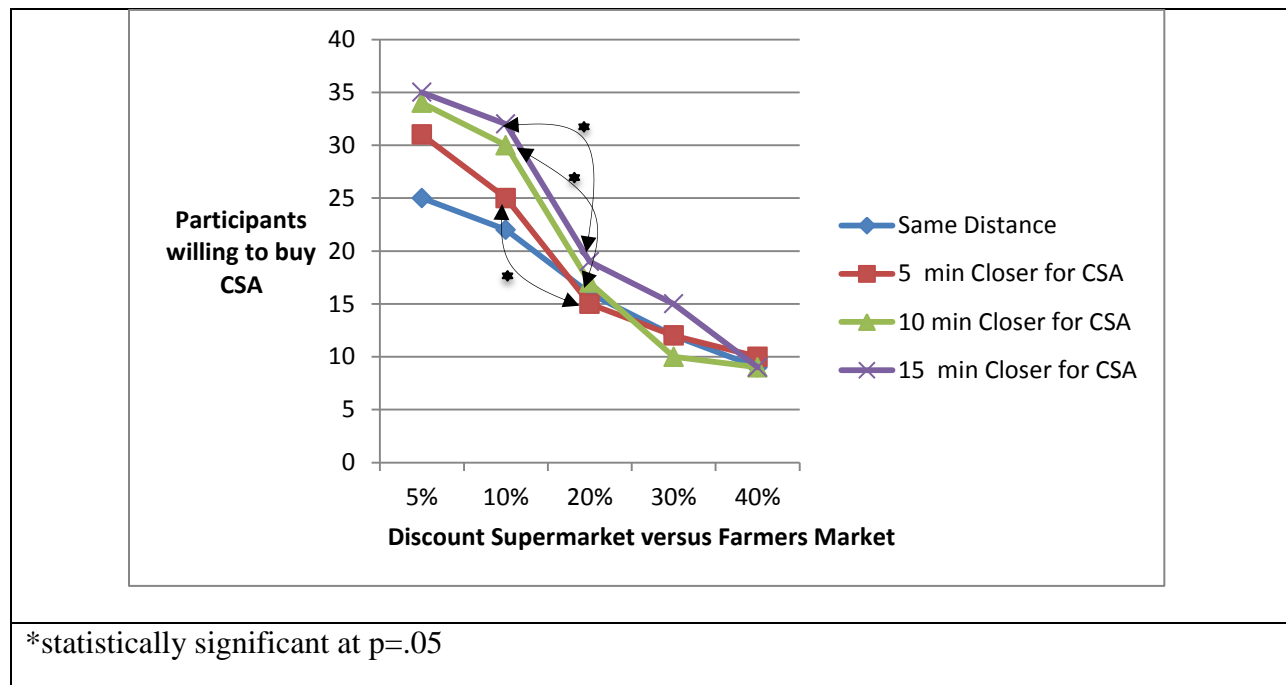


### ***CSA More Expensive than Supermarket***

A summary of the findings for the ‘CSA More Expensive than the Supermarket’ scenario can be found in Figure 11. Participants were decreasingly willing to purchase a CSA share as savings at the supermarket increased for all distances, and increasingly willing as closeness to the CSA increased. The highest willingness was for the ‘15minutes closer-5% discount at the Supermarket’ choice, and the lowest willingness was at the ‘40% discount’ choice across

multiple distances. There were four participants (4/41=10%) who would not purchase the CSA under any of circumstances when it was more expensive, and five (5/41=12%) participants that would purchase the CSA under all circumstances. Statistically significant differences were found between the 10% and 20% price savings at the supermarket for CSA closer 5 minutes ( $p=.046$ ), 10 minutes ( $p=.007$ ), and 15 minutes ( $p=.006$ ).

**FIGURE 11. CSA More Expensive than the Supermarket**



Participants mentioned needing to get the most for their money: “If it was the cheaper price. I would buy from the supermarket...I would have to go where I could get the most of my money... better bang for your bucks.” [NY Participant], though some would get the CSA no matter the price savings at a supermarket given the perceived superior quality: “But you may have better quality. And that's my thing, if I know it is better quality, I wouldn't mind paying that price...” [WA Participant]

### ***Differences by Household Characteristics***

A summary of differences by household characteristics can be seen in Table 9. There was consistently larger interest for those with  $\leq 2$  children versus  $\geq 3$  children when the CSA had a smaller discount and longer distance, with two scenarios having statistically significant differences. Smaller households ( $\leq 4$  people) were consistently more interested in infrequent low variety produce compared to larger household ( $\geq 5$  people), but with a statistically significant difference only for “Frequent low variety 1 time per month” ( $p=.02$ ). There were consistent differences in willingness by Race when the CSA was more expensive and minimally closer than the SM. There were statistically significant differences across States with certain scenarios. Participants from WA frequently had the highest interest in the CSA when the SM and CSA were the same distance but CSA more expensive, with particularly large differences in interest compared to NC participants. With no differences between these states regarding demographic variables, differences in interest may be due to cultural influences.

**TABLE 9. Differences by Household Characteristics**

Characteristic	Scenario
Number of children (≤2 children (n=23) vs. ≥3 children (n=19))	‘CSA 5% Cheaper and 10 minutes (17/22 vs. 8/19; p=.030) and 15 minutes (10/22 vs. 2/19; p=.02) further than the supermarket’
Household Size (≤4 people (n=23) vs. ≥ 5 people (n=19))	“Frequent low variety 1 time per month” (p=.02)
Race (Caucasians (n=21) vs. non-Caucasians (n=21))	‘CSA 10% more Expensive Same distance’ (16 vs. 6; p=.004)
	‘CSA 5 minutes closer’ (17 vs. 8; p=.004)
State	Half size share/\$15 (NY vs. WA p=.03)
	Full-Low Variety/2x per month (VT vs. WA p=.01)
	Full-Standard/\$20 (NY vs VT; p=.03)
	Full-Standard \$20 (NY vs VT; p=.03)
	SM40%/Same Distance (NC vs. WA; p=.01)
	SM40%/5min (NC vs. WA; p=.01)
	SM10%/Same Distance (NC vs. WA p=.01; NC vs. VT p=.001)
	SM5%/Same Distance (NC vs. WA p=.01; NC vs. VT p=.03)

## Discussion

Families with children and low incomes preferred a CSA share of 8-9 items of mixed variety, distributed every other week (2 times per month), priced at less than \$15, no more than 10 minutes further than the supermarket from their home, and preferably less expensive but no more than 20% more expensive than supermarket prices. Overall, these findings reinforce the idea of strategic food shopping among low income families to get the best value for their money and avoid food insecurity.<sup>22</sup>

Our findings of willingness to spend on a CSA are similar to the typical spending habits of US low income populations on weekly produce purchases, but lower than the average price nationally for a CSA share. For individuals who are income-eligible for the Supplemental Nutrition Assistance Program (SNAP) ( $\leq 150\%$  poverty level), the average monthly expenditure for produce ranges from \$12.50-\$13.75 per week (\$50-55 per month).<sup>23</sup> Our findings reflect this price threshold, as once the price level reached \$15, participants were most interested in receiving the share only once per month. Importantly, this amount is less than the average national CSA weekly price of \$17.88,<sup>24</sup> or around \$71.52 per month. CSA's in the United States typically deliver weekly shares for an average of 24 weeks,<sup>24</sup> so the two week preference found would be an adjustment for farmers and may have implications for their business model. Research has also shown that in some locations there is a price savings for CSA produce compared to similar produce from local retail markets,<sup>25-27</sup> so the findings from this study may be useful in understanding interest under that condition. Information on the typical items found in shares and the average distance that customers travel for their CSA pickup was not found.

Participants frequently mentioned that they were willing to travel further for the CSA if they could do additional shopping along the way. This planned multipurpose trip approach, or "trip chaining", has previously been seen in the literature.<sup>28,29</sup> Willingness to participate in the CSA was also significantly increased or decreased based on distance to the supermarket. Locating pickup sites at places with other shopping opportunities, but not too close to supermarkets, may be an important strategy for CSA distribution.

It is important to consider the economic implications of these findings for farmers offering CSAs. Evidence suggests mixed levels of profitability for farmers offering a CSA, and oftentimes inadequate economic returns on labor,<sup>30-33</sup> despite the expected benefits of financial



security, reduced marketing demands, and decreased production costs.<sup>34,35</sup> While reaching a low income audience might require modifications to CSA models, the potential economic return of reaching additional customers may make this attractive to farmers.

A major strength of this study was the mixed methods approach, which allowed for a more comprehensive understanding of preferences. The examination of multiple factors at once was also a strength, as assessing single factors may not accurately represent the complex nature of shopping decisions. Lastly, the sample was diverse in terms of geographical residence, race, and household size.

This study also had limitations. Shopping influences may be more complex than the 2-3 factors tested concurrently in this study,<sup>9</sup> as behaviors might also include both observable and unobservable factors, and be based on accumulated knowledge and experiences in daily life. It is challenging to conduct a test of more than two shopping factors at a time because it creates a large respondent burden which can negatively impact response rates and data quality. The small sample size may have limited generalizability and the ability to conduct some statistical testing. Willingness to purchase based on hypothetical scenarios may differ from willingness to purchase in reality. Our study also assessed weekly payment, which is not the traditional model for a CSA, but may be a required modification for a low income audience.

Future work should further test the instrument for validity and reliability. Consideration should also be given to expanding or refining factors to values that are most meaningful to both farmers and potential consumers, including expansion of price points, payment types, and distances willing to travel.

### Implications for Research and Practice

There are several important real world applications and implications that can be derived from this research. Farmers and health intervention professionals could use this tool or findings to tailor CSA programs to fit the needs of low income individuals, and policy level changes might expand the ability for both farmers to accept and customers to use government subsidies beyond current parameters of limited pre-payment, as well as increased public transit options to improve access.

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## **CHAPTER 4: FEDERAL NUTRITION PROGRAM PARTICIPANT INTEREST IN AN INTEGRATED EDUCATION PLUS COMMUNITY SUPPORTED AGRICULTURE PROGRAM**

### **Overview**

Background: The continued burden of diet related chronic disease in low-income populations in the United States (US) is of great public health concern. There is a need to develop an effective intervention that sustainably addresses environmental and individual-level determinants. A coordinated produce box approach may be an effective strategy to improve the healthy food access issue within federal nutrition education programs. AIM: The goal of this study was to develop an initial understanding of EFNEP and SNAP-Ed participant interest in the proposed EFNEP Plus program among a diverse group of current EFNEP and SNAP-Ed participants across North Carolina. We examined associations between demographic and behavioral measures of shopping behaviors with interest in the program using bivariate and multivariable regression analyses. Results: There was high overall interest (85%) in the program, and most (84%) would be more interested in program. There were statistically significant differences in willingness to participate by Race ( $p=.03$ ), but not by Age ( $p=.70$ ) or BMI ( $p=.057$ ). Discussion: Greater level of understanding of federal nutrition program participants and their preferences for the program and current shopping and consumption habits has practical implications for public health programming development.

## Introduction

The continued burden of diet related chronic disease in low-income populations in the United States (US) is of great public health concern.<sup>1,2</sup> High rates of obesity, cardiovascular disease, diabetes, cancer, and lower life expectancy are experienced by these populations, with rates disproportionately higher than their higher income counterparts.<sup>1,2</sup> These disparities in chronic disease prevalence and negative health outcomes are partially due to inadequate fruit and vegetable (F&V) consumption<sup>3</sup> and physical activity (PA) rates<sup>4</sup>. Low income populations have particularly low levels of fruit and vegetable consumption and physical activity rates compared to their more affluent counterparts<sup>5</sup>, which is problematic when considering that few US adults meet dietary recommendations.<sup>6-8</sup>

Individual and environmental factors have been suggested as determinants of these unhealthy behaviors, including low levels of important personal characteristics<sup>9-17</sup> like self-efficacy, knowledge, and perceived access, and limited access to healthier foods.<sup>10-19</sup> Given this, there is a need to develop an effective intervention that sustainably addresses multiple levels of the sociological model, including both environmental (food access) as well as individual-level determinants.

The nationwide United States Department of Agriculture funded Expanded Foods and Nutrition Education Program (EFNEP)<sup>20</sup> and Supplemental Nutrition Assistance Program-Education (SNAP-Ed)<sup>21</sup> may both be strong resources to address the important individual level factors that influence diet and PA in limited income audiences in both rural and urban settings, as they provide weekly nutrition and physical activity education class sessions led by peer educators. These programs are integrated into county level Cooperative Extension programs and reach hundreds of thousands participants per year. Despite addressing the important individual

level factors associated with a healthier diet and PA, the EFNEP and SNAP-Ed programs generally neglect to solve the problem of limited access to healthier foods, a problem that many program participants face as low income individuals living in areas with limited access to healthy foods.<sup>10-13</sup>

A coordinated produce box approach may be an effective strategy to improve the healthy food access issue within these programs. One model of this approach is a cost-offset Community Supported Agriculture (CSA) program, where fruits and vegetables are collected from local farmers, packed into boxes, and distributed to low-income households who pay a reduced rate because of program subsidies. The benefits of this coordinated approach are clear: 1) it gives participants increased access to the fruits and vegetables they currently lack access to, enabling them to incorporate the foods being stressed in the class sessions into their diets, and 2) gives participants the tools (through the EFNEP classes) needed to prepare the foods acquired through the cost-offset CSA. Few CSA programs have been conducted that are designed to reach lower income populations, and most have had inadequate evaluation approaches.<sup>22, 23</sup> In the most strongly designed study to date, Quandt et al 2013<sup>22</sup> completed a randomized CSA program in an under-resourced urban community in North Carolina. This intervention lasted for 16 weeks, with 5 education and skill-building sessions conducted by local NC Cooperative Extension staff. The intervention resulted in a significant increase in the number of foods in the household inventory of fruits and vegetables in the intervention group compared to the control group, and greater increases in fruit and vegetable consumption in the intervention group, although it did not reach significance.

While this innovative approach appears promising, it importantly remains unclear what this model should look like in order to be most effective in a low income population. No



published peer reviewed literature has been found which has done a broad formative evaluation to gain a better understanding of the preferences of potential participants regarding a cost offset CSA program with EFNEP or SNAP-Ed. Without understanding the needs of potential participants, the proposed program will likely lack uptake, effectiveness, and long term success. Quandt et al 2013,<sup>22</sup> based on their process evaluation, suggested that altering some of the financial and operational aspects of traditional CSA programs would be necessary to improve the impact of CSA participation in a limited resource audience. Thus, a broad survey of potential participants on program preferences, shopping behaviors, and demographics is needed to understand the relevant needs and preferences for participating in the proposed program.

The goal of this study was to develop an initial understanding of EFNEP and SNAP-Ed participant interest in the proposed EFNEP Plus program among a diverse group of current EFNEP and SNAP-Ed participants across North Carolina.

## **Methods**

### *Study setting and participants*

This study was conducted in EFNEP and SNAP-Ed nutrition education programs through county level North Carolina Agricultural Extension offices in 12 geographically diverse counties across North Carolina. Characteristics of the counties can be found in Table 10.

Questionnaires (Appendix 4) were distributed to current participants in EFNEP or SNAP-Ed within North Carolina. Eligible participants were those that were 18 years of age, English speaking, and were participants in the EFNEP or SNAP-Ed. Surveys were distributed out to local program staffs (n=10 counties) that were trained in administering the survey, who then distributed to their classes. Participants were entered into a drawing based on chance in which each subject has equal odds of receiving one of three \$15 gift cards in order to incentivize

participation. Informed consent was obtained for all participants. The study procedures and the interview guide received approval from the Institutional Review Board (IRB) at the University of North Carolina at Chapel Hill.

Participants were asked a series of closed and open ended questions, including demographic information, residential address, address of supermarket they primarily shop at, address of EFNEP or SNAP-Ed location, current food shopping frequency and expenditures, produce box price points, produce quantity desired, and the desired frequency of receiving the boxes. When asked the highest price they were willing to pay, a picture (Figure 2) was shown of a standard 8 item CSA box. When asked what amount they were interested in receiving each week, they were shown a graphic (Figure 3) of four increasingly larger boxes of produce, and asked to circle the option they would want. Participants were also asked for average daily fruit and vegetables consumed per day (1/2 cup or less, ½ cup to 1 cup, 1-2 cups, 2-3 cups, 3-4 cups, 4 cups or more), including an example listing of what a cup would look like for certain vegetables, using the National Cancer Institute Food Attitudes and Behavior Survey.

#### *Quantifying access to supermarket of choice and EFNEP or SNAP-Ed*

A total of 135 (out of 262; 51.5%) participants had complete home address information. Data on distance to supermarket and EFNEP or SNAP-ED location was obtained using information from the survey, a batch geocoder (Batch Geo), and ArcGIS mapping software. The location of the supermarket that participants usually shop at was verified using the Reference USA Business database. For both the class location and supermarket location, if participants were missing or had incomplete street address or city information, and it could not otherwise be determined, it was coded as missing data. The Google API was used to generate values for

distances, and locations and a 10% sample of distances were verified using internet listings and Google Maps.

#### *Determining Modified Retail Food Environment Index (M-RFEI) and Urban/Rural Residence*

The M-RFEI<sup>24</sup> is an index that indicates the ratio of healthy to less healthy food retailers within census tracts based on typical food offerings of specific types of stores. The mRFEI is calculated by dividing the number of healthy food retailers (supermarkets, large grocery stores, supercenters, and produce stores) by the number of health food retailers plus the number of less healthy food retailers (fast food restaurants, small grocery stores, and convenience stores). The mRFEI score for each participant with a complete residential address was determined by spatially linking geocoded participant addresses with census tract level mRFEI values from a shapefile obtained from the US Centers for Disease Control (CDC) using ArcGIS. Urban/Rural classification was determined by spatially joining participant points with a 2010 US Census Bureau urban-rural classification shapefile.

#### Analysis

Questionnaire data was analyzed using descriptive statistics, bivariate statistics, and linear modeling. Fisher's Exact Tests were used to willingness (yes versus no/maybe) by Race (white versus non-white), Gender (Male/Female), and Household Income (<\$30,000 versus ≥ \$30,000). T-tests and the Mann-Whitney-Wilcoxon Test (non-normal distributions) were used to assess for differences in Willingness (yes vs. no/maybe) by Age, BMI, M-RFEI, and Urban/Rural, and for differences in Highest Price Willing to Pay for Standard Box by Household Income level. One-way ANOVA (with effect coding) was used to test for differences in 'Amount Wanted' by 'Age' and 'Household Size', with assumptions of normality, homogeneity of variance and independence of errors assessed and deemed adequate.

Logistic regression was used to understand the factors that predicted willingness to participate in the program (Yes/No), but a random effects model to account for clustering at the county level was not used given sample size issues. For the logistic regression, the primary outcome of interest was willingness to participate in the proposed fruit and vegetable box program. Independent variables of interest included self-reported BMI (derived from participant reported height and weight; height was rounded up to the closest whole inch.), Age, Ease of purchasing fresh fruits and vegetables (Easy/ Hard), and Race (Non-white vs. White). Spatial variables, including distance to supermarket shopped and the MRFEI for each participant, was not included given the amount of missing data creating a sample size that was too small for analysis (n=96), especially given the low variance in the dependent variable.

## **Results**

### *Participant Characteristics*

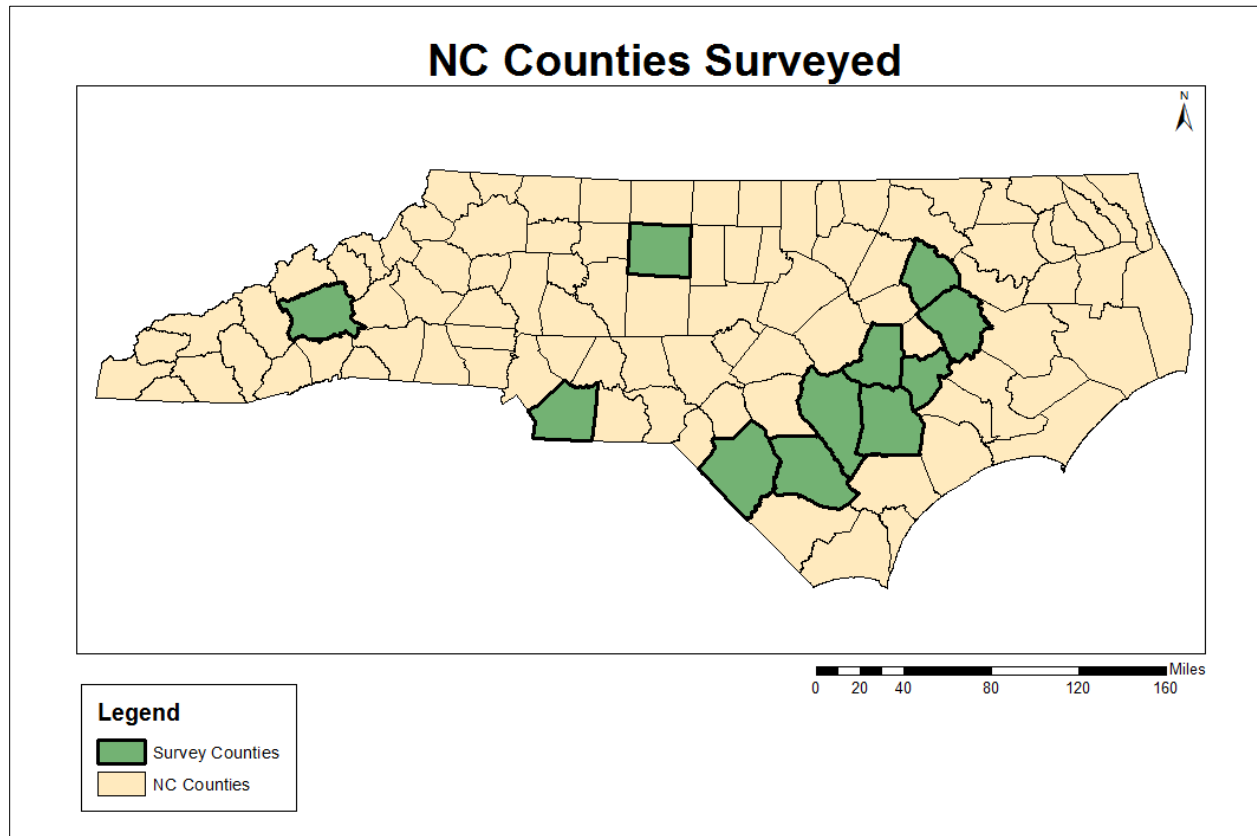
The demographic characteristics of participants are in Table 10, and a map of counties surveyed is in Figure 12. The average age of participants was 49.8 (SD=17.5), 72.1% were female, the average BMI was 31.0 (sd=7.5), over half (57%) of participants highest grade completed was High School/GED or less, 69.4% had a yearly household income less than \$30,000, 85.4% were non-white, the average number of adults in the household was 1.9 (sd=0.96), the average number of children in the household was 1.3 (sd=1.4), there were 240 (91.6%) EFNEP participants and 22 (8.4%) SNAP-Ed participants, and participants had been in the EFNEP or SNAP-Ed program an average of 6.4 weeks (sd= 4.7). The most common mode of transportation to EFNEP or SNAP-Ed location was Car (71%), followed by Public Transport (34%), Bike (5%), Multiple modes (5%), and Walk (3%). Participants lived an average of 7.64 miles (R=.0-51.4; SD=10.1) from where their EFNEP or SNAP-Ed class meets.

**TABLE 10. Demographic characteristics of North Carolina EFNEP and SNAP-Ed participants (n=262)**

Characteristic	Mean	SD
BMI	31.0	7.5
Age (years)	49.8	17.5
Total Household Composition (avg.)	3.2	1.8
Number of adults (avg.)		
Number of children (avg.)		
Distance to primary Supermarket (avg.)	3.8 (R=0.06-16.3)	3.7
Length of time in EFNEP or SNAP-Ed program an (avg. weeks)	6.4	4.7
	%	
Sex (%)		
Male	27.9	
Female	72.1	
Residential location (%)		
Urban	49% (66/135)	
Rural	51% (69/135)	
Race (%)		
African American	75%	
White	16%	
Other	9%	

Household Income less than \$30,000 (avg. yearly)	69.4%
High School Graduate or less	57%
Transportation Mode to Class	
Car	71%
Public Transport	34%
Bike	5%
Multiple Modes	5%
Walk	3%
EFNEP participants	91.6%
SNAP-Ed participants	8.4%

**FIGURE 12. North Carolina Counties Surveyed**



### *Food Environment*

Participants average M-RFEI was 10.6 (Range: 0-28.6 SD=7.8). Participants (n=112) lived an average of 3.8 miles (SD=3.7) from the supermarket they usually shop at. Over one third of participants surveyed lived closer to the education class than the supermarket (46/135=34%).

### *Food Obtainment*

Participants most frequently said that getting fresh, high quality fruits and vegetables was somewhat easy (39% (90/233), and 30% (69/233) said that it was somewhat or very difficult. The majority of participants (51%) bought fresh fruits and vegetables less than once per week, with participants most commonly reporting buying fresh fruits and vegetables once a week

(37%). Few participants reported being part of a CSA program (9.5% (23/242), but nearly half (46%; 112/243) received free fresh fruits and vegetables from a food pantry or food bank.

### *Food Consumption*

Nearly half of participants (45%) (112/248) consumed less than 2 cups of fruit per day, and 87% (211/241) consumed less than 3 cups of vegetables per day. Participants reported eating an average of 4.4 (sd= 2.0) home cooked dinners in a typical week. Most participants (58% (141/240)) thought it would be ‘Very Easy’ to eat seasonally, and 13% thought it would be ‘Somewhat Hard’ or ‘Very Hard’ to eat seasonally.

### *Interest in the Program*

There was high interest in participating in the program, with 85% (217/256) saying “yes” they were interested, 13% (33/256) saying they would “maybe” be interested, and only a few not interested at all (2%, (6/256). Most (84%; 209/248) said that they would be more interested in going to their nutrition education program if they could purchase fresh local fruits and vegetables, while some said that it would make no difference (12% (29/248).

### *Factors Influencing Participation*

The most commonly cited factors for making it hard to participate in the program were: 1) Price (74% (196/262)), 2) Not able to pick items (22% (58/262)), and 3) Carrying the box home (19% (51/262)). Participant’s said there were certain factors important in getting them to participate, including: 1) Convenient Location (75% (199/262)), 2) Learn to Budget for box (37% (97/262)), and 3) Program Accepts SNAP-EBT (25% (66/262)).

### *Program Preferences*

The average highest price participants were willing to pay for the standard box of produce was \$15.69 (RANGE=\$2-\$46), SD=10.9). Participants were most interested in the share



with 8 items (51%; 121/234), and least interested in the share with 2 items (12%; 29/234), with larger sizes incrementally more popular. Participants said that they would most want the boxes to come every other week/2x per month (40% (102/252)), followed by 1x per week (38% (97/252)), 1x per month (18% (47/252)), and Neve (2% (6/252)). The most likely payment type would be Cash: 65% (164/254), followed by SNAP-EBT: 37% (95/254), Debit: 19% (47/254), Credit: 7% (18/254), and Check: <1% (2/254).

### *Program Impact*

Most participants (78% (186/238)) said that buying a box of fruits and vegetables from the program would make them more likely to try the recipes from EFNEP or SNAP-Ed, with 17% (41/238) saying 'Maybe'. The fresh fruits and vegetables from the program would most likely Add on to (53% (131/243)) rather than Replace (46% (112/243)) the fruits and vegetables that they currently bought.

### *Bivariable Analysis, Linear Models, Logistic Regression*

There was a statistically significant difference ( $p<.001$ ) in willingness (yes vs. maybe/no) to participate between whites and non-whites, with non-whites more likely to participate than whites. There was not a statistically significant difference by gender ( $p=0.17$ ), household income ( $p=0.7$ ), or household size ( $p=0.15$ ). Those who were interested had a statistically significant higher age ( $p<.001$ ) than those maybe/not interested, as well as a statistically significant higher BMI ( $p<.005$ ) than those maybe/not interested. There was a statistically significant difference in Highest Price willing to pay for Standard Box by Income ( $P<.001$ ).

There was a statistically significant difference between household size and amount wanted ( $p=0.02$ ), with significant differences between the 8 item Largest box (mean Household Size 3.6) with the 4 item box (mean Household size = 2.7;  $p=0.01$ ), and 6 item box (mean

Household size= 2.8;  $p=0.02$ ) by household size. There was not a statistically significant difference between levels of Amount Wanted by participant Age ( $p=0.2$ ).

The results of the logistic regression can be found in Table 11. The only variable that was found to be statistically significant was Race (white versus non-white), with non-Whites having 3.3 times the odds of participating in the program versus Whites, after adjustment for confounders. A finding that was almost statistically significant was that those who had a higher BMI were more likely to participate ( $p=.057$ ). The overall model  $p$ -value was statistically significant ( $p= 0.03$ ), indicating that the current model fits better than an empty model.

**TABLE 11. Results of logistic regression**

Variable	Estimate	St. Error	Z value	P-value
Intercept	0.053	1.195	0.045	0.964
BMI	0.072	0.038	1.898	0.057
Fresh Difficult (Difficult, Easy)	-0.669	0.0481	-1.391	0.164
Age	0.005	0.013	0.385	0.700
Race(B/W)	1.202	0.536	2.242	0.025*
<b>*statistically significant</b>				

## Discussion

The factors influencing participation were similar to what has been found in other literature regarding factors to fruit and vegetable consumption in low income individuals. Convenient location, price of the box, and acceptance of SNAP-EBT as important factors have been suggested by other similar populations and community nutrition educators. The price that

participants were willing to pay for the standard box was similar to weekly expenditures for those who are income eligible for the Supplemental Nutrition Assistance Program (SNAP) ( $\leq 150\%$  poverty level) fruits and vegetables, around \$15. One difference was that participants didn't state that ability to cook the items received in the box was an important factor, though this was an issue identified by community nutrition educators.

There were several similarities to results found in a more in-depth choice experiment of preferences for this type of program in a similar low income population. Similar preferences included getting larger sized boxes, to pay \$15 or less per week, and receiving boxes 2 times per month.

There were some unexpected findings. Most participants wanted to pay with Cash rather than SNAP-EBT or some other form of payment. While it could be that there were lower levels of SNAP-EBT use due to income levels, less than half (44.1%) of those with a household income of less than \$30,000 were planning to pay with SNAP-EBT, and just over half (52.8%) of those with a household income of less than \$10,000 were planning to pay with SNAP-EBT. This may suggest differential allocation of payment type based on the product being purchased. This population may view purchasing this box as special purchase over their usual food shopping. Interestingly, most participants thought that it would be very easy to eat seasonally, which was surprising.

There was overall a high amount of interest in the program, with certain groups being more willing than others, including those who were non-white, those of higher age, and those with a higher BMI. Cultural interest or food access issues may explain the difference between racial groups, and those with a higher BMI may be interested in healthier eating. The lack of

relationship between willingness and census tract level mRFEI was interesting, as the fact that some local food environment does not seem to significantly influence the interest in the program.

There are several strengths of this study, including the broad dissemination giving a wider range of viewpoints, the use of visual prompts of produce amounts to help participants more accurately answer questions, and the use of spatial tool to determine and examine the influence of the food environment.

The weaknesses of the study include the lack latent variables such as motivation, perceived access, which did not allow for more advanced models like Structural Equation Modeling, and the inability to do higher level analysis such as Multi-Level Modeling because of a lack of data at higher levels than the individual. Future work should explore these more robust models. Analysis was limited by the small sample size, and high level of missing data, particularly for the spatial data (residential class site, and supermarket addresses).

The greater level of understanding of federal nutrition program participants and their interest in and preferences for the program, as well as current shopping and consumption habits, has practical implications for public health programming development.

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## **CHAPTER 5: SYNTHESIS AND DISCUSSION**

### **Overview of major research findings**

The findings of this formative evaluation of an enhanced nutrition education program incorporating food access through CSA's indicate that there are specific factors and program characteristics needed for both participants and community nutrition educators in order to ensure that the program will be attractive to these audiences, effective at creating positive dietary changes for participants, and sustainable long term for both participants and staff.

Extension Educators showed strong interest in the program, and believed their participants would also be interested. Educators stressed the importance of making the program convenient, educational, skill building, and incorporating child involvement. They identified potential incorporation issues for Extension and additional skills needed to conduct the program.

Low income individuals suggested that the ideal CSA program would be a full-sized box of 8 or 9 items of mixed variety, distributed every other week (2 times per month), priced at less than \$15, no more than 10 minutes further than the supermarket from their home, and preferably less expensive but no more than 20% more expensive than supermarket prices. There were statistically significant differences in willingness by race and household size. Adaptations of the typical CSA disbursement frequency and price points may be needed to be most attractive to a low income audience.

The survey indicated high overall interest (85%), and most (84%) would be more interested in nutrition education program. There were statistically significant differences in willingness by race ( $p < .001$ ), Age ( $p < .05$ ), and BMI ( $p < .05$ ), but not by M-RFEI (.08).

The results of this research should be used to inform future food access programming within community nutrition education programs given the informative insights and feedback presented.

### **Significance of findings**

Given the burden of diet related disease and limited healthy food access for low income populations, there was a need to inform an intervention that sustainably addresses environmental and individual-level determinants. There was no existing literature that provided an in-depth formative evaluation of this type of programming which incorporates a CSA food access program into nutrition education programming, particularly when it comes to examining potential participant program preferences, and community nutrition educator feedback and guidance on the program. This research provided clarity on what this model should look like in order to be most attractive to a low income population given their needs and preferences, how it could be designed in order to maximize effectiveness at increasing fruit and vegetable access and consumption, and how it could be successfully implemented within existing Cooperative Extension nutrition education programming, as well as the large structure of Extension.

### **Context in which the research should be placed**

Given the diversity in regards to geographical residence, race, and household size of the potential participants interviewed and surveyed, and the diversity of demographics, location, and experience in regards to the community nutrition educators interviewed and surveyed, these findings may have wide application and generalizability. It should also be considered that educators were predominantly white, female, and all rural, which may have limited the diversity of experience and perceptions of the program. Also, the sample of educators, while fairly geographically diverse, may not capture all experiences and opinions from this nationwide



program. The sample size of the choice experiment was also small, and the EFNEP and SNAP-Ed participants were only surveyed in North Carolina, which might limit generalizability.

### **Health/nutrition/public health/policy significance**

There are several important real world implications and applications that can be derived from this research. Farmers and health intervention professionals should use the information from the choice experiment and broad survey of EFNEP and SNAP-Ed participants to best tailor their CSA programs to fit the needs of low income individuals and maximize program uptake and impact. Findings from the in-depth interviews and focus groups with Extension Staff should be used to inform future food access programming within community nutrition education programs given the informative insights and feedback presented.

### **Strengths and Weaknesses**

#### *Strengths*

Overall, the major strengths of this research were the innovative methods used, the mixed methods approach, the diverse and geographically spread sample, the use of both a large sample for broad feedback and a smaller sample for in-depth feedback, and examining stakeholders (participants and staff) from multiple parts of the potential program system.

The utilization of both in-depth interviews and focus groups with Extension Staff allowed for a more complete understanding of the topic. The educators were diverse in demographics, location, and experience. The use of phone focus group potentially created more independent answers and allowed for greater participation. The use of thematic matrices allowed for cross-tabulation of ideas across different factors.

For the choice experiment, the use of a mixed methods approach for examining participant preferences allowed for a more comprehensive understanding. The examination of

multiple factors at once rather than the examination of factors individually was also a strength, as assessing only single factors may not accurately represent the complex nature of shopping decisions. Lastly, the sample was diverse in terms of geographical residence, race, and household size.

For the surveys the broad dissemination giving a wider range of viewpoints, the use of visual prompts of produce amounts to help participants more accurately answer questions, and the use of spatial tool to determine and examine the influence of the food environment were strengths.

The weaknesses of the study include the lack latent variables such as motivation, perceived access, which did not allow for more advanced models like Structural Equation Modeling, and the inability to do higher level analysis such as Multi-Level Modeling because of a lack of data at higher levels than the individual. Future work should explore these more robust models. Analysis was limited by the small sample size, and high level of missing data, particularly for the spatial data (residential class site, and supermarket addresses).

### *Weaknesses*

The small sample for some of the research activities limited the analytic opportunities, and may also limit generalizability. Not fully testing some of the methods, including validity and reliability testing of the choice experiment method, was a weakness. This research only examined two parts (staff and participants) of the potential program system, and did not examine other parts such as broader spatial allocation and location issues, input from farmers on the program and consumer preferences, and whether the foodshed could supply the required amount of produce needed for this program.

For the interviews, the inability to witness non-verbal communication in the focus groups was a weakness. For the choice experiment, the participants were given two to three factors at a time, but shopping decisions may be based on a myriad of factors at once, including both observable and unobservable factors. Willingness to purchase based on hypothetical scenarios may differ from willingness to purchase in reality. For the broad survey, the lack of latent variables such as motivation, perceived access eliminated their ability to do higher level analysis such as Structural Equation Modeling.

For the surveys, the lack of latent variables such as motivation, perceived access, which did not allow for more advanced models like Structural Equation Modeling, and the inability to do higher level analysis such as Multi-Level Modeling because of a lack of data at higher levels than the individual. Future work should explore these more robust models. Analysis was limited by the small sample size, and high level of missing data, particularly for the spatial data (residential class site, and supermarket addresses).

### **Directions for future research**

Future work should test the choice experiment instrument for validity and reliability. Consideration should also be given to expanding or refining factors to values that are most meaningful to both farmers and potential consumers, including expansion of price points, payment types, and distances willing to travel. Future work should explore more advanced models of participant willingness to participate in this type of programming that include latent variables such as perceived access, motivation, neophobia, etc. Given the strong initial interest of educators and possibly their participants in the proposed program, work should be done to critically examine the integration of this type of program into current Extension programming.

Future work should also develop models that examine whether the local foodshed can support this type of programming.

## **APPENDIX 1: EXTENSION EDUCATOR IN-DEPTH INTERVIEW GUIDE**

- Do you think the low-income families in your community would be interested in this type of program? Why or why not?
  - Probe: Access to local foods, financial reasons, food prep skills
- What do you think would make it easier for low-income families in your community to participate in a CSA program?
  - Probes: delivery, budgeting, choice, convenience/location, seasonality, payment options, cooking skills
- What do you think would make it harder for low-income families in your community to participate in a CSA program?
  - Probes: transportation to pick up location or farm, budgeting, choice, canned items for longer shelf life, convenience/location, seasonality, payment options, cooking skills, time
- What potential problems do you foresee in incorporating this type of program into your current work delivering health education to low-income populations?
  - Probe: Administrative issues, financial management, coordinating with farmer
- What are the advantages and disadvantages you see of running this type of program within Extension?
- What additional skills or knowledge do you feel you would need to help with this program?
- What difficulties do you/might you encounter in using local, seasonal foods in your curricula?

- Follow-up: In your experience, do the consumers that you work with have the kitchen skills required to prepare such foods? What, if any, skills might they need to learn?
- Please describe your level of organizational support for these types of initiatives from higher level staff....
- What resources would your Extension Office have to help enhance or support a program like this?

## **APPENDIX 2: EXTENSION EDUCATOR FOCUS GROUP GUIDE**





1. What are your initial thoughts on the proposed CSA program, including the education curricula?
  - a. Follow-up: Is a program like this needed?
  - b. Follow-up: What needs to be done to make the proposed CSA program as effective as possible for a low income audience?
2. From your experience, what is the best way to engage low income populations on diet and nutrition topics?
3. Do you have suggestions of how to get people to participate in this type of CSA/educational program?
  - a. Probe: Best locations for programming and distribution (and reasons why)
  - b. Follow-up: What things might be least effective in getting participation?
4. Do you feel like this type of program could be sustainable and integrated long term into Extension services? Tell me why or why not.
5. What other community organizations could Extension partner with to help with this type of effort?
6. Do you have any recommendations or suggestions for the team as the project moves forward?

### APPENDIX 3: CHOICE EXPERIMENT FOR LOW INCOME ADULTS

**Interviewer:** *For this exercise, we want to see how different factors like produce price, amount, share frequency, and distance influence participation in a CSA.*

*{Interviewer fills out form, showing images and tables to participants, and asking all probes. For tables, go row by row}*

1. I am going to show you a picture of a quantity of produce, along with different prices. The types of produce shown are representative of a typical CSA shares or boxes. Please tell me whether or not you would purchase a CSA share of produce in each situation.
  - a. First, what would you pay for a starter share of produce? *{Interviewer write down response; If they say an amount higher than \$20, check all of the certain prices boxes}*.
  - b. Now, I am going to ask about certain prices. Would you pay \$8? *{Interviewer asks about each price for each amount, finishing the price points for a particular amount before starting the next amount}*.

Amount		a. What would you pay?	b. Certain prices			
			\$8	\$10	\$15	\$20
Summer CSA Starter Share						
Summer CSA Half Share						
Summer CSA Full Share-low variety						
Summer CSA Full Share-Standard variety						

\*[PROBE]-Which of the share/price combinations is most appealing to you? Least appealing? What are the reasons why?

\*[PROBE]-Tell me the reasons you were either more interested in having low variety (multiple of same items) or higher variety (singles of different items)



2. Now I am going to ask about the distance you would be willing to travel for a share of produce. What would be your most likely travel route? Car, walk, other? *{Interviewer show photo of a full share with standard variety. }*

Would you be willing to travel 5 minutes to pick up this share of produce? *{Interviewer ask about each travel time. }*



5 minutes	
10 minutes	
15 minutes	
What is the maximum distance you would be willing to travel for this share of produce?	

3. Now I want you to consider together both distance and price.  
*{Interviewer again show photo of a full share with standard variety. }*  
 a. Would you be willing to travel 5 minutes to pick up a share of produce if the price is \$8? *{Interviewer ask about each scenario}*



<b>Distance</b>	<b>Price</b>	<b>If yes, check</b>
5 minutes	\$8	
10 minutes	\$8	
15 minutes	\$8	
5 minutes	\$10	
10 minutes	\$10	
15 minutes	\$10	
5 minutes	\$15	
10 minutes	\$15	
15 minutes	\$15	
5 minutes	\$20	
10 minutes	\$20	
15 minutes	\$20	

4. Now I want you to consider together both the share frequency AND price.





Would you be willing to purchase a share of produce if it was 1 time per week and the share cost \$8?

*{Interviewer ask about each scenario}*

*{Interviewer show photo of a full share with standard variety.}*

<b>Frequency</b>	<b>\$8</b>	<b>\$10</b>	<b>\$15</b>	<b>\$20</b>
1 time per week				
Every 2 weeks				
1 time per month				

5. Now I want you to consider together both the share frequency AND amount of produce.  
Would you be willing to purchase a share of produce if it was 2 times per week and you got the CSA starter share? *{Interviewer continues with each scenario}*

Amount		Frequency		
		1 time per week	Every 2 weeks	1 time per month
Summer CSA Starter Share				
Summer CSA Half Share				
Summer CSA Full Share-Low Variety				
Summer CSA Full Share-Standard variety				







\*[PROBE]- Which is your ideal share size/frequency? What is the reason for that? Based on the exercise above, would you rather have frequent smaller shares, or less frequent larger shares? What are some reasons why?













6. Now I want to know more about what you would most want in a share of produce. First, please tell me which of the items pictured you would want and why. Next, please tell me what an ideal box weekly box of produce would look like for you and your family by indicating which items and how many of each item you would like.









**Interviewer: If the respondent points, please verbalize their choice for transcription purposes.**

- Please tell me about the reasons you choose those items.
- Please tell me about the reasons you choose that amount for each item
- Do you think you could eat all of those items in one week, without them spoiling? What are some of the reasons for your answer?
- Are there items not picture that you would like in a share? What are the reasons you would like those items?

- e. What price would you be willing to pay for the share you have selected?
- a. What is the highest amount you would pay? Can you tell me more about that?

Green Beans (1lb. pictured) # lbs. desired _____ 	Beets: # beets desired _____ 	Broccoli: # heads desired _____ 	Radishes (1 small bunch pictured) # bunches desired _____ 
Cabbage: # heads desired _____ 	Carrots (large bunch pictured) # bunches desired _____ 	Cauliflower: # heads desired _____ 	Summer Squash: # squash desired _____ 
Cucumbers: # cucumbers desired _____ 	Fennel: # desired _____ 	Peppers: # peppers desired _____ 	Winter Squash: # squash desired _____ 

Kohlrabi: # heads desired _____ 	Turnips: # turnips desired _____ 	Sweet Potatoes: # desired _____ 	Cooking Greens (1 bunch pictured) # bunches desired _____ 
Tomatoes: # desired _____ 	Lettuce: # heads desired _____ 	Potatoes: # potatoes desired _____ 	Peas (1 pint pictured) # pints desired _____ 
Plums: # desired _____ 	Apples: # desired _____ 	Grapes: # bunches desired _____ 	Melon: # Melons desired _____ 

<p>Blueberries (1 pint pictured) # pints desired _____</p> 	<p>Raspberries: # pints desired _____</p> 	<p>Blackberries: # pints desired _____</p> 	<p>Strawberries: # pints desired _____</p> 
<p>Nectarines: # desired _____</p> 	<p>Peaches: # desired _____</p> 	<p>Pears: # desired _____</p> 	<p>Watermelon: # desired _____</p> 

## **Where You Shop for Produce**

Now I want to ask you some questions about your preferences for where you purchase produce.

- I. First, I have a table here that displays the price of the CSA produce share compared to produce at the supermarket, and the travel time from your home to pick-up the CSA produce share compared to the supermarket. In each of the first set of scenarios, the CSA produce share is priced lower than purchasing the same produce in the supermarket.

***[Hand the table to the participant. Interviewer go through each scenario]***

### **a. Same Distance Scenario**

*“If the CSA share was 5% less expensive than the same produce from the supermarket, meaning the CSA produce would cost you \$7.40 instead of \$8.00, would you be willing to purchase from the CSA produce share program if it was the same distance from your home?”*

### **b. Further Distance Scenario**

*“If the CSA share was 5% less expensive than the same produce from the supermarket, meaning the CSA produce would cost you \$7.40 instead of \$8.00, would you be willing to purchase from the CSA produce share program if it was 5 minutes further from your home than the supermarket? 10 minutes further? 15 minutes further?”*

***[Ask the participant to circle the shares they agree with. Go through all further scenarios]***

<b>Discount on CSA Produce Share</b>	<b>Supermark et Price</b>	<b>CSA Produce Share Price</b>	<b>Travel Time for CSA Produce Share Pick-up Compared to Supermarket</b>
5%	Price: \$8.00	Price: \$7.40	same
			+5 minutes (further)
			+10
			+15
10%	Price: \$8.00	Price: \$7.20	same
			+5 minutes
			+10
			+15
20%	Price \$8.00	Price: \$6.40	same
			+5 minutes
			+10
			+15
30%	Price: \$8.00	Price: \$5.60	same
			+5 minutes
			+10
			+15
40%	Price: \$8.00	Price: \$4.80	same
			+5 minutes
			+10
			+15

2. Next, I have a similar table in which each scenario has the CSA produce share priced higher than the same produce from the supermarket. *[Hand the table to the participant.*

*Interviewer go through each scenario]*

**a. Same Distance Scenario**

*“If the Supermarket produce was 5% less expensive than the same produce from the CSA share, meaning the supermarket produce would cost you \$7.40 instead of \$8.00, would you be willing to purchase from the CSA produce share program if it was the same distance from your home?”*

**b. Closer scenario**

*“If the Supermarket produce was 5% less expensive than the same produce from the CSA share, meaning the supermarket produce would cost you \$7.40 instead of \$8.00, would you be willing to purchase from the CSA produce share program if it was 5 minutes closer to your home than the supermarket? 10 minutes closer? 15 minutes closer?”*

*[Ask the participant to check the shares they agree with. Go through all further scenarios]]*



<b>Discount on Supermarket Produce</b>	<b>CSA Produce Share Price</b>	<b>Supermarket Produce Price</b>	<b>Travel Time for CSA Produce Share Pick-up Compared to Supermarket</b>
5%	Price: \$8.00	Price: \$7.40	same
			-5 minutes (closer)
			-10
			-15
10%	Price: \$8.00	Price: \$7.20	same
			-5 minutes
			-10
			-15
20%	Price \$8.00	Price: \$6.40	Same
			-5 minutes
			-10
			-15
30%	Price: \$8.00	Price: \$5.60	same
			-5 minutes
			-10
			-15
40%	Price: \$8.00	Price: \$4.80	same
			-5 minutes
			-10


## APPENDIX 4: SURVEY FOR EFNEP AND SNAP-ED PARTICIPANT

A future program may make a box of fresh, local fresh fruits and vegetables available to buy at a low cost for those in EFNEP or SNAP-Ed. The following questions are about this program.





<p>1. Would you be interested in this program if it was available to you?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> Maybe</p> <p><input type="radio"/> No (Why not?): _____</p>	<p>2. Would you be <u>more</u> interested in going to the EFNEP or SNAP-Ed program if there was a program where you could purchase fresh, local fruits and vegetables?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input type="radio"/> Makes no difference</p>
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<p>3. Which of the following things might make it hard for you to buy a fruit and vegetable box from this program? (please check all the things that would make it hard)</p> <p><input type="radio"/> Carrying the fruit and vegetable box home</p> <p><input type="radio"/> If the fruit and vegetable box price is too high</p> <p><input type="radio"/> If I am not able to pick the items</p> <p><input type="radio"/> I don't like fruits and vegetables</p> <p><input type="radio"/> My family doesn't like fruits and vegetables</p> <p><input type="radio"/> I don't know how to cook fresh fruits and vegetables</p>		<p><input type="radio"/> I don't have the needed cooking equipment at home</p> <p><input type="radio"/> I like buying fruits and vegetables from another store</p> <p><input type="radio"/> I don't have time to cook</p> <p><input type="radio"/> Other (fill in blank): _____</p>
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<p>4. What would get you to buy from this new program? (check all that apply)</p> <p><input type="radio"/> I can pick up my box of fruits and vegetables at a convenient location for me</p> <p><input type="radio"/> If I can learn how to budget money to buy the box</p> <p><input type="radio"/> If I learn how to prepare and cook fruits and vegetables</p> <p><input type="radio"/> If the program accepts SNAP/EBT (food stamps)</p> <p><input type="radio"/> Other : _____</p>	
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<p>5. What is the <u>highest</u> price that you would pay for a box of 8 fruit and vegetable items (example pictured below)?</p>  <p>Highest price you would pay (fill in blank): _____</p>	<p>6. If this program was available, how would you <u>most likely</u> pay for the fruits and vegetables?</p> <p><input type="radio"/> Cash</p> <p><input type="radio"/> Credit</p> <p><input type="radio"/> SNAP/EBT (also known as food stamps)</p> <p><input type="radio"/> Debit</p> <p><input type="radio"/> Other _____</p>
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7. If you were to receive a box each week, which amount would you want? (circle the number in the box you would want)

<p>1</p> 	<p>2</p> 
<p>3</p> 	<p>4</p> 

<p>8. How do you usually travel to your EFNEP or SNAP-Ed program location?</p> <p><input type="radio"/> Car/truck   <input type="radio"/> Walk</p> <p><input type="radio"/> Bike   <input type="radio"/> Public Transport (Bus, subway, etc.)</p>	<p>9. Would buying a box of fruits and vegetables from the program make you more likely to try the recipes shown in the EFNEP or SNAP-Ed lessons at home?</p> <p><input type="radio"/> Yes   <input type="radio"/> No   <input type="radio"/> Maybe</p>												
<p>10. How often would you want to buy fresh, local fruits and vegetables from this program?</p> <p><input type="radio"/> Once a week</p> <p><input type="radio"/> Every other week (two times per month)</p> <p><input type="radio"/> Once a month</p> <p><input type="radio"/> Never</p>	<p>11. How easy or hard would it be for you to mostly eat with the seasons, meaning that you would try to eat the fruits and vegetables available at local farms at that time of year (e.g. strawberries only in spring)?</p> <p><input type="radio"/> Very easy   <input type="radio"/> Somewhat hard</p> <p><input type="radio"/> Somewhat easy   <input type="radio"/> Very hard</p>												
<p>12. Would buying fresh fruits and vegetables from this program replace or add to the fruits and vegetables you currently buy?</p> <p><input type="radio"/> Replace fruits and vegetables I buy</p> <p><input type="radio"/> Add on to fruits and vegetables I buy</p>	<p>13. How easy or difficult is it for you to get fresh, high quality fruits and vegetables?</p> <p><input type="radio"/> Very Difficult   <input type="radio"/> Somewhat easy</p> <p><input type="radio"/> Somewhat difficult   <input type="radio"/> Very easy</p>												
<p>14. About how many cups of fruit (including 100% pure fruit juice) do you eat or drink each day? (check circle)</p> <table border="1"> <tr> <td><input type="radio"/> ½ cup or less</td> <td><input type="radio"/> ½ cup to 1 cup</td> </tr> <tr> <td><input type="radio"/> 1-2 cups</td> <td><input type="radio"/> 2-3 cups</td> </tr> <tr> <td><input type="radio"/> 3-4 cups</td> <td><input type="radio"/> 4 cups or more</td> </tr> </table> <p>1 cup of fruit could be: 1 small apple, 1 large banana, 1 large orange, 6 large strawberries, 1 medium pear, 2 large plums, 32 seedless grapes, 1 cup (8 oz) of 100% juice, ½ cup dried fruit</p>	<input type="radio"/> ½ cup or less	<input type="radio"/> ½ cup to 1 cup	<input type="radio"/> 1-2 cups	<input type="radio"/> 2-3 cups	<input type="radio"/> 3-4 cups	<input type="radio"/> 4 cups or more	<p>15. About how many cups of vegetables (including 100% vegetable juice) do you eat or drink each day?</p> <table border="1"> <tr> <td><input type="radio"/> ½ cup or less</td> <td><input type="radio"/> ½ cup to 1 cup</td> </tr> <tr> <td><input type="radio"/> 1-2 cups</td> <td><input type="radio"/> 2-3 cups</td> </tr> <tr> <td><input type="radio"/> 3-4 cups</td> <td><input type="radio"/> 4 cups or more</td> </tr> </table> <p>1 cup vegetables could be: 3 broccoli spears (3 in. long), 1 cup of cooked leafy greens, 2 cups of lettuce or raw greens, 12 baby carrots, 1 medium potato, 1 large sweet potato, 1 large ear of corn, 1 large raw tomato, 2 large celery stalks</p>	<input type="radio"/> ½ cup or less	<input type="radio"/> ½ cup to 1 cup	<input type="radio"/> 1-2 cups	<input type="radio"/> 2-3 cups	<input type="radio"/> 3-4 cups	<input type="radio"/> 4 cups or more
<input type="radio"/> ½ cup or less	<input type="radio"/> ½ cup to 1 cup												
<input type="radio"/> 1-2 cups	<input type="radio"/> 2-3 cups												
<input type="radio"/> 3-4 cups	<input type="radio"/> 4 cups or more												
<input type="radio"/> ½ cup or less	<input type="radio"/> ½ cup to 1 cup												
<input type="radio"/> 1-2 cups	<input type="radio"/> 2-3 cups												
<input type="radio"/> 3-4 cups	<input type="radio"/> 4 cups or more												
<p>16. How many times per month do you buy <u>fresh</u> fruits and vegetables?</p> <p><input type="radio"/> Never   <input type="radio"/> Once a Week</p> <p><input type="radio"/> Less than Once a Month   <input type="radio"/> 2-3 Times a Week</p> <p><input type="radio"/> Once a Month   <input type="radio"/> Daily</p> <p><input type="radio"/> 2-3 Times a Month</p>	<p>17. Are you currently a member of a fresh fruit and vegetable box subscription service (commonly called a "CSA"), where you receive a weekly box of fresh fruits and vegetables?</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>												
<p>18. In the past year, have you participated in a food distribution program where you were given free fresh fruits and vegetables, such as at a food pantry or food bank?</p> <p><input type="radio"/> Yes   <input type="radio"/> No</p>	<p>19. In a typical week, how many home-cooked dinners do you or your family prepare?</p> <p>Number of Meals: _____</p>												

20. What is the name and physical address of the supermarket you usually shop at (describe location as best you can)?

Name:	Address (Street or closest intersection, City, or describe as best you can)
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21. What is the physical address of where your EFNEP or SNAP-Ed class meets?

Street	City	State	Zipcode
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### Demographic Questions

1. What is the physical address of your home (not the mailing address if different, NOT a PO box)? (We need this to only see where you live compared to food stores, and will not use it for any other reason).

Street	City	State	Zipcode
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2. Current age? <input type="text"/>	3. Gender? Male _____ Female _____
4. How much do you weigh? Weight (lbs.) _____	5. Your height? Feet _____; Inches _____
6. Highest grade completed in school? <input type="radio"/> Eighth Grade or less <input type="radio"/> Some high school <input type="radio"/> High School Graduate or GED <input type="radio"/> Trade or beauty school graduate <input type="radio"/> Some college <input type="radio"/> College Graduate <input type="radio"/> Post Graduate	7. Your yearly household income? <input type="radio"/> less than \$10,000 <input type="radio"/> \$10,000-\$20,000 <input type="radio"/> \$20,000-\$30,000 <input type="radio"/> \$30,000-\$40,000 <input type="radio"/> \$40,000-\$50,000 <input type="radio"/> \$50,000 or more
8. Consider yourself as Hispanic or Latino/Latina? <input type="radio"/> Yes <input type="radio"/> No	9. What race(s) do you consider yourself? <input type="radio"/> Black/African American <input type="radio"/> White <input type="radio"/> American Indian or Alaskan Native <input type="radio"/> Asian <input type="radio"/> Native Hawaiian or Other Pacific Islander <input type="radio"/> Other
10. Including yourself, how many <u>adults</u> age 18 or older currently live in your household? <input type="text"/>	11. How many <u>children</u> (less than age 18) for whom you buy food live in your household? <input type="text"/>
12. How long have you been in the EFNEP or SNAP-Ed program? _____ weeks	

If you would like to be in the drawing for the gift card, please provide your information below, and we will reach you if you are selected:

Email: \_\_\_\_\_

Phone: \_\_\_\_\_