A CASE STUDY OF A FAMILY BASED INTERVENTION FOR INTRODUCING SUSTAINABLE AGRICULTURE INTO LIMITED-INCOME COMMUNITIES

A Thesis in
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by

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ABSTRACT

The overall intent of this study was to learn about effective ways to construct and deliver community gardening/sustainable agriculture educational programs in limited-income communities. More specifically, a case study was conducted to test the impact of a specific sustainable agriculture education program model that was developed to increase participants’ knowledge of and positive attitudes towards sustainable agriculture and promote the adoption of sustainable practices in their day-to-day lives. A total of 27 youth and adults participated in a six-week summer program, Families Reinforcing Environmentally Sustainable Habits (FRESH). Eight youth were administered pre- and post-quizzes to determine changes in knowledge and attitude with regard to sustainable agriculture, local food systems and nutrition. Four adults were administered a retrospective design survey at the end of the program to measure changes in knowledge, attitude, and behavior. Four weeks after the end of the program, two of the adults who filled out a retrospective design survey were given a follow-up survey to measure sustained change in behavior over time. Due to the expected small sample size, the primary investigator and a research assistant took observational notes throughout the implementation of the program to complement the survey and quiz result data. Results from the survey did not indicate any program impact on adult participants’ knowledge about health and nutrition, food systems and the environment, but did show an increase in attitudes and behaviors related to these general topics. There was some pre- to post-program change in the youth quiz results for questions pertaining to knowledge about food systems and the environment, but overall there was little change in knowledge and attitudes. Positive program-related changes were found in adult participants’ attitudes and
behaviors towards health and nutrition, food systems and the environment, and
gardening, and in youth attitudes and behaviors towards gardening. These changes were
attributed to the aspects of the FRESH program that provided participants with multiple
opportunities to discuss and explore the relevance of sustainable agriculture principles to
their lives as individuals, family members, and community residents.
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CHAPTER 1
INTRODUCTION

A. General Problem Statement

As agriculture in the United States has become both more industrialized and production has become conglomerated, the accessibility to locally grown food has declined across the nation (Halweil, 2002; Morton & Blanchard, 2007). While the benefits of industrial agriculture include greater productivity and efficiency, the abundance of cheap foods, and the ability to feed a rapidly growing global population, many scholars argue that the benefits do not outweigh the costs. For example, Feenstra, (2002), Horrigan, Lawrence, and Walker, (2002), and Kimbrell, (2002) believe that the current industrial food system contributes to environmental degradation, including air and water pollution, and a decrease in biodiversity; human health concerns, including limited access to affordable and healthy foods and an increase in pollution related health affects; and the economic decline of small family farmers, community processors, and other local businesses tied to food production.

The production of livestock, which includes growing feed crops, producing fertilizer, and burning fossil fuels for production and transportation, has contributed to nearly one-fifth of all greenhouse gas emissions (Horrigan et al., 2002; Steinfeld, Gerber, Wassenaar, Castel, Rosales, & de Haan, 2006). Along with being a major contributor of greenhouse gasses, the U.S. currently has the largest “water footprint” due to its agricultural practices. The “virtual water content” (the amount of water required for all production and transportation) of beef is more than five times that of husked rice, and the
average meat consumption in the U.S. is three times greater than the world average (Hoekstra & Chapagain, 2007). In response to these environmental concerns, market demands have increased for local and organic foods, and many farmers, government agencies, and communities have been working together to develop small-scale, sustainable, local food systems (Hinrichs, 2000; Lyson, 2004; Pfeffer, 1992).

Although the term “sustainable” is commonly applied to a set of agricultural practices and the positive effects these practices may have on the environment, it is important to consider the social and economic implications as well. Lyson (2005) defines sustainable agriculture as “a holistic, systems-oriented approach to farming that focuses on the interrelationships of social, economic, and environmental processes” (p. 95). There is a conceptual link between sustainable agriculture and sustainable community development. Broadly, the United Nations defines sustainable development as that which, “seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future” (United Nations, 1987).

Agriculture reaches into every realm of society, affecting the day-to-day life of every community member. From an education perspective, it is important that we develop effective ways for individuals of all ages to learn about the importance of agriculture and how it affects their quality of life and day-to-day experience.

B. Importance of Study

Agriculture has a profound impact on consumer health and nutrition. Corn and soy are two important food crops both domestically and around the world because they are important sources of oils, calories, and protein, particularly for undernourished populations (Penti, 1974). These crops are also subsidized in the United States because of
their industrial applications, such as producing ethanol and biofuel (Pimental & Patzek, 2005). However, as a result of federal subsidies, corn and soy have become two of the cheapest and most abundantly grown foods in the United States, which some scholars believe contributes to the increasing obesity epidemic (Eubanks, 2009; Fields, 2004; Pollan, 2007). Corn and soy are often processed into oil (soy) and sugar (corn) and are commonly found in cheap foods, due to their low cost and plentitude as a subsidized food crop. Food insecurity and obesity have become two major health concerns faced by limited-income families in the United States in part because processed foods tend to be inexpensive, low in nutrients and high in calories, fat, and sugar (Drewnoski, 2007; Drewnoski & Specter, 2004; French, 2003; Horrigan et al., 2002; Morton, Bitto, Oakland, & Sand, 2008; WHO, n.d.). Studies show that people from lower incomes proportionately consume greater amounts of sugars and fats than those with higher incomes (Bleich, Wang, Wang, & Gortmaker, 2009; Drewnoski, 2003; Kranz, Smicklas-Wright, Sega-Riz & Mitchell, 2005; Widome, Neumark-Sztainer, Hannan, Haines, & Story, 2009).

Household food insecurity is defined as not having every member able to access nutritionally adequate, safe foods, in a socially acceptable manner, in order to have a healthy, active lifestyle, and is most frequently attributed to insufficient incomes (Anderson, 1990; USDA ERS, n.d.; USDA FNS, n.d.). In the United States over 13 million households were considered food insecure at some point during 2007 (Nord, Andrew, & Carlson, 2007). Limited-income families are more likely to consume foods high in fat, sugar, and calories because they are cheap and ubiquitous. Therefore it is important to address these problems through education and programming.
It is also important to address accessibility to fresh fruits and vegetables, particularly in limited-income communities where there is a greater incidence of health related problems (Morón, 2006; Wunderlich & Norwood, 2006). Organic and local farmers will often market their produce to upper- and middle-class consumers in order to make a higher profit and cover the increased costs associated with their production systems. This strategy fuels the myth that sustainably produced food is only for the rich and that only the wealthy can afford environmentally friendly lifestyles (Allen, 1999; Feenstra, 2002; Feenstra, 1997).

However, there is some interest and effort in crafting sustainable agriculture strategies for reaching limited-income populations. Sustainable, local food systems do not merely aim at solving environmental problems. Their goals are more inclusive, looking to alleviate social and economic injustices. Many sustainable agriculture organizations collaborate with school lunch programs, food banks, local governments, food stamp programs, and other institutions in the greater community and can directly benefit limited-income families. Sustainable, local food systems are “rooted in particular places, aim to be economically viable for farmers and consumers, use ecologically sound production and distribution practices, and enhance social equity and democracy for all members of the community” (Feenstra, 1997, p. 28). Sustainable, local food systems are an economically viable way to assist limited-income families in combating nutrition related health problems. There are many government, organization, and university initiatives that promote sustainable agriculture as a practical way to address many problems that face communities today.
Sustainable, local food systems also benefit the entire community by creating new sources of revenue and boosting local economies. When people purchase food directly from a farmer, 90% of the food dollars are returned to the farm, rather than the majority of the money paying for shipping, packaging, and advertising when buying imported foods (Spector, 2002). Local farmers would see a 5% increase in their income if consumers switched only 1% of their total food costs to purchasing local food (Gandee, 2002). When food dollars remain within the community, citizens can directly impact their local economy and enhance their community by purchasing local food. In order to create more sustainable local food systems, it is important that all members of society actively collaborate and cooperate towards the same goal and “engage in food-related behaviors that support, rather than threaten, the development of a democratic, socially and economically just, and environmentally sustainable food system” (Wilkins, 2005, p. 269).

Community gardening is one way in which to promote the consumption of local foods, hence community gardening practices are emphasized in the literature on sustainable agriculture and represent a major component of the sustainable agriculture program developed and piloted as part of this study. There are many benefits that come from community gardening, including increasing the access of nutritious foods to all community members, lower food costs for families, improving environmental and individual health, and strengthening community relationships and bonds (Armstrong, 2000; Okvat & Zautra, 2011; The Green Institute, 2006).

Many people have limited access to fresh foods because of geographic location, lack of transportation, or financial constraints. Rather than purchasing high priced fruits and vegetables from a grocery store or farmers market, gardening can prove to be a low
cost alternative (Marsh, 1998; Okvat & Zautra, 2011; Patel, 1991). It is estimated that individuals can save anywhere from $50-250 per season if they belong to a community garden (Hubik et al., 1994). Although it is necessary to invest in a garden, the monetary input that goes into a garden is far less than the value that comes out of the garden in terms of produce (Patel, 1991). Families that belong to a community garden can have access to fresh and healthy foods at a fraction of the cost of going to a supermarket. Community gardening also provides a place for limited-income families who do not own their own land to garden and enjoy the benefits of nutritious foods right in their own neighborhood. It is important for community gardening programs to carefully consider a location where participants have easy access.

Community gardening and growing one’s own food not only provide a cheaper source of healthy foods, but there are many environmental benefits as well. As noted earlier, industrial agriculture is a major contributor of pollution and greenhouse gas emissions (Horrigan et al., 2002; Steinfeld, Gerber, Wassenaar, Castel, Rosales, & de Haan, 2006). Community gardening can cut down on pollution because of decreased transportation distances, decreased use of chemical fertilizers, and a greater consumption of fruits and vegetables in place of meat.

Many consumers are becoming increasingly concerned with the health risks associated with produce treated with chemical pesticides and herbicides used in conventional farming (Dimitri, Greene, & U.S., 2002; Williams & Hammitt, 2002). Growing one’s own food is one way in which individuals and families can control what they eat, and eliminate or limit the amount of chemicals used.
Community gardening not only improves individual and environmental health, but it also has the potential for promoting community cohesion (Armstrong, 2000; Teig et al., 2009). Community gardening endeavors in low-income neighborhoods have been shown to strengthen social networks, facilitate a sense of individual and community empowerment, and even generate employment opportunities.

When considering ways to introduce people to sustainable agriculture concepts, it is important to go beyond presenting abstract concepts; the concepts need to be linked to tangible practices that have meaning in the context of their every day actions. For communities to become sustainable as a whole, it helps when individuals understand the fundamental principles of sustainability and how to apply them to their lives in order to improve their own well-being and the well-being of their community. It is in this context that we developed and piloted a community-based intervention program aimed at introducing sustainable agriculture principles to youth and their families in a limited income community.

C. Origin of Study

In order to introduce sustainability into limited-income communities and promote sustainable behaviors, it is important to understand the impact agriculture has at the individual and community level. People must be able to understand why sustainability is important, how it affects them, and what they can do to promote sustainability in their own lives. In order to implement a successful sustainable agriculture program in a low-income community, a partnership was created with the Centre County Youth Service Bureau (YSB), a local organization that serves limited-income families and at-risk youth. A common goal shared by both the researcher and the YSB was to figure out ways to
increase participation in community gardening and to promote behaviors that benefit the environment while improving the lives of local residents.

**D. Specific Problem Statement**

Although considerable research has been devoted to environmental and nutrition education, and sustainable, local food systems in the family context, rather less attention has been paid to finding effective strategies to include limited-income populations as economically viable consumers in local food systems. Many local and community food systems aim at increasing the access of limited-income communities to local foods. However, they fail to explore strategies to promote pro-sustainable agriculture attitudes and behaviors. It would seem, therefore, that further investigations are needed in order to figure out effective ways of promoting the adoption of sustainable practices in limited-income communities, particularly within the family context. Thus, the goal of this project is to develop, implement, and evaluate a sustainable agriculture curriculum, Families Reinforcing Environmentally Sustainable Habits (FRESH), to examine the process of how limited-income families discuss and adopt sustainable practices.

**E. Purpose and Objectives**

The overall intent of this study is to enhance our understanding about effective ways to construct and deliver community gardening/sustainable agriculture educational programs in limited-income communities. More specifically, this is a case study that was designed to test the viability of a multifaceted sustainable agriculture education program model that was developed to increase participants’ knowledge of and positive attitudes towards sustainable agriculture and promote the adoption of sustainable practices in their
day-to-day lives. Research objectives revolve around determining program impact on participants with regard to the following programmatic objectives:

(1) Increasing participants’ *knowledge* about how to grow their own food, sustainable agriculture principles, the environmental impacts of commercial and local food systems, and the importance of eating healthier foods by the end of the program.

(2) Increasing participants’ positive *attitudes* towards growing their own food, sustainable agriculture principles, eating healthier foods, and working cohesively with their families to make positive decisions about their food choices.

(3) Influencing participants to adopt sustainable *behaviors* that include, but are not limited to, growing more of their own food, purchasing more foods that are healthier and that are sustainably and locally produced, and reusing, recycling, and composting more waste.

F. Operational Definitions

The following terms used in the context of this study are defined as follows:

**Adults**: Participants of ages 18 and over.

**Community garden**: A public space in which people collectively care for a garden. The people are members of the local community in which the garden exists, and all members have shared ownership over the garden (Ferris, Norman & Sempik, 2001).

**Limited-income**: Yearly income does not exceed 150 percent of the poverty level amount (U.S. Department of Education, 2009). All of the participants were considered limited-income because they live in “Section 8 housing” (see below for operational definition).
Local food system: A system in which residents collaborate to enhance the environmental, economic and social health of their community. The following are goals of sustainable community food projects: Family farms are economically viable while using sustainable methods; all community members have access to affordable and nutritious foods; a stronger link is formed between farmers and consumers; the economy of the community is enhanced through food and agriculture-related businesses; improved living and working conditions for laborers in agriculture and food processing; local policies that promote sustainable food production and processing and production; and the community adopts behaviors that reflect concern for environmental and community health (UC SAREP, n.d.).

Section 8 housing: “The Housing Authority of Centre County operates a Section 8 Rental Assistance Program to help low income families/individuals with their rent, along with providing decent, safe and sanitary housing through Housing Quality Standards Inspections” (The Centre County Housing Authority, n.d.).

Sustainable agriculture: “An integrated system of plant and animal production practices having a site-specific application that will, over the long term: satisfy human food and fiber needs; enhance environmental quality and the natural resource base upon which the agricultural economy depends; make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls; sustain the economic viability of farm operations; and enhance the quality of life for farmers and society as a whole” (FACTA, 1990).

Youth: participants ages 6-13 (There were no youth above the age of 13 that participated in the program, even though people of all ages were welcomed to participate.)
CHAPTER 2

REVIEW OF LITERATURE

Contributions to the field of sustainable agriculture have focused on community systems and inter-organizational cooperation (Abel, Thomson & Maretzki, 1999; Feenstra, 1997), economic obstacles to adopting locally controlled practices (Zilberman, Khanna, & Lipper, 1997), and the environmental benefits of local food systems (Horrigan, et al., 2002; Steinfeld, et al. 2006). In this context, this study narrows in on teaching sustainable agriculture principles using a hands-on approach in a community garden setting. The purpose of this study is to evaluate the impact of a community gardening/ sustainable agriculture educational program on participants’ knowledge, attitudes and behaviors.

This chapter presents a review of literature related to the study and is organized into five sections. The first two sections explore literature related to knowledge, attitudes, and behaviors related to health and nutrition (section A), and the environment (section B), all in the context of community gardening programs. The next two sections (C and D) explore literature related to developing a basic structure to the program and its implementation strategy in the context of an underlying orientation that values family-based and experiential educational approaches. In order to develop the FRESH curriculum it was important to consider the objectives of the program, its target audience, and ways of achieving the desired outcomes. At the end of the chapter a summary of the literature review is presented in section E.
A. Health and Nutrition

One of the primary objectives of a research study by Koch, Walizcek, and Zajicek (2006) was to determine if participating in a gardening program could improve the knowledge of nutrition among youth. The change in knowledge was measured using an 11-question exam with “true or false” and multiple-choice questions. Only the results of the participants who completed a pre-test, mid-test, and post-test were analyzed (n=56). The researchers found that the gardening program did significantly increase knowledge of nutrition and healthy food choices.

In order to promote the consumption of fruits and vegetables, it is important to shape food preferences and encourage positive attitudes towards healthy eating. In evaluating a nutrition education program with a gardening component, Morris and Zidenberg-Cherr (2002) used a vegetable preference survey to determine if there was any increase in preference for vegetables among fourth-graders. The researchers saw a significant increase in participants’ preference for some vegetables, including vegetables the participants were not directly exposed to in the garden.

Community gardening can address diet-related problems by promoting healthy behaviors. Research shows that many people, both youth and adults, do not consume the recommended number of daily servings of fruits and vegetables (CDC, 1996; Cullen et al., 2001; Domel et al., 1993; Krebs-Smith et al., 1996; and Subar et al., 1995). In a study by Blair, Giesecke, and Sherman (1991), the researchers evaluated the nutritional, social and economic contributions of a community garden in Philadelphia. The methodology included oral surveys with one hundred and forty-four gardeners and sixty-seven non-gardening controls. The study found that people who garden, either at home or in a
community garden, are more likely to consume more vegetables more often and less sweets and sweet drinks overall than non-gardeners. The study also found that the gardeners were more interested in the quality of life benefits of community gardening than in the economic benefits. Similar studies (Flanigan & Varma, 2006; Heim, Stang & Ireland, 2009; Koch, Waliczek, & Zajicek, 2006; Lineberger & Zajicek, 2000; Morris, Neustadter & Zidenberg-Cherr, 2001) found that gardening provides a way for people to eat healthier (more fruits and vegetables) and get more physical activity in their lives, leading to an overall healthier lifestyle.

**B. The Environment**

In a study by Aguilar, Waliczek and Zajicek (2008), the research was framed to achieve the following objectives: (1) examine an experiential approach to environmental education by use of a gardening program for third- through fifth-grade students; and (2) promote pro-environmental attitudes through a gardening program. In order to measure change in pro-environmental attitudes, a survey, containing twenty questions pertaining to environmental attitudes, was given to 193 youth who did not participate in the gardening program (control group) and 461 youth who did participate in the gardening program (experimental group). This study showed that while there was no significant difference in pro-environmental attitudes between those in the control group and those in the experimental group after completion of the program, those who had prior experience to gardening, either as part of a formal program or informal activity, were more likely to have positive attitudes towards the environment.

In a similar study, Mayer-Smith, Bartosh and Peterat (2007) asked the research question: How can we promote a responsible attitude and caring view of the planet
among young people? The researchers examined an intergenerational community gardening program, coupled with a school environmental education curriculum. They found that the relationships formed among the participants as well as their “hands-on” gardening experiences can increase positive attitudes towards the environment among youth.

C. Family Based Approach

It is important to consider the entire family when developing interventions aimed at influencing people’s attitudes toward the environment and changing their behaviors in regard to how they produce and consume food. Parents and other family members play an influential role in shaping youth attitudes towards the natural environment, including attitudes toward gardening and farming. A family approach may be even more successful than environmental programs that target youth alone. When families participate in the program, they are more likely to support and encourage each other to change their behaviors in the home, making the effects of the program more sustainable (Arnold, Cohen, & Warner, 2009; Eagles & Demare, 1999). Therefore it is necessary to target the entire family in order to increase efficacy of the program. Not only can adding a family-based component to environmental education programs lead to a greater change in participants’ attitudes, it can also result in more sustainable changes in their behaviors that benefit the environment. According to Gruber and Haldeman (2009), “reciprocal reinforcing relationships among family members are important for acquiring and maintaining new behaviors” and it is important to encourage family interactions and dialogue when implementing programs that seek to promote long-lasting behavior change. Many studies show that children can influence the decisions their parents make
(Beatty & Talpade, 1994; Foxman, Tansuhaj, & Ekstrom, 1989; Moschis, 1985; Ward, 1974), including family decisions made in regard to behaviors that affect the environment (Duval & Zint, 2007). Children can influence their parents to make decisions that positively affect their local community, the environment, and their individual health.

Studies show that nutrition education interventions aimed at the whole family rather than the individual are more likely to result in acquiring and sustaining behavior change (Crockett, Mullis, & Perry, 1998; Gruber & Haldeman, 2009; Kelsey, Earp, & Kirkley, 1997; Mulvaney-Day, Alegria, & Scribney, 2007). It has also been found that families who eat meals, specifically dinner, together are more likely to make healthier food choices and consume a greater amount of fruits and vegetables (Gable, Change, & Krull, 2007; Gillman, Rifas-Shiman, Frazier, Rockett, Camargo, Field, et al., 2000; Larson, Neumark-Sztainer, Hannan, & Story, 2007; Rockett, 2007; Videon & Manning, 2003). With the overall goal of achieving long-lasting behavioral changes, the approach taken for the program developed for this study is one of educating both children and adults in a family together, and facilitating communication and cooperation with regard to ways to eat healthier.

**D. Experiential Learning**

The curriculum upon which this study is based utilizes an experiential learning pedagogical framework for teaching participants about sustainable agriculture. The curriculum includes a variety of hands-on activities pertaining to community gardening. The community in which the program piloted, Ashworth Woods, in Boalsburg, Pennsylvania, is a Section 8 housing complex in which a community garden has been established.
The community gardening activities provide the participants with real, hands-on opportunities to apply sustainable agriculture concepts related to producing food in sustainable, environmentally friendly ways. Such concepts, e.g., sustainable agriculture principles related to the process of composting, become tangible when the participants gain firsthand experience in interpreting and applying them in their own backyard. Not only do the participants learn more from a hands-on approach, but they also become active citizens in their community as well (Dewey, 1938; Lewin, 1948; Mayo, 2000; and Newman, 1999).

Dewey (1938) emphasized the importance of integrating education with everyday experiences. It is the individual experience that gives purpose and meaning to the individual student. Kolb (1984) also acknowledges the benefits of experiential learning in conjunction with traditional educational methods and developed his own model. His experiential learning cycle has four stages: (1) concrete experience; (2) observation and reflection; (3) forming abstract concepts; and (4) testing and experimentation. He believes his theory of experiential learning is a “holistic integrative perspective on learning that combines experience, perception, cognition, and behavior” (Kolb, 1984, p. 21). Rather than trying to teach principles of sustainable agriculture in the abstract, the FRESH program used an integrative approach to learning, and emphasized the application of the principles of sustainability to day-to-day actions thereby giving the principles more tangible meaning. By translating complex concepts into simple actions, participants are more likely to adopt new attitudes and behaviors that reflect the fundamental principles of sustainability.
E. Summary of Literature Review

This chapter presented literature related to how community gardening programs can increase people’s knowledge and influence their attitudes, and behavior related to health and nutrition and the environment. The literature review also highlighted the value of utilizing educational strategies that are family-based and that emphasize experiential learning approaches.

Gardening programs can positively impact the knowledge, attitudes, and behaviors of participants in the areas of health and nutrition and the environment. In order to successfully foster behavior change, it is important to target the whole family and encourage families to work cohesively while supporting one another. The literature also shows that experiential learning is a key aspect of education. It is not learning sustainable agriculture principles, alone, that makes a program effective, but how the participants reflect on those principles and apply them to their every day actions.
CHAPTER 3  
METHODS AND PROCEDURES

A. Overview of Research

As noted in Chapter 1, the purpose of this study was to learn effective ways to implement community gardening/sustainable agriculture educational programs in limited-income communities, and to test the viability of a specific sustainable agriculture education program. The curriculum, Families Reinforcing Environmentally Sustainable Habits (FRESH), is described below, with additional detail provided in Appendix A. The objectives of this study were to: (1) increase knowledge of sustainable agriculture, gardening, and health and nutrition; (2) improve positive attitudes towards sustainable agriculture, community gardening, and eating healthy foods; and (3) promote the adoption of sustainable behaviors. This study used an action research framework and consists of one case study. The researcher designed and piloted a six-week, place-based educational program, FRESH, for introducing sustainable agriculture principles in a limited-income community. Some sessions of the curriculum were adapted from other curricula; such instances are noted and specified in the curriculum itself in Appendix A.

This pilot study of the FRESH program took form in seven phases: (1) selection of possible partnering organizations; (2) program curriculum development; (3) administering of youth pre-quizzes; (4) program implementation; (5) administering of youth post-quizzes and adult post-then-pre surveys; (6) administering of follow-up surveys; and (7) analysis of quantitative and qualitative data.
The remainder of this section provides information about the curriculum – including goals, objectives, and program components, followed by information about the population or sample that took part in the study, a review of research instruments, and a description of the data collection and data analysis procedures.

**B. The Program Intervention**

1. Goals and Objectives

   The overall goal of FRESH is to create awareness about the impacts of consumer food choices, increase knowledge of and positive attitudes towards sustainable agriculture, and promote the adoption of sustainable practices on the part of program participants, specifically within the family context. FRESH is designed to be accessible to, and effective in, limited-income communities. Each of these goals translates into a series of learning objectives (using Bloom’s 1956 framework) which will be assessed as follows:

   **Cognitive Objectives** – participants will gain increased knowledge about: how to grow their own food, sustainable agriculture principles, the environmental impacts of industrial and local food systems, and the importance of eating healthier foods by the end of the program.

   **Affective Objectives** – participants will display an increase in positive attitudes towards growing their own food, sustainable agriculture principles, eating healthier foods, and working cohesively with other members of their families to make healthier food choices.

   **Behavioral Objectives** – the participants will adopt sustainable behaviors (as determined by a 4-week follow-up survey) that include, but are not limited to, growing more of their
own food, purchasing more foods that are healthier and that are sustainably and locally produced, and reusing, recycling, and composting more waste.

2. The Curriculum

The overall goal of FRESH was to create awareness about the impacts of consumer food choices, increase knowledge of and positive attitudes towards sustainable agriculture, and promote the adoption of sustainable practices on the part of program participants. As it is a place-based program centered on a community garden, the participants also learned to work collaboratively on maintaining the garden and growing their own food. To facilitate family communication and cooperation on matters related to food and nutrition, all members of each family were invited to participate in the program.

Table 1, below, describes the titles and objectives for each of the six sessions of the FRESH program.
Table 1. Session Titles and Objectives for the FRESH Curriculum

<table>
<thead>
<tr>
<th>Session</th>
<th>Session Title</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session 1</td>
<td>Sustaining the Garden</td>
<td>Overview of program, introduction to gardening in Pennsylvania</td>
</tr>
<tr>
<td>Session 2</td>
<td>Sustaining Our Bodies</td>
<td>Learn about healthy eating, proper portions, and cooking your own food</td>
</tr>
<tr>
<td>Session 3</td>
<td>Sustaining Our Families</td>
<td>Examining the importance of family communication and its impact on food choices</td>
</tr>
<tr>
<td>Session 4</td>
<td>Sustaining Our Communities</td>
<td>Introduction to local food systems, learning how when local farms benefit it benefits the entire community</td>
</tr>
<tr>
<td>Session 5</td>
<td>Sustaining Our Planet</td>
<td>Discovering how food choices impact the local and global environment</td>
</tr>
<tr>
<td>Session 6</td>
<td>Sustaining Our Hopes for the Future</td>
<td>Taking the lessons learned in the first five sessions and how to apply them in the future</td>
</tr>
</tbody>
</table>

The following program outline provides more detail as to what was done in each session. Further detail is provided in Appendix A.

Session 1 – Sustaining The Garden

- Youth Pre-test
- Lecture:
o Overview of program
  o What does sustainability mean?
  o Why grow your own food?

• Visual/Hands on:
  o Where does this grow?

• Hands on:
  o Decorating “Recipes from the Garden” books

• Gardening Experience

• Group Discussion:
  o Food from the Garden

• Take Home:
  o Sharing Family Recipes

Session 2 – Sustaining Our Bodies

• Recap of family activities throughout the week

• Lecture/Hands on:
  o Name the Ingredients!

• Visual/Hands on:
  o Find the Fat

• Hands on:
  o Sugar Game

• Gardening Experience

• Group Discussion:
  o What’s hiding in our garden?
• Take Home:
  o What Your Plate Should Look Like – decorating placemats
  o Tips for Eating Out

• Formative Evaluation

**Session 3 – Sustaining Our Families**

• Recap of family activities throughout the week

• Lecture/Visual:
  o So You Think You Know Me? (similar to the “Newlywed Game”)

• Hands on:
  o What’s in the bag?

• Gardening Experience

• Group Discussion:
  o Communicating With Others

• Take Home:
  o What food am I?

**Session 4 – Sustaining Our Community**

• Recap of family activities throughout the week

• Lecture:
  o Introduction to Sustainable Agriculture/Local Foods Systems – 3Ps

• Visual:
  o How far does your food travel? (map/globe)
  o Visualizing Commercial and Local Food Systems

• Hands on:
Money Flow – Who really benefits?

- Gardening Experience
- Group Discussion:
  - The 3Ps of the Garden
- Take Home:
  - Family Produce Map
- Formative Evaluation

Session 5 – Sustaining our Planet

- Recap of family activities throughout the week
- Lecture:
  - Where does garbage go after we throw it away?
- Visual:
  - How much water does it take…?
  - All About Compost
- Hands on:
  - Soil – It’s Alive!
- Gardening Experience
- Group Discussion:
  - Don’t treat your soil like dirt!
- Take Home:
  - Garbage Contest

Session 6 – Sustaining our Hopes for the Future

- Recap of family activities throughout the week
• Lecture/Visual:
  o Envisioning Your Future: Where do you want to be in 1 and 5 years?
    What do you want this town to look like? Drawings and discussion.

• Hands-on:
  o Time Capsule

• Gardening Experience

• Group Discussion:
  o Keeping the Garden Alive

• Take Home:
  o Going Back to School – school lunches, brown bagging

• Adult Post-then-Pre-test

• Youth Post-test

A consistent program format was used each week. Each session was about two
hours long, each with a different theme (See Table 1 above), beginning with the
facilitator asking participants to recall what was learned the week before. During this
time participants also discussed what they did during the week for the take home activity,
and how, if at all, they applied what they learned from the week before. After discussing
the previous week and introducing the current week’s topic, participants took part in 1-3
group activities, with the groups formed on the basis of family relationships, peer
relationships, or community relationships. Following these hands-on activities, the
families worked on the garden - weeding, watering, mulching, harvesting, etc. (whatever
needed to be done that week). During that time the program facilitators discussed a few
principles of gardening as well as things that can be done during the following week on
their own. At the end of the gardening activity, families were brought back into a group where the facilitator led a discussion aimed at reinforcing and extending lessons from the garden-related activities. Once the group discussion was complete, the families received their take home activity for the week with verbal and written instructions. When the families returned the following week, the activities they did were shared and discussed.

FRESH was designed to take place during the summer and in a local community garden in order to promote hands-on experiential learning. Participants apply the concepts and content of the curriculum to the garden. An important aspect of the FRESH program is that it is carried out in a convenient location for the program participants where everyone has connections to each other and a sense of connection to the shared environment.

3. Selection of Partnering Organizations

When developing or piloting a community program, it helps to establish collaborative relationships with community organizations that serve the target population. Local organizations can be an invaluable resource of information, expertise in the program area, volunteers/staff, and funding. These organizations have specialized knowledge that can help strengthen the program, remove barriers or reservations of participation, and help design appropriate activities because of their membership to the community (Scannel & Roberts, 1994). Accordingly, a local statewide sustainable agriculture organization was contacted, but due to the stated reasons of a lack of available staffing and limited resources, they chose not to play a role in implementing the FRESH program.
However, since FRESH addresses family and youth development issues as well, it was possible to establish a partnership with the Centre County Youth Service Bureau (YSB). The YSB, which primarily serves at-risk youth and limited-income populations, agreed to help recruit participants, provide space for the program activities, and provide input in the development of the FRESH curriculum.

Once the YSB was on board, it was important to assign roles and find staff. Insofar as the goals of the FRESH program are consistent with those of YSB’s StreetWorks program (which provides year-round after school activities for low-income families in the targeted community), the focus was on working with YSB StreetWorks staff where possible.

4. Considerations in Developing the Program

The following considerations were taken into account in designing this educational program:

Why a setting with access to a community garden?

- The program takes place during the summer, a period of time when gardens provide many activity options related to environmental learning and community service.
- Ideal for hands-on experiential learning.
- Ideal for conveying relevant sustainable agriculture program concepts and content.
- Community gardens are often in underdeveloped or poorly developed areas of low-income communities.

Why place-based?
• Conducive to creating a group in which participants are likely to have social connections to one another and geography in common;

• Provides opportunities for reaching people in the context of what they care about – relevant to their experience.

• Convenience – limited-income families might not have the resources to travel.

It is also important to be considerate of the participants involved and their cultural and socio-economic backgrounds. Since this curriculum was specifically designed for low-income populations, the curriculum does not require the participants to purchase or bring any items such as gardening equipment or educational materials or incur additional expense. During the pilot of this program, dinner was provided for the participants each week as part of an incentive to participate and to promote healthy eating. Many of the dinners were made with fresh, local ingredients from Centre County.

5. Implementation

The families who participated in FRESH already participated in the Centre County Youth Service Bureau’s StreetWorks program that serves local limited-income families. The population for this program consisted of local residents residing in a Section 8 housing complex, called Ashworth Woods, in Boalsburg, Pennsylvania. All of the residents living in this community come from lower socioeconomic backgrounds (a requirement for living in Section 8 housing). Most of the participants were elementary school aged children and their parents. Whereas many programs work solely with children or parents, this program aims to include members of the entire family with the goal of promoting sustainable change as noted in the previous section. The protocol for targeting and enlisting the participation of entire families is described below.
In order to advertise the program, YSB staff informed the residents of Ashworth in person about the piloting of FRESH. Before June 7th there was no advertising other than spreading the information by word of mouth. Between June 7th and 14th FRESH flyers were placed on every door in the neighborhood. One of the research assistants and the primary investigator went “door-to-door” to speak to the residents of the neighborhood and inform them about the program. In addition to distributing flyers and knocking on doors, two mothers who had previously provided their phone numbers were contacted via phone calls. Incentives were also used to increase participation rates. Each week, dinner was provided for all of the participants and at the end of the program, as promised during the participant recruitment phase of the program, participating adults were entered into a prize drawing of a $50 gift certificate to a local supermarket.

The original start date of implementing FRESH was May 31st, but due to the Boalsburg Memorial Day Carnival, the start date was postponed until June 7th. However, not enough adults attended on the first day, so the start date was postponed yet another week, to June 14th and the time was changed from 4pm to 6pm to accommodate working parents.

C. Selection of Population to be Studied

The purpose of the program was to study the effects of a community gardening and sustainable agriculture education program in a limited-income community. For that reason it was deemed important to find a community in which the population falls under the definition of limited-income in which to implement the program. As stated earlier, the YSB primarily serves at-risk youth and limited-income populations, and implements a weekly program in Ashworth Woods (a Section-8 housing complex in Boalsburg,
Pennsylvania) called StreetWorks. Furthermore, there is already a community garden at this site. The combination of three major factors – i.e., the limited-income housing complex, an already existing community garden, and the partnership with YSB (which with its StreetWorks provides a workable framework for delivering new programs that are likely to benefit local youth) made the location an ideal place to implement FRESH. This was a purposive sample in a local community and was open to all residents of Ashworth Woods, regardless of age, gender, or other demographic characteristics. No control group was used for the purpose of this study. Although children younger than six were permitted to participate, they were not used in the research. Details of the program participants are provided in the Demographic Profiles of Participants section in Chapter 4.

D. Research Approach

To determine specific objectives of the program, the objectives must be measurable in order to determine if the objectives were met and to evaluate the success of the program. There are three domains in which objectives can be measured: the cognitive domain, which includes knowledge, awareness, comprehension, synthesis, and evaluation; the affective domain, which includes attitudes, values, and opinions; and the psychomotor domain, which involves physical skills, movement, and hands-on abilities and applications (Bloom, 1956).

The research design included five methodological approaches: semi-structured observations, pre- and post-quizzes for the youth, post-then-pre surveys for the adults, feedback loop surveys for all participants during implementation, and follow-up surveys for the adults.
The following table provides information on the timing of data collection in the context of the structure of the curriculum.

Table 2. Schedule of Data Collection

<table>
<thead>
<tr>
<th>Session 1</th>
<th>Session 2</th>
<th>Session 3</th>
<th>Session 4</th>
<th>Session 5</th>
<th>Session 6</th>
<th>4-weeks after end of program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Youth Pre-quiz*</td>
<td>Feedback Loop 1</td>
<td>Feedback Loop 2</td>
<td>Youth Post-quiz, Adult post-then-pre survey</td>
<td>Adult follow-up survey</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Some youth participants took the pre-quiz at the beginning of other sessions because they did not attend Session 1.

More details on the research instruments and data collection procedures are provided in the following section.

E. Instrumentation and Data Collection

The researcher developed all evaluation instrumentation used in measuring changes in knowledge, attitudes, and behaviors. Youth were given a pre-quiz their first day of participation (not necessarily the first day of the program) and a post-quiz at the end of the last session. The post-quiz was identical to the pre-quiz. These were used to measure change in knowledge, attitude and behavior with regard to sustainable agriculture, local food systems and nutrition. The youth quiz was adapted from one developed by Penn State University for use with school aged children (Penn State University Cooperative Extension, n.d.). The first section of the quiz measured knowledge about health and nutrition and food systems and the environment and contained nine questions. For Question 1 the participants had to circle all of the images of healthy foods. For Questions 2 – 8 participants had to answer “YES” or “NO” for
knowledge statements. For Question 9 participants had to circle images of fruits and vegetables that grow on trees. The “attitude” portion of the quiz contained seven questions, with the participants having to choose either “YES” or “NO” for the corresponding statement regarding their attitudes towards gardening and the environment or health and nutrition. (See Appendix B for Youth Quiz) The structure and parts of the quiz were adapted from PSU Cooperative Extension’s survey tools for school age children (n.d.)

Adults were given a self-report retrospective design post-then-pre-survey (Rockwell & Kohn, 1989) to measure change in knowledge, attitude and behavior. The participating adults were not given a pre-survey at the beginning of the survey, but instead given a survey at the end of the program that asked them about their knowledge, attitudes, and behavior as a result of the program and then about their knowledge, attitudes, and behavior before the start of the program. The first five questions pertaining to knowledge were “True or False” questions, in which the participants had to choose either “true” or “false” for the corresponding statement. The next five knowledge questions were multiple-choice, in which participants had to determine the correct answer listed below. All 10 questions pertaining to attitudes were developed using a modified four-level Likert scale (Likert, 1967). For each attitude statement there were four possible answers: “strongly disagree,” “disagree,” “agree,” and “strongly agree.” All 10 questions pertaining to self-reported behavior were developed using a typical five-level Likert scale (Likert, 1967). For each behavior statement there were five possible answers: “almost never,” “rarely,” “about half the time,” “often,” and “almost always.” Table 3 below provides a sample of one question used in the post-then-pre survey given to adults.
Table 3. Sample Behavior Question Included in Adult Post-Then-Pre Survey

<table>
<thead>
<tr>
<th>Before FRESH</th>
<th>End of FRESH</th>
</tr>
</thead>
<tbody>
<tr>
<td>DID I?</td>
<td>DO I?</td>
</tr>
</tbody>
</table>

Please circle the number that best represents how often you do each of the following behaviors:

1 = almost never
2 = rarely
3 = about half the time
4 = often
5 = almost always

I compost all of my food scraps/waste.  

1  2  3  4  5  1  2  3  4  5

(See Appendix B for the entire Adult Post-then-Pre instrument.)

The adults also had a chance to comment on the structure, content and instruction of the program at the end of the survey. Four weeks after the completion of the program a follow-up survey was administered to the adults who filled out the post-then-pre survey. Two of the surveys were delivered in person and two were mailed because the families moved out of state. The follow-up survey measured change in or sustained behaviors over time, and not knowledge or attitudes. The questions on the follow-up survey were identical to the questions relating to behavior in the post-then-pre survey.

Due to the small size of the sample, the reliability for the three sections of the adult survey (knowledge, attitudes, and behavior) and the two sections of the youth quiz (knowledge and attitudes) was not calculated.

All participants who attended Sessions 2 and 4 were given a “feedback loop” survey at the end of these sessions to assist the instructor in making any necessary adjustments during the course of the program (e.g., reinforcing or clarifying a lesson
topic to enhance understanding). The purpose of these surveys was to determine if the content was clear and understood by the participants. The participants were provided with a list of topics covered in the previous two sessions, i.e. “Knowing the Ingredients” and “What Your Plate Should Look Like.” They were then asked to write down the topics for which they felt confident that they learned something and to write down the topics for which they did not feel confident that they learned something (see Appendix B for Feedback Loop Surveys).

For each of the six program sessions, the primary investigator and/or a research assistant took detailed observational notes in regard to patterns of interaction between the participants and participants’ comments and other behaviors that provided clues as to their knowledge and attitudes related to sustainable agriculture principles and practices. An observational protocol (provided in Appendix B) was used to provide some structure and consistency in the way the primary investigator and research assistant took notes, and to reduce researcher bias. The observations included verbal remarks on the program as well as gestures and body language. StreetWorks staff were available to assist in the facilitation of several FRESH program activities. The Human Subjects Institutional Review Board at Penn State University approved study procedures (see Appendix C for IRB approval letter and consent forms).

**F. Data Analysis**

Only data from youth participants who took both the pre-quiz and post-quiz were used in the analysis. The differences between pre- and post-responses for each quiz item were totaled for each question, but no statistical analysis was used beyond this due to the small sample size.
To assess program impact on youth, they were given a pre-quiz at the start of the program and an identical post-quiz at the conclusion of the program. The “knowledge” portion of the quiz contained nine questions. For Question 1, the participants had to circle all of the images of healthy foods. For each correct answer the participant received one point and for each unhealthy food circled a point was subtracted. For Questions 2 – 8, participants had to answer “YES” or “NO” for knowledge statements. For each correct answer participants received one point. No points were deducted in this portion of the quiz. For Question 9, participants had to circle images of fruits and vegetables that grow on trees. This was scored the same way as Question 1, where one point was given for each correct answer circled and one point deducted for each incorrect answer. The “attitude” portion of the quizzes contains seven questions, with the participants having to choose either “YES” or “NO” for the corresponding statement regarding their attitudes towards gardening and the environment or health and nutrition. One point was given for each positive response, e.g., choosing “YES” for the statement “I think it is important to recycle” (Question 15).

To assess program impact on the adults, they were given a retrospective design survey at the conclusion of the program. The “knowledge” portion of the survey contained five “true or false” questions and five multiple-choice questions. For each correct answer the participant received one point for that portion of the survey. The “attitude” and “behavior” portions of the survey each contained ten questions in which the answers were ranked 1 through 4 (attitude) or 1 through 5 (behavior). For each of the three portions of the survey, the questions were scored only in comparison with questions corresponding to that portion of the instrument.
After all observational notes were typed the following content analysis procedure took place: the main researcher and a colleague with a PhD in a social science field independently reviewed the transcribed text, developed categories to reflect major themes, and worked together to establish a single categorization system that incorporated the full range of themes reflected in the transcribed observation text. After the categorization system was finalized, portions of the text were sorted into relevant categories.
CHAPTER 4

FINDINGS

A. Demographic Profile of Participants

There were a total of 27 participants in FRESH. Of the 27 participants, only 12 returned pre- and post-survey data. As indicated in Table 4, below, the majority of the participants were youth between the ages of 6 and 13.

Table 4. Total Number, Age Distribution, and Survey Return Rate of Participants

<table>
<thead>
<tr>
<th>Age Group</th>
<th># Participated</th>
<th>% of Total Participants</th>
<th># Returned Surveys/Quizzes</th>
<th>Survey/Quiz Return Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult (ages 18 and above)</td>
<td>5</td>
<td>18.5</td>
<td>4</td>
<td>80</td>
</tr>
<tr>
<td>Youth (ages 6-13)</td>
<td>22</td>
<td>81.5</td>
<td>8*</td>
<td>36.4</td>
</tr>
<tr>
<td>TOTALS</td>
<td>27</td>
<td>100</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

*These youth participants completed both the pre-quiz and the post-quiz. Those who completed only the pre-quiz (14) were not included in data analysis.

The majority of the participants were female. Of the five adult participants one was male (20%) and four were female (80%). Of the 22 youth participants, eight were male (36.4%) and 14 were female (64.6%). In line with the large number of the residents of Ashworth that are first and second generation Russian immigrants, 10 of the youth who participated fit into this category. However for these youth, none of their parents participated in the program.

Although there were a total of 27 participants, only between 11 and 18 participants came to each session. At the last session, only one adult was eligible to take the survey (another adult at the session had not attended any of the previous sessions);
three additional adult participants (other than the one who attended the last session) were contacted two days after the end of the program and all agreed to complete the survey. Eight youth took the post-quiz on the final session (another two youth were in attendance, but since they were below the age of six, they were unable to take the quiz).

Table 5. Number of Participants at Each Session of the FRESH Program

<table>
<thead>
<tr>
<th>Session</th>
<th>Adults</th>
<th>Youth</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>10</td>
<td>12</td>
</tr>
</tbody>
</table>

B. Presentation and Interpretation of Data

The data on changes in youth knowledge, attitudes, and behavior are presented separately for outcomes related to topics tied to “health and nutrition” and “food systems and the environment.” In order to analyze the results from the adults, data available for each adult were examined individually because of the small sample size (n=4).

**YOUTH FINDINGS**

1. Youth Knowledge

Findings indicate little or no program impact on youth participants in terms of their knowledge about topics related to health and nutrition, but there was some indication that the program had the intended impact on participants’ knowledge about topics related to food systems and the environment. This section will present results from the quantitative (quizzes) as well as observational data sources. In the quizzes that youth filled out at the beginning and end of the program, change in knowledge among youth
was measured by questions 1 – 9 in the youth quiz. Table 6 below provides data for questions 2 – 8 which provided a Yes/No response option.

Table 6. Knowledge Gain by Youth Participants of the Program on Health & Nutrition and Food Systems & the Environment Topics

<table>
<thead>
<tr>
<th>Question #</th>
<th>Question Topic</th>
<th>Total Number of Correct Answers on Pre-quiz</th>
<th>Total Number of Correct Answers on Post-quiz</th>
<th>Total Change in Score for All Participants*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Health &amp; Nutrition</td>
<td>7</td>
<td>8</td>
<td>+1</td>
</tr>
<tr>
<td>3</td>
<td>Food Systems &amp; the Environment</td>
<td>8</td>
<td>7</td>
<td>-1</td>
</tr>
<tr>
<td>4</td>
<td>Health &amp; Nutrition</td>
<td>8</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Health &amp; Nutrition</td>
<td>4</td>
<td>5</td>
<td>+1</td>
</tr>
<tr>
<td>6</td>
<td>Food Systems &amp; the Environment</td>
<td>0</td>
<td>3</td>
<td>+3</td>
</tr>
<tr>
<td>7</td>
<td>Food Systems &amp; the Environment</td>
<td>5</td>
<td>6</td>
<td>+1</td>
</tr>
<tr>
<td>8</td>
<td>Food Systems &amp; the Environment</td>
<td>5</td>
<td>7</td>
<td>+2</td>
</tr>
</tbody>
</table>

These questions had a Yes/No response option. Each correct answer is valued at one point. The total number of points from all quizzes was added for each question for the pre-quiz and post-quiz. The difference between the pre-quiz total and post-quiz was calculated for the total change per question. Only for questions for which respondents scored a pre- to post-quiz score improvement of +2 or more were they considered to have displayed a modest increase in knowledge. See Appendix B for Youth Quiz.

**Health and Nutrition:**

Questions 1, 2, 4 and 5 of the youth quiz instrument all asked questions pertaining to health and nutrition. Question 1 had pictures of foods, unhealthy and healthy. The youth were asked to circle all of the healthy foods pictured. If an unhealthy food was circled, a point was deducted. If a healthy food was circled a point was awarded. The average score for pre-quiz responses to question 1 was 7.25 and the average score for the post-quiz was 7.875, thus showing a modest increase in knowledge about healthy and
unhealthy foods. Looking at the data above in Table 6, there was little change in knowledge for questions 2, 4 and 5.

However, when considering the observational data, there were indications that the program experience enhanced some youth participants’ awareness of the “food-body” connection. For example, after one male youth learned how much sugar was in sweetened iced tea he responded, “That’s why I get hyper!” While eating carrots, another youth said, “I’m making my eyesight better.” The participants were able to apply the information they learned to their own lives and eating habits.

**Food Systems and the Environment:**

Questions 3, 6, 7, 8 and 9 measured change in knowledge in regard to food systems and the environment. As shown in Table 6, above, participants showed modest improvement in their knowledge of the topics noted in questions 6 and 8 (i.e., with a pre-to post-quiz score improvement of +2 or more). Question 9 displayed pictures of fruits and vegetables. The youth were asked to circle all of the items that grow on trees. If an item that does not grow on a tree was circled, a point was deducted. If an item that does grow on trees was circled a point was awarded. The average score for pre-quiz responses to question 9 was 1.75 and the average score for the post-quiz was 2.25, thus showing only a slight increase in knowledge about produce that grow on trees.

In question 6 on the youth quiz, respondents were asked whether or not oranges can grow in Pennsylvania (the correct answer being “no”). The number of youth who said yes was 8 in the pre-quiz and only 5 said yes in the post, showing an increase in knowledge about this facet of food systems and the environment.
In question 8, youth were asked if garbage can end up in the ocean after being thrown away. The number of respondents who said yes in the pre-quiz was 5 and increased to 7 in the post-quiz, again showing an increase in knowledge about the environment. The participants exhibited an increased understanding of sustainability and what they can do to help the environment. When asked why composting is important, one youth replied, “[it] helps the environment because it doesn’t go to the landfill.”

The observational data show that some of the youth participants became increasingly aware of the connection between the foods they eat and its effects on the environment. One youth said, “Eat locally because you need fresh food and it takes a lot of gas and energy to bring from other parts of the country.” Another said, “Our garden is to help us because people aren’t losing money and wasting gas.” This connection was also made when learning how far food travels, one youth said, “That’s a lot of gas and energy!” Such comments illustrate that at least for some of the youth participants, they were beginning to understand how their food choices affect the environment.

2. Youth Attitudes

In the quantitative (survey) data, there was no apparent pattern indicating program impact on participants in terms of their attitudes towards health and nutrition and food systems and the environment. However, there was some indication from the qualitative data that the program had the intended impact on participants’ attitudes related to health and nutrition and food systems and the environment. This section will present results from the quantitative as well as observational data sources.

Questions 10 – 16 measured change in attitudes. The respondents were asked to answer yes or no to statements pertaining topics related to health and nutrition, food
systems, the environment, and family life (question 13). The results are presented in Table 7, below, and discussed in the following sub-sections.

**Table 7. Attitude Change by Youth Participants of the Program on Health & Nutrition and Food Systems & the Environment Topics**

<table>
<thead>
<tr>
<th>Question #</th>
<th>Question Topic</th>
<th>Total Number of Correct Answers on Pre-quizzes</th>
<th>Total Number of Correct Answers on Post-quizzes</th>
<th>Total Change in Score for All Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Food Systems &amp; the Environment</td>
<td>7</td>
<td>8</td>
<td>+1</td>
</tr>
<tr>
<td>11</td>
<td>Food Systems &amp; the Environment</td>
<td>8</td>
<td>7</td>
<td>-1</td>
</tr>
<tr>
<td>12</td>
<td>Health &amp; Nutrition</td>
<td>5</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>Family Life</td>
<td>8</td>
<td>7</td>
<td>-1</td>
</tr>
<tr>
<td>14</td>
<td>Food Systems &amp; the Environment</td>
<td>7</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>Food Systems &amp; the Environment</td>
<td>8</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>16</td>
<td>Health &amp; Nutrition</td>
<td>7</td>
<td>8</td>
<td>+1</td>
</tr>
</tbody>
</table>

These questions had a Yes/No response option. Each correct answer is valued at one point. The total numbers of points from all quizzes were added for each question for the pre-quiz and post-quiz. The difference between the pre-quiz total and post-quiz was calculated for the total change per question. See Appendix B for Youth Quiz.

**Health and Nutrition:**

As shown in Table 7, above, for the two questions designed to assess changes in participating youths’ attitudes towards health and nutrition (Questions 12 and 16), no major pre- to post- program changes were found.

However, as was clear from the observational data, some youth participants were clearly excited about and very receptive to lessons covering topics regarding health and nutrition. During meals, most of the youth participants exhibited a willingness to try new, healthier foods, or ones they said they did not like before. One female youth expressed
enjoyment of eating the healthy meal (vegetarian lasagna, green beans etc.) After reading the ingredients in Mac & Cheese, this youth said, “I’m never eating that ever again!”.

Youth participants also learned about unhealthy drinks, such as store bought iced tea and sodas that contain a lot of sugar. In response, one male 11 year-old said, “You can make your own iced tea without sugar and it tastes so much better!”

**Food Systems and the Environment:**

Whereas there was an indication of an increase in some youth participants’ knowledge regarding sustainability and the environment (as noted in the previous section), no changes were detected from the quiz data (questions 10, 11, 14 and 15 measured changes in attitudes towards food systems and the environment, and the results are listed in Table 5, above). However, the observational data suggest that there was a program impact on youth participants’ attitudes towards the environment and an increase in positive attitudes towards gardening. During each gardening experience the participants were enthusiastic about the hands-on gardening opportunities and excited to see the progress and growth of the plants. Three of the youth participants were eager to water the plants during the garden experiences. One 7 year-old female participant enthusiastically asked, “Can we bring the zucchinis home to bake something?” During the composting lesson one youth asked, “Can we bring our own food to the compost bin?” and another said, “Tomorrow I’m going to make compost!” Both showed a change in attitude towards gardening and composting, and a willingness to change their behavior.

3. Self-Reported Understanding of Topics
The feedback loop data collected at the end of Sessions 2 and 4 provided some useful information with regard to which activities were most effective in educating the youth about topics related to health, nutrition, food systems and the environment.

The participants were provided with a list of topics covered in the previous two sessions (Session 1 and 2 for the first feedback loop survey, and Session 3 and 4 for the second feedback loop survey – see Appendix B for evaluation instrumentation) and they were then asked to distinguish, in writing, between those topics for which they felt confident that they learned something from those for which they were not confident.

Eight youth filled out the feedback loop survey for Session 2. All eight who participated in the “Sugar Content” activity (hands-on), seven who participated in the “Fat Content” activity (hands-on), seven who participated in the “Basics of Gardening” activity (hands-on), six who participated in the “Knowing the Ingredients” activity (hands-on), one who participated in the “Understanding Sustainability” activity (lecture), and five who participated in the “What Grows in Pennsylvania” activity (lecture) stated that they were confident in what they learned from these activities.

Of the four youth who filled out the feedback loop survey for Session 4, three who participated in the “Local Versus Commercial Systems” activity (hands-on), two who participated in the “Importance of Communication” activity (hands-on), four who participated in the “Impacts of Food from Afar” activity (hands-on), and three who participated in the “Principles of Sustainable Agriculture” activity (lecture with visual aids) indicated that they were confident in what they learned from these activities.

For the most part, it seems that the topics taught via hands-on format were most readily understood by the participating youth.
ADULT FINDINGS

Considering the small number of adults in the program, it is not feasible to attempt to generate conclusive statements about program impact on adults. Across the board, adults did not show much change in knowledge, attitudes or behavior from the pre- to post-program survey as shown in Table 8 and 9 below.

Table 8. Change in Attitudes of Adult Participants of the FRESH Program

<table>
<thead>
<tr>
<th>Statement</th>
<th>Before FRESH</th>
<th>After FRESH</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean*</td>
<td>SD</td>
</tr>
<tr>
<td>I think it is important to feed my children healthy foods</td>
<td>4</td>
<td>3.75</td>
<td>0.5</td>
</tr>
<tr>
<td>I think it is important to know where my food comes from</td>
<td>4</td>
<td>3</td>
<td>1.4</td>
</tr>
<tr>
<td>I like to eat fresh fruits and vegetables whenever possible</td>
<td>4</td>
<td>3</td>
<td>1.4</td>
</tr>
<tr>
<td>I enjoy growing my own food</td>
<td>4</td>
<td>2.5</td>
<td>1.3</td>
</tr>
<tr>
<td>I think it is important to communicate with my family about food</td>
<td>4</td>
<td>3</td>
<td>1.4</td>
</tr>
<tr>
<td>I enjoy cooking meals using fresh produce</td>
<td>4</td>
<td>3.25</td>
<td>1.0</td>
</tr>
<tr>
<td>I care about the natural environment</td>
<td>4</td>
<td>3.25</td>
<td>1.5</td>
</tr>
<tr>
<td>I enjoy spending time cooking with my family</td>
<td>4</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>I think it is important to support local farmers</td>
<td>4</td>
<td>2.25</td>
<td>1.0</td>
</tr>
<tr>
<td>I prefer to eat organic produce</td>
<td>4</td>
<td>2.5</td>
<td>1.3</td>
</tr>
</tbody>
</table>

* Mean computed on a scale: 1=strongly disagree to 4=strongly agree.
See Appendix B for Adult Survey.
Table 9. Change in Behaviors of Adult Participants of the FRESH Program

<table>
<thead>
<tr>
<th>Statement</th>
<th>Before FRESH</th>
<th>After FRESH</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean*</td>
<td>SD</td>
</tr>
<tr>
<td>I compost all of my food scraps/waste.</td>
<td>4</td>
<td>1.25</td>
<td>0.5</td>
</tr>
<tr>
<td>I buy as many foods grown as close to home as possible.</td>
<td>4</td>
<td>2.25</td>
<td>1.0</td>
</tr>
<tr>
<td>I go to fast food restaurants.</td>
<td>4</td>
<td>3</td>
<td>1.8</td>
</tr>
<tr>
<td>I recycle all of my recyclable materials (bottles, cans, etc.).</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>I always read the nutrition and ingredients labels on food items.</td>
<td>4</td>
<td>3.25</td>
<td>1.7</td>
</tr>
<tr>
<td>I make all of the food decisions for the family.</td>
<td>4</td>
<td>4.5</td>
<td>0.6</td>
</tr>
<tr>
<td>I grow my own vegetables whenever possible.</td>
<td>4</td>
<td>2.25</td>
<td>1.9</td>
</tr>
<tr>
<td>I spend time outdoors as much as possible.</td>
<td>4</td>
<td>3.75</td>
<td>1.9</td>
</tr>
<tr>
<td>I cook most meals from scratch.</td>
<td>4</td>
<td>3</td>
<td>0.8</td>
</tr>
<tr>
<td>When shopping, I bring reusable bags.</td>
<td>4</td>
<td>2.5</td>
<td>1.7</td>
</tr>
</tbody>
</table>

*Mean computed on a scale: 1=almost never to 5=almost always. 
See Appendix B for Adult Survey.

However, when viewing the survey data along with the observational data, it becomes possible to generate profiles of how individual adult participants experienced certain aspects of the program. Each person exhibited some change in certain aspect(s) of the program, particularly in the qualitative data. There was a lot of variation in what the participants got out of the program as a whole, as well as which elements of the program they found most useful and educational. Summaries of profiles created for each of the four of the adult participants are provided below.
Participant 1:

Participant 1 is the mother of three children, one of whom participated in the program. Both mother and daughter who participated were particularly engaged in and contributed greatly to the program. Often the mother attended the weekly sessions telling stories about what they did during the week as a family that reflected the concepts they learned from the previous session. The mother always came prepared with questions and completed take home activities.

For adult participant 1, there was only a very limited indication of change in knowledge and attitude. Overall knowledge increased by only 1 point (out of a possible 10 points) from pre- to post-survey and there was a positive change in attitudes of 3 points (out of a possible 30 points). However, there was more indication of change in behavior as seen from the survey results, increasing a total of 8 points (out of a possible 40 points). In particular, participant 1 noted changes in her family’s behavior with regard to composting, buying local foods, and gardening. Behavior Question 1 states, “I compost all of my food scraps/waste”. Before the program she rated herself at a “1” which equates to “almost never”. By the end of the program she was composting “almost always” (a rating of “5”). This change was the largest change possible for a behavior question. This self-reported increase in composting behavior was corroborated by observations made during the program. After “learning about compost week” participant 1 returned the following week with a compost bucket filled with food scraps. As a family activity, she and her family painted their compost bucket with apple cores, plants and roots, insects, and other garden related images and shared it with the rest of the participants. They were also the only family to fill out the “Garbage Contest” sheet (tracking the amount of waste
composted, recycled, or thrown out in one week) and the “Where Your Food Comes From” map (keeping track of where the produce eaten over the course of one week comes from in the world), the two take home activities from the week before.

**Participant 2:**

While the other three adult participants exhibited some change in knowledge and attitude, participant 2 expressed no change in knowledge or attitude for any of the survey questions. She also reported the least amount of change in her behavior (with an increase of 6 points from pre- to post-survey). Nevertheless, she always attended the program and usually displayed a high level of interest in the activities and lessons.

There are several possible explanations for the lack of change in her pre- to post-program survey responses. As the mother of two small children, it might have been difficult for her to fully engage in the program. In fact, she attended the least number of sessions out of all of the adult participants.

Another possibility has to do with the fact that she entered the program with a high level of interest, knowledge and positive attitudes toward issues related to making healthy food choices and caring for the environment. This would leave little room for her to display growth in the program as measured by survey results (i.e., with limited pre- to post-program changes in survey results), thus indicating a sort of “ceiling effect.”

**Participant 3:**

At the beginning of the program Participant 3 expressed that she was uninterested in gardening. Having participated in the community garden in previous years, she said that she did not expect to enjoy the gardening aspect of the program. However, throughout the program her attitude and behavior showed otherwise. Every session she
attended she would bring her young son and engage in the activities with interest and enthusiasm. By the end of the program she was enjoying the gardening activities and taking it upon herself to compost and garden.

Adult participant 3 showed very little change in knowledge (1 point difference out of a possible 10 points) from pre- to post-survey, but there was some change in her responses to questions about attitude (7 point difference out of a possible 30 points) and behavior (8 point difference out of a possible 40 points). The data show change particularly in the area of gardening. When asked to rate how much she agreed or disagreed with the statement, “I enjoy growing my own food” (Question 4), before the program, she indicated that she “disagreed” (response option #2), but after the program she “strongly agreed” (response option 4) with this statement. Also, pre- to post- program survey responses made by Participant 3 increased 2 points for two different behavioral questions pertaining to gardening. Behavior Question 1 states, “I compost all of my food scraps/waste”. Before the program she rated herself at a “2”, which equates to “rarely”, and after the program she rated herself at a “4”, which equates to “often”. This finding is consistent with an observation of the participant bringing food scraps to the compost pile on a day that the program was not being implemented, thereby demonstrating sustained behavior change after the end of the program. [Unfortunately, sustained behavior change for this participant could not be measured by the follow-up survey because she moved out of state.]

In response to the statement in Question 7, “I grow my own vegetables whenever possible,” before the program this participant rated herself at a “1”, which equates to
“almost never”, and after the program she rated herself at a “3”, which equates to “about half the time.”

From the beginning of the program, Participant 3 seemed quite passionate about issues related to gardening and food production, with her commitment growing over time. At the first session she attended she said, “I’ve put so much hard work and sweat into this garden and some of the kids come and trash it. They smashed the pumpkins and watermelons last year. A brand new beautiful fence was put in and they ruined it. I don’t want to waste my time for nothing”. By the end of the program she was putting more time and effort into gardening than she had anticipated.

Participant 4:

Looking at Participant 4, we see a picture of an individual who is very excited and engaged in the program. As the mother of two boys, she always had a very positive attitude and was very engaged in the program and with the other participants, while encouraging her sons to do the same. It was clear that she was a strong figure in the community that reached out to the other community residents.

Participant 4 showed little change in knowledge (1 point different between pre- and post-survey), but there was some change in her responses to questions about attitude (16 point increase out of a possible 30 points), particularly with regard to family, health and nutrition, and food systems, and behavior (14 point increase out of a possible 40 points). Attitude Question 3, “I like to eat fresh fruits and vegetables whenever possible”, increased by 2 points, going from a “1” (“strongly disagree”) to a “3” (“agree”). This corresponds to Behavior Question 3, “I go to fast food restaurants”. Before FRESH participant 4 rated herself at a “5” (“almost always”). After the program she rated herself
at a “2” (“rarely”), a change in 3 points. This large a change in responses to questions about attitudes and behavior was not evident for the other adult participants and suggests that different people experience and are influenced by the program differently.

The observational data reveal that participant 4 was exceptionally interested and enthusiastic about the program. She took on the role of both role model and mentor as she encouraged the participation of all the youth at the program, not just her own children. She said to the group, “I can be all of your moms!” This participant was more engaged and willing to collaborate more than any of the other adult participants.
A. Summary

The purpose of this study was to learn effective ways to implement community gardening/sustainable agriculture educational programs in limited-income communities, and to test the viability of one particular sustainable agriculture education program model. The objectives of this study were to determine the extent to which this program had the following effects on the participants: (1) increase knowledge of sustainable agriculture, gardening, and health and nutrition; (2) increase positive attitudes towards sustainable agriculture, community gardening, and eating healthy foods; and (3) promote the adoption of sustainable behaviors.

Youth were given a pre-quiz their first day of participation (not necessarily the first day of the program) and a post-quiz at the end of the last session. The post-quiz was identical to the pre-quiz. These were used to measure change in participants’ knowledge, attitude and behavior with regard to sustainable agriculture, local food systems and nutrition as a function of having participated in the program.

Adults were given a self-report retrospective design post-then-pre-survey to measure change in knowledge, attitude and behavior. The adults were not given a pre-program survey at the beginning of the program, but instead given a survey at the end of the program in which they were asked to describe their knowledge, attitudes, and behavior before the program as well as after the program.
At the end of the second session and the fourth session participants were asked questions about their understanding of various topics covered in the program. The purpose of these “feedback loop” surveys was to determine if the content was clear and understood by the participants.

For each of the six program sessions, the primary investigator and/or a research assistant took detailed observational notes of the patterns of interaction between the participants and participants’ comments and other behaviors that provided clues as to their knowledge and attitudes with regard to sustainable agriculture principles and practices.

This study has demonstrated that the FRESH program can influence participants’ attitudes and behaviors related to health and nutrition, food systems, and the environment, without necessarily increasing their knowledge about these topics. While not all of the participants exhibited the same type or magnitude of change, it was clear that FRESH can impact the ways in which people behave regarding the environment and sustainability. Particular aspects of the program that resonated with participating youth and adults were interpreting abstract concepts into tangible ones and turning them into day-to-day actions that benefit their community and the planet.

Results will also be used to inform curricular revision decisions, with the goal of increasing the educational value and accessibility of this program.

**B. Conclusion**

Considering the small sample size, it is impossible to make definitive conclusions about program impact from the survey and quiz data. However, when looking at qualitative data in conjunction with the survey and quiz results, it is possible to piece
together a narrative as to how participants experienced or were influenced by the program.

As noted earlier, there was little change in knowledge among youth from the pre-quiz to the post-quiz. This might be a function of a “ceiling affect” rather than a lack of program impact on the participants. The pre-results revealed that the youth started the program with a high level of knowledge about food and agriculture, thus leaving little room for demonstrating pre- to post-program increases in knowledge. At the first session, one of the youth participants said, “This is not hard, I know all about gardening”. The small amount of change in knowledge could have also been due to a “history effect,” insofar as the pre-quiz and post-quiz were identical, some of the youth may have remembered the questions from the pre-quiz.

Although findings do not suggest a major program impact on participants’ knowledge, they are getting exposed to sustainable practices. FRESH succeeded in terms of helping people adopt sustainable behaviors and explore the personal dimensions of these facts. Some people were very excited and exhibited distinct changes in their attitudes and behaviors, but for some others, the program experience did not appear to lead to such changes.

C. Scope and Limitation of Study

It is unrealistic to assume dramatic, sustainable behavior change in the participants over a period of six weeks. Yet, considering the time duration limitations associated with conducting this type of applied research program within the confines of a Master’s-level thesis, it would not have been feasible to conduct a longitudinal study or increase the participation rates.
Although the intentions of the program were to be low cost, there are some disadvantages of working with very small budgets. With greater funding the program could have provided more tools and equipment needed to maintain and care for the garden and enhance the gardening experience. Greater participation from other organizations can possibly help bring in funds to improve and expand the program. This collaboration can also help increase the sustainability of the community itself, creating another layer of support for community residents.

Due to the small sample size and case study research design, there are limits to the extent to which the findings can be generalized to a larger population. It was possible to document changes in the knowledge, attitudes and behaviors of some of the individual participants, however it is impossible to determine conclusively that the program is the primary cause of such changes.

The surveys and quizzes did not include overly difficult questions, and the questions were not complex enough to show subtle differences in pre- versus post-program knowledge. The curriculum and program had higher-level concepts but the data collection instrument did not adequately assess knowledge related to the high level principles of sustainability. Some of the questions were too general and basic to accurately reflect higher levels of knowledge that were addressed in the curriculum and throughout the program. The evaluation instruments need to be more precise and contain more challenging questions that better demonstrate the complexities of the concepts taught and learned in the curriculum in order to rule out the “ceiling affect” as an alternative explanation of findings that indicate areas of limited program impact. Hence, to ensure that the youth quiz is age-appropriate, for future evaluation research of the
FRESH curriculum it is suggested that the youth quiz instrument be pretested and modified if it is determined that it is not up to youth participants’ knowledge from the beginning. Insofar as the age range for youth participation in this program model is so wide, it may also be necessary to develop at least two versions of the quiz appropriate for different age groups.

Difficulties were also encountered in terms of recruiting participants and facilitating their sustained involvement in the program. As noted in Chapter 4, 10 of the 22 youth participants are from Russian immigrant families, but none of the parents participated, despite repeated efforts to introduce them to the program. In hindsight, this may reflect a language barrier; perhaps if the recruitment materials were translated into Russian that would have enhanced their participation. The following section provides several ideas for curriculum modification to facilitate more sustained participation in the program.

D. Promising Directions for Modifying the FRESH Program

There is a continued need for sustainable agriculture programs that focus on making food choices that lead to healthier individuals, more cohesive communities and a healthier environment. Although the FRESH program is just one short-term initiative, results from this study provide clues as to how such programs can be structured to enhance the educational impact on participants and reach diverse audiences in low-income communities.

One of the biggest problems encountered in the pilot study of the FRESH program was the low participation rates, particularly for the adult participants. Even parents who said they would attend did not always attend. However, program participants
expressed interest and enjoyment while at program. One way to address this issue is to provide a longer and more intensive key informant interview period, at least two to three months in advance, during which time participants and other community residents could be made aware of the importance of their participation with regard to how their families and overall community can benefit from the program.

Another way to address the issue of low participation rates is to establish a system in which interested community members could be involved in the curricular development or modification process. Considering that the original FRESH curriculum was part of a controlled study, the program could not be modified during the implementation based on participant input, and we were not able to fully utilize the creativity of the participants and introduce their ideas into the curriculum. While the general structure of the program seems to work in terms of effectively engaging and stimulating participants, there could be more opportunities for participants to give suggestions on how the program could be altered so that it better meets participants’ needs and addresses priority issues in the community.

Furthermore, greater deliberation with participants and co-creation of the program would likely result in greater participation rates and more engaged participants. To maintain program fidelity, there could be a core curriculum that consists of a series of basic activities that are considered central to the program and which would not vary much across communities and participant groups, in addition to a wide range of program activity options from which future participant groups can choose.

A specific recommendation for modifying the program is to infuse a stronger focus on the gardening experience to promote long-term maintenance and care. During
the implementation of the pilot project, limited attention was paid to the garden itself. With dinner at the beginning and making sure all of the consent and assent forms were filled out and signed (both Week 1 and 2), the actual programming started much later, which made it difficult to get in significant gardening time. This is unfortunate since it was the gardening-type activities that were most successful in capturing the youths’ attention throughout entire program.

One way to build up the gardening component of the program would be to conduct the program two days a week, with one day allotted to gardening and the other to other activities. This is an alternative to the current structure of having the activities and lessons immediately followed by the gardening experience. We found that when both were consecutively implemented, some participants lost focus.

Another strategy to increase participation and efficacy would be to encourage gardening in the community garden beyond the six-week period of the program. With an explicit focus on garden development and maintenance, community members might be more likely to participate in the program during the six-weeks if more effort is made throughout the year.

E. Implications for Future Research

Results from this study indicate that the success of the FRESH program had more to do with the way in which participants’ attitudes and behaviors were changed than with the actual information that was provided to them. Throughout the program, there were numerous opportunities for participants to discuss and explore the relevance of sustainable agriculture principles to their lives as individuals, family members, and community residents. This suggests that a fruitful strategy for future studies of FRESH
and similar programs is to examine not only the information and knowledge presented to
the participants, but also the venues developed and provided for hands-on learning
activities, discussion, reflection and exploration of the personal significance of this
information. Such research will likely contribute to the development of pedagogical
approaches for eliciting discussion and application rather than just efficient modes of
information transfer.

It would also be instructive to examine how some of the program modifications
noted in the previous section might help to address some of the recruitment and program
participation challenges encountered in the FRESH demonstration project.

**F. Concluding Comments**

It is important to understand the role of the individual and the family unit in the
context of the greater community. Individuals are not isolated entities in which they adopt
behavioral change independently, but are citizens of an integrated community in which
they have dynamic relationships. These complex relationships should be acknowledged
and nurtured, while citizens are empowered to take control of their own lives.

Empowering participants means allowing them to share responsibilities and leadership
roles and collectively make decisions that affect the whole community (Okvat & Zautra,
2011; Perkins & Zimmerman, 1995, Rappaport, 1984). Kroc, MacRae, Mougeot &
Welsh (1999, p. 6) confirm the need for citizens to work collectively to improve food
systems and build community:

> Moving beyond the notion that consumers act as rational beings who
> focus on their individual interests, the concept of food democracy (or food
citizenship) recognizes that consumers can identify the interests of others
(food workers, other consumers, future generations, and other species). As citizens, we can participate in shaping the food system and the ways consumption of food in our communities expresses the values of family and culture.

It is important for youth as well as adults to understand the influence their eating behaviors have on the local community. However, it is important that we go beyond the goal of enhancing “understanding.” Community residents need to take responsibility and work together if they want to achieve the goal of establishing small-scale, sustainable, local food systems.

On one hand, FRESH is just one small demonstration program. However, it is a step in the right direction in terms of contributing to the development of healthier and more sustainable communities. As FRESH continues to be implemented, it is important that sustainable community development is considered as an integral part of the program. This will increase the efficacy of the FRESH program and provide residents with opportunities to discuss and explore the relevance of sustainable agriculture principles to their lives as individuals, family members, and community residents.
REFERENCES


APPENDIX A

PROGRAM MATERIALS

- FRESH Curriculum
- FRESH Curriculum Appendices and Supporting Materials
- FRESH Curriculum References
F R E S H

Families Reinforcing Environmentally Sustainable Habits
Instructions:
Insert Tab 1 here.

Curriculum Introduction
and Overview
CURRICULUM OVERVIEW

TITLE OF PROGRAM:
This program is designed to encourage families to collectively learn about, and hopefully adopt, sustainable practices. It is a six-week program, with each session about two hours long, each with a different theme. At the end of each session there will be a take home activity designed for families to do together. When the families return the following week, the activities they did will be shared and discussed.

PROGRAM OBJECTIVES:
The overall goal of this sustainable agriculture education program is to create awareness about the impacts of consumer food choices, increase knowledge of and positive attitudes towards sustainable agriculture, and promote the adoption of sustainable practices on the part of program participants. As it is a place-based program centered on a community garden, the participants will also learn to work collaboratively on maintaining the garden and growing their own food. To facilitate family communication and cooperation on matters related to food and nutrition, all members of each family are invited to participate in the program.

WHAT DOES SUSTAINABILITY MEAN?
While many people think of sustainability in terms of agriculture or the environment, sustainability has a much broader meaning that can be applied to all aspects of life. Sustainability, in simplest terms, means lasting. Rather than addressing problems with short-term results, sustainability looks to solve problems with long-lasting solutions. It can be applied to health, relationships, school, and more. This program is designed to use the community garden as a metaphor for how sustainability can be applied to our everyday lives to improve ourselves, our families, our communities, and our planet.

WEEKLY AGENDA:
There is a consistent program format that will be used each week. Each session will begin with the facilitator asking participants to recall what was learned the week before. During this time participants will also discuss what they did during the week for the take home activity, and how, if at all, they applied the principles they learned from the week before.

After discussing the previous week and introducing this week’s topic, participants will take part in 1-3 group activities, with the groups formed on the basis of family relationships, peer relationships, or community relationships (e.g., in large group format).

Following these hands-on activities, the families will then work on the garden - weeding, watering, mulching, harvesting, etc. (whatever needs to be done that week). During that time the program facilitators will discuss a few principles of gardening, as well as things that can be done during the week on their own.

At the end of gardening, families will be brought back into a group where the facilitator will lead a group discussion tying together what was learned from the activities with the garden. Once the group discussion is complete, the families will receive their take home activity for the week with verbal and written instructions.
SESSION 1 –
SUSTAINING THE GARDEN

Make sure to introduce the program to the participants. Inform them about the various kinds of activities (visual, hands on, etc.) and weekly agenda. Discuss with them the meaning of sustainability. (See Curriculum Overview.)

DISCUSSION STIMULATOR: Why grow your own food?

OBJECTIVES: To introduce the importance of growing your own, and to introduce the participants to gardening and a few basic principles.

TIME REQUIRED: 10 minutes

DIRECTIONS: Ask the participants if any of them have gardened before. If any of them have experience, have them share it with the rest of the group. Then discuss with the group how growing your own food can save you money – less money spent on produce, less trips to the supermarket – while providing healthy, nutritious meals for the family. When you grow your own food, you know exactly what has been put into the garden; therefore you know exactly what comes out. The garden is a great place for members of the community to come together, share experiences, and live healthy, sustainable lives.

Many people, children in particular, have never been to a farm or have seen where certain things grow. For example, if you ask a child “Where does this orange come from?” a common response is “The store.” There are a variety of different ways fruits and vegetables are grown, and this activity is designed to visually show where and how different fruits and vegetables grow.

ACTIVITY: Where does this grow?

OBJECTIVES: To learn where different fruits and vegetables grow.

MATERIALS:
- produce cut-outs (see Appendix, Session 1)
- adhesive tape
- “Garden Cross-Section” (see Appendix, Session 1)
• Where does this grow? Answer Key (See Appendix for “Where does this grow? Answer Key.”)

TIME REQUIRED: 15 minutes

DIRECTIONS:
• Split group into teams of 8-10.
• Give each team “Garden Cross-Section” page, produce cut-outs, and tape.
• Tell the teams to attach produce cut-outs (different vegetables and fruits) onto “Garden Cross-Section” where they think each type of produce grows.
• When the teams are finished, have them come back together as one group and evaluate their answers.
• The team with the most correct placements wins (see Answer Key)

This activity is specifically designed to promote intergenerational communication. Throughout the course of the program each family will receive recipes from other participating families. The children will make a decorate recipe books for their parents or grandparents in which they can collect recipes!

ACTIVITY: Decorating “Recipes from the Garden” Books

OBJECTIVES: To create books for families in which to keep recipes they have collected throughout the summer.

MATERIALS:
• cardstock
• plain paper
• string or yarn
• hole punch
• markers or crayons

TIME REQUIRED: 30 minutes

DIRECTIONS:
• Punch two holes along one side of each piece of cardstock and paper, 1/2 inch from corners and 1/4 inch from edge.
• Provide each child with 2 pieces of 4x6” cardstock, 10 pieces of 4x6” plain paper, 2 pieces of 6” string or yarn.
• Have the children decorate one side of each piece of cardstock with markers, crayons, stickers, etc.
• Attach the cardstock and plain sheets of paper using string, with decorated sides of cardstock facing outwards.
GARDENING EXPERIENCE

GROUP DISCUSSION: **Food from the Garden**

It is important that the families see this garden as a place to come together as a community, but also as a source of healthy food. Growing some of your own food means buying less from the store and keeping a little more money in your wallets.

**Ask the participants:** What are some of your favorite foods that we can grow right here? Are there any favorite recipes or meals that you could make with food from the garden?

TAKE HOME ACTIVITY: **Sharing Family Recipes**

**OBJECTIVES:** To have families talk about their favorite foods and recipes. Families will also feel more connected to the community after sharing their personal favorite recipes.

**MATERIALS:**
- Cooking with Kids handout (Appendix, Session 1)

**DIRECTIONS:**
- Give each family *Cooking with Kids* handout. During the week have each family work together to decide on a favorite family meal or recipe that uses produce that grow (or could grow) in the community garden. Then have each family print, type, or hand-write the recipe to share with the rest of the group.
- The following week (Session 2) families will bring in their recipes to share with the group. Copies will be made of each recipe and given to each family to be placed into the “Recipes from the Garden” books.
SESSION 2 –
SUSTAINING OUR BODIES

Many packaged and process foods claim they are healthy and good for you. But are they really? What actually goes into processed “food” items? The purpose of this game is to learn about what secret ingredients are hiding in our food. Many of these “food” items contain chemicals and harsh ingredients that we would never eat by themselves, so why would we eat them if they were put into a bottle or can?

ACTIVITY: Name the Ingredients!

OBJECTIVES: To learn the ingredients hiding in processed and packaged foods.

MATERIALS:
• 4 packaged food items with nutrition and ingredients labels removed
• pencils or pens
• paper

TIME REQUIRED: 15 minutes

DIRECTIONS:
• Split group into four age-integrated teams.
• Give each group a packaged food item (such as a bottle of soda, Doritos or a hot dog label), a pencil or pen, and a piece of paper.
• The group must collectively list all of the ingredients in the can or box and designate one person to write down their answers.
• After the groups think they have listed all of the ingredients, they will all come back together.
• Then the facilitator will reveal to the groups the actual ingredients in each of the food items.

The facilitator will ask if anyone knows what certain ingredients are, such as “acesulfame potassium”. Ask the participants if they can even pronounce it! Then ask if the participants if they think it sounds delicious, if they would eat it by itself, and if it is good for them or not.

The purpose of this game is to teach families about nutrition and fat content. Working together, the families must figure out which food item has the most fat in the group. Deciding between baked potatoes and French fries? Don’t
know if you should have hamburgers or burritos dinner? This activity is
designed to help families make the best decisions when planning meals
together.

ACTIVITY: **Find the Fat**

OBJECTIVES: To learn which foods are good for you and their benefits and which foods
to avoid.

MATERIALS:
- pens or pencils,
- Find the Fat handouts (one for each team) (see Appendix, Session 3)
- Find the Fat Answer Key (see Appendix, Session 2)

TIME REQUIRED: 15 minutes

DIRECTIONS:
- Split group into teams, each team is one family. If someone does not have a family member have them join another team.
- Give each team one *Find the Fat* handout and a pen or pencil.
- For each grouping of food items, have the teams pick which food item has the most fat.
- When everyone has completed the worksheet, bring the teams back into one group and reveal the correct answers.

Discuss why some foods have more fat than others (see Find the Fat Answer Key, Appendix, Session 2).

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Do you really know how much sugar is in the bottle of juice? What about in that bottle of soda? This eye opening activity reveals how much sugar is actually hiding in some of the foods we eat – even the ones we thought were healthy.

ACTIVITY: **Sugar Game**

OBJECTIVES: To learn how much sugar is actually in the foods we consume.

MATERIALS:
- different foods (such as a bottle of soda, an apple, slice of white bread, a cookie, bottle of ketchup, etc.)
• granulated sugar
• Ziploc bags or bowls

TIME REQUIRED: 15 minutes (not including prep-time)

DIRECTIONS:

To be done ahead of time:
Place equivalent amount of sugar into a plastic bag or bowl for each corresponding food item by dividing the number of grams by 4.2 to get the number of teaspoons. For example, if a bottle of juice has 30 grams of sugar, divide 30 by 4.2, which gives you a little more than 7 teaspoons of sugar. Then measure out the teaspoons and place into plastic bags or bowls. Code each bowl or bag (A, B, C… or 1, 2, 3…) to keep track of what food item it represents, then write down the letter or number and its corresponding food item on a piece of paper without letting the participants see you (this step can be done ahead of time). Also write down how many teaspoons of sugar is in each bag or bowl on your piece of paper. Make sure to remove or cover the ingredients and nutrition labels from the food items.

• Place the food items on one side of a table.
• On the other end of the table, put all of the corresponding labeled bags or bowls of sugar.
• Then have the participants come up to the table, look at the food items and containers of sugar.
• As a group, have them work together to match the food item to the corresponding container of sugar.
• When they think they have correctly matched the food items with the sugar, let them know how well they did by revealing the correct answers, and how many teaspoons of sugar are in each food item.

This game was adapted from “Balancing the Sugar” in FRIDGE, which was based upon the online resource: MyPyramid.gov, Education Framework, Key concepts for educations, Sugars and Sweets.

GARDENING EXPERIENCE

GROUP DISCUSSION: What’s hiding in our garden?

As we saw earlier when playing Name the Ingredients! and the Sugar Game, many packaged and processed foods have hidden ingredients, particularly sugar.

Ask the participants: What are some of the hidden ingredients in the food we grow in our own garden? What pesticides and herbicides do we have to worry about?
We know *everything* that goes into this garden. There are no hidden ingredients, no extra sugar, and no chemicals that we can’t even pronounce! The USDA recommends at least five fruits and vegetables a day. Remember, “Strive for five”!

**TAKE HOME ACTIVITY: What Your Plate Should Look Like**

**OBJECTIVES:** Families will create placemats at home to learn about servings sizes and balancing meat, grains, and vegetables.

**MATERIALS:**
- What Your Plate Should Look Like handout (see Appendix, Session 2).

**DIRECTIONS:**
- Provide each family with one placemat handout. Directions are on handout.
- The following week (Session 3) have the families share with the group how they used their placemats to eat healthier.

**TAKE HOME ACTIVITY: Tips for Eating Out**

**OBJECTIVES:** This gives family easy solutions to eating healthier when on the go and at fast food restaurants.

**MATERIALS:**
- Tips for Eating Out handout (see Appendix, Session 2)

**DIRECTIONS:**
- Provide each family with one *Tips for Eating Out* handout. Discuss with the participants that it is ideal to make every meal at home, but it is unrealistic. Often people will find themselves on the road and hungry. What do you do?
- The following week (Session 3) ask if any of the families went out to eat and used the *Tips for Eating Out* handout. Did it help them make healthier food choices?
SESSION 3 –
SUSTAINING OUR FAMILIES

It is played like the well-known TV show, The Newlywed Game”, where the “contestants” are quizzed to see how well they know each other. In this version, the questions are all about food. The purpose is to expose how little or how much families really know about each other, and to encourage more communication about food at home.

ACTIVITY: So you think you know me?

OBJECTIVES: To recall and learn about food preferences and food habits of other family members.

MATERIALS:
• paper
• 2 markers
• 2 clipboards
• set of questions (see Appendix, Session 3 or see below)

TIME REQUIRED: 30 minutes

DIRECTIONS:
• Choose two people from each family to be a pair, preferably one parent and one child.
• Each team plays one at a time while the rest of the group watches.
• Each person playing gets one clipboard, 5 pieces of paper, and a marker.
• The facilitator will ask one player to answer a question by writing it on a piece of paper attached to the clipboard (one answer per page, written big enough for the audience to see).
• Then the facilitator will ask the other player to write down what they think the first player wrote.
• After both players have written down their answers, they will reveal what they wrote.
• Were the answers the same? Encourage discussion about the answers.
• Each correct answer receives one point.
• Once all 5 questions have been asked, tally the points and have the next paired team come up to play and answer the same 5 questions.
• The team with the most correct answers wins.

“So you think you know me?” QUESTIONS:
1. What is your favorite food?
2. How many servings of fruits and vegetables do you eat each day?
3. After eating a meal, who does most of the cleaning?
4. What is your favorite place to eat out?
5. What is your least favorite food?

Additional questions if time permits:

1. What is your favorite dessert?
2. How many times do you go to the grocery store each week?
3. What is your favorite drink?
4. How many times a day do you normally eat?
5. What is your favorite breakfast food?

This activity was adapted from (FRIDGE).

Many people often forget the importance of good communication and listening skills. When talking about food and healthy eating habits, it is important to listen to one another and have good communication skills. This game will show people just how important it is to express yourself clearly and listen to what others have to say.

**ACTIVITY TITLE:** What’s in the bag?

**OBJECTIVES:** To improve communication and listening skills.

**MATERIALS:**
- brown paper bags
- paper
- pencils
- various objects such as pencils, paperclips, shoelaces, keys, etc.

**TIME REQUIRED:** 15 minutes

**DIRECTIONS:**
- Split group into pairs, if possible, one parent and one child.
- Give one person from each pair a brown paper bag with an object inside. Make sure the other person in the pair does not know what the object is.
- Give the other person in the pair a piece of paper and a pencil.
- Have the person with the brown paper bag describe the object inside the bag to the other player without saying what it actually is or used for. They should only describe the shape, size, texture, etc. but not use words that will give away what the object is, i.e. if the object is a pencil, the person describing it should say “straight, one end is pointy, one end is soft and round”, rather than “a tool used for writing”.


• When the pair thinks they are finished, the object and the drawing will be revealed to see if they are the same.
• After the activity is completed, the facilitator asks “How might we apply what we learned from this activity to our communication with family members at home?”

This activity is an adaption from “Food systems: Youth making a difference: 11 lessons for teaching food policy to today’s teens”.

GARDENING EXPERIENCE

GROUP DISCUSSION: Communicating With Others

Before gardening, ask the participants to pay attention to their communication skills and how well they listened to others.

Ask the participants to pay attention to how they communicate with others, including how they listen to, as well as share information and ideas. When you spoke did others listen? Did you listen to others as well as you should have? How do you think good communication can improve this garden? How might you apply what you learned from this activity to our communication with family members at home?

The facilitator might try to encourage the participants in terms of the following:
• Working as a group will help generate good ideas to improve the garden
• Listening to others will help you understand what others want from the garden

TAKE HOME ACTIVITY: What food am I?

OBJECTIVES: To get families to play a fun communication game together at home.

MATERIALS:
• What food am I? handout (see Appendix, Session 3)

DIRECTIONS:
• Give each family one copy of What Food am I? handout.
• The following week (Session 4) ask families to share their experience playing the What food am I? game with the rest of the group.
SESSION 4 –
SUSTAINING OUR COMMUNITY

DISCUSSION STIMULATOR: Introduction to Sustainable Agriculture, Local Food Systems, and the 3Ps

OBJECTIVES: To introduce the key principles of sustainable agriculture and local food systems to a consumer audience.

MATERIALS:
• 3Ps sheet (see Appendix, Session 4)

TIME REQUIRED: 5 minutes

DIRECTIONS:
• Show the 3Ps sheet to the whole group and explain main principles of sustainable agriculture using the 3Ps sheet.
• Briefly discuss the benefits of sustainable agriculture:
  o Unites the local community – building a bridge between consumers, retailers, and farmers
  o Seeks to improve environmental quality of the land, air, and water.
  o Improves the health of its consumers by providing better quality, safer foods that have higher vitamin content.
  o Improves the community by boosting the local economy, therefore helping out families and individual members of the community.
  o Uses fewer resources to grow and transport food, which results more money saved and less pollution in the air.
  o Uses limited amounts (or no amounts) of chemical pesticides and herbicides, and relies on natural predators and pollinators, improving and boosting the natural ecosystems
  o Better land management improves the soil for future generations
  o When there are disease, virus, pest, and fungus outbreaks, they spread quicker and farther in conventional food systems. Local food systems can better contain and eliminate such spreads.
  o Community gardens bring people and families together!
  o Farmers who practice sustainable agriculture are helping the natural environment – the air, water, land, and biodiversity (or animals).
  o Helps save different varieties of vegetables. Most supermarkets only sell 1 or 2 kinds of tomatoes, but there are over 7,000 varieties of tomato! Farmers preserve the seeds, therefore preserving a unique variety!
Most of the produce that is found in grocery stores and supermarkets has traveled longer and farther than most people realize. The five-minute drive to the store makes it easy to ignore just how long ago that banana or broccoli was harvested.

ACTIVITY: **How far does your food travel?**

OBJECTIVES: To learn how far food travels before it gets to your plate.

MATERIALS:
- map or globe
- 5 pieces of produce with stickers from where they came
- string (if using a globe)
- ruler

TIME REQUIRED: 10 minutes

DIRECTIONS:
- As a group, look at where each piece of produce came from.
- Take the sticker off of the first piece of produce and stick it to the map or globe on the country from where it came.
- After all of the stickers have been placed on the map, use a ruler (or string) to measure how far all of the produce traveled in miles.
- Then ask the participants: How long does it take to travel the number of miles these pieces of produce traveled? How much gas do you think it takes to get this produce here? Do you know the farmer that grew these and his or her farming practices?

Understanding the journey food takes to get to our plates is abstract and can be somewhat complex and confusing. This activity uses a visual “map” to help consumers and families understand the complexity of the commercial food system by comparing it to community and local food systems.

ACTIVITY: **Visualizing Commercial and Local Food Systems**

OBJECTIVES: To understand the difference between commercial and local food systems.

MATERIALS:
- Commercial Food Systems map *(see Appendix, Session 4)*
- Local Food Systems map *(see Appendix, Session 4)*
TIME REQUIRED: 5 minutes

DIRECTIONS:
- Ask two people to volunteer.
- Show the Commercial Food Systems map to the group.
- Ask the first volunteer to see if they can explain what is happening.
- Hold up the Local Food Systems map.
- Ask the second volunteer to explain what is happening in the map.

Which map is more complex? Obviously the Commercial Food Systems Map is more complicated. Then talk about how long and complex the process is to get food from farm to table in commercial food systems and how much time and energy (particularly gas and oil) is wasted. Is it necessary? What about local food systems? How does the food differ? Remember: less travel and processing time means fresher food.

Briefly discuss the pros and cons of commercial food systems:
PROS:
- Cheaper food
- Able to feed lots of people
- Convenience (produce all year round)

CONS:
- Environmental degradation
- Damage to fisheries and water systems (from pesticides, herbicides, animal waste)
- Health risks from chemical residue on produce
- Obesity related illness from cheapness of corn and soy oil and high fructose corn syrup
- Increased ozone pollution and green house gas emissions from heavy use of fossil fuels

This activity is adapted from (see “Food Systems”, right before pg. 20).

This role-playing activity shows the participants the flow of money in two food systems – commercial and local. Who benefits from your food purchase?

ACTIVITY: Money Flow – Who really benefits?

OBJECTIVES: To learn who benefits (or who doesn’t) from food purchases.

MATERIALS:
- fake money

TIME REQUIRED: 15 minutes
DIRECTIONS:
- Split the group into two age-integrated teams. One team will have five members, while the other team will have nine members.
- Then designate the following roles to each player:

<table>
<thead>
<tr>
<th>Team 1:</th>
<th>Team 2:</th>
</tr>
</thead>
<tbody>
<tr>
<td>consumer</td>
<td>consumer</td>
</tr>
<tr>
<td>farmer</td>
<td>retail store</td>
</tr>
<tr>
<td>farm employee</td>
<td>wholesale distribution</td>
</tr>
<tr>
<td>utilities*</td>
<td>food processing</td>
</tr>
<tr>
<td></td>
<td>truck company/transportation</td>
</tr>
<tr>
<td></td>
<td>farmer</td>
</tr>
<tr>
<td></td>
<td>farm employee</td>
</tr>
<tr>
<td></td>
<td>utilities*</td>
</tr>
</tbody>
</table>

(* If there aren’t enough participants for the activity, eliminate these roles.)

Describe each of those roles – What do they do? What is their purpose? (** ADD HERE, DON’T PUT IN APPENDIX)

- The facilitator gives the consumer on Team 1 ten bills.
- The consumer then goes over to the local farmers’ market where he or she buys some produce from a local farm. The consumer gives the ten bills to the farmer on Team 1.
- The farmer then takes the money he or she made from the market and distributes 1 dollar each to the farm employee, local water company*, and local gas company* on the same team.

How much money is the farmer left with? This money is put back into the farm and local community. The more money the farmer has, the more he or she profits. The more he profits, the more money stays within the community and the more it helps out the members of the community.

- Collect the bills from the players on Team 1.
- Then give the consumer on Team 2 ten bills. The consumer then goes to the store and buys some produce. The consumer gives the ten bills to the retail store on Team 2.
- The retail store then gives 9 of those dollars to wholesale distribution.
- Wholesale distribution then gives 8 dollars to food processing.
- Food processing gives 7 dollars to the truck company.
- The truck company gives 6 dollars to the farmer.
- The farmer gives 1 dollar each to the farm employee, local water company*, and local gas company*. 


How much money is the farmer left with in this commercial food system? The local farmer is left with only 3 dollars, versus 7 dollars in the local food system.

Which farmer is likely to have a higher quality of life for themselves and their family members?

From which system does the community benefit the most? Hint: think in terms of where the money goes and where it stays.

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**GARDENING EXPERIENCE**

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**GROUP DISCUSSION: The 3Ps of the Garden**

**Ask the participants:** Now that we know the basics of sustainable agriculture, how might our garden benefit the community?

The facilitator might try to encourage the participants in terms of the following:
- Bringing the community together to work towards a similar goal.
- Using local resources to maintain the garden.
- Using less chemicals and pesticides to limit pollution of local water systems (this will be discussed in greater detail in Session 5).

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**TAKE HOME ACTIVITY: Family Produce Travel Map**

**OBJECTIVES:** To learn from where and how far your food travels.

**MATERIALS:**
- Produce Travel Map (see Appendix, Session 4)

**DIRECTIONS:**
- Provide each family with a Produce Travel Map.
- Over the course of the week the family is to figure out where their produce comes from (by reading a sign at the supermarket or the sticker on the piece of fruit or vegetable) and mark it on the map (with a marker, pen, or stickers from the produce). [This is a good activity for reinforcing what participants learned from the “How far does your food travel?” activity.]
- The following week (Session 5) the families will share their maps with the rest of the group to see how many miles our food traveled in only one week.
SESSION 5 –
SUSTAINING OUR PLANET

We drive to the supermarket. We buy food in plastic, cans and boxes. We make food. We throw the wrappers and packaging in the garbage. We take bags of garbage to the dumpster or put in on the curbside for pickup. Then what? This discussion will explore the world of garbage and the impact we have on our precious planet.

DISCUSSION STIMULATOR: Where does garbage go after we throw it away?

OBJECTIVES: To learn what exactly happens to garbage after it leaves our homes.

MATERIALS:
• picture of landfill (see Appendix, Session 5)
• map of ocean gyres (see Appendix, Session 5)

TIME REQUIRED: 10 minutes

DIRECTIONS:
• Ask participants if they know what happens to garbage after it is picked up. Where does it go after we throw it away?
• Briefly discuss some facts about garbage:
  o Plastic is forever! Once we create it, it stays around FOREVER.
  o Even if we throw away “biodegradable” and “compostable” materials, they may not degrade because they are layered between plastic in our landfills, which prevents them from breaking down. If you have something that is “compostable”, make sure it gets composted and not thrown away with garbage!
  o Every single day in the U.S. over 2500 tons of non-biodegradable garbage is thrown away. Where does it go?
  o Sometimes plastic bags, balloons, and other pieces of garbage fly off of the dump truck or barge and end up in the ocean – where birds and other animals accidently eat them, leading to choking or starvation.
  o When plastic and other garbage ends up in the ocean, it follows gyres – or giant currents (see next page for map of ocean gyres) – and collects on our beaches, gets eaten by animals, and pollutes our water!
  o Plastic slowly releases toxic chemicals that harm marine life.
  o What is the Great Pacific Garbage Patch?
    • It is a giant patch of floating plastic and garbage in the northeast Pacific Ocean (see next page for map of ocean gyres). It is 537,640 square miles (2 times the size of Texas and 119,475.5 times the size of State College!)
• Then show pictures of landfill and the Great Pacific Garbage Patch.
• Ask the participants if they know a way to limit the amount of garbage we produce.

ACTIVITY: **How much water does it take…?**

OBJECTIVES: To learn how much water is needed to grow produce and raise animals.

MATERIALS:
• How much water does it take…? (see Appendix, Session 5)
• 5-gallon bucket filled with water

TIME REQUIRED: 5 minutes

DIRECTIONS:
Discuss with the participants the amount of water it takes to raise animals and crops:
• Not only is more water used to raise animals than fruit and vegetable crops, but a lot more land is used! If water and land didn’t have to be used for feed crops (corn and other produce that go to feeding animals), that land could be used to feed people!
• Food and agriculture are the largest consumers of water
  o 1,000 times more than we need to drink
  o 100 times more than we need for personal use (bathing, washing clothes, homes, etc.)
• There are more than 10 billion animals raised every year for consumption

Make sure to stress the importance of water as a resource:
• Millions of people around the world don’t have regular access to clean water and are undernourished. We have enough food to feed everyone in the world, but most of that food is going to feed animals instead of humans.

Tell the participants how much water it takes for each specific item, starting with beef.
• 1 kilogram (or 2.2lbs) of…
  o fresh beef – uses over **3,962 gallons** of water
  o fresh lamb – uses over **2,641 gallons** of water
  o fresh poultry – uses over **1,585 gallons** of water
  o cereals (grains) – uses over **396 gallons** of water
  o citrus fruits – uses over **264 gallons** of water

• Then ask if they can guess how many baths or showers that would be.
• Once they have made their guesses, show them the *How much water does it take...?* sheet with all of the bathtubs (representing amount of water needed for each food item).
• Take out the 5-gallon bucket filled with water. Is it heavy? Imagine carrying the amount of water needed for only 2.2 pounds of beef. Talk about exhausting!

Compost is an essential component of farming and gardening. It helps keep our soil healthy, which means healthy plants, and better tasting fruits and vegetables. But what exactly is compost? How do you make it?

ACTIVITY: All About Compost

OBJECTIVES: To learn about compost and how to make it.

MATERIALS:
• What can be composted? (see Appendix, Session 5)
• chicken wire (or palettes)
• stakes (or string/rope/twine if using palettes)
• sledge hammer (if using stakes and chicken wire)
• rake (to gather brown material from around the garden)

TIME REQUIRED: 20 minutes

DIRECTIONS:
• First discuss what compost is:
  o What is compost?
    • Decomposed organic matter (anything that is or once was living from the earth) that can be used by plants. It can be used mixed with potting soil or put right into our garden.
  o Why compost?
    • Compost is a great way to add important nutrients to your garden. It will keep you plants healthy, which will keep you healthy!  
    • It also prevents food scraps from ending up in our landfills. You know what happens when food goes there – it stays there forever!
  o Making compost:
    • There needs to be a balance of nitrogen and carbon. Layer your materials in the following order (refer to What can be composted? handout):
      ▪ 6-inch layer of brown material
      ▪ 6-inch layer of green material
      ▪ 2-inch layer of moist soil, which contain decomposers and help prevent bad odors
      ▪ Repeat!
    • The pile should be between 3 and 5 cubic feet.
    • Remember to keep the compost pile moist.
• Mix the pile about once a week with a shovel or pitch fork to help oxygen flow through and decompose the fresh materials.
• It takes about 3-4 months to complete the compost cycle. The color should be dark brown and smell like dirt. If it smells bad, it’s not compost yet!

• Then make a compost bin so families can start composting!
  o Find a dry, shady spot near a water source to put the compost pile.
  o Work together to build a compost bin using the materials listed above.
  o See if there are any materials in or around the garden that can be raked up and put into the bin.
  o Remind families to compost any food scraps or yard waste from now on and put them into the compost bin they just made!

• Ask the participants: How does composting help sustain our planet?

The facilitator might try to encourage the participants in terms of the following:
• Limiting the amount of waste being put into landfills.
• Returning nutrients to the soil.
• Limits the need for chemical fertilizers.

---

While many people think of soil as just some dirt, minerals, and water, soil is an ecological paradise for a multitude of living organisms, such as earthworms, fungi, and bacteria. Without these organisms, plant matter would just collect on the surface of the earth, unable to decompose – in other words, all of the living critters in the ground help plants rot when they die. If they didn’t, there wouldn’t be any decomposed organic matter for other plants to live off of. The organisms in the soil are an essential part of keeping our plants alive – which keep us alive!

---

**ACTIVITY TITLE:** *Soil – It’s Alive!*

**OBJECTIVES:** To test for the presence of bacteria in sand, clay and soil without a microscope.

**MATERIALS:**
- sand
- clay
- soil
- hydrogen peroxide
- plastic cups

**TIME REQUIRED:** 10 minutes
DIRECTIONS:
- Discuss what happens when you pour Hydrogen Peroxide on a cut – it foams as bacteria are killed. Hydrogen peroxide foams whenever it comes into contact with bacteria and kills them. Bacteria live in soil and survive off of the organic matter.
- Split group into teams, each team is one family (there must be at least one adult in each group).
- Place a little sand in one cup, clay in a second, compost in a third, and soil in a fourth cup – three cups of each for each team.
- Have the adult in each group pour a little hydrogen peroxide in each cup and observe what happens.

Which material foams the most? What does this mean?

This activity was derived from the Food Project.

GARDENING EXPERIENCE

GROUP DISCUSSION: Don’t treat your soil like dirt!

Ask participants: How long do you think it takes to make an inch of topsoil in this climate?
Answer: It takes 100-200 years to make just one inch of topsoil! When we fill our land with garbage, plastic, and toxic materials, it makes it almost impossible to grow anything in that land! We have to think about our day-to-day actions and how it affects others here in our own community and around the world. What if someone told you that they were turning this land into a landfill – how would that make you feel?

The facilitator might try to encourage the participants in terms of the following:
- The garden wouldn’t be healthy because of all of the garbage and toxins
- Healthy gardens make the community beautiful – garbage doesn’t!

TAKE HOME ACTIVITY: Garbage Contest

OBJECTIVES: To see which family can produce the least amount of garbage in one week by reusing objects, recycling, and composting.

MATERIALS:
• Garbage Contest handout (see Appendix Session 5)
• What can be composted? handout (see Appendix, Session 5)
• Guide to Recycling (see Appendix, Session 5).

DIRECTIONS:
• Provide each family with a “Garbage Contest” handout, “What can be composted?” handout and a “What can be recycled?” handout.
• Announce to the whole group that every family is to compete to produce the least amount of garbage in one week by reusing materials that cannot be recycled, recycling those that can, and composting food waste.
• The following week (Session 6) all of the families will bring in their filled out Garbage Contest handouts and whoever threw away the least wins.
SESSION 6 –

SUSTAINING OUR HOPES FOR THE FUTURE

When talking about sustainability, it is important to think about the long-term, not just quick fixes for our problems. As families we can work together to fulfill our shared goals for the future.

ACTIVITY: Envisioning Your Future

OBJECTIVES: To encourage participants to think about their future and share their goals with their family members.

MATERIALS:
• paper
• crayons, markers, etc.

TIME REQUIRED: 15 minutes

DIRECTIONS:
• Split group into teams, each team is one family.
• Give each participant a piece of paper and some crayons, markers, etc.
• Say to participants: Remember way back in Session 1 when we defined sustainability as lasting? We could also look at this of lasting for each of our individual lives. Thinking about your own life;
  o How would you apply sustainability to your own lives in order to improve your future?
  o Where do you want to be in 1 year?
  o Where do you want to be in 5 years?
  o What do you want your community to look like?
• Tell them to draw or write down their ideal visions of the future.
• Allow them to draw for about 10 minutes.
• When they are finished, have them share their futures with their families and talk about what is important to them.
• Ask the participants: What can they do to make their ideal futures a reality?

The facilitator might try to encourage the participants in terms of the following:
• Using Food Stamps at the supermarket. Many supermarkets are beginning to sell produce from local farms in support of sustainable agriculture and to help their communities thrive. Whether using cash or Food Stamps it is essential to know how to shop at local supermarkets and get delicious food that is healthy, too!
• Working with others to improve and beautify the community.
• Caring about the health of our planet and ourselves.

This is a great activity for everyone to come together and think about the future of the garden and its future caretakers. By creating a time capsule, the current gardeners will be able to preserve a part of themselves and history for future generations of gardeners to learn about.

ACTIVITY: Time Capsule

OBJECTIVES: To leave behind words of wisdom, thoughts, and advice for future gardeners.

MATERIALS:
• shovel
• paper
• pens, pencils, markers, etc.
• waterproof, air tight container
• stone or wood sign to mark the place of the time capsule.

TIME REQUIRED: 20 minutes

DIRECTIONS:
• Give each person a piece of paper and pens, crayons, markers, etc.
• Tell the participants to draw pictures or write any thoughts or advice for future gardeners. Participants can draw a picture of the garden, of themselves, or anything they would want people to know about in the future.
• After the participants are finished with their drawings or words of wisdom, place all of the pieces of paper in the time capsule (waterproof, air tight container) and bury it near the garden.
• Place the stone or wood sign where the time capsule was buried so in the future, people can find and open the time capsule and add to it.

GARDENING EXPERIENCE

GROUP DISCUSSION: Keeping the Garden Alive

Although this is the last session of the six-week program, there is plenty of work to do and fun to be had in this garden. Without the hard work and dedication from the participants – the garden cannot survive. And without the garden, there would be no
homegrown produce for the families. It is important that the garden is cared for – the results will be delicious!

**Ask the participants:** What are your plans for the garden for the rest of this season? What are some changes you want to see in the garden for next year? How, if at all, would having a vibrant sustainable garden contribute to yourselves having vibrant sustainable lives?

The facilitator might try to encourage the participants in terms of the following:

- Community cohesion
- Spending more time with the family
- Improved health of the garden means improved health of participants

**Ask the participants:** Does anyone have any closing thoughts or insights about sustainable agriculture, the community garden, and our time together this summer?

---

**TAKE HOME ACTIVITY: Going Back to School**

**OBJECTIVES:** To provide information for the families on great ways to prepare for going back to school. This includes information on easily portable and healthy snacks, delicious lunches for the kids to bring to school, and environmentally and economically friendly ways to pack lunches.

**MATERIALS:**
- Going Back to School! handout (see Appendix, Session 6)

**DIRECTIONS:**
- Provide each family with a Going Back to School handout.
APPENDIX SESSION 1

Activity Materials
Handouts
Answer Keys
Take Home Activities
Produce Cut-outs (SESSION 1)
Cooking With Kids

Safety Rules:

1. Make sure there is always an adult helping and/or supervising.
2. Tie long hair back.
3. Wash hands with soap and water. Dry hands thoroughly.
4. Wear an apron. This will keep your clothes clean and keep loose shirts from getting caught on equipment.
5. Use hot pads to handle pots and other hot items.
6. Clean up spills and messes as they happen.
7. Do not place hot items directly on tables or counters. Use a hot plate or pad.
8. When opening lids on hot pans, tip them away from you. This will prevent the escaping steam from hitting you in the face.
9. Keep handles of pans and pans pointed towards the center of the stove. If you are using a hot plate, keep handles pointed towards the middle of the table or counter. This will prevent you from bumping the handle and knocking the pot off the stove or table.
10. Make sure mixers and blenders are turned off and unplugged before putting any utensils inside.
11. Do not use electrical appliances near water.
12. When using a microwave, use only microwave-safe dishes, plates and bowls.
13. When you are using a knife or scissors, pick them up by their handles only. When cutting with a knife, hold the handle and keep the sharp edge pointed away from you.
APPENDIX SESSION 2

Activity Materials
Handouts
Answer Keys
Take Home Activities
Find the Fat

Directions: Circle the food in each group of foods that is highest in fat.

1. baked potato
   French fries
   mashed potatoes

2. bean burrito
   cheeseburger
   hamburger

3. chicken nuggets
   turkey sandwich
   tuna fish sandwich

4. cream-filled doughnut
   plain doughnut
   plain bagel

5. pretzels
   nacho chips
   potato chips
6. mayonnaise  honey  mustard  ketchup
Find the Fat Answer Key

The answers to the items in “Find the Fat” activity can be debatable. The fat content of each of the alternatives depends sometimes on how it was prepared (with whole or skim milk), or on the additional toppings that were added to sandwiches, for example. Also, many products that we find in the supermarket have a fat-free version, like sour cream, or even “butter”. If participants have disagreements about which items are highest in fat, you may want to explore the assumptions that they were using when they made their decisions.

Answers to “Find the Fat” activity:

1. French Fries
2. Cheeseburger
3. Chicken Nuggets
4. Cream-filled doughnut
5. Potato Chips
6. Mayonnaise
**What Your Plate Should Look Like**

**VEGETABLES**
Fill ⅓ of your plate with non-starchy veggies.
Examples: carrots, broccoli, green beans, cauliflower, eggplant, red peppers, asparagus

**MEAT/PROTEIN**
Fill ⅓ of your plate with lean protein.
Examples: non-fried fish, poultry, pork, soy, eggs, and legumes.

**GRAINS/STARCH**
Fill ⅓ of your plate with grains and starchy vegetables.
Examples: whole wheat bread, brown rice, cereals, potatoes, yams, squash, corn, and peas.
Tips for Eating Out

1. **Keep portion sizes small.** If the fast-food restaurant offers several sandwich sizes, pick the smallest or order half a sandwich, if available. Bypass hamburgers with two or three beef patties, which can pack more than 1,000 calories and 70 grams of fat. Instead, choose a regular- or children's-sized hamburger, which has about 250 to 300 calories. Also, skip the large serving of french fries or onion rings and ask for a small serving instead.

2. **Choose a healthier side dish.** Instead of french fries choose a side salad with low-fat dressing or a baked potato. Or add a fruit bowl or a fruit and yogurt option to your meal.

3. **Go for the greens.** Choose a large entree salad with grilled chicken, shrimp or garden vegetables with fat-free or low-fat dressing on the side, rather than regular salad dressing, which can have 100 to 200 calories per packet. Watch out for high-calorie salads, such as those with deep-fried shells or those topped with breaded chicken or other fried toppings. Also skip salad extras, such as cheese, bacon bits, croutons and fried chips.

4. **Pick grilled items.** Fried and breaded foods, such as crispy chicken sandwiches and breaded fish fillets, are high in fat and calories. Select grilled or roasted lean meats — such as turkey or chicken breast, lean ham, or lean roast beef.

5. **Have it your way.** Ask for healthier options and substitutions. For example, ask for reduced-fat mayonnaise or mustard on your sandwich. Or at a fast-food Mexican restaurant, request salsa with your meal instead of shredded cheese and nacho cheese sauce. Try to avoid special dressings, tartar sauce, sour cream and other high-calorie condiments.

6. **Watch what you drink.** Many beverages contain a large number of calories. For example, a large regular soda (32 ounces) has about 300 calories. Instead, order diet soda, water, unsweetened iced tea, sparkling water or mineral water. Also, skip the shakes and other ice-cream drinks. Large shakes can contain more than 800 calories and all of your saturated fat allotment for the day.

Taken from Mayo Clinic’s “Fast Food: 6 ways to eat healthier meals”,
http://www.mayoclinic.com/health/healthy-diet/HQ00599
APPENDIX SESSION 3

Activity Materials
Handouts
Answer Keys
Take Home Activities
So you think you know me?

Questions:

6. What is your favorite food?
7. How many servings of fruits and vegetables do you eat each day?
8. After eating a meal, who does most of the cleaning?
9. What is your favorite place to eat out?
10. What is your least favorite food?

Additional questions if time permits:

1. What is your favorite dessert?
2. How many times do you go to the grocery store each week?
3. What is your favorite drink?
4. How many times a day do you normally eat?
5. What is your favorite breakfast food?
What food am I?

When the whole family is together, perhaps after sharing a meal and sitting around the table, this is a great activity to get the family communicating and laughing!

• Each person writes down a food item, such as “carrot”, “pepperoni pizza” or “candy bar”, on a small piece of paper or an index card.
• Then pass your piece of paper to the right, with the words facing down so the person you pass it to can’t see it.
• When you get your piece of paper with the type of food hidden, carefully tape (using adhesive tape, such as Scotch Tape) the paper or index card to your forehead with the words facing away from you, making sure not to reveal the food.
• Once everyone has taped the paper to his or her forehead, take turns asking “yes or no” questions – only one question can be asked each turn.

These questions can include:

* Am I a healthy food?
* Am I green?
* Would you put dressing on me?
* Am I sweet?
* Can you buy me from a fast food restaurant?

Here are some examples of questions that can’t be asked because they cannot be answered by “yes” or “no”:

* What color am I?
* What time of day would you normally eat me?
* Where can you buy me?

The other people playing will be able to see what is on your card, so they will be able to answer your “yes or no” questions. Once you have figured out what you are, you have to wait until your next turn to ask. For example, if you are a grilled cheese sandwich you would ask the group “Am I a grilled cheese?” If you are correct, and the first one to correctly guess – you win! If you guess the wrong food item, you have to wait until your next turn to ask another question.
APPENDIX SESSION 4

Activity Materials
Handouts
Answer Keys
Take Home Activities
Sustainability

Planet
Preserving and caring for the natural environment and its resources.

People
Preserving social justice and equity for all members of society.

Profit
Ensuring the economic livelihood of communities and farmers.
APPENDIX SESSION 5

Activity Materials
Handouts
Answer Keys
Take Home Activities
Map of Ocean Gyres

What's that brown spot?
That brown spot is the Great Pacific Garbage Patch!
79 50-gallon bathtubs of water!
Or 792 5-gallon buckets of water!

53 50-gallon bathtubs of water
Or 528 5-gallon buckets of water!
32 50-gallon bathtubs of water

Or 317 5-gallon buckets of water!
8 50-gallon bathtubs of water

Or 79 5-gallon buckets of water!
5 50-gallon bathtubs of water!

Or 53 buckets of water!
2.2 lbs (1 kg) citrus fruits

2.2 lbs (1 kg) grains

2.2 lbs (1 kg) pork
2.2 lbs (1 kg) beef

2.2 lbs (1 kg) poultry
What can be composted?

Green Materials

Fresh leaves, plant cuttings and weeds
Grass clippings
Fruit and vegetable peels and wastes
Breads and grains
Nut shells
Coffee grounds and tea bags
Egg shells

Brown Materials

Dead weeds and dry leaves
Clipped brush
Wood ash
Sawdust
Wood chips
Straw

What doesn’t go in the compost pile?

Meat
Bones
Cheese
Salad dressing
Oils and other fats (such as butter)
Any plants that are diseased or infested with insects
# Garbage Contest

Each day record how much you throw out. In each box place a scratch mark for each item thrown in the trash. Example: \[\boxed{\text{++++}}\] is equal to 5 items. If you recycle an item, place an “\textbf{R}” in the box. If you compost an item, place a “\textbf{C}” in the box. Then place the number of total items thrown out, recycled, and composted for the week in the column labeled “\textit{Total}”.

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APPENDIX SESSION 6

Activity Materials
Handouts
Answer Keys
Take Home Activities
Going Back to School!

- **Remember to plan ahead!** That is the key to giving your kids (and yourself) healthy and delicious lunches. Make sure you know ahead of time what your kids will and won’t eat.

- **Trying to get those five fruits and veggies a day?** Pack a piece of fruit or a whole vegetable like a carrot – it’s quick and easy! If you cut the apple into slices ahead of time, squeeze some lemon juice on them to prevent them from turning brown.

- **Make packing lunches a fun event for the whole family!** Over the weekend plan out lunches for the whole week as a family. What are your favorite school lunches? What unhealthy foods are you willing to give up?

- **No more soggy sandwiches!** If you are packing sandwiches with mayo, jelly, or any other condiment, toast the bread. This prevents sandwiches from getting soggy.

- **Don’t throw it out!** Don’t use brown paper bags (but if you do, they can be composted!) or plastic sandwich baggies. They may be cheaper than Tupperware up front, but you have to keep buying them and it can really add up. Instead buy reusable containers. Over the long run they are much cheaper and better for the environment!

- **Be creative!** You don’t have to pack the same old boring peanut butter and jelly every day. With reusable containers you can pack soups and leftovers. Sandwiches are always more exciting when you use cookie cutters to turn them into fun shapes!

- **Hydrate, hydrate, hydrate!** Even kids need plenty of water. Rather than buying disposable plastic bottles (that over time can cost an arm and a leg!) buy a reusable water bottle and fill it with tap or filtered water. That way your kids will stay hydrated, you’ll save money, and you’ll be helping out the environment by keeping plastic out of landfills and putting less pollution in the air!
References


FRIDGE (Food-Related Intergenerational Discussion Group Experiences) (n.d.). Penn State University Cooperative Extension, College of Agricultural Sciences.


APPENDIX B

EVAULATION INSTRUMENTATION

- Youth quiz
- Adult post-then-pre survey
- Feedback loop 1
- Feedback look 2
- Follow-up survey
- Observation Protocol
Tell us what you know!

1. Circle all of the healthy foods below:
Place an X next to your answer.

2. It is good to eat at least 5 different fruits and vegetables a day:
   ____ YES
   ____ NO

3. Earthworms are good for the soil:
   ____ YES
   ____ NO

4. Soda has lots of sugar in it:
   ____ YES
   ____ NO

5. White bread is healthier than whole wheat bread:
   ____ YES
   ____ NO

6. Oranges can grow in Pennsylvania:
   ____ YES
   ____ NO

7. It takes a lot of water to raise a cow:
   ____ YES
   ____ NO

8. Garbage can end up in the ocean, even if I throw it away:
   ____ YES
   ____ NO
9. Circle all of the foods that grow in trees:
Place an X next to your answer.

10. I think it is important to compost:
   ____ YES
   ____ NO

11. I like spending time outside:
   ____ YES
   ____ NO

12. I enjoy eating vegetables:
   ____ YES
   ____ NO

13. I like to spend time with my family:
   ____ YES
   ____ NO

14. I think it is important to use less water:
   ____ YES
   ____ NO

15. I think it is important to recycle:
   ____ YES
   ____ NO

16. I think it is important to know what is in my food:
   ____ YES
   ____ NO
Dear program participant,

Thank you for attending the StreetWorks summer program, FRESH, at Ashworth Neighborhood Garden. As part of my graduate research at Penn State University I am interested in how families learn about the impact of their food choices and adopt sustainable agricultural practices.

Please complete this brief 20-minute survey about the food you eat as well as your knowledge about nutrition and the environment. Your answers will be completely confidential and will only be seen by myself.

If you have any questions, please contact me at (914) 400-3343 or at mcm339@psu.edu. I will be happy to discuss with you any concerns you may have about the program or the research.

Thank you for your participation in advance,

Misha Moschera, Primary Investigator (PI)
Master’s Graduate Student
Department of Agricultural & Extension Education
Penn State University
Participant Code # ______

**Purpose:** The purpose of this survey is to measure knowledge, attitude, and behavior associated with sustainable agriculture practices.

**Confidentiality:** You can be assured of complete confidentiality. At no time will your responses or survey be linked to you. The only person who will see these answers is the primary investigator (PI). Only your birthday will be used to identify you.

**Time to Complete the Survey:** The time needed to complete this survey is approximately 10 minutes. Most answers have been designed for quick answering by circling the selected answer.

**Instructions:** An adult who attended some or the entire 6-week FRESH program should fill out the questionnaire. Some questions ask about your opinions about certain topics related to food and agriculture. In these cases, there is no one “correct” answer, so please just provide your best judgment. The PI will collect the completed questionnaire from you.

---

**KNOWLEDGE**

Please circle your answer to the statements listed below.
[Your answers under the “Before FRESH” column are about your thinking or understanding before you participated in the FRESH program. Answers under the “End of FRESH” program are about your thinking or understanding right now.]

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<tr>
<th>Statement</th>
<th>Before FRESH</th>
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<tr>
<td>1. Plastic decomposes in the ground in fifty to sixty years.</td>
<td>TRUE FALSE</td>
<td>TRUE FALSE</td>
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<tr>
<td>2. Organic vegetables are grown without the use of herbicides and pesticides.</td>
<td>TRUE FALSE</td>
<td>TRUE FALSE</td>
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<tr>
<td>3. The Great Pacific Garbage Patch is a giant floating island of plastic.</td>
<td>TRUE FALSE</td>
<td>TRUE FALSE</td>
</tr>
<tr>
<td>4. Bacteria in the soil help break down organic matter.</td>
<td>TRUE FALSE</td>
<td>TRUE FALSE</td>
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<tr>
<td>5. It is OK to put meat in a compost pile.</td>
<td>TRUE FALSE</td>
<td>TRUE FALSE</td>
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</tbody>
</table>
Please complete the following statements (circle one):

6. Almonds grow:
   a. in a bush
   b. underground
   c. in a tree

7. Which of the following takes the most water to produce?
   a. one pound of beef
   b. one pound of poultry
   c. one pound of citrus fruits
   d. one pound of grains

8. When planning a meal, potatoes are considered a:
   a. vegetable
   b. starch
   c. protein source
   d. fat/oil

9. Which of the following has the highest fat content per serving?
   a. chicken nuggets
   b. turkey sandwich
   c. tuna fish sandwich

10. Every day the United States throws away how many tons of non-biodegradable garbage?
    a. 10 tons
    b. 150 tons
    c. 2,500 tons
    d. 8,000 tons
## ATTITUDE

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</tbody>
</table>

Please circle the number that best represents how much you agree or disagree with each of the following statements:

1. I think it is important to feed my children healthy foods
2. I think it is important to know where my food comes from
3. I like to eat fresh fruits and vegetables whenever possible
4. I enjoy growing my own food
5. I think it is important to communicate with my family about food
6. I enjoy cooking meals using fresh produce
7. I care about the natural environment
8. I enjoy spending time cooking with my family
9. I think it is important to support local farmers
10. I prefer to eat organic produce
BEHAVIOR

| 1 = almost never | 2 = rarely | 3 = about half the time | 4 = often | 5 = almost always |

Please circle the number that best represents how often you do each of the following behaviors:

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Before FRESH DID I?</th>
<th>End of FRESH DO I?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I compost all of my food scraps/waste.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>2. I buy as many foods grown as close to home as possible.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>3. I go to fast food restaurants.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
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<tr>
<td>4. I recycle all of my recyclable materials (bottles, cans, etc.).</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>5. I always read the nutrition and ingredients labels on food items.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>6. I make all of the food decisions for the family.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>7. I grow my own vegetables whenever possible.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>8. I spend time outdoors as much as possible.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>9. I cook most meals from scratch.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>10. When shopping, I bring reusable bags.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>
OTHER QUESTIONS

1. How many weeks did you participate in the 6-week summer program? (Circle one)

   0   1   2   3   4   5   6

2. How many children in your family participated in the program? ______

3. Are you male / female? (Circle One)

4. Are you: single ____  married ____  divorced ____  widowed____

5. How many adults (18 years and older) live in your household? ______

6. How many children (17 years and younger) live in your household? ______

7. Are you employed? (Circle one)  Y / N

   If you answered YES to question 7, what is your occupation? ____________

8. Which activities were the most fun for you and your family? Please explain your answer.

   __________________________________________

   __________________________________________

   __________________________________________

   __________________________________________

9. In which activities did you learn the most? Please explain your answer.

   __________________________________________

   __________________________________________

   __________________________________________
10. Any additional comments on the program content, instruction or anything else?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Thank you for taking the time to complete this survey!
Interim Feedback after Session 2

Please fill out the following information. This is used solely for the purpose of understanding what areas of the program needed to be strengthened. Please do not include your name on this form. Your answers will be completely confidential and only see by the Primary Investigator.

The following topics were covered during Session 1 and 2:
Understanding Sustainability  Basics of Gardening
What Grows in Pennsylvania  Knowing the Ingredients
Fat Content  Sugar Content

Of all the topics and activities we have covered so far, identify the topics from the list above that you feel confident you learned something or that is clear to you.

Of all the topics and activities we have covered so far, identify the topics from the list above that you feel NOT confident you learned something or that is unclear to you.

Please share any ideas that you have for improving this program on the back of this sheet.
Interim Feedback after Session 4

Please fill out the following information. This is used solely for the purpose of understanding what areas of the program needed to be strengthened. Please do not include your name on this form. Your answers will be completely confidential and only see by the Primary Investigator.

The following topics were covered during Session 3 and 4:
What Your Plate Should Look Like  Importance of Communication
Principles of Sustainable Agriculture  Impacts of Food from Afar
Local vs. Commercial Food Systems

<table>
<thead>
<tr>
<th>Of all the topics and activities we have covered so far, identify the topics from the list above that you feel confident you learned something or that is clear to you.</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Of all the topics and activities we have covered so far, identify the topics from the list above that you feel NOT confident you learned something or that is unclear to you.</th>
</tr>
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</table>

Please share any ideas that you have for improving this program on the back of this sheet.
Dear program participant,

Thank you for attending the StreetWorks summer program, FRESH, at Ashworth Neighborhood Garden.

Please complete this brief 5 minute follow-up survey about the food you eat and your behaviors pertaining to sustainable agriculture. Your answers will be completely confidential and will only be seen by myself.

If you have any questions, please contact me at (914) 400-3343 or at mcm339@psu.edu. I will be happy to discuss with you any concerns you may have about the program or the research.

Thank you for your participation in advance,

Misha Moschera, Primary Investigator (PI)
Master’s Graduate Student
Department of Agricultural & Extension Education
Penn State University
BEHAVIOR

1 = almost never
2 = rarely
3 = about half the time
4 = often
5 = almost always

Please circle the number that best represents how often you do each of the following behaviors:

1. I compost all of my food scraps/waste.  
   Before FRESH DID I? 1 2 3 4 5  
   End of FRESH DO I? 1 2 3 4 5

2. I buy as many foods grown as close to home as possible.  
   Before FRESH DID I? 1 2 3 4 5  
   End of FRESH DO I? 1 2 3 4 5

3. I go to fast food restaurants.  
   Before FRESH DID I? 1 2 3 4 5  
   End of FRESH DO I? 1 2 3 4 5

4. I recycle all of my recyclable materials (bottles, cans, etc.).  
   Before FRESH DID I? 1 2 3 4 5  
   End of FRESH DO I? 1 2 3 4 5

5. I always read the nutrition and ingredients labels on food items.  
   Before FRESH DID I? 1 2 3 4 5  
   End of FRESH DO I? 1 2 3 4 5

6. I make all of the food decisions for the family.  
   Before FRESH DID I? 1 2 3 4 5  
   End of FRESH DO I? 1 2 3 4 5

7. I grow my own vegetables whenever possible.  
   Before FRESH DID I? 1 2 3 4 5  
   End of FRESH DO I? 1 2 3 4 5

8. I spend time outdoors as much as possible.  
   Before FRESH DID I? 1 2 3 4 5  
   End of FRESH DO I? 1 2 3 4 5

9. I cook most meals from scratch.  
   Before FRESH DID I? 1 2 3 4 5  
   End of FRESH DO I? 1 2 3 4 5

10. When shopping, I bring reusable bags.  
    Before FRESH DID I? 1 2 3 4 5  
    End of FRESH DO I? 1 2 3 4 5
A Case Study of a Family Based Intervention for Introducing Sustainable Agriculture Into Limited-Income Communities

Misha Moschera, Primary Investigator

The following protocol is a modified version of a “protocol for conducting observations”, used by Shih-Tsen (Nike) Liu to collect preliminary data to inform her study of an intergenerational environmental education program (Liu, 2004). It has been adapted to meet the objectives of the research.

### Protocol for Conducting Observations

**Interaction between participants:**
- Take notes on the quantity of interaction (number and length of conversations) between children and their parents.
- Note who initiates and guides the conversations.
- Note the level of interest/attention/enthusiasm displayed by the participants.
- Pay attention to, and make note of, non-verbal communication (things like touch, body language, and facial expressions).
- Note behaviors that illustrate the types of roles parents are taking in their communication with their children, e.g., “teacher,” “mentor,” “co-learner,” “role model.”

**Sustainable agriculture learning:**
- Record any statements or behaviors that indicate that participants are learning things about sustainable agriculture (e.g., a participant says, “Oh, I see, it takes a lot of water to raise a pig because it drinks water and because it takes a lot of water to grow the corn the pig eats”).
- Record questions asked regarding factual information about sustainable agriculture.
- Record accuracy of answers provided in response to questions about sustainable agriculture.

**Sustainable agriculture attitudes:**
- Note any statements or behaviors that indicate participants’ attitudes about sustainable agriculture or healthy foods (i.e., as they observe and/or discuss sustainable agriculture, note if participants are smiling, giggling, frowning, running away, etc.).
- Take notes on how participants discuss/share their attitudes towards sustainable agriculture or healthy foods.
APPENDIX C

CONSENT FORMS AND CORRESPONDENCE

- IRB approval letter
- Research consent form
- Child consent form
- Child assent form
- YSB letter of agreement
Hi Misha-

The Office for Research Protections (ORP) has reviewed the eSubmission modification request for the research study noted in the subject line of this email. This request does not change the exemption status and this study continues to be exempt from IRB review. You may continue with your research.

MODIFICATION REVIEW CATEGORY:
Category 1: Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods. [45 CFR 46.101(b)(1)]

Category 2: Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observations of public behavior unless: (i) information obtained is recorded in such a manner that human participants can be identified, directly or through identifiers linked to the participants; and (ii) any disclosure of the human participants' responses outside the research could reasonably place the participants at risk of criminal or civil liability or be damaging to the participants' financial standing, employability, or reputation. [45 CFR 46.101(b)(2)]

COMMENT: The June 30, 2010 modification request has been reviewed. It has been determined that the changes to your research protocol do not change the determination of exemption. The changes to your research protocol that were reviewed include: Addition of study personnel J. Schulte. No other changes.

PLEASE NOTE THE FOLLOWING:
- The principal investigator is responsible for determining and adhering to additional requirements established by any outside sponsors/funding sources.
- **Record Keeping**
  - The principal investigator is expected to maintain the original signed informed consent forms, if applicable, along with the research records for at least three (3) years after termination of the study.
  - This will be the only correspondence you will receive from our office regarding this modification determination.
- **MAINTAIN A COPY OF THIS EMAIL FOR YOUR RECORDS.**
- **Consent Document(s)**
  - The exempt consent form(s) will no longer be stamped with the approval/expiration dates.
  - The most recent consent form(s) that you uploaded for review is the one that you are expected to use.
• **Follow-Up**
  - The Office for Research Protections will contact you in three (3) years from the date of original determination to inquire if this study will be on-going.
  - If the study is completed within a three year period from the date of original determination, the principal investigator may complete and submit a Project Close-Out Report. ([http://www.research.psu.edu/orp/areas/humans/applications/closeout.rtf](http://www.research.psu.edu/orp/areas/humans/applications/closeout.rtf))

• **Revisions/Modifications**
  - Any changes or modifications to the study must be submitted through the eSubmission application for this protocol in PRAMS ([www.prams.psu.edu](http://www.prams.psu.edu)).

Please do not hesitate to contact me if you have any questions or concerns.

Thank you,

Sara Hartman
Research Compliance Coordinator II
Office for Research Protections
The Pennsylvania State University
The 330 Building, Suite 205, University Park, PA 16802
Telephone: 814-865-3696
Title of Project: A Case Study of a Family Based Intervention For Introducing Sustainable Agriculture into Limited-Income Communities

IRB Protocol: 33989

Principal Investigator: Misha Moschera, Graduate Student
009 Ferguson Building
University Park, PA 16802
(914) 400-3343; mcm339@psu.edu

Advisor: Dr. Matt Kaplan
7A Ferguson Building
University Park, PA 16802
(814) 863-4753; msk15@psu.edu

1. Purpose of the Study: The purpose of this research study is to explore how families in limited-income communities learn about and adopt fundamental principles of sustainable agriculture and local food systems.

2. Procedures to be followed: The research will consist of a 6-week program, FRESH (Families Reinforcing Environmentally Sustainable Habits), and informal interviews, surveys and ongoing observations. You will be asked to fill out one survey with two sets of questions. One set of questions pertains to knowledge, attitudes, and behavior related to sustainable agriculture prior to the start of the program, and the second set will ask how your knowledge, attitudes, and behavior has changed now the program is at an end. Four weeks after the completion of the program adults will be given a follow-up survey. The purpose of this survey is to measure sustained changes in behavior over time. Only adults will be surveyed, and children will be quizzed to assess knowledge and attitudes. Throughout the program another graduate student and the principle investigator will be making observations of public behavior while families are participating in the program.

3. Duration: The program is 6-weeks long and each session is approximately 2 hours long. It will take about 10-15 minutes to complete each survey.

4. Statement of Confidentiality: Your participation in this research is completely confidential. The data will be stored and secured in room 9 or 7A Ferguson Building, University Park, in a password protected file behind locked doors. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared.

5. Right to Ask Questions: Please contact Misha Moschera at (914) 400-3343 or mcm339@psu.edu with questions or concerns about this study.

6. Payment for participation: Participants will be entered in a prize drawing for a gift
certificate to GIANT Food Stores at the end of the summer program and completion of the research.

7. **Voluntary Participation:** Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. There will be no penalty for refusal or withdrawing.

   **You must be 13 years of age or older to take part in this research study. If you agree to the following information noted above, please complete the following section, and sign and date this form.**

You will be given a copy of this form for your records.

________________________________________________________________________  
Participant Signature  
Date

________________________________________________________________________  
Person Obtaining Consent  
Date

I give permission for my child __________________________ to participate in this research.

**PARENT CONSENT:**

________________________________________________________________________  
Signature of Parent / Guardian  
Date

**TEEN ASSENT:**

________________________________________________________________________  
Signature of Teenagers age 13 and Older  
Date

________________________________________________________________________  
Signature of Principle Investigator/Person Obtaining Consent  
Date
Informed Child Ages 6 – 12 Consent Form for Social Science Research
The Pennsylvania State University

Title of Project: A Case Study of a Family Based Intervention For Introducing Sustainable Agriculture into Limited-Income Communities

IRB Protocol: 33989

Principal Investigator: Misha Moschera, Graduate Student
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2. Procedures to be followed: The research will consist a 6-week program, FRESH (Families Reinforcing Environmentally Sustainable Habits). A quiz will be administered at the start of the program and a quiz will be administered at the end of the program to assess change knowledge and attitudes. Throughout the program another graduate student and I will be taking observational notes on public behavior while participating in the program.

3. Duration: The program is 6-weeks long and each session is approximately 2 hours long. It will take about 5-10 minutes to complete each quiz.

4. Statement of Confidentiality: Your child’s participation in this research is completely confidential. The data will be stored and secured at 7A Ferguson Building, University Park, in a locked file behind locked doors. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared.

5. Right to Ask Questions: Please contact Misha Moschera at (914) 400-3343 or mcm339@psu.edu with questions or concerns about this study.

6. Voluntary Participation: Your decision to have your child be in this research is voluntary. Your child can stop at any time. Your child does not have to answer any questions he or she does not want to answer. There will be no penalty for refusal or withdrawing.

You must be 18 years of age or older to permit your child to take part in this research study. If you agree to allow your child to take part in this research study and to the information outlined above, please fill in the following information and sign your name and
indicate the date below.

You will be given a copy of this form for your records.

I, ____________________________, give my son/daughter, ____________________________, permission to participate in FRESH and in the research. I understand that the PI, advisor, or research assistant will not be held liable in the event of loss or injury resulting from the activities or research. I also understand that my child may withdraw from the program and research at any time.

______________________________________________
Parent/Guardian Signature

_____________________
Date

______________________________________________
Person Obtaining Consent

_____________________
Date
Ages 6-12 ASSENT Form for Social Science Research
The Pennsylvania State University

Title of Project: A Case Study of a Family Based Intervention For Introducing Sustainable Agriculture into Limited-Income Communities

IRB Protocol: 33989

Principal Investigator: Misha Moschera, Graduate Student
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TO BE READ ALOUD IN THE PRESENCE OF A WITNESS:

What is research?

We are asking you to be in a research study. Research is a way to test new ideas. Research helps us learn new things.

Being in research is your choice. You can say Yes or No. Whatever you decide is OK. You will not be in trouble for saying No.

Why are we doing this research?

In our research study we want to learn about how families adopt sustainable habits. Sustainable means eating healthy foods, being active in your community, and caring about the natural environment.

We are asking children and their family members living in the Ashworth community to be in this research study and participate in the FRESH program.

What will happen in the research?

Ashworth community residents will have the opportunity to participate in a 6-week program. Each session takes place every Monday from May 31st to July 5th, and is about two hours long. You may participate in all or none of the activities. The activities include games, drawing, role-playing, gardening and more. You will also be given a short quiz to see what you know about gardening, eating healthy foods, and the environment at the start of the program, and a similar quiz at the end of the program to see what you have learned.
What are the good things that can happen from this research?

The activities are designed to be fun and interesting. We hope that you will learn healthy eating habits, and change the way you do things to help your family, your community, and the environment.

What are the bad things that can happen from this research?

You may not feel comfortable participating in all of the activities. You do not have to do any game or activity you do not feel comfortable doing. We are asking you to fill out two quizzes. You may not know all of the answers or may not want to share everything. This may make you feel embarrassed. You do not have to answer any question you do not feel comfortable answering.

What else should you know about the research?

Being in the research is your choice. You can say Yes or No. Either way is OK. Whatever you choose, we will still take good care of you.

If you say Yes and change your mind later that is OK. You can stop being in the research at any time. If you want to stop, please tell the researchers or YSB staff.

Take the time you need to make your choice. Ask us any questions you have. You can ask questions any time.

Name and Signature of Researcher Obtaining Assent

Date

Witness Information

PLEASE NOTE: A witness signature is required when using the Short Form Assent.

Witness Statement

I have been present during the oral presentation of this research study.

Name and Signature of Witness

Date

Copy to: Parent/Legal Guardian
Dear Misha Moschera,

I am writing to indicate my full support for the research study entitled "A Case Study for a Family Based Intervention for Introducing Sustainable Agriculture Into Limited-Income Communities" being conducted by Misha Moschera (Primary Investigator) and Dr. Matthew Kaplan (Advisor). This program is an important element of the Centre County Youth Service Bureau's StreetWorks summer program. I am happy this research will provide us with important information as to its effectiveness in introducing these families to sustainable agriculture principles. I agree that my organization is a partner in the research and that it will take place in Ashworth Neighborhood Garden (located off of Route 45), Boalsburg, Pennsylvania.

Thank you.

Alison Turley
YSB, Prevention Programs