

Determination of Domains and Factors of a Capacity Building Framework that Support a
Collaborative Fruit and Vegetable Prescription Program

Olivia Rae Schwartz

Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

Master of Science
In
Human Nutrition, Foods, and Exercise

Elena Serrano
Valisa Hedrick
Sarah Misyak
Kim Niewolny

April 20, 2017
Blacksburg, Virginia

Keywords: garden, fruit, vegetable, food insecurity, community, limited income,
prescription, intervention, capacity building, organizational capacity building

Determination of Domains and Factors of a Capacity Building Framework that Support a Collaborative Fruit and Vegetable Prescription Program
Olivia Rae Schwartz

ABSTRACT

Over half of U.S. adults, roughly 117 million individuals, suffer from at least one preventable chronic disease, such as obesity, hypertension, coronary heart disease, and certain types of cancer. Epidemiological studies suggest that fruit and vegetable intake may be protective against these diseases, yet it is estimated that less than one-quarter of the population meets current fruit and vegetable recommendations. Low consumption rates may be attributed to lower income, food insecurity, and poor access and availability to fruits and vegetables. As a result, access to affordable and nutritious foods and beverages, particularly in underserved communities, such as “food deserts,” has become a national priority. An emerging strategy to address this is prescription programs, whereby physicians provide prescriptions or vouchers for fruit and vegetables to clients to encourage increased consumption, implemented in the form of the Farmacy Garden, which was the result of collaboration between multiple agencies. For collaborative efforts to be able to implement and sustain their shared goals, partnering individuals, agencies, and organizations need to first have the capacity or the potential to build capacity as a ‘unit.’ The purpose of this study was to concretely examine different factors and domains within Matachi’s Capacity Building Framework related to the Farmacy Garden in order to replicate the program in other locations. This framework conceptualizes organizational capacity building as dependent (and interdependent) on three different domains - individual, organizational, and environment. The study utilized semi-structured, open-ended interviews to ascertain concrete factors of organizational capacity building present at each level among Farmacy Garden collaborative project stakeholders (n=7). Interviews with six stakeholders (85.7% response rate) ranged in length from thirty-two minutes to one hour and twenty minutes. Common themes were coded separately by two members of the research team, first for overall recurring themes and second, to reveal connections between themes. Relevant quotes were identified and any discrepancies between researchers were resolved. Common themes often crossed over different levels, such as time, beliefs, values, and attitudes and inter-organizational linkages/partnerships, attitudes, and relationships, highlighting the inter-dependence of various factors across domains of capacity building. In addition to identifying specific factors that were necessary for the creation and sustainability of the Farmacy Program, the analysis revealed the importance of a “shared belief and value system.” In other words, individuals and organizations “valorized” this project in different ways than more traditional programs and/or interventions. The findings of this study can help guide leadership in cultivating relationships and new benchmarks to ensure transparency in project goals, in addition to time and physical resources, as well as inform the organizational capacity research area within nutrition and food systems fields.

KEYWORDS: garden, fruit, vegetable, food insecurity, community, limited income, prescription, intervention, capacity building, organizational capacity building

Determination of Domains and Factors of a Capacity Building Framework that Support a Collaborative Fruit and Vegetable Prescription Program

Olivia Rae Schwartz

General Abstract

Obesity and chronic disease are linked to the leading causes of death in the United States. Fruit and vegetable intake may be protective against these diseases, yet less than one-quarter of the population meets current recommendations, potentially due to lower income, food insecurity, and poor access and availability. As a result, access to affordable and nutritious foods and beverages, particularly in underserved communities, such as “food deserts,” has become a national priority. An emerging strategy to improve access is a fruit and vegetable prescription program, whereby physicians provide prescriptions or vouchers for fruit and vegetables to clients. The Farmacy Garden, a gardening prescription program adapted from a fruit and vegetable prescription model, was created in the New River Valley, Virginia through the collaboration of individuals from multiple health agencies. The goal of this study was to examine the different domains and factors within a capacity building framework that contributed to the creation and ongoing implementation of the Farmacy Garden. Interviews were conducted with participating individuals and representatives of the organizations (n=7). Interviews with six stakeholders (85.7%) ranged in length from thirty-two minutes to one hour and twenty minutes. In addition to identifying specific factors that were necessary for the creation and sustainability of the Farmacy Garden, the analysis revealed the importance of a “shared belief and value system.” In other words, individuals and organizations valued this project in different ways than more traditional programs and/or interventions. The findings of this study can help guide leadership in cultivating relationships and new benchmarks to ensure transparency in project goals, in addition to time and physical resources and can be used to inform the development and delivery of a similar program in other locations.

KEYWORDS: garden, fruit, vegetable, food insecurity, community, limited income, prescription, intervention, capacity building, organizational capacity building

Acknowledgements

I would like to thank my family and loved ones for their support throughout this journey. Without their support I'm pretty sure I would have given up one of the many times I thought it was just too hard to go on.

Thank you Elena for being the best advisor I could ever dream of having. You have been there for me not only professionally, but also personally. I have always enjoyed our quick conversations of non-work related topics and each time I wish we longer to chat. You are such a wonderful force of nature that can juggle more responsibilities (including being a great mom to two boys) than anyone I have ever encountered. Working beside you over the years has taught me so many things including: how to continue on even when things seem imperfect since they have a way of working themselves out, how to uphold a professional relationship while also getting to know someone on a personal level, and finally, how to leave the perfect amount of so personal growth can occur while also assisting when necessary. I truly feel like it was meant to be when I ran into you in the hallway that one day in Wallace Hall a few years back. I knew I wanted to work with you in whatever way you would have me.

I also want to take the time to acknowledge my research team who was absolutely essential in this process and I could not have accomplished this without them. Elaine Meredith, thank you for bringing your innate interviewing skills and patience to this project. Sarah Misyak, thank you so much for helping me word smith and me how to design and evaluate a research study and program. I really enjoyed learning from you and I look forward to expanding my skills further in this area in the future. Thanks for

showing me that evaluation can be very interesting. I applaud your attention to detail and linguistic skills.

Meredith, thank you for hiring me as your Virginia Family Nutrition Program summer intern a couple of years back. Without that position I would not have had the chance to fall in love with the Farmacy Garden and all of the amazing partners and individuals who are so committed to its success. Your laughter always brightens my day no matter where and when I hear it.

Lastly, thank you to all of the interview participants who provided their time amidst their busy schedules. I want you to know that your hard work in your field does not go unnoticed. I only hope to have the opportunity to work with professionals like you one day in the future.

Table of Contents

Chapter 1: Introduction and Literature Review	1
Fruit and Vegetable Consumption	2
Cancer.....	5
Type 2 Diabetes.....	6
Cardiovascular Health.....	8
Bone Health.....	9
Eye Health.....	10
Gut Health.....	10
Weight Status.....	12
Contributors to Low Fruit and Vegetable Consumption.....	13
Strategies to Increase Fruit and Vegetable Consumption and Health	
Outcomes.....	18
Capacity Building.....	22
Summary.....	27
Research Goals.....	28
Chapter 2: Determination of Domains and Factors of a Capacity Building Framework that Support a Collaborative Fruit and Vegetable Prescription	
Program	30
Abstract.....	30
Introduction.....	31
Methods.....	34
Results.....	37
Discussion.....	47
References.....	53

Chapter 3: Conclusions	56
Appendices	59
Appendix A. IRB Approval Letter, “Assessment of Capacity Building Framework for Partnerships”.....	59
Appendix B. Consent Form.....	61
Appendix C. Interview Script.....	64
Appendix D. Code Book.....	68
Appendix E. Interview Quotation Table.....	71
Appendix F. Garden Prescription.....	108
Appendix G. Pictures of the Farmacy Garden.....	109
References	111

Chapter 1: Introduction and Literature Review

Infectious diseases, specifically those caused by nutritional inadequacy, have radically decreased in the United States (U.S.), meanwhile, over the past 100 years diet-related chronic diseases have increased and are correlated with poor eating and lifestyle behaviors.¹ Over half of the adults in the U.S., roughly 117 million individuals, suffer from at least 1 preventable chronic disease such as obesity, hypertension, coronary heart disease, stroke, high total blood cholesterol, diseases of the eye, certain types of cancer, and diminished bone health.¹ In 2010, of the top ten causes of death in the U.S., 7 diseases were preventable chronic diseases, with 48.0% caused by certain types of cancer and heart disease alone.² Healthcare costs for these diseases accounted for 86.0% of all healthcare spending in 2010.³ Obesity has been shown to correspond with numerous adverse health consequences, such as type 2 diabetes, hypertension, specific types of cancer, heart disease, decreased quality of life, mental illness, and even death.⁴

Given these factors, public health researchers and practitioners have been focusing efforts on preventative care, particularly obesity prevention and weight maintenance. Currently, 70.7% of adults over 20 years old in the U.S. are classified as overweight or obese with 37.9% classified as obese.^{5,6}

Overweight and obesity affects groups of individuals differently based on age and gender. For example, middle-aged and older adults have higher rates of obesity, 40.2% and 37.0%, respectively, than other age groups.⁵ The relationship between income and obesity is more apparent in women than men. For 42.0% of women living at or below the 130% poverty level are obese compared to 29.0% 42.0% who live at or above 350% poverty level.⁷ Only 33.0% of men who reside in a household that is at or above 350% of

the poverty level are classified as obese, which does not differ significantly from the 29.2% of obese men who live at or below the 130% poverty level are considered obese.⁷ Additionally low-income preschool aged children have higher rates of obesity than their middle and high-income peers.⁸ Obesity affects multiple groups of individuals, which makes identifying a single cause not a simple task.⁹

There is not a single proposed cause of obesity, rather obesity is attributed to multiple factors influencing and interacting to determine weight status. Diet is an important contributor to obesity. Simplistically, excess weight and obesity occur as a result of energy imbalance – where excessive calories (diet) are consumed compared to expended calories (movement, physical activity).

Fruit and Vegetable Consumption

According to the Dietary Guidelines for Americans (DGA 2015-2020), a healthy eating pattern should consist of consuming a diet rich in fruits, vegetables and whole grains with lean meats and low-fat dairy.¹⁰ Yet, it is estimated that 75.0% of the population do not meet current fruit and vegetable recommendations.¹¹ Meanwhile, more than half of the population successfully meet the recommendations for protein and grains and exceed the daily recommendation levels for added sugars, saturated fat, and sodium in the diet.¹²⁻¹⁴ As a result, the DGA recommend a shift in eating patterns to include higher levels of fruits, vegetables, and whole grains, and lower intakes of added sugars, saturated fat, and sodium. These changes could partially ameliorate obesity and chronic diseases.¹¹

Many health professionals believe fruits and vegetables should be the primary focus of health interventions,¹⁵ particularly since fruits and vegetables are considered

‘functional foods’ providing numerous components the body needs in order to promote overall health.^{15,16} Critical nutrients and compounds varying in color indicate the presence of certain potentially beneficial phytochemicals. For instance, carotenoids (β - carotene, lycopene, lutein, and zeaxanthin) supply the yellow/orange/red pigments found in mango, peaches, tomatoes, and carrots and are known to assist with reducing the risk of developing eye diseases such as macular degeneration, cataracts, and cancer.¹⁷⁻¹⁹ The blue/green color found in fruits and vegetables such as green beans, broccoli, kale, peas and spinach is known as chlorophyll has been associated with decreased cancer incidence.^{20,21} Phytochemicals, fiber, vitamins, and minerals are other bioactive substances found in fruits and vegetables and have been shown to have a negative correlation with a number of chronic diseases and health conditions ranging from Type 2 diabetes, eye health, heart disease, and overweight and obesity.^{10,14,22}

The average adult (based on a 2000 calorie diet) should consume: 2 ½ cup equivalents of vegetables (1 cup equivalent is equal to ½ cup cooked, frozen, or canned vegetables or 1 cup raw of vegetables, 1 cup vegetable juice, or two cups raw green leafy vegetables) and 2 cup equivalents of fruit (1 cup equivalent is equal to 1 cup of fresh, frozen or canned fruit, ½ cup dried fruit, or 1 cup 100% fruit juice).^{10,23,24} The vegetable group contains five sub-groups based on differing characteristics such as starch content and color. Each sub-group boasts different nutrients and therefore varying health attributes. Depending on the sub-group a vegetable is categorized into, each has a different recommended weekly consumption amount. Based on a 2,000 calorie diet it is recommended to consume per week: ¹¹

- 1 ½ cup equivalents of dark-green vegetables
- 5 ½ cup equivalents of red and orange vegetables

- 1 ½ cup equivalents of legumes and beans
- 5 cup equivalents of starchy vegetables
- 4 cup equivalents of any type of vegetables determined by the consumer

Consumption patterns for fruits and vegetables vary based on age, poverty level, and ethnicity. According to the 2007-2010 National Health and Nutrition Examination Survey (NHANES), males 19 years and older consumed 1.8 cup equivalents of vegetables and 1.1 cups of fruit per day and women consumed 1.6 cup equivalents of vegetables and 1.1 cup equivalents of fruit per day, almost half of what is recommended.¹² NHANES also found 93.0% of children consumed less than the recommended servings for vegetables and 60.0% consumed less than the recommended servings of fruit.¹² The 2011 adult and youth Behavioral Risk Factor Surveillance System (BRFSS) found 36.0% of adolescents (12-19 years old) reported eating fruit less than one time daily and 37.7% of those adolescents ate vegetables one time daily. In adults, 37.7% of consumed fruit less than one time daily and 22.6% consumed vegetables less than one time daily.²⁵ In addition to dietary consumption rates varying across the lifespan, consumption rates vary widely from state to state. Moore et al. estimated from 2011 BRFSS data that adults (18 years or older) consumed 63.0% of the recommended vegetables and 60.0% of the recommended fruit per day. Only 8.2% of the population met vegetable recommendations and 14% met fruit recommendations. Consuming zero fruits and vegetables was found to be more common in males, non-Hispanic Blacks, younger age groups and in people with a poverty income ratio of less than 1.25, demonstrating lower consumption rates of residents in the U.S. when household income fell below the poverty line. By state, West Virginia had the lowest percent of people who met or exceeded the requirements for fruit at 7.0%. Louisiana only had 4.7% of the state

meet or exceed the recommendation for vegetables. In Virginia 13.2% adults met or exceeded the recommendations for fruit and 7.5% met or exceeded the recommendations for vegetables.²⁶

Fruit and vegetables are commonly viewed as “healthy” due to the presence of nutrients and compounds found within these foods. Consuming fruits and vegetables containing compounds such as phytochemicals, antioxidants, fiber and nutrients (vitamins and minerals) has been associated with decreased rates of chronic diseases by operating on a variety of mechanisms in the body. As a result, research on the positive effects of fruit and vegetables on particular chronic diseases (cancer, Type 2 diabetes, cardiovascular disease, diseases of the bones and the eye, and gut health) are numerous in the literature.

Cancer

In 2016, new cancer diagnoses are estimated to be around 1,685,210.²⁷ Of the top 10 causes of death, cancer ranks second.⁶ According to the American Cancer Society, certain types of cancer can largely be prevented by consuming a diet rich in fruits and vegetables, whole grains, nuts and seeds, and low in saturated fat.²⁸ Approximately one third of all cancers are caused by dietary factors, namely the absence or lack of consumption of protective compounds such as fiber, sterols, stanols, polyphenols, flavonoids, carotenoids, and chlorophyll found in fruits and vegetables.^{17,20,29-35} Additionally, cancer and chronic diseases can be caused by exposure to carcinogens occurring naturally in the diet such as secondary fungal metabolites known as mycotoxins (i.e., aflatoxin and fumonisin) found in corn and peanuts and heavy metals (i.e., cadmium, arsenic, and lead).^{36,37} These compounds can be found in fruits and vegetables growing in tainted soil caused by improper disposal of industrial and agricultural waste

into the environment.³⁸ Collectively, these compounds can influence the occurrence of preventable diseases such as some types of cancer due to the body's reduced ability to perform detoxification, proper growth, hormone regulation, apoptosis, and cell repair.³⁹

The ability to detoxify the body is a crucial process ridding the body of cancer and inflammation causing materials. Consuming cruciferous vegetables (broccoli, cabbage, Brussels sprouts) rich in the secondary plant metabolite, glucosinolates, has been associated with reduced risk of developing extraprostatic disease, an aggressive form of prostate cancer⁴⁰ and colorectal adenoma.⁴¹ Additionally, men with high dietary intake of the carotenoid, lycopene, found in tomatoes, were less prone to developing prostate cancer compared to men with low intakes of lycopene.⁴²⁻⁴⁴ Chlorophyll, another antioxidant compound found in fruits and vegetables, was shown to decrease the bioavailability of ingested aflatoxin in animal models, indicating possible detoxification abilities in humans.⁴⁵

Many compounds exist in fruits and vegetables, making it difficult to pinpoint the exact mechanism causing alterations to the cell cycle. Specifically, antioxidants can either help or have deleterious on an individual's health depending on the progression of the disease state and quantity consumed, indicating no claim can be made on whether antioxidants, as a whole, positively or negatively affect cancer, indicating the need for research on specific antioxidants on specific types of cancer at a time.³⁹

Type 2 Diabetes

According to Centers for Disease Control, 29.1 million people (9.3%) of the U.S. population are diagnosed with type 2 diabetes, with an additional 8.1 million people remaining undiagnosed.⁴⁶ One of the classic symptoms of type 2 diabetes is

hyperglycemia. Hyperglycemia in type 2 diabetics increases oxidative stress in the body by activation of certain proteins and pathways causing mitochondrial dysfunction and increasing the presence of harmful pro-oxidants and reactive oxygen species (ROS).⁴⁷ These destructive compounds damage endothelial function when there is a greater amount of pro-oxidants in relation to antioxidants.⁴⁸ This imbalance combined with inflammation in the body is thought to hinder cardiovascular function and structure⁴⁸, potentially leading to heart attack, stroke, and even death.⁴⁷ Individuals with type 2 diabetes are twice as likely to have a heart attack compared to someone without this disease.⁴⁹

Cooper et al. found the risk of developing type 2 diabetes decreased by 21.0% when fruit and vegetable intake increased.⁵⁰ However, most people with type 2 diabetes do not reach the recommended amount of fruits and vegetables each day.⁵¹ Potential reasons explaining the decreased risk could be rooted in the presence of polyphenols, or antioxidants in food. Polyphenols are in all fruits and vegetables and flavonoids are a type of polyphenol.⁵² Found in produce such as apples, bananas, romaine lettuce, and blueberries, flavonoids have been shown to have an inverse relationship with type 2 diabetes, likely due to their antioxidant, anti-inflammatory, and enhanced insulin sensitizing properties, yielding cardioprotective effects.^{53,54} Anthocyanin, another type of polyphenol, when consumed, has also been associated with a lower risk of type 2 diabetes.⁵⁵ In one study, consumption of blueberries, apples, and grapes in whole fruit form were associated with a decreased risk for developing type 2 diabetes.⁵¹ It should be noted that the ingestion of fruit juice was associated with a higher risk of developing type 2 diabetes, possibly due to the lack of fiber and ease of overconsumption.⁵¹ Overall, the

research is strong regarding the relationship between fruit and vegetable consumption and decreased risk of type 2 diabetes providing a potential strategy to decrease the prevalence and burden of this disease in the U.S.

Cardiovascular Health

Cardiovascular disease was the number one cause of death in the U.S., accounting for 614,348 deaths in 2014.⁶ Based on data from NHANES 1999-2010, income level predicted the presence of one or more cardiovascular disease risk factors such as uncontrolled high levels of low-density lipoprotein (LDL) cholesterol, uncontrolled high blood pressure, or smoking. Lower income adults were 60.8% more likely to have one or more cardiovascular disease risk factors compared to 47.2% of middle- and 37.9% of high-income groups.⁵⁶

In numerous studies, fruit and vegetable consumption has been linked to a reduced risk of coronary heart disease and stroke. For example, McCall et al. found a dose-response relationship for fruits and vegetables on blood pressure, one risk factor for heart disease.⁵⁷ When they added one additional portion of fruit and vegetables, they found that blood flow improved by 6.2%. In a two-month study on the effects of adding 100 grams of berries plus one small glass of berry juice per day – rich in polyphenol and antioxidants - to individuals' diets, participants had increased HDL- cholesterol serum concentrations.⁵⁸ Additionally, inhibited platelet formation and decrease in blood pressure was observed perhaps explained by changes in the metabolism of nitric oxide.⁵⁸ In a large prospective cohort study, increasing dietary intake of fruits and vegetables was associated with a lower risk of coronary heart disease.⁵⁹ Given the link between fruits and vegetables and different components of heart health, the American Heart Association

advocates for individuals to follow the US Dietary Guidelines for Americans 2015-2020 for fruits and vegetables.⁶⁰

Bone Health

Using data from NHANES 2005-2010 to estimate the prevalence of osteoporosis in the U.S., Wright found that approximately 10.2 million adults had osteoporosis and 43.4 million suffered from low bone mass in 2010.⁶¹ It is estimated that an osteoporotic bone fracture occurs worldwide every 3 seconds.⁶² Bone health, specifically osteoporotic fractures, is associated with higher morbidity and mortality.^{1,10} Proper nutrition decreases the risk of developing this disease.^{1,10} Specific nutrients have been found to be associated with bone health, including calcium and vitamin D. Dairy products are high in vitamin D and calcium – however there are other sources of these vitamins and minerals as well. Exposure to sunlight from being outdoors and through consumption of mushrooms and soybeans are considered good sources of vitamin D.¹⁰

Fruit and vegetable consumption may help protect bone health – however research on this topic is not necessarily compelling, possibly because many of the studies had low compliance⁶³ and complex interventions^{64,65} making it difficult to interpret the results. Although, several studies have found convincing results. A study investigating the influence of eating a high proportion of vegetables during pregnancy found increased bone mineral density of the offspring at nine years old⁶⁶, specifically when green leafy vegetables and fruit were consumed.⁶⁷ Gender differences in two separate studies revealed a lower decrease in bone health over three⁶⁸ or four years in male participants, but not female participants.⁶⁹ An association between increased bone mass in children and yellow vegetables and dark-green leafy vegetable consumption was found in a

prospective study.⁶⁹ Despite the mixed results, fruits and vegetables may offer numerous benefits to pregnant women, children and possible other populations related to other health concerns, but there is need for additional research in the area of bone health.

Eye Health

In the U.S. age-related macular degeneration (AMD), a common eye disease causing damage to the macula resulting in blurred and loss of vision, and age-related cataracts, or clouding of the lens of the eye, affect 6.5% and 17.0% of persons 40 years and older, respectively.⁷⁰⁻⁷² It is expected for the incidence of AMD to increase by 50.0% in the next 10 to 20 years as the U.S. population ages and due to the lack of primary prevention efforts.⁷³ Zeaxanthin and lutein are two carotenoids commonly found in spinach, oranges, and carrots.⁷⁴ These protective compounds located directly inside the macula, are antioxidants that provide an electron to surrounding harmful free radicals, protecting against AMD and cataracts.^{19,75}

Gut Health

Research focusing on the potential link between the gastro-intestinal tract (gut), diet, and health has been steadily increasing over the past decade, largely due to advancements in sequencing technology and profiling metabolites. Current research demonstrates that gut health is optimal with a diverse distribution of beneficial probiotic species.⁷⁶ Changes in the ratio of beneficial and detrimental bacteria in the gut has been linked to inflammatory bowel disease,^{77,78} metabolic disorders,⁷⁹ irritable bowel disease,⁸⁰ allergies,⁸¹ diabetes,⁸² and even weight status and obesity⁸³ in adults. Two variations of bacteria in the gut flora were found to be lower in obese individuals compared to normal-weight individuals.⁸⁴ Many other species found in the gut have been studied to reveal

variations between people with differing weight status.⁸⁵ Recent research has also highlighted the critical role diet can play in establishing beneficial health, such as through the ingestion of probiotics and prebiotics.⁸⁶

Probiotics are live organisms that consumed or ingested at sufficient levels may confer a health benefit.⁸⁷ Probiotics are naturally occurring in foods, added to food products, and available in pill form. Probiotics benefit gut health when beneficial colonies surpass a minimum quantity and outgrow bacteria that may have negative consequences.⁷⁶

A prebiotic is a food that helps support or “feed” probiotics.⁸⁸ Prebiotic compounds are substrates for probiotics, assisting in determining the microbiota species present in the gut.⁸⁹ Prebiotics easily move from the small intestine to the colon where specific probiotics utilize metabolites such as short chain fatty acids (SCFAs) created by breaking down the prebiotics as a source of energy to grow, flourish, and outnumber the “bad” bacteria in the gut.⁸⁹ Prebiotic-rich food contain non-digestible carbohydrates, such as resistant starches, sugar polyols, di-, oligo- and polysaccharides, and include many fruits and vegetables, such as asparagus, onions, leeks, garlic, artichokes, bananas, and tomatoes.⁹⁰

The mechanism is not clear, but several compounds have been identified that promote “good” bacteria accumulation in the gut. Consuming prebiotic rich inulin and galacto-oligosaccharides foods may benefit health. These two compounds were shown to increase the abundance of bifidobacteria in participants, except some people were ‘nonresponders’, indicating the intricacies of the gut and the potential for variation from person to person.^{91,92} Also, SCFAs found in fruits and vegetables in the form of fiber,

have been linked to appetite control by signaling fatty acid receptors to release hormones.⁹³

Probiotics have increased in popularity due to increased media coverage, recommendations from healthcare providers, and research on probiotics and the gut microbiota. To date, according to the 2016 Food & Health Survey, 33.0% of Americans consumed probiotics and 10.0% consumed prebiotics.⁹⁴ Although more research is needed to ensure and distinguish the proper dosage and varieties needed to improve health, the general public is increasingly in favor of this newly proposed method of consuming pre- and probiotics whether in fresh produce or in pill form.⁹⁴

Weight Status

As stated above, overweight and obesity prevalence are high in the U.S. The U.S. DGA 2015-2020 emphasize the importance of fruits and vegetable consumption in achieving a healthy weight and addressing obesity,¹⁰ based on moderate evidence of the association between consumption and weight status coupled with shifts in other eating patterns, such as lower consumption of added sugars and saturated fats.⁹⁵

According to studies found on the United States Department of Agriculture's (USDA) Nutrition Evidence Library, a small, but significant difference in body weight was found when more than the recommended amounts of fruits and vegetables were consumed over a variety of intervention lengths ranging from 6 weeks to 18 months in length.⁹⁶⁻¹⁰⁰ In these interventions, body weight was shown to be lower over a period of five years or more during middle adulthood indicating the efficacy of adding fruits and vegetables to the diet in order to maintain a healthy weight. There is not conclusive

evidence that the consumption of fruit and vegetables aid in weight loss programs compared to weight maintenance.⁹⁵

Conversely, Bertolia et al. studied the notion that not all fruits and vegetables contribute to healthy weights. Consumption of high fiber fruits and vegetables (i.e., broccoli, Brussels sprouts, apples, and bananas) was inversely associated with gaining weight over a four-year period of time. For each additional portion of fruit added to the diet daily, weight loss of 0.24 kg was found. Each additional portion of non-starchy vegetables added to the daily diet was associated with 0.11 kg weight loss. Consumption of starchy vegetables (i.e., peas, corn, and potatoes) was associated with weight gain.¹⁰¹ This exposes the varied correlations vegetables may have on weight and the importance of paying attention to the composition of fruits and vegetables, primarily focusing on high fiber, low carbohydrate vegetables in order to decrease body weight.¹⁰¹

Contributors to Low Fruit and Vegetable Consumption

There are numerous suggested factors contributing to less than optimal fruit and vegetable consumption in the U.S. All of these factors can be viewed through the social ecological framework, which posits that individual behavior – including dietary, physical activity, and even weight status - is determined by numerous factors and layers of

influence.¹⁰²

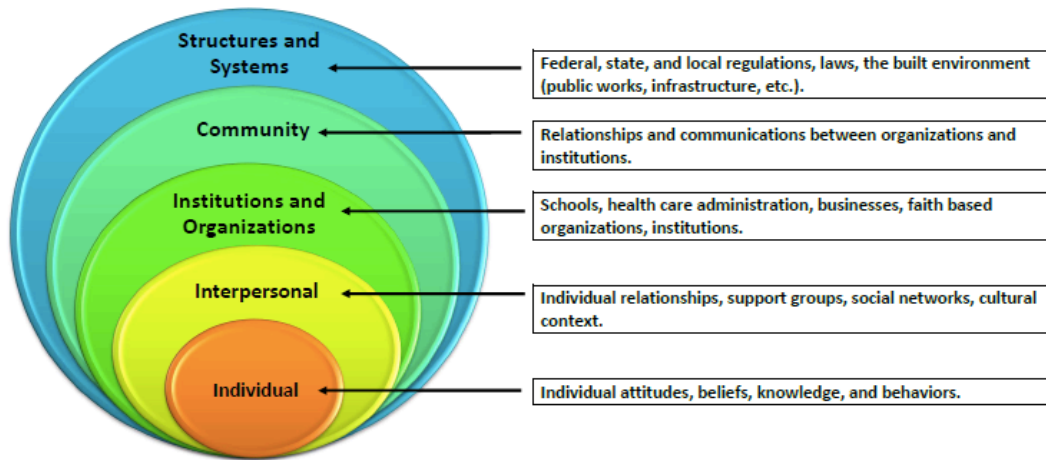


Figure 1. Social Ecological Model¹⁰³

At the broadest level, social and cultural norms and values (belief systems, traditions) shape attitudes toward food, physical activity, and weight status. At the center, individual behaviors are influenced by demographics (sex, age, socioeconomic status/income, disability, and race/ethnicity) and personal factors (food preferences, interactions between genes and the environment, knowledge and skills, and psychosocial factors). Other layers include sectors of influence, such as government, education, healthcare, agriculture, community organizations, the media, and industry. These sectors can inform policy and systems that can determine access to nutritious foods, physical activity, information, promotional and marketing messages, and education. Finally, the settings where individuals reside and/or spend large portions of their days are also critical in framing the food and activity environment, such as schools, worksites, community settings, homes, recreational facilities, and foodservice establishments (See Figure 1).¹⁰³ Health outcomes that occur from this network of influences are affected by the

individual's experience with all of the previously listed factors along with personal food and beverage intake and physical activity level.^{104,105}

Of these factors, the following have been shown to strongly predict fruit and vegetable intake among limited income audiences.

Individual Preferences

Influence on individual food preferences originate from a complex interaction between personal, cultural, and environmental elements. Early childhood food preferences have a strong to moderate heritability piece along with influence from social-cultural norms.¹⁰⁶ Individual taste preferences are also shaped by the access and availability to food.¹⁰⁷ Increased acceptance through repeated exposure to a variety of fruits and vegetables, especially during childhood, has been found to enhance individual food preferences for fruits and vegetables, therefore, affecting adult preferences and consumption rates.^{106,108}

Socio-Economic Status

Not all Americans have the same opportunities for purchasing foods consistent with a healthy eating pattern due to their income, socio-economic status, and where they reside.¹⁰⁹ Food security is defined as when a household has consistent access to enough food to live a healthy and active lifestyle.¹¹⁰ In the U.S. in 2015, 87.3% (109.3 million) of U.S. households were food secure while 15.8 million households (12.7%) were considered food insecure, meaning the household was unable to acquire enough food for one or more members due to insufficient funds or resources. In food insecure households, 6.3 million of those households (5.0%), were not able to provide enough food for more than one member of the household causing disruptions in eating patterns.^{110,111} Food

security may also be influenced by the food available in surrounding areas of individuals or their food environment.¹¹²

Food Access

Food access is a major concern for a large portion of the population in the U.S. Access is a broad term used to describe the relationship between the physical/measurable factors and perceived access factors and their effect on health.¹¹² The term “food desert,” defined as, “a low-income census tract where a substantial number or share of residents have low access to a supermarket or large grocery store,” by the USDA, is often used to describe low food access. “Low access” is defined as living 1 mile or more from a grocery store in an urban area and 10 miles or more from a grocery store in rural areas.¹¹³

Availability

While these definitions give specific and objective parameters of food access, a more broad and conceptually inclusive approach has been put forward by Usher consisting of five dimensions: availability, affordability, accessibility, acceptability, and accommodation.¹¹² When food access is viewed multi-dimensionally, the factors contributing to access can be better understood. Increasing access to high quality food in terms of the volume and variety at grocery stores throughout the year (known as availability) was found to be associated with decreased risk of obesity.^{112,114,115} The lack of available food stores selling healthy and affordable options was identified as a possible determinant for low fruit and vegetable consumption rates in low-income neighborhoods.¹¹⁶

Affordability

Affordability refers to when prices of available food aligns with a household's budget.¹¹⁷ The price or affordability of fruits and vegetables can directly influence purchasing patterns. In one study with low-income individuals, cost was found to be the greatest perceived barrier of consuming fruits and vegetables.¹¹⁸ In another study, fruit and vegetable consumption was lowest for adults living at the lowest poverty level (poverty income ratio $\geq 400\%$) where only 21.0% of those adults reported consuming vegetables at least three times per day, indicating 79.0% did not meet the daily vegetable consumption recommendation.¹¹⁹

Accessibility

Accessibility refers to how residents perceive and physical distance from grocery store locations based on proximity, transportation method, and cost of transportation.¹¹² Zick et al. observed reduced risk of obesity in low-income neighborhoods when access to one grocery store/ food outlet offering healthy food was present. The close proximity of the store could reduce time costs associated with procuring healthy food options and allow for multiple trips per week to ensure access to perishable foods such as fresh fruits and vegetables.¹²⁰

Acceptability

Acceptability can be viewed in terms of perceived relationships between grocery store owners and shoppers, especially in regards to the sale of culturally appropriate food items¹¹² and the acceptability of fruits and vegetables based on taste and preference. Usher's view of acceptability in terms of food access focused on the culturally appropriate foods availability and perceived understanding of the community by the grocery stores and associates.¹¹² Additionally, acceptability can be shaped by preference,

which is affected by internal behavioral decisions and external environmental factors. Internal behavior decisions are determined by one's knowledge, self-efficacy, and motivation to engage in healthful activities such as consuming fruits and vegetables. The physical and social food environment, especially for children and adolescents, can affect whether children and adolescents make healthy eating decisions.¹²¹ Repeated exposure to fruits¹²² and vegetables throughout childhood has been linked to increased fruit and vegetable intake.¹⁰⁸

Accommodation

Accommodation is comprised of perceptions of food store hours, organization of healthy food displays, area crime, and the physical environment and condition of grocery stores. For example, accommodation is the appropriateness of grocery store hours based on typical shopping times to meet the specific community's needs. This dimension of food access is important, yet there is a gap in the literature examining the impact this dimension has on food access, indicating the need for additional research.¹¹²

Some articles have highlighted the perceived and objective barriers of food access as mentioned above.¹²³⁻¹²⁵ These barriers are influenced by socio-political, cultural norms, and economic factors. In order to truly improve food security in the U.S. and gain a greater understanding of food access, action research projects are needed to address the barriers stated above.

Strategies to Increase Fruit and Vegetable Consumption and Health Outcomes

A number of different approaches have been put forward to improve dietary quality, particularly fruit and vegetable consumption, to address chronic disease rates. Approaches range from gardening programs to community physical activity programs.

Community gardens have been associated with numerous positive outcomes including improved mental health,¹²⁶ physical activity,^{126,127} and increased fruit and vegetable consumption.^{128,129} For example, in a community garden program located in Toronto, Ontario, improvements in mental health, access to food, and increased physical activity was found.¹²⁶ Focusing on a younger population, Heim et al. found a youth garden based education program increased fruit and vegetable consumption, preference for vegetables, as well as increased fruit and vegetable asking behaviors at home.¹²⁹ Using a “seed to table” approach with youth may foster healthy eating patterns such as increased fruit and vegetable consumption.¹²⁹ Focusing on an older population, gardening has been shown to increase adult urban gardeners consumption of fruits and vegetables 3.5 times more compared to non-gardeners¹²⁸ demonstrating benefits to gardening across the lifespan.

Appleton and colleagues reviewed successful vegetable interventions among children and adults.¹³⁰ Of the 77 studies in their review, they found that the 49 interventions that changed the environment and increased consumption through increasing the provision of vegetables, resulted in increased selection and/or consumption of vegetables.¹³⁰ Further, multi-component interventions reported the greater success, when (international) gardening programs were paired with primary care services compared to programs without the integration.¹³⁰ These findings support Usher’s expanded view of food access, highlighting the importance of increasing fruit and vegetable availability, affordability, physical accessibility, personal acceptability, and accommodation via various produce delivery models.¹¹²

In other studies, partnerships between primary care providers and community organizations to offer interactive interventions has been shown to improve health outcomes for patients who face health disparities.¹³¹

Uniting primary care providers and community organizations is a somewhat novel approach to enhance health. In this combined effort, the physicians provide written prescriptions or vouchers for fruits and vegetables to patients while the community organizations assist in setting up produce pickup locations and coordinate community involvement.¹³²⁻¹³⁶ One of the first of these initiatives was started by Wholesome Wave, a non-profit organization, who increase affordable access to produce through multiple avenues, including the Fruit and Vegetable Prescription (FVRx) program.¹³⁷ Health care providers at community health centers write FVRx prescriptions for fruits and vegetables, then families can visit local participating farmers markets and grocery stores to utilize their Health Bucks vouchers. In addition to monetary vouchers participants receive nutrition education and the opportunity to attend cooking demonstrations.

Similar projects to FVRx have been implemented in hospitals with a variety of outcomes studied. In New York City, Lincoln Medical Center and Harlem Medical Center provided 550 children and their families free boxes of organic, local fruits and vegetables using a grant from the Tisch Fund instead of being provided with Health Bucks to use at farmers markets and participating grocery stores. Measures of Body Mass Index (BMI) pre- and post-intervention revealed 47.0% of the participants decreased their BMI as well as 69.0% of participants increased fruit and vegetable consumption.^{133,137,138}

In South Carolina a community based participatory research approach to target underserved patients with diabetes at a federally qualified health center with a voucher

program was utilized. Positive impacts on dietary intake were observed with an increase in fruit and vegetable consumption by 1.6 servings per day when a one-time \$50 farmers market voucher was provided.¹³⁹

In another study in the United Kingdom, 1,188 prescription vouchers for fruits and vegetables were distributed to patients during primary care facility visits in an underserved area where income, health, education, and employment were ranked low.¹⁴⁰ Each prescription contained 4 vouchers to be used at the most popular grocery store in the area providing £1 for every £3 or more spent on fresh fruits and vegetables. In this example, the delivery method was found to be an effective way to increase knowledge of health-related messages, such as the recommended amount of servings of fruits and vegetables to consume per day, but no significant change was observed in fruit and vegetable consumption patterns.¹⁴⁰ This may have been caused by the vouchers being used by individuals who already consumed fruits and vegetables and were therefore more likely to use the vouchers.

Program sustainability and success were measured in these studies by changes in fruit and vegetable consumption and health outcomes, as well as the extent of voucher usage. Although these are certainly important outcomes and metrics to measure, they may not capture many indirect benefits, as outlined in the socio-ecological model. The social ecological model's five levels of influence help explain and understand health interventions and programming. Although, not expanded on in the studies, it is important to identify the factors that assisted in program success and program management.

Capacity Building

Broadly, capacity building can be defined as an, “ongoing process by which people and systems, operating within dynamic contexts, enhance their abilities to develop and implement strategies in pursuit of their objectives for increased performance in a sustainable way,”¹⁴¹ used to improve non-profit effectiveness and programming in developing countries.¹⁴² While it has been applied to numerous contexts, capacity building is relatively novel within the nutrition field. For example, the previously mentioned studies aimed at improving fruit and vegetable intake (and access) did not measure or use capacity building within their programming. The level of capacity within these programs is important to consider, as it may influence the effectiveness, “success,” and sustainability of their activities while providing insight into the replicability of their program.

Capacity building has been defined in multiple with multiple frameworks, all focusing on different fields and domains.^{141,143} Capacity building encompasses organizational capacity, specifically focusing on organizational development and meeting objectives. Organizational capacity building has been supported as a way to increase the sustainability and effectiveness of nonprofits¹⁴² and is defined as the “organizational and technical abilities, relationships and values that enable countries, organizations, groups, and individuals at any level of society to carry out functions and achieve their development objectives over time.”^{144,145}

In some cases, capacity is very broad and self-determined and in others the domains and factors are well defined. In general, there are three consistent levels across various capacity building definitions and frameworks: individual, organization, and

environment. At the individual level, capacity includes the will and ability of the individual to achieve objectives by using the individual's personal skills and knowledge.¹⁴⁴ Any influence on an organization's performance or capacity is known as the second level, or the organizational level. Lastly, the environmental level refers to specific conditions and environments necessary in order for capacity to be present in the individual and organizational levels.¹⁴⁴ All levels interact with one another¹⁴⁴ and can be paralleled to the social ecological model given its systems-level lens.¹⁴⁶

For collaborative, community-level programs to be able to implement and realize their shared goals and to make positive changes that are ongoing and sustainable, partnering individuals, agencies, and organizations need to first have capacity or the potential to build capacity and make positive changes.¹⁴⁷⁻¹⁴⁹ Capacity building has been put forward as a tool to support non-governmental organizations in order to create, maintain, enhance programming and accomplish organizational goals in developing countries,¹⁵⁰ environmental science,¹⁵¹ tourism development,¹⁵² food systems,¹⁵³ and to a lesser degree community-based nutrition and promotion programs^{147,148,154} Additionally, it can be used in multiple ways – including the identification of components needed to implement and sustain a project - to retrospective analyses of what elements allowed an integrated project to be successful.

The emphasis placed on the actual constructs within these levels is inconsistent between models. Goodman et al. and Meyer emphasize the importance of a program or institution's problem-solving abilities, commitment, and resources,^{155,156} whereas others have emphasized the importance of relationship building, decision making, community planning, and action.^{148,155,157} Chaskin outlined a sense of community, a level of

commitment, the ability to solve problems, and the ability to act on one's will as factors within capacity building. Additionally, he identified four core components to assist in the building of capacity: leadership development, community organization, organizational development, and fostering collaborations among organizations.¹⁴⁹ Labonte and colleagues emphasized the importance of building capacity within collaborating organizations/stakeholders, leading program workers to examine how their work builds accountability for efforts to successfully increase capacity through programming and funding.¹⁵⁴ In a review by Liberato et al. measured community capacity building in 17 papers. Consensus on three out of the nine key factors, dependent on context and purpose, were found.¹⁵⁸ These included learning opportunities and skills development, resource mobilization, partnership/linkages/networking, leadership, participatory decision-making, and development pathway.¹⁵⁸

Existing capacity building studies within community-based nutrition programs have focused on the community level aspect of capacity building, instead of within organizations. Topics of interest within community capacity building research includes the prevention of childhood obesity and the promotion of healthy eating,^{159,160} community gardening¹⁶¹, cardiovascular disease programming,¹⁶² and diabetes prevention.¹⁶³ A community-wide intervention program in Australia called Romp & Chomp aimed to reduce childhood obesity and increase healthy eating in children aged 0-5 years old by building organizational capacity and changing the environment. Activities considered to enhance the capacity of the participating organizations included: professional development opportunities for preschool teachers and service staff; development and enhancement of partnership, strategic alliances, and community organizational networks;

establishment of project management, coordination, budgetary, and governance structures; and identification of funding and resources.¹⁵⁹ This intervention was found to significantly lower mean body weights in the 3.5 year old sample, as well as significantly lower intake of prepackaged snacks and fruit juice, the reported success of this intervention was attributed to a combination of building organizational capacity to in turn grow community capacity and change behaviors. The study did not define capacity building or describe how capacity was evaluated and if the activities indeed increased capacity among the organizations or community.¹⁵⁹

In an additional childhood obesity intervention called “Be Active, Eat Well,” a community capacity approach was used to reduce obesity. Actions around governance, coordination, training, partnerships, and resource allocation with the goal to reduce weight gain among young children were identified.¹⁶⁰ Sanigorski et al. developed a list of community capacity building strategies utilized in this study including developing partnerships and networks, increasing health professional skills, growing community leadership and ownership, creating new organizational strategies, and creating new and sustainable health-promotion strategies. However, how these were accomplished or even challenges and strengths of these actions, were not revealed within the paper.¹⁶⁰

In a six-month study with indigenous Australians, examined if capacity building research related to school gardens and nutrition education was a viable approach. The Outreach School Garden Project integrated the Health Promoting Schools Framework in conjunction with Crisp et al.’s theoretical capacity building framework¹⁶⁴ and principles of action research.¹⁶¹ The goal of the research was to see if utilizing a school-based garden and integrating nutrition education into key learning areas in school was effective

approach to teach indigenous students about nutrition. Descriptive qualitative data were collected in conjunction with quantitative data. According to the author, utilizing a capacity building framework offered the flexibility for the project to evolve and that capacity building may play an integral role in using school gardens as nutrition education tools since awareness is gained in the areas of ethical and cultural issues, social levels, and how programs must be tailored towards the target audience.¹⁶¹ The study, however, did not define capacity building and did not identify which elements of the study built capacity, specifically.

Building organizational capacity rather than community capacity was examined in a study focusing on heart health promotion.¹⁶² In this study, MacLean et al. measured partnership and organizational development to test construct validity and relevance. Partnership development was used to facilitate networking, improve organizational capacity, and increase knowledge and skills. Organizational development was accomplished through technical support and organizational consultation revealing possible changes to organizational structures and processes. Effectiveness of these capacity building strategies was determined to be effective by conducting qualitative interviews with key stakeholders and having them fill out organizational reflection logs. This study found focusing on developing partnerships and organizational development to be an effective way to measure and increase capacity building in heart health promotion programs.¹⁶²

Capacity building has also been used in understanding the effectiveness of type 2 diabetes interventions. Andersson et al. utilized the Rifkin spidergram method to gain insight and understand the development of inter-sectoral partnerships in three diabetes

interventions. The research team interviewed key stakeholders to uncover key aspects for intervention success finding wide intersectoral participation, resources, leadership, networks, and implementation to be important aspects for success in the interventions.¹⁶³

Summary

The prevalence of chronic diseases, including diet-related chronic disease and obesity, has vastly increased over the past 100 years in the U.S. are correlated with poor eating and lifestyle behaviors.¹ A proposed method to partially ameliorate obesity and chronic diseases is to meet the DGA 2015-2020 fruit and vegetable recommendations.¹¹ Yet, only three-quarters of the population meet current fruit and vegetable intake recommendations.¹¹ Intake of fruits and vegetables can help decrease risk for chronic disease, including several types of cancer³⁹⁻⁴⁴, type 2 diabetes^{50,51,53-55}, and cardiovascular disease⁵⁷⁻⁶⁰. They may benefit overall health as well, including bone⁶⁶⁻⁶⁹, eye^{19,74,75}, and gut health⁹¹⁻⁹³ through a variety of mechanisms.

Programs that link primary care facilities with fruit and vegetable prescriptions show promise in accomplishing the goal of increasing access and availability of fruits and vegetables by increasing provisions and removing financial barriers targeting multiple layers of the social ecological model. Increasing provisions was found to increase consumption of fruits and vegetables in the reviewed interventions including multi-component interventions which paired primary care facilities paired with gardening programs.¹³⁰ Other programs have increased access and availability by setting up produce pickup locations¹³⁴⁻¹³⁶ and providing fruit and vegetable vouchers to be used at participating stores and farmers markets^{139,140}. It is common for these interventions to use the social ecological model to target the various levels of influence to facilitate

impactful programs and interventions. Metrics utilized in these studies ranged from measuring fruit and vegetable consumption with questionnaires along with body mass index at pre- and post-intervention to measuring voucher usage rates but not necessarily what it took to make the programs successful and sustainable.

Capacity building, including organizational capacity building, is critical in the creation of long-term, sustainable solutions to programming. Capacity building is used to understand intervention management and implementation to increase program success even further than following only the social ecological model. Multiple capacity building frameworks have been applied to various health intervention programs in several settings. In existing published studies, the role and effect of including elements of capacity building into community-based interventions have been examined, broadly deeming capacity building as a facilitator for program sustainability. Specific factors within the capacity building framework have not been thoroughly shared, particularly related to organizational capacity and community health programs, highlighting the need for further research. Limited research exists on organizational capacity as it relates to food access, especially unique programs like the Farmacy Garden. Limited research exists on programs that link a primary care facility, fruit and vegetable prescription program, and an educational garden. As well as research focusing on the organizational stakeholder relationships and fruit and vegetable prescription program success/effectiveness. This warrants additional research to understand these programs from various perspectives.

Research Goals

The goals of this study were to: 1) explore the different domains and factors of a capacity building framework related to a unique collaborative program that promoted access to

fruits and vegetables (and potentially increasing intake of fruits and vegetables and therefore decreasing risk for chronic disease); and 2) provide insight into factors that would be essential to replicate the program in other locations.

Chapter 2: Determination of Domains and Factors of a Capacity Building Framework that Support a Collaborative Fruit and Vegetable Prescription Program

ABSTRACT

Improving access to affordable and nutritious foods and beverages, particularly in underserved communities, has become a national priority. The Farmacy Garden was created in the New River Valley of Virginia through a multiple agency collaboration. The goal of this study was to examine the different domains and factors within a capacity building framework that contributed to the creation and ongoing implementation of the Farmacy Garden. Interviews were conducted with six individuals/ representatives of the partnering organizations (85.7%). Common themes often crossed over the individual, organizational, and environmental domains, such as time, beliefs, values, and attitudes and inter-organizational linkages/partnerships, attitudes, and relationships, highlighting the inter-dependence of various factors across domains of capacity building. In addition to identifying specific factors that were necessary for the creation and sustainability of the Farmacy Garden, the analysis revealed the importance of a “shared belief and value system.” In other words, individuals and organizations “valorized” this project in different ways than more traditional programs and/or interventions. The findings of this study can help guide leadership in cultivating relationships and new benchmarks to ensure transparency in project goals, in addition to time and physical resources, as well as inform the organizational capacity research area within nutrition and food systems fields. This research provides insight into factors that would be essential to replicate the program in other locations.

INTRODUCTION

Chronic diseases the leading causes of death in the United States.¹ Fruit and vegetable intake may be protective against these diseases,²² yet less than one-quarter of the population meets current recommendations.¹² There are many factors that may contribute to poor intake of fruits and vegetables, including food access and availability.¹⁰⁹ As a result, promoting access to affordable, safe, and culturally appropriate nutritious foods and beverages, particularly in underserved communities has become a national priority. Therefore, innovative strategies that span the socio-ecological model are warranted to increase fruit and vegetable consumption are needed to increase consumption. Numerous approaches have been studied including interventions targeting the environment or the increased provision of vegetables, both resulting in increased selection and/or consumption of vegetables.¹³⁰ To date, programs that combine primary care services with gardening programs have reported greater success than programs done independently or in isolation.¹³⁰

This emerging strategy is to integrate care with fruit and vegetable prescription programs and gardens, whereby physicians provide garden work prescriptions or vouchers for fruit and vegetables to clients.^{133,137,139,140} Numerous community-based programs have been implemented to help improve access and availability of fruits and vegetables, including a program in South Carolina that provided underserved patients at a federally qualified health center with vouchers for fruits and vegetables. Program success and effectiveness was measured by fruit and vegetable consumption. An increase of 1.6 servings was observed.¹³⁹ A program in the United Kingdom prescribed 1,188 prescription vouchers for fruits and vegetables to primary care patients living in an

underserved area. Program success was measured by voucher usage rates and questionnaires to track produce consumption. No increase in consumption was found, but the study had limitations since prior vegetable consumption was not measured. Another unpublished study measured program success through decrease body mass index (BMI).¹³⁷

For these collaborative programs to be successful, capacity building has many definitions based on the field it is being applied, but broadly can be defined as an “ongoing process by which people and systems, operating within dynamic contexts, enhance their abilities to develop and implement strategies in pursuit of their objectives for increased performance in a sustainable way.”¹⁴¹ Capacity building also encompasses organizational capacity, a type of capacity building, specifically focusing on organizational development and meeting objectives.^{144,145} In general, there are three consistent levels across various capacity building definitions and frameworks: individual, organization, and environment. At the individual level, capacity includes the will and ability of the individual to achieve objectives by using the individual’s personal skills and knowledge.¹⁴⁴ Any influence on an organization’s performance or capacity is known as the second level, or the organizational level. Lastly, the environmental level refers to specific conditions and environments necessary in order for capacity to be present in the individual and organizational levels.¹⁴⁴

Capacity building is respected as a means to achieve program success by accomplishing program goals and program sustainability throughout time. This is done by changing communities or organizations ability to address health issues via creating new structures, values, and/or approaches.¹⁶⁴ Existing capacity building studies within

community-based nutrition programs have focused on building capacity in communities, not focusing on building capacity within organizations that facilitate health programs, rather focusing on the potential for a community to adopt/implement proposed changes. In organizational capacity determination of who is explicitly responsible for what and attention to program planning is necessary.¹⁶⁵

Topics of interest within community capacity building research includes the prevention of childhood obesity and the promotion of healthy eating,^{159,160} community gardening¹⁶¹, cardiovascular disease programming,¹⁶² and diabetes prevention.¹⁶³ Interventions often measure a program success by observing declines in weight status or increased fruit and vegetable consumption and deem the capacity building a success based on these metrics. A community-wide intervention program in Australia aimed to reduce childhood obesity and increase healthy eating in children by building organizational capacity and changing the environment. This intervention was found to significantly lower mean body weights in the 3.5 year old sample, as well as significantly lower intake of prepackaged snacks and fruit juice. The reported success of this intervention was attributed to a combination of building organizational capacity to in turn growing community capacity and change behaviors. The organizational capacity building literature has outlined numerous factors that are ‘needed’ in order for a program or project to meet the desired goals and these vary.

Building organizational capacity rather than community capacity was examined in a study focusing on heart health promotion.¹⁶² In this study, MacLean et al. measured partnership and organizational development to test construct validity and relevance. Partnership development was used to facilitate networking, improve organizational

capacity, and increase knowledge and skills. Organizational development was accomplished through technical support and organizational consultation revealing possible changes to organizational structures and processes. Effectiveness of these capacity building strategies was determined to be effective by conducting qualitative interviews with key stakeholders and having them fill out organizational reflection logs. This study found focusing on developing partnerships and organizational development to be an effective way to measure and increase capacity building in heart health promotion programs.¹⁶²

Capacity building has also been used in understanding the effectiveness of type 2 diabetes interventions. Andersson et al. utilized the Rifkin spidergram method to gain insight and understand the development of inter-sectoral partnerships in three diabetes interventions. The research team interviewed key stakeholders to uncover key aspects for intervention success finding wide intersectoral participation, resources, leadership, networks, and implementation to be important aspects for success in the interventions.¹⁶³

Goal of the Research. The purpose of this study was to examine the different domains and factors within a capacity building framework, which conceptualizes organizational capacity building as dependent (and interdependent) on three different levels - individual, organizational, and environmental - related to the Farmacy Garden in order for the garden to be successful and guide replicability in other locations.

METHODS

Description of the Collaborative Fruit and Vegetable Prescription Program. The Farmacy Garden project was conceptualized in 2013 through a partnership between: the New River Health District (NRHD)'s the Special Supplemental Program for Women,

Infants, and Children (WIC) program, the Department of Social Services, which administers the Supplemental Nutrition Assistance Program (SNAP), formerly referred to as Food Stamps, Virginia Cooperative Extension (VCE), including the Virginia Family Nutrition Program (FNP), which directs the Supplemental Nutrition Assistance Program – Educational Program (SNAP-Ed), the educational and outreach arm of SNAP and the Montgomery County, VA Extension Office Agriculture and Natural Resources Agent and the Community Health Center of the New River Valley, and a Federally Qualified Health Center (FHQC) located in Southwest Virginia.

The purpose of the garden program was to improve fruit and vegetable access while providing opportunities for physical activity and community engagement for low-income Virginians. Collaboratively, these agencies created the garden to provide gardening skills, physical activity, and community engagement through a work-share program and hands-on educational workshops. The Farmacy Garden project utilized a modified Fruit and Vegetable Prescription (FVRx) Program in which primary care physicians and nurses and mental health professionals from the FQHC “prescribe” garden participation to patients. The agencies involved also refer clients.

Since opening in 2014, The Farmacy Garden has initiated in-garden WIC nutrition education classes, community gatherings, youth-focused programming opportunities, and agriculture workshops. The garden also and served as a recruitment site for SNAP-Ed participation and referral for the participating agencies and the local farmers market SNAP-match program.

Setting. The Farmacy Garden project is located in southwest Virginia, beside the FQHC and the Health Department, housing WIC and the Department of Social Services. The

location also allows for a convenient space for workshops, cooking demonstrations, nutrition education and community gatherings.

Study Design. Semi-structured interviews were conducted with Farmacy Garden stakeholders responsible for program management and implementation.

Interview Design. Using Matachi's Capacity Building Framework^{144,166} interviews were designed to elicit responses about which capacities on the individual, organizational, and environmental levels were necessary to successfully operate the Farmacy Garden. The research team collaboratively developed an interview guide. To ensure consistency, one member of the research team conducted all interviews. Each interview was audio recorded and transcribed verbatim by a professional transcription service. Themes were developed a priori using the Capacity Building Framework. One member of the research team developed a codebook.^{167,168} Codebook definitions were agreed upon between researchers to ensure consistency. Two members of the research team used a thematic approach to manually code the data using an inductive and iterative process, identifying and analyzing recurrent and converging themes.^{144,167-169} Relevant direct quotes were identified that aligned with agreed upon themes. Negative cases and discrepancies were identified and resolved between researchers. All study procedures were approved by the Virginia Tech Institutional Review Board. Interviews were conducted in December 2016 and January 2017.

Participants. Study participants were recruited based on positions held at partner organizations of the Farmacy Garden (See Table 1). Length of employment at the agencies ranged from 2 years to 25 years. All six participants were female and reported being white; one participant indicated Latino/Hispanic ethnicity (16.7%).

Table 1. Stakeholder Roles

Agency	Role
FQHC	<ul style="list-style-type: none"> • Referred patients and wrote ‘prescriptions’ for the garden • Distributed fresh product to patients not participating in the garden program as an additional recruitment and outreach tool
New River Health District, Women, Infants, and Children (WIC)	<ul style="list-style-type: none"> • Funded infrastructure of the garden • Provided staff (30-hours a week) to manage the garden • Referred WIC participants to the garden • Distributed fresh produce to participants, harvested from the garden • Applied for funding to support additional programming efforts
Virginia Cooperative Extension (VCE) and VCE’s Family Nutrition Program (SNAP-Ed)	<ul style="list-style-type: none"> • Conceptualized the design of the garden • Linked Master Gardeners with the garden • Assisted with outreach • Provided summer intern to support garden programming activities (3 days a week during the summer) (SNAP-Ed) • Received referrals to offer nutrition education classes to participants, such as cooking with fresh produce • Provided WIC nutrition education in the garden
Department of Social Services	<ul style="list-style-type: none"> • Marketed the Farmacy Garden to participants

Results

Participants. Seven stakeholders were contacted, six agreed to participate in the interviews (85.7% response rate). Interviews ranged in length from thirty-two minutes to one hour and twenty minutes. They were held in convenient locations chosen by the interviewee, such as their office or by phone.

Key Themes of the Interviews. Responses varied between interviews, but major interdependent and independent themes were identified across individual, organizational, and environmental levels from Matachi’s Capacity Building Framework. They are

highlighted below.

Individual Level

Knowledge, Skills, and Experience

The knowledge, skills, and experience theme to successfully start the garden, the importance of an individual's skillset, in conjunction with knowledge and prior experience, was exemplified when one respondent stated, "They needed someone with that [horticulture] technical subject matter..." In addition to skills, knowledge, and experience in gardening, one respondent spoke about the importance of having experience in community programming for example, when one noted:

I've had lots of community experience. I've had successes, I've had failures, I know community work is hard, so I think I had to have that capacity in order to be realistic about what could or could not happen as a result of the projects. So that's another thing I'll add to the end of individual capacity... You don't want to go in with rose-colored glasses because any time you're dealing with humans and human behavior it's unpredictable.

This highlighted the importance for one to have the knowledge and awareness of humans unpredictable nature gained through previous experience. Lastly, knowing the specific community's needs along with how to engage the employees of the inter-agencies and the general public about the garden were mentioned as important aspects of capacity building on the individual level.

Relationships

Throughout the interviews, strong relationships with individuals in their organization and with partnering organizations were reported as being beneficial in assisting to start and maintain the Farmacy Garden in a collective effort. One participant commented:

I think it's important for people to know this is a collective effort. You need to

have strong partners and relationships just like with any other community-based program. Without that collective effort, it would be challenging to implement a program like this.

Participants reported their work and the garden to be strengthened when they built and used individual relationships rather than trying to accomplish tasks and goals alone.

I think you have to know and have the experience that relationships with other partners can be synergistic and positive, and that coming together makes ...but it's greater than the parts, the whole is greater than the parts, so I had to have that.

Attitude

The attitude of an individual towards the people involved with the Farmacy Garden and the project as a whole was mentioned to contribute to the success of the garden, specifically, "...having a good attitude about it because I think it makes a big difference..." This kind of attitude during the beginning stages of starting a novel program such as the Farmacy Garden was reported to assist in navigating the unknowns that intrinsically come along with starting a new project. One respondent stated, "...I think you individually have to have positive values and attitudes more than anything else. Because you might not know much about it, but if you have a positive sense about the potential then that would be a major motivator and driver". Other attitude attributes mentioned included being open-minded, passionate, and patient.

Beliefs & Values

Underlying personal beliefs and values was a major theme on the individual level of capacity building. One partner stated the importance of finding value in the Farmacy Garden when they stated, "I mean, not only do you need to be a good team player and a collaborator but you need to find the value in it." Individual partner beliefs and values on health, fruits and vegetables, and gardening were mentioned throughout the interviews

providing the foundation to believe and value what the garden can provide for the community. A critical characteristic of the individual partners involved with the garden was reported as their belief and value that this garden had the potential to increase participants quality of life and access to food.

Resources & Strategies

When asked what resources and strategies were used to participate in the Farmacy Garden, respondents reported use of tools such as materials to advertise the garden to the public. Quality assurance was used as a strategy to reflect on the success of the past garden season by learning from mistakes, identifying current barriers to participation, and making innovative improvements for the following season. Another strategy that was used to build organizational capacity was, “continuing to forge that connection” between the partners to ensure buy-in and dedication.

Time

Time was a major theme on the individual and organizational level. One respondent stated, “If you count, I give a lot of time to the garden...” Devoting time amid their busy work schedules and other obligations to their individual responsibilities at the Farmacy Garden was reported to be an important component of capacity building to start and maintain the Farmacy Garden. Partners individual beliefs, values, and attitude were mentioned in conjunction with the amount of time they wanted to devote to the garden when one interviewee talked about these integrated themes:

It's really easy to have a full plate all the time. You've got to be passionate about certain projects so you can find the time to get out there and develop and implement those projects otherwise it's just going to get lost in the shuffle. It's also about improving the quality of life of folks that we're serving and I feel like that you've got to have that rooted in somewhere, you have to have that initial want to give to people to improve their lives, to assess need and find out how you

can create classes or programming to make that a better situation altogether. Yeah, I think attitude is really important. You not only have to have the passion that you can find the time to devote to the project but then you also have to have a holistic view of what are the goals of the project and sometimes you have to be creative about how you can achieve those goals.

Organizational Level

Human Resources

Human resources refer to the “capacities of individuals within an organization” related to the program or activities of interest.¹⁴⁴ While the interviews conveyed the importance of all partnering individuals’ capacities, the garden coordinator “who understands community-based work and gets along well with people and is able to oversee students and other volunteers” was highlighted the most. An individual with agricultural expertise was also mentioned as beneficial for the Farmacy Garden.

Physical Resources

Numerous organizational physical resources were identified across interviews, particularly financial resources to purchase garden supplies and fund a part-time garden coordinator and an undergraduate summer student intern. One respondent emphasized the need for “sustained funding stream” as provided from WIC. Other physical resources included space for the garden, nutrition education materials, family-friendly recipes using fresh produce from the garden, and cooking demonstration tools. Other natural physical resources were also referenced with one respondent stating, “We knew we had to build the garden up and we had to get a lot of natural components to be able to do that” such as topsoil, seeds, a water source, fence, compost, woodchips, and materials to build raised beds.

Inter-Organizational Linkages/ Partnerships

The importance of inter-organizational linkages and partnerships between participating individuals and organizations, as well as integration across all capacity building domains, was a common theme throughout all of the interviews.

Respondents indicated the act of working together to build collective effort and investment in the garden in combination with strong relationships between partners was essential for the Farmacy Garden to operate on a daily basis. One respondent stressed the importance this collective effort and investment with the comment, “It’s hard for me to talk just about myself, because I’m just one piece of the bigger picture.” Overall, individual and organizational relationships consistently arose as a central component across capacity factors and domains:

But it's ...really the foundation is partnerships and communication. One person can think of the idea, but not one person can execute it. It's all about having those relationships, partnerships, having really receptive partners who are open minded and can see a big picture and the potential, and then having them also dedicate time and resources to it.

Resources/strategies also appeared to transgress the different domains. A respondent spoke about evaluation of human resources as a resource/strategy to maintain and strengthen partnerships and capacities:

What's required of that is attention, on-going attention, and re-evaluating at least an annual basis, who is capable of doing what and roles or responsibilities and that kind of thing. Some of those are pended through the amount of understanding or agreement. Some of those are looser, collaborative partnerships. Definitely, it's an intentional work to maintain an ongoing collaboration.

Leadership of Managers

The interviews highlighted the importance of managers leadership style along with their commitment to the project by allocating human and physical resources to the

garden. The type of leadership needed to maintain the Farmacy Garden was explained as:

...if you have a leader that invokes fear in failure then you're not going to be willing to try a project, and staff members won't try if they're worried that they're going to be evaluated for whatever success metrics there are. You definitely have to have leadership that's positive and says, let's test it out, this is how we're going to test it, and we'll learn lessons along the way being open to that.

Another respondent stated, "All I needed was my supervisors approval" to spend paid work time in the garden. These responses highlighted and alluded to the impact of a manager's individual values on the partnership and overall organizational capacity.

Time

Time was a common theme throughout all of the interviews. It was important for organizations to allocate time for employees to "dedicate[d] time and resources to it." Time on the organizational level also was mentioned to be a necessary component for success, although with the partner organizations working together, allowed the burden on time to be dispersed amongst the organizations, helping in sharing the burden of work.

Environmental

Legal

Being aware of rules and regulations setting the stage for legal environment was discussed as an important component to start and maintain the Farmacy Garden which was exemplified when an interviewee stated, "...because we are all publically funded, we need to make sure that whatever resources we did devote on an organizational level was within the guidance of our funding sources." In addition to following protocol for funding allocation, having a risk management plan in case someone is injured while working in the garden was mentioned when one respondent stated:

...that legally if anything were to happen to anybody as a result of the project that we had some kind of risk management or coverage for that. You have legal policies that say, if someone is gardening and they get injured what does that mean in terms of liability and legality? So you have to have those established already. All of our agencies are used to that kind of stuff, but you do have to have a risk management plan in place for something like that.

Each partner upholds organization specific legal standards and procedures, thus possibly decreasing the legal burden of the garden as a whole, sharing in the responsibility.

Political

The political climate and environment also played a role, especially political support from the community:

When this number of agencies devote financial resources of some kind to a project like this, all the agencies have to be prepared for, especially when they're publicly funded which all of the agencies are in some shape or form, you have to acknowledge that you probably wouldn't move forward unless you knew that there was political support from your community... So I think you have to have the political culture that this is a project that benefits the community and it's a good investment of financial resources.

Broader than having community political support for the garden, a respondent emphasized the political environment created by the federal government. "I think the political climate of 'Let's Move', and all that. Gardens in the White House definitely didn't hurt."

Economic

Economic capacities were mainly mentioned in regards to the economic status of potential beneficiaries of the Farmacy Garden program, including "... people that are low income, but they're not struggling day by day. They have the freedom and flexibility in their lives to still come to the garden, work in the garden, and take some fresh produce home." It was also mentioned indirectly through the concept of buy-in from the

organizations, implying that if an organization had buy-in, they would also have the economic capacity. The economic and environment in regards to funding was commonly mentioned throughout the interviews as well.

Social

Social capacity at the environmental level was interwoven with relationships on the individual level and inter-organizational linkages/partnerships within the organizational level by having trust in the partnerships and cohesion among the different members of the partnering organizations. One respondent spoke how social capacity, relationships, and partnerships strengthened the garden:

Just working across agencies, ensuring that we're all on board with what we're doing and that it's an accurate reflection of our organization's missions. I love working with the women that I work with. We work really well together, and so that definitely strengthens the program. We haven't encountered any problems in terms of working as a team.

Perceived social capital growth amongst gardeners was revealed during the interviews when an interviewee stated:

Basically everybody that comes to the garden is bringing with them some form of human capital. They're bringing something that they can share, whether that's just a personal experience that they've gone through, or a listening ear, or maybe they have gardened their whole lives and they have a lot of knowledge around different ways to do things, or maybe they come from another country, and they know how to grow this really interesting variety of something or other, and they want to share that with people, or maybe they have building skills, or maybe whatever it might be, just honoring that everybody who's coming to the garden has a knowledge base that you don't. With that viewpoint it becomes a really open place for people to feel like they have something to offer and also develop a sense of ownership over the project themselves.

The presence of social capacity as well as human capital between the partnering organizations and in the garden was reported to increase connections to the community and the ability to start and maintain the Farmacy Garden.

Cultural

Participants spoke about the presence of cultural capacity on the environmental level of the Farmacy Garden through a historical lens - whether the gardening participants have prior gardening experience or not, those that do were observed by one interviewee:

As far as cultural competencies, the beauty of this region is that it's agricultural at its roots and heritage, so something I encounter is there's a lot of folks that pop their heads over the fence that grew up having gardens, or gardening with their grandparents, or gardening with their parents, or even having their own home garden at one point, and then moving and not having the space to do it, or losing their physical capabilities, so not being able to do it physically anymore. That's really beautiful, because people come in with pre-existing knowledge and a pre-existing context for what they're doing, and it reminds them of, you know, a part of their lives that's been foregone. In that way it's really lovely just to connect with people through gardening, because they already have that existing connection.

Overall

Figure 2 represents a conceptualization of the key factors across the three domains of the organizational capacity related to the Farmacy Garden, as well as factors that overlapped across the three domains.

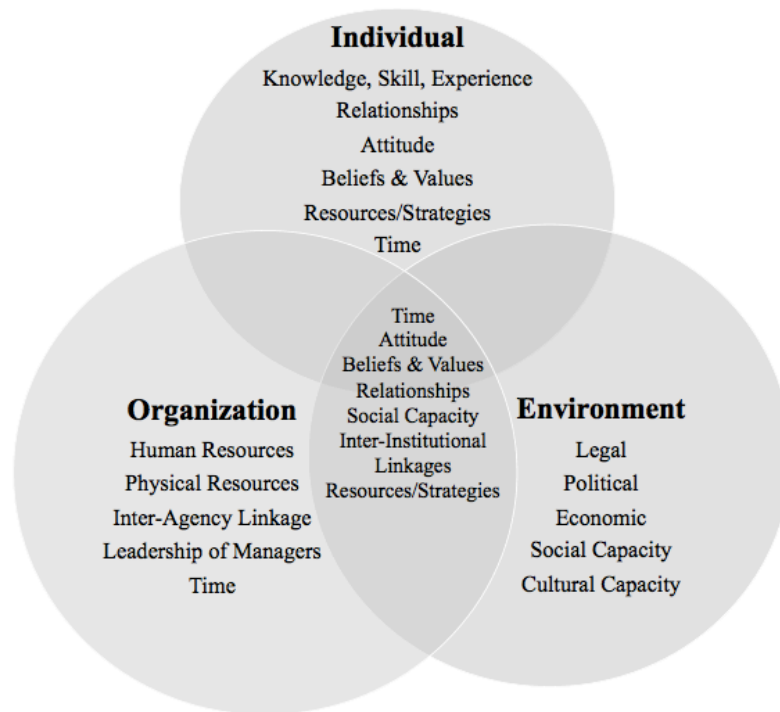


Figure 2. Organizational Capacity Factors Identified by Key Stakeholders to Support the Farmacy Program

DISCUSSION

This study was designed to examine the independent and interdependent organizational capacity building factors at the individual, organizational, and environmental domains related to the creation, ongoing implementation, and replicability of a collaborative fruit and vegetable prescription program. Chaskin uncovered barriers to translating community capacity building into action, one being issues arising with organizational collaboration.¹⁴⁹ Necessary to progress building capacity, Chaskin found that establishing organizational roles and responsibilities, establishing how to deal with accountability, how to develop consensus, resource allocation, and how to acknowledge contributions from the various organization's needs to be worked through and agreed

upon between partnering organizations to ensure successful inter-organizational linkage/partnerships.¹⁴⁹ Overall, research on how to measure and build community capacity in community health programming is prevalent throughout the research. In contrast, organizational capacity has not been thoroughly studied in regards to community health programming, thus signaling the need to identify factors within a capacity building framework necessary to create and maintain a collaborative fruit and vegetable prescription program to facilitate its replication in other settings.

To date, several studies have highlighted the importance of building community capacity in impacting nutrition and health status of individuals, but not necessarily explored the factors or components necessary to launch and sustain an innovative program that may not necessarily impact these types of metrics, but still may influence individuals, organizations, environments, and communities positively.

The results of this study highlighted several interesting findings that are consistent with other community-level studies. For example, funding, physical resources, and human resources were mentioned consistently throughout the interviews as facilitators to success of the Farmacy Garden. The most highly endorsed organizational barriers in one study among chronic disease practitioners implementing an evidence-based program included funding, in addition to incentives.¹⁷⁰ Unfortunately, community health programming is often discontinued after the initial funding concludes and resources are then depleted, jeopardizing ongoing activities.¹⁷¹ So, it is not surprising that interviewees commented on the need for physical and financial resources since they have been available continuously for this project.

Throughout the interviews all stakeholders spoke about their belief and value in the garden program, which created a shared valued system. This shared value system was built upon shared beliefs on the potential positive community impact the Farmacy Garden and the value assigned to the partnerships each organization and individual provided. Stakeholder valorization of the garden occurred and is necessary when implementing an unconventional project in hopes to make it conventional. Also, many programs are publicly funded so it is important to consider ‘impacts’ and what all partners consider successful. In this case, it was about the concept of the program and what indirect messages and/or social and cultural norms, values, and attitudes the project conveyed. This is important as others embark on other food system or food access programs since the ‘direct’ benefits may shift from a more traditional lens.

In addition to beliefs and values, time was mentioned as a facilitator on both the individual and organizational levels. Respondents consistently mentioned how “spending time” working on their garden responsibilities was thought to build capacity to initiate and maintain the garden. Perhaps by placing value on the garden, they de-emphasized the burden often associated with time, coupled with support and buy-in from management. In this case, time was dedicated and organizationally scheduled at some level to the project and therefore facilitated the project success, whereas in many public health interventions, practitioners report (lack of) time as a barrier, because effort was expected but not necessarily allocated by the individual and/or leadership.¹⁷² For example surveyed health departments (also partners in this project) reported that time, resources, funding, and data were commonly-cited as major barriers in the implementation of evidence-based decision-making.¹⁷³

Unique to this project, the ‘legal’ and ‘political’ environment were raised as issues and are not reported often within capacity building research. The public health initiative of the “Let’s Move” campaign provided the environment for gardening programs, along with the presence of gardens at the White House. This project involved physical labor and public space requiring legal permission to use land and also to have risk management plans in place due to the inherent risk involved with the physical nature of gardening.

The other key finding from this study was that several factors overlapped, including time and resources - showing that the inter-connectedness of individuals and organizations was considered critical for both the synergy and effectiveness of the program. In general, respondents appeared to have difficulty separating out the factors according to the capacity building domains, maybe because individual partners and organizations did not work in isolation of one another: One influences the other and vice versa, similar to the interrelation of levels in the social ecological model.¹⁰³ Lack of exposure to viewing capacity building through the varying levels of this nuanced approach could also be an explanation for the respondents collapsing the domains.

Additionally, the overlapping of inter-organizational linkages/partnerships were critical factors across domains. Throughout the literature, improving and increasing partnership linkage with organizations has been touted as a method to build capacity in health promotion programs.^{154,174,175} This overlap could be explained by individuals’ and organizations’ desire to partner together due to their intrinsic efficiency and usefulness.

Finally, it was interesting that the topic of health, or an individual’s perception of health was *not* mentioned in the interviews even though each participant in this study was

funded through, or an employee of, a health organization. One explanation for this was that ‘health’ was implicit and therefore did not need to be explicitly described or health was viewed in a different way. Or the stakeholders may have chosen to measure health in a new way due to the innovative nature of the garden. Viewing health in regards to quantified fruit and vegetable intake and/or reduction of disease takes time and has many confounding variables. Due to this the stakeholders had to think of other metrics for success in this garden program. All stakeholders mentioned that the garden had been a success, seeming like success was defined in a new way—by creating a community space that provides combined services. In the beginning stages (at least in the first few years) garden metrics should not be based on classic metrics such as pounds of produce produced and garden participation. Patience is needed while continuing to believe that the garden project will enhance quality of life in alternative ways for different people.

Implications/ Future Steps/Limitations

For replication in other locations this research offers insight into the important factors necessary to implement a project similar to the Farmacy Garden. One factor is a shift in how the stakeholders and organizations involved view health. This is a critical aspect due to the unique nature of this collaboration. Health needs to be viewed as varied for everyone and sometimes can be immeasurable based on conventional standards.

The attitude of individuals involved in a project like this one is also very important. It was uncovered that positive attitudes were needed especially from leadership to successfully facilitate growth and employee buy-in. Stakeholders from all partnering organizations need to collaboratively develop a program mission, set goals, and determine metrics for success. Questions of the motivation behind wanting to be

involved in the project need to be asked to ensure values and beliefs align with those of the shared mission and program goals. Along with a positive attitude, partners need to take the political and economic environment into consideration when starting a garden program such as the Farmacy Garden. Stakeholders must gain community buy-in and ensure a sustained funding stream is available.

Limitations of this study include the small sample size, unique physical location, and lack of research on the effectiveness of these domain and factors. Further research is needed to identify and elaborate on additional factors and domains needed for varying locations based on community-specific needs. Future research could utilize the identified organizational capacity factors and domains to measure organizational capacity to evaluate health program success regarding the organizational collaborations for effectiveness.

References

1. Ward BW, Schiller JS, Goodman RA. Multiple chronic conditions among US adults: A 2012 update. *Preventing Chronic Disease*. 2014;11:E62.
2. Boeing H, Bechthold A, Bub A, et al. Critical review: vegetables and fruit in the prevention of chronic diseases. *European journal of nutrition*. 2012;51(6):637-663.
3. National Cancer Institute Division of Cancer Control & Population Sciences. Usual dietary intakes: Food intakes, U.S. population, 2007-10. 2015; <http://epi.grants.cancer.gov/diet/usualintakes/pop/2007-10/>. Accessed August 27, 2016.
4. Rudd Center for Food and Policy & Obesity. *Access to healthy foods in low-income neighborhoods opportunities for public policy*. New Haven, CT: Yale University;2008.
5. Appleton KM, Hemingway A, Saulais L, et al. Increasing vegetable intakes: rationale and systematic review of published interventions. *European journal of nutrition*. 2016;55(3):869-896.
6. Jane E. Brody. Prescribing vegetables, not pills. *The New York Times*. December 2, 2014, 2014.
7. Wholesome Wave. Wholesome Wave's fruit and vegetable prescription program. 2014; http://legacy.wholesomewave.org/wp-content/uploads/2014/07/2012_Fruit-and-Vegetable-Prescription-Program-Factsheet-copy.pdf. Accessed September 1, 2016.
8. Freedman DA, Choi SK, Hurley T, Anadu E, Hébert JR. A farmers' market at a federally qualified health center improves fruit and vegetable intake among low-income diabetics. *Preventive Medicine*. 2013;56(5):288-292.
9. Buyuktuncer Z, Kearney M, Ryan CL, Thurston M, Ellahi B. Fruit and vegetables on prescription: a brief intervention in primary care. *Journal of human nutrition and dietetics : the official journal of the British Dietetic Association*. 2014;27 Suppl 2:186-193.
10. Lusthaus C, Anderson G, Murphy E. *Institutional assessment: A framework for strengthening organizational capacity for IDRC's research partners*. IDRC; 1995.
11. Matachi A, Africa IfCBI. *Capacity Building Framework: UNESCO-IICBA*. United Nations Economic Commission for Africa; 2006.
12. Morgan P. Capacity and capacity development-some strategies. *Hull: Canadian International Development Agency*. 1998.
13. Crisp BR, Swerissen H, Duckett SJ. Four approaches to capacity building in health: consequences for measurement and accountability. *Health promotion international*. 2000;15(2):99-107.
14. Heward S, Hutchins C, Keleher H. Organizational change—key to capacity building and effective health promotion. *Health promotion international*. 2007;22(2):170-178.
15. de Silva-Sanigorski AM, Bell AC, Kremer P, et al. Reducing obesity in early childhood: results from Romp & Chomp, an Australian community-wide

- intervention program. *The American Journal of Clinical Nutrition*. 2010;91(4):831-840.
16. Sanigorski AM, Bell A, Kremer PJ, Cuttler R, Swinburn BA. Reducing unhealthy weight gain in children through community capacity-building: results of a quasi-experimental intervention program, Be Active Eat Well. *International Journal of Obesity*. 2008;32(7):1060-1067.
 17. Viola A. Evaluation of the Outreach School Garden Project: building the capacity of two indigenous remote school communities to integrate nutrition into the core school curriculum. *Health Promotion Journal of Australia*. 2006;17(3):233.
 18. MacLean DR, Farquharson J, Heath S, Barkhouse K, Latter C, Joffres C. Building capacity for heart health promotion: results of a 5-year experience in Nova Scotia, Canada. *American journal of health promotion : AJHP*. 2003;17(3):202-212.
 19. Andersson CM, Bjärås G, Tillgren P, Östenson C-G. A longitudinal assessment of inter-sectoral participation in a community-based diabetes prevention programme. *Social Science & Medicine*. 2005;61(11):2407-2422.
 20. Harrell MC, Bradley MA. *Data collection methods. Semi-structured interviews and focus groups*. DTIC Document;2009.
 21. Creswell JW. *Qualitative inquiry and research design: Choosing among five approaches*. Sage; 2013.
 22. Lindseth A, Norberg A. A phenomenological hermeneutical method for researching lived experience. *Scandinavian journal of caring sciences*. 2004;18(2):145-153.
 23. Strauss AL. *Qualitative analysis for social scientists*. Cambridge University Press; 1987.
 24. Chaskin RJ. Building community capacity a definitional framework and case studies from a comprehensive community initiative. *Urban affairs review*. 2001;36(3):291-323.
 25. Jacobs JA, Dodson EA, Baker EA, Deshpande AD, Brownson RC. Barriers to evidence-based decision making in public Hhealth: A national survey of chronic disease practitioners. *Public Health Reports*. 2010;125(5):736-742.
 26. Shediak-Rizkallah MC, Bone LR. Planning for the sustainability of community-based health programs: conceptual frameworks and future directions for research, practice and policy. *Health education research*. 1998;13(1):87-108.
 27. Jacobs JA, Jones E, Gabella BA, Spring B, Brownson RC. Tools for implementing an evidence-based approach in public health practice. *Prev Chronic Dis*. 2012;9:E116.
 28. Dodson EA, Baker EA, Brownson RC. Use of evidence-based interventions in state health departments: a qualitative assessment of barriers and solutions. *Journal of public health management and practice : JPHMP*. 2010;16(6):E9-e15.
 29. Centers for Disease Control and Prevention. Framing the issue- Social Ecological Model 2013; <http://www.cdc.gov/nccdphp/dnpao/state-local-programs/health-equity/framing-the-issue.html>. Accessed October 25, 2016.
 30. Labonte R, Woodard GB, Chad K, Laverack G. Community capacity building: a parallel track for health promotion programs. *Can J Public Health*. 2002;93(3):181-182.

31. Laverack G. *Addressing the contradiction between discourse and practice in health promotion*. Deakin University;1999.
32. Labonte R, Laverack G. Capacity building in health promotion, Part 1: For whom? And for what purpose? *Critical public health*. 2001;11(2):111-127.

Chapter 3: Conclusions

The purpose of the Farmacy Garden program was to ultimately improve fruit and vegetable intake by increasing access to affordable (free) and nutritious fruits and vegetables for limited-income Virginians. Collaboratively, the participating agencies created the garden to provide gardening skills, nutrition education, and community engagement through a work-share program and hands-on educational workshops. Additional benefits may include increased vegetable consumption, ideally for the reduction of chronic diseases and obesity risk. The goals of this study were to: 1) explore the different domains and factors of a capacity building framework related to a unique collaborative program that promoted access to fruits and vegetables (and potentially decreased risk for chronic disease); and 2) provide insight into factors that would be essential to replicate the program in other locations.

This research identified key factors within the individual, organizational, and environmental domains for building capacity for the Farmacy Garden. These included individual beliefs and values, attitude, resources, relationships, time within the organizational and individual domains, physical and human resources, and the legal, political, and economic environment.

Overall, having shared values among all individuals and organizations appeared to be critical to the program's creation and maintenance. A shared value system assisted in viewing the program's 'success' through the lens of successful collaboration and sustainability of the program thus far. For future replication of this project it is important to make sure all parties involved have shared values and create a shared mission for the project. For example, stakeholders valorized this project, unlike other health and

community programs. The valorization created a sense of ownership and belief that this program model benefits the community in unique ways, such as enhancing the cohesion and belief in the garden from all stakeholders. Assigning value to this program and believing in it allowed the stakeholders to endorse the positive impacts it may have on the community. This is also an important factor that could enhance the future success of other programs.

Further research is needed in order to refine if any of the factors were directional or program ‘drivers.’ For example, did positive leadership and capacity inspire higher individual capacity or were they synergistic? Would time and resources been made available if there was no leadership capacity?

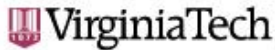
For replication, partners should have honest discussions about their expectations around the project and to: 1) Determine the goals and potential impacts (unintended benefits and expenses) of the program. What do they hope to accomplish? What are their beliefs, values, and attitudes toward the program concept? 2) Make sure all parties involved have a shared value and belief system surrounding the garden. Do all individual and organizations find value in this program model? Why are they doing it? Why do the organizations want to partner for this type of project? How would they justify the program (including time, resources, cost) to a wide range of stakeholders?

Despite the noted limitations, this research provides insight into broad organizational capacity concepts that can be transferrable to other communities demonstrating interest in replicating a similar program. Additionally, the overall conceptual framework could be applied to other clinical-community partnerships to compare and contrast critical factors for program success or to even detect changes in

capacity over time. Further research is also warranted to identify and elaborate on additional factors and domains needed for varying locations based on community-specific needs.

APPENDICES

Appendix A. IRB Approval Letter, “Assessment of Capacity Building Framework for Partnerships”



Office of Research Compliance
Institutional Review Board
North End Center, Suite 4120, Virginia Tech
300 Turner Street NW
Blacksburg, Virginia 24061
540/231-4606 Fax 540/231-0959
email irb@ut.edu
website <http://www.irb.ut.edu>

MEMORANDUM

DATE: December 13, 2016
TO: Elena L Serrano, Olivia Schwartz, Elaine Marshall Meredith, Sarah Anne Misyak
FROM: Virginia Tech Institutional Review Board (FWA00000572, expires January 29, 2021)
PROTOCOL TITLE: Assessment of Capacity Building Framework for Partnerships
IRB NUMBER: 16-1063

Effective December 13, 2016, the Virginia Tech Institutional Review Board (IRB) Chair, David M Moore, approved the New Application request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report within 5 business days to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

<http://www.irb.vt.edu/pages/responsibilities.htm>

(Please review responsibilities before the commencement of your research.)

PROTOCOL INFORMATION:

Approved As: **Expedited, under 45 CFR 46.110 category(ies) 5,6,7**
Protocol Approval Date: **December 13, 2016**
Protocol Expiration Date: **December 12, 2017**
Continuing Review Due Date*: **November 28, 2017**

*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals/work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

Invent the Future

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
An equal opportunity, affirmative action institution

Date*	OSP Number	Sponsor	Grant Comparison Conducted?

* Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office (irbadmin@vt.edu) immediately.

Appendix B. Consent Form

**VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
Informed Consent for Participants
In Research Projects Involving Human Subjects**

Title of Project: Assessment of Capacity Building Framework for Partnerships

Principal and Co-Principal Investigators: Elaine Meredith and Olivia Schwartz

Participant's Printed Name: _____

I. Purpose of the Research

The purpose of this study is to evaluate and understand the capacity of partnering agencies in sustaining an interagency project. The findings will help to sustain current and future projects. Information collected in this interview may be published.

II. Procedures

We would like to hold an audio-recorded interview to gather information on your experience and your role in these partnerships.

III. Time Duration of the Procedures and Study

The interview will last between 30-60 minutes.

IV. Discomforts and Risks

There are no more than minimal risks associated with your participation in this project. There is a possibility of identification through quotes included in future publications, even with pseudonyms used, due to the small number of participants in this study.

V. Potential Benefits

There are no direct benefits for participating in this study.

VI. Statement of Confidentiality

If we do publish the results from this interview, your responses will be kept confidential to the best of our ability. Your agency's name and the name of the Farmacy Garden project will be included in publications. Pseudonyms will be used if quotes from this interview are used for publication.

VII. Costs for Participation

Person Explaining the Research: Your signature below means that you have explained the research to the participant/participant representative and have answered any questions he/she has about the research.

Signature of person who explained
this research

Date

Time

Printed Name

Appendix C. Interview Script

Level of Capacity	Capacity Building Element	Interview Question
Introduction		<p>Thank you for talking with me today. Your participation in this study is completely voluntary. If you do not wish to participate, be audio recorded or wish to stop the interview at any time, that's completely fine. Your information will also be kept confidential; we will not release your name or identifying information in any published materials. If you have any questions about the Organizational Review Board process and/or your rights as a research participant, you can contact Virginia Tech's IRB at 540-231-4991 or moored@vt.edu.</p> <p>May we continue with the interview?</p> <p>We will be asking a number of questions about what you believe was required from you and your organization to build capacity to implement and sustain the Farmacy Garden project. Your feedback will also help provide insight into successful inter-agency collaborations. For this project, we are defining capacity as the “organizational and technical abilities, relationships and values” to meet project objectives.</p> <p>There are three different levels of capacity – individual or persona; organizational or organizational; and environmental or systems. We will ask you questions across these three levels along with all different types of capacity.</p>
Individual – “will and ability of an individual to set objectives and to achieve them using one’s own knowledge and skills”	Knowledge, Skills, Value, Attitude, and Health	<p>First, let’s consider capacity building at the individual level, which is the “will and ability of an individual to set objectives and to achieve them using one’s own knowledge, skills, value, attitude, and health.”</p> <p>What was required of YOU to be involved in this project and collaboration? Consider ‘capacity.’ What specific knowledge, skills, competencies, relationships, and values were required of YOU to be part of the project? Why?</p> <p>Tell me about your attitude toward the project. Was that important in participating in this project? How?</p> <p>Provide examples and stories to illustrate how these were used.</p>

		<p>What strategies or resources did YOU use to participate in the Farmacy project?</p> <p>What strategies or resources did YOU need that you did not have to participate?</p> <p>Probe:</p> <ul style="list-style-type: none"> • tools • training • technical assistance • quality assurance <p>What was required of you to keep the project going? Why?</p>
<p>Organization – “anything that will influence an organization’s performance”</p>	Human Resources – capacities of individuals in organizations	<p>Now, let’s consider organizational factors. Organizational factors are “anything that will influence an organization’s performance” to meet project objectives. These include intellectual resources, organizational structure and management, such as organizational culture, incentive, reward system, and leadership of managers.</p> <p>Please tell the story of how your organization got involved first.</p> <p>What did your organization require to be involved in the project? Consider competencies, relationships, values. Why? Explain more.</p> <p>Probe with... What about:</p> <ul style="list-style-type: none"> • human resources – like people, staff time? • physical resources - materials or resources? space? • intellectual resources – ideas, creativity? • organizational structure and management - incentives/rewards/other? • leadership - support from managers and leadership? Organizational support? <p>What factors will be required for your organization to sustain the project or keep it going? [Probe more as needed.]</p>
	Physical Resources – facilities, equipment, materials, etc	
	Intellectual Resources – organizational strategy, strategic planning, business know-how, production technology, program management, process management, inter-organizational linkage, etc.)	
	Organizational Structure and Management Methods – human, physical intellectual assets, such as organizational culture, incentive and reward system	
	Leadership of Managers	
<p>Environment – “environment and conditions necessary for demonstrating capacity at the</p>	<p>Formal Institutions (policies, etc.) – laws, policies, decrees, ordinances, membership rules, etc</p>	<p>Finally, I’d like you to consider some of the environmental or systems-level factors that might influence this project. In this example, the environment is considered the conditions necessary for demonstrating capacity at the individual and organizational levels.</p>

individual and organizational levels”		What environmental factors do you think were required to <i>start</i> the Farmacy Garden? Consider administrative, legal, technological, political, economic, social, and cultural capital. Why? Please tell me more about each of these factors.
	Informal Institutions – customs, cultures, norms, etc.	
	Social Capital or Social Infrastructure	
	Capacity of Individuals and Organizations under the Environment	<p>Probe with...What about:</p> <ul style="list-style-type: none"> • Administrative – support for reporting and paperwork for the different partnering organizations? • Legal – memo of understanding related to the partnership? • Technological – timely and relevant skills to support technologies for the Farmacy Garden like enhanced gardening techniques, new ways of communicating to consumers about the garden, other? • Political – policies that support the Farmacy Garden? Support from local stakeholders, like legislators? • Economic – finances for time and space for the Farmacy garden? • Social – trust in the partnership? cohesion among the different members of the organizations who are participating? connecting to communities? • Cultural – community acceptance of gardening? News and media attention; High interest in the Farmacy garden? <p>What environmental factors do you think are required to <i>maintain</i> the Farmacy Garden or keep it going? Address the sustainability of the project and partnership.</p> <p>Probe as needed using the following list again...</p> <ul style="list-style-type: none"> • Administrative – support for reporting and paperwork for the different partnering organizations? • Legal – memo of understanding related to the partnership? • Technological – timely and relevant skills to support technologies for the Farmacy Garden like enhanced gardening techniques, new ways of communicating to consumers about the garden, other? • Political – policies that support the Farmacy garden? Support from local stakeholders, like legislators? • Economic – finances? • Social – trust in the partnership? cohesion among the different members of the organizations who are participating?

		<ul style="list-style-type: none"> • Cultural – community acceptance of gardening? news and media attention; High interest in the Farmacy garden?
Integrated		Considering all of these different factors, what is important for others who are interested in supporting a project like this to know? Tell us about what was most important to you in building your capacity as a partner in this project.
Demographic Questions		<p>Finally, we would like to ask you a few demographic questions for research purposes.</p> <p>What is your job position at this agency/organization? How many years have you been with this agency/ organization? What are you degrees and/or training in? What is your race/ethnicity? What is your gender?</p>

Reference: Matachi A, International Institute for Capacity Building in A. *Capacity building framework: UNESCO-IICBA*. Addis Ababa, Ethiopia: United Nations Economic Commission for Africa; 2006.

Appendix D. Capacity Building Interview Code Book

Level: Individual	Abbreviation: IND	Definition: “will and ability of an individual to set objectives and to achieve them using one’s own knowledge and skills” ¹⁴⁴
Individual- Knowledge, Skills, and Experience	IND-KSE	<p>“The sum of what is known by an individual.”¹⁷⁶</p> <p>“An ability and capacity acquired through deliberate, systematic, and sustained effort to smoothly and adaptively carryout complex activities or job functions involving ideas (cognitive skills), things (technical skills), and/or people (interpersonal skills; Competence.”¹⁷⁷</p> <p>“One’s direct observation of or participation in events as a basis of knowledge and skills”¹⁷⁸</p>
Individual-Beliefs and Values	IND-BV	<p>“Set of ideas that are important to a person and guide an individual on how to evaluate right versus wrong usually stemming from beliefs.”¹⁷⁹</p> <p>“Something one accepts as true or real; a firmly held opinion”¹⁸⁰</p>
Individual-Attitude	IND-ATTITUDE	“A settled way of thinking or feeling about someone or something, typically one that is reflected in a person’s behavior” ¹⁸¹
Individual-Health	IND-HEALTH	An individual’s perception of health and or the topic of health.
Individual-Relationship	IND-RELATIONSHIP	“A connection, association, or involvement” ¹⁸²
Individual-Resources/Strategies	IND-RESOURCES/STRATEGY	“A plan of action or policy to achieve a major or overall aim.” ¹⁸³
-Tools	IND-RESOURCES/STRATEGY - TOOL	“Anything used as a means of accomplishing a task or purpose” ¹⁸⁴
-Training	IND-RESOURCES/STRATEGY-TRAIN	“The education, instruction, or discipline of a person” ¹⁸⁵
-Technical Assistance	IND-RESOURCES/STRATEGY - TECH	“The providing of advice, assistance, and training pertaining to a task at hand” ¹⁸⁶
-Quality Assurance	IND-RESOURCES/STRATEGY	“An individual’s evaluation of a program or process to ensure it is

	QA	meeting objectives and goals.
Individual-Time	IND-TIME	Time allotted by an individual to accomplish a task.
Level: Organization	Abbreviation: ORG	Definition: “anything that will influence an organization’s performance. Capacity at the organization level will determine how individual capacities are utilized and strengthened.” ^{144,187}
Organization-Human Resources	ORG-HUMANRESOURCES	“Capacities of individuals in the organization” ¹⁴⁴
Organization-Physical Resources	ORG-PHYSRES	“Monetary capital, facilities, equipment, materials, etc.” ¹⁴⁴
Organization-Intellectual Resources	ORG-INTEL	“Organization strategy, strategic planning
-Organizational Strategy	ORG- INTEL-ORGSTRAT	“The sum of the actions a company/organization intends to take to achieve long-term goals” ¹⁸⁸
-Strategic planning	ORG-INTEL-PLAN	“A systematic process of envisioning a desired future and translating this vision into broadly defined goals or objectives and a sequence of steps to achieve them.” ¹⁸⁹
-Business know-how	ORG-INTEL-BUS	“Knowledge about business; the knowledge and skill required to run a business correctly.” ¹⁹⁰
-Program management	ORG-INTEL-PROGRAMMGMT	“Process of managing multiple related projects at once.” ¹⁹¹
-Process management	ORG-INTEL-PROCESSMGMT	“Problem-solving skills, decision-making process, and communications.” ¹⁴⁴
Inter-organizational linkage	ORG- INSTLINK	“Networks, partnerships, and collaborations between institutions” ¹⁴⁴
Organization-Organizational Structure	ORG-ORGSTRUC	“The structure of an organization and management methods which affect the utilization assets” ¹⁴⁴
-Organizational Culture	ORG-ORGSTRUC-ORGCULTURE	“An organization’s expectations, experiences, philosophy, and values that hold it together and is expressed in its interactions with the outside world.” ¹⁹²
-Incentive/Reward System	ORG-ORGSTRUC-REWARDSYSTEM	“Serving to incite to action. A structured approach to reward one or more persons who act in a

		desirable way.” ¹⁹³
Organization-Leadership of Managers	ORG-LEADMANAGER	“The ability and activity of leading managers.” ¹⁹⁴
Organization-Time	ORG-TIME	Time allotted by an organization to accomplish a task.
Level: Environment	Abbreviation: ENV	Definition: Environmental factors necessary to start and maintain the Farmacy Garden and “the conditions necessary for demonstrating capacity at the individual and organizational levels.” ¹⁴⁴
Administrative	ENV-ADMIN	“Collective policies, practices, systems, and procedures” ¹⁴⁴
Legal	ENV-LEGAL	Laws and regulations that affect businesses and organizations.
Technological	ENV-TECHNOLOGY	Any technology affecting the current environment/ program.
Political	ENV-POLITICAL	“The environment set by actions taken by the government which could affect the daily activities of organizations. The actions may be on the local, regional, national, or international level.” ¹⁹⁵
Economic	ENV-ECONOMIC	“The totality of economic factors such as employment, inflation, income, interest rates, productivity, and wealth that influence the buying behaviors of consumers and institutions.” ¹⁹⁶
Social	ENV-SOCIAL	“Reflects the connections among people and organizations or the social glue to make things happen.” ¹⁹⁷
Cultural	ENV-CULTURAL	“Reflects the way people ‘know the world’ and how to act in it.” ¹⁹⁷

Appendix E. Interview Quotation Table

Level of Capacity	Capacity Building Element	Quotes
<p>Individual – “will and ability of an individual to set objectives and to achieve them using one’s own knowledge and skills”¹</p>	<p>Knowledge & Skills, Experience (IND-KSE)</p>	<ul style="list-style-type: none"> ● "I've had lots of community experience. I've had successes, I've had failures, I know community work is hard, so I think I had to have that capacity in order to be realistic about what could or could not happen as a result of the projects. So that's another thing I'll add to the end of individual capacity....You don't want to go in with rose-colored glasses because any time you're dealing with humans and human behavior it's unpredictable.”(Interview 1 lines 133-140 IND-KSE) ● “...understanding of the community health needs in which it related to nutrition, knowing how to access those who needed the service that we had envisioned, and how to engage them as well as engage partners. I needed to have the relationships and the knowledge about the needs.” (Interview 2 lines 18-21 IND-KSE, IND-RELATIONSHIP) ● Luckily I had worked with Community Gardens in the past, so I kind of knew how hard it is. ... Then the actual starting of the programming of getting people to do outreach and explaining the prescription program to the clinic. That's where it was and it required some understanding of how to sell that idea to medical staff. Then how to sell that idea to agency staff. I've really also had to have known that even if the executive director of either the agency or the clinic is like, "Yes! This is a great, sexy idea. We love it." If the front desk person doesn't know and also buy in-Then the idea does not ever make it to the client. Even if the executive director is like way on board, you also have to go beyond them to the front staff. Which is something I had seen programs die in the past because of that. It didn't matter who cared though if the top loved it. If the bottom doesn't love it then it doesn't move forward because they're the people talking to the clients. (interview 4 lines 43-66 IND-KSE) ● Definitely the knowledge about growing food.... Yeah. In order to have this position the person needs to be really knowledgeable about growing food. (interview 5 lines 30-44 IND-KSE) ● They needed someone with that technical subject matter of horticulture to really get in there and promote best practices and make sure that the garden was being installed in a proper manner and then throughout it's three years old now.... Now, in the more recent years, the second and third year it's been more of maintaining the garden, crop selection, if we can do any type of trials or experimentation out there as far as not only what do people like as far as their taste but what produces the best for us, you

		<p>know, those type things. Is that answering that question? (interview 6 lines 13-21 IND-KSE, IND-RESOURCES/STRATEGY-TECH)</p> <ul style="list-style-type: none"> • I was also working on other projects that focus on community food security and food access and that really is the intersection of a lot of my work. It intersects between farm, community and food. I work for agriculture and natural resources, it's often promoting horticulture or gardening, that side of agriculture and natural resources. I already had somewhat of that community food systems lens going into the Farmacy garden concept so it wasn't like it was completely foreign to me. I think not only my pairing of my horticulture knowledge as well as my understanding of the goals they wanted to achieve with the project is why I was approached. Interview 6 lines 29-36 IND-KSE)
	<p>Relationships (IND-RELATIONSHIP)</p>	<ul style="list-style-type: none"> • I guess some of the social capital that I can help bring to the Farmacy garden is my understanding of education, facilitation, community development. Just that understanding of there's one thing to know how to garden or how to implement horticulture but then how do you teach that to other people. A lot of people might have one or the other, they don't always have both. I always have that advantage that my job has taught me to do both. Also through social, it's one thing to teach people how to garden, be in the garden and they take home their share of produce at the end of the day and you feel good about them having healthy options on their plate. It's another thing while you're at the garden with them you began to build those relationships. You began to talk to them and find out maybe why they can't garden at home or some of the limitations or barriers they may be facing and maybe I can come up with some creative solutions to overcome some of those barriers. I feel like just being an active listener and engaging that audience. Not only being there as a teacher but just being there as a compassionate human being I think is often a huge ... We're talking about low income folks that are often marginalized in society. They don't often get the care or the consideration or the attention paid to them that someone else may get. How can I treat them with respect that I would treat anyone else? That's for my effort to the clients or the volunteers that are working in the garden. The garden as a whole has done a lot to build community and social capital through offering monthly potlucks. This happens during the growing season, it's not 12 months out of the year like right now we're on a break because nobody wants to be out there when it's cold. I'd say like May through October we offer monthly potlucks. It's the opportunity for anyone and they're offered in the evening, anyone who is volunteering in the garden during the day or is getting prescriptions from the community clinic or benefiting from nutrition education at the WIC clinic, they can

		<p>come to the garden for a potluck and just engage with other folks that like to garden, like to share recipes, just to form some type of a community. We've seen a lot of success through that and we try to offer something educational at the potlucks but the real goal is just forming those relationships. (Interview 6 lines 284-312 IND-RELATIONSHIP, IND-KSE, ENV-SOCIAL, ENV-CULTURAL, IND-ATTITUDE)</p> <ul style="list-style-type: none"> ● "I think you have to know and have the experience that relationships with other partners can be synergistic and positive, and that coming together makes ... I can't think of the quote, but it's greater than the parts, the whole is greater than the parts, so I had to have that." (Interview 1 lines 28-31 IND-RELATIONSHIP) ● I think it's important for people to know this is a collective effort. You need to have strong partners and relationships just like with any other community-based program. Without that collective effort, it would be challenging to implement a program like this. (interview 1 lines 258-260 IND-RELATIONSHIP, ORG-INSTLINK) ● I needed to have organizational relationships at the managerial level so that there would be buy-ins from certain organizations like the health department, the community health center, the HNF program, the cooperative extension, et cetera, all the community partners. I needed to know how to direct the individual who was hired to make this happen enough ... I needed enough detail to get that person started. (interview 2 lines 23-27 IND-RELATIONSHIP, IND-KSE, ORG-INSTLINK) ● Then within the WIC program too, so me having a relationship within WIC, not only with the WIC staff, but with the WIC participants too. Having a relationship with the WIC staff enabled me to further the collaboration of WIC and the garden, which is something I've continued to try to do. It's like how do we get, number one, more WIC participants down in the garden, but how can the garden serve simultaneously the WIC program? Yeah. Having a relationship with the head of WIC has been important, and then the WIC staff, who have direct relations with the WIC clients on an almost daily basis. That was important. (interview 5 lines 71-78 IND-RELATIONSHIP)
	<p>Beliefs and Values (IND-BV)</p>	<ul style="list-style-type: none"> ● "I guess I used my capacity to encourage our staff to be involved, and to be positive, and to frame it in a very positive way, I think this is a win-win for our organization, and for our participants, and for our standing within community members, and our role in overall health in the area. " (Interview 1 lines 40-44 IND-ATTITUDE) ● "I think the other thing, again I was secondary so I think a lot of it was coaching and encouraging. As it became evident that the number of participants in the project wasn't going to be as high as maybe we'd initially anticipated, continuing to coach

	<p>and to be a positive leader in supporting the project in spite of that, seeing the larger picture." (Interview 1 lines 76-79 IND-ATTITUDE, ORG-LEADMANAGER)</p> <ul style="list-style-type: none"> ● "I do think that thinking through those that in some ways, I think you individually have to have positive values and attitudes more than anything else. Because you might not know much about it, but if you have a positive sense about the potential then that would be a major motivator and driver, I think." (interview 1 lines 31-34 IND-BV, IND-ATTITUDE) ● And then individuals in there as well. If you have a shift in someone's attitude towards the project then that's likely going to impact their investment in it and their involvement. You need a positive attitude. (interview 1 lines 252-254 IND-ATTITUDE) ● Even if the final numbers of participants is relatively low, it's still worth the investment. One of the things that we need to do is be patient, and they need to be patient. (interview 1 lines 261-263 IND-ATTITUDE, ORG-ORGSTRUC-ORGCULTURE) ● Just the fact that for me to be there...To assist the people that came to work in the garden and having a good attitude about it because I think that makes a big difference, if you're out there and you're not enjoying what your doing ... You know that's going to feed on to them but if you're out there and you really care about what's going on and it has a real purpose for you and I think it makes a big difference and they feel that. Lines (Interview 3 lines 253-261 IND-ATTITUDE) ● Yeah. I guess on a personal level I am really passionate about local food systems. I'm passionate about gardening. I'm passionate about everybody having access to healthy food. As such, I've adapted my lifestyle to incorporate those values on a personal level. Because I'm passionate about that on a personal level, I feel like it transcends into my work too. The passion that I have for food, the passion that I have for eating healthy I think has enabled me to do better work in this job. Yeah. I think I've incorporated a lot of my personal knowledge into the projects as well. It's given me good direction on working with individuals, whether it's in the WIC nutrition classes or just talking to people in the garden about how they can incorporate fresh foods into their diet, healthy lifestyle tips, that sort of thing. (Interview 5 lines 17-26 IND-BV, IND-ATTITUDE, IND-KSE) ● "I guess I had to have that, and that I really believe fruits and vegetables are really central to supporting healthy eating." (interview 1 lines 18-19 IND-BV, IND-HEALTH)** ● Yeah, I definitely think attitude was really important. I mean, not only do you need
--	---

		<p>to be a good team player and a collaborator but you need to find the value in it. Someone that has a position like mine, a cooperative extension job in a county or someone who's working in local government, it's really easy to have a full plate all the time. You've got to be passionate about certain projects so you can find the time to get out there and develop and implement those projects otherwise it's just going to get lost in the shuffle. It's also about improving the quality of life of folks that we're serving and I feel like that you've got to have that rooted in somewhere, you have to have that initial want to give to people to improve their lives, to assess need and find out how you can create classes or programming to make that a better situation altogether. Yeah, I think attitude is really important. You not only have to have the passion that you can find the time to devote to the project but then you also have to have a holistic view of what are the goals of the project and sometimes you have to be creative about how you can achieve those goals. (Interview 6 lines 57-70 IND-ATTITUDE, IND-BV, IND-TIME)</p> <ul style="list-style-type: none"> ● I guess just being open minded about it. You know letting me dedicate one day a week to doing that when I could be doing other things so ...I think that was happening though ... The open mindedness to see how it could benefit ...The community. (Interview 3 lines 316-326 IND-ATTITUDE, ORG-ORGSTRUC-ORGCULTURE) ● That one's hard. Let's see. What was most important to me? I think, first it's important to me is that, it's really disappointing and sad to me that we have any community member that can not access affordable, safe, culturally appropriate foods and beverages. Seeing how this project could help address that at any level is important to me because I feel like it's a basic human right that everybody should have access to food. Food that they want to eat, and that they like, and that costs and access shouldn't be an issue. I think that's the most important thing. It's obviously a very challenging issue and concern. Being able to see that there's different ways to address that and that this might fill one of those gaps was really important to me. (interview 1 lines 274-282 IND-BV)
	<p>Health (IND-HEALTH)</p>	<ul style="list-style-type: none"> ● “I guess I had to have that, and that I really believe fruits and vegetables are really central to supporting healthy eating” (INTERVIEW 1 LINES 18-19 HEALTH, IND-BV) ● To volunteer and that's how I got started there and once I got started, I started telling my clients about and getting them in there because I saw it was such a good way for them to get out of the house ...To get more exercise because a lot of the clients I see

		<p>don't feel well ...And then they're depressed on top of that so that was a way of getting them out in the community and meeting new people and working on something that made a difference. (INTERVIEW 2 LINES 275-282 IND-HEALTH)</p> <ul style="list-style-type: none"> You think about modern day American conventional medicine and it's a pill. For doctors to see that holistic view and again, they are prescribing this to folks for preventative type issues. Pre-diabetic, pre-obesity, maybe some mental health issues. Not only how you can get more fresh food on your plate but also how can you get out in the garden and breathe in the fresh air, slow down. Your heart rate, everything seems to slow down when you're in the garden. Also be a little bit active, if you're in the garden participating in it, if you're watering or weeding or planting then you're going to be more mobile and of course that's going to help everyone's health. Those have been growing the garden and the mission and attracting new community partners has been a big benefit. (INTERVIEW 6 LINES 120-138 IND-HEALTH, ORG-INSTLINK, ENV-CULTURAL)
	<p>Resources/ Strategies: Tools (IND-RESOURCES/STRATEGIES-TOOL) Training (IND-RESOURCES/STRATEGIES-TRAINING) Technological Assistance (IND- RESOURCES/STRATEGIES-TECH) Quality Assurance (IND- RESOURCES/STRATEGIES-QA)</p>	<ul style="list-style-type: none"> Okay. My time has been the biggest resource. The resources that I bring with me through cooperative extension, best management practices or how to do certain things, that's been a huge resource. Then also looking to my other partners. Not only the partners that helped establish the garden, the New River Valley Health District and the Family Nutrition Program but also the partners directly out of this office. I also run the New River Valley Master Gardener Program and so that's been a good source for volunteers and also folks with horticulture knowledge that can help advance this project or move it along. Also because of my location, I'm here in Montgomery County so students often call on me in need of service project or they need a community partner to connect to and because I'm next to them I get called on a lot. Last semester for example I had seven students that were tied to me as a community partner, they were looking for some volunteer service so I'm able to use those students at the Farmacy garden as well and that's been a good connection. (INTERVIEW 6 LINES 80-93 IND-RESOURCES/STRATEGIES-TOOLS, IND-RELATIONSHIPS, IND-TIME)** " ... I guess one strategy or resource I would have ... It was a pretty novel project so we didn't have a lot of other examples to draw from around the state or the country. I guess just to know what would be expected as an end product from the project. What we could expect in terms of involvement, or something like that. But I don't think we would have been able to find it." (INTERVIEW 1 LINES 65-70 IND-RESOURCE/STRATEGY-TOOLS) "The other part would be obviously that I used my capacity to try to identify

		<p>resources within our organization that could be devoted to it. Whether that be the use of our car, the use of travel funds, all of that.” (INTERVIEW 1 LINES 44-47 IND-RESOURCES/STRATEGY)</p> <ul style="list-style-type: none"> ● Once I had the vision and the buy-in from the local health department manager, I called on the WIC director at the state level and I said, "Hey, Mike. Mike Welch, here's my idea. Do you think you could give me a little extra WIC money to help make this happen?" In the first year, he actually gave me some money to build the first raised bed [inaudible 00:04:16] to do the infrastructure part and then he agreed that my goal would definitely be outreach in nutrition ed and that I could use WIC funds to be able to help staff members. (INTERVIEW 2 LINES 34-40 IND-STRATEGIES/RESOURCES) ● It was my job to hold the coordinator accountable. Actually to develop a good job description, expectations, a good measurement of what success would look like from the agency's point of view, and to be a good sounding board for the coordinator and the partners so that they could be successful as they recreated their own sub-vision and to be supportive and support them as they generated new ideas. (INTERVIEW 2 LINES 71-75 IND-RESOURCES/STRATEGY-QUALITY ASSURANCE, IND-RESOURCES/STRATEGY-TECH) ● What's required of that is attention, on-going attention, and re-evaluating at least an annual basis, who is capable of doing what and roles or responsibilities and that kind of thing. Some of those are pended through the amount of understanding or agreement. Some of those are looser, collaborative partnerships. Definitely, it's an intentional work to maintain an ongoing collaboration. (INTERVIEW 2 LINES 177-181 IND-RESOURCES/STRATEGY-QA, ORG-INSTLINK, ENV-SOCIAL) ● I try to make it fun. Like chalk drawings in front of the free clinic with arrows being like, "Garden this way!" That peak peoples interest. Making sure that when people leave produce at the free clinic for people to take, they'll leave a cart with food on it. Make sure it's pretty! People don't want to take crappy looking stuff. Don't just pile it in a plastic bag. You have to be kind of selling it, even though it's free food. You think they're going to grab it. You kind of have to still sell it. It's making sure people running the garden understand that people are people. You buy food with your eyes, so to remember that. (INTERVIEW 4 LINES 155-164 IND-RESOURCES/STRATEGY-TOOLS, IND-RESOURCES-TECH) ● I figured out who to talk to for that so I could go to their monthly meetings and talk about the garden. Mandated clients aren't the most excited people to talk to but I knew that that was an existing. It was a good place to start because I knew that the
--	--	--

person running that program is desperate to have new faces come in every month. It was kind of like, "Here's a gift. I'll come in and be speaker if you remember that my program exists when you're talking to your clients in the summer. "You know? It's kind of like understanding that they have a caseload mentality, how do I fit into that to give them what they need? Because I don't have a caseload. They remember to send people to me. So it's kind of like understanding that agency culture was helpful. I don't think a lot of the people ... I don't think Kim had a background. She had a health and gardening background. It wasn't like an agency background. I think it was good that I got that culture a little bit. (INTERVIEW 4 LINES 129-145 IND-RESOURCES/STRATEGY-TRAIN, IND-KSE, IND-RELATIONSHIP)

- I think figuring out a way to work with a garden that serves FNP's objectives. But isn't a burden to our partner. I think sometimes our evaluation can be a burden to our partner. (INTERVIEW 4 LINES 616-619 IND-RESOURCES/STRATEGY-QA, ORG-INSTLINK, ORG-INTEL-PLANNING)
- I mean, there's definitely been a learning curve in terms of vegetable production. I had a basic knowledge, and I had enough knowledge to definitely grow things, but with that every year you learn something new based on the environmental factors. I wouldn't say that I didn't have that, because I've had Kelli as a great resource along the whole way. If something's going wrong with a plant, I can call on her, and she'll give me that assistance, but just as a basis knowledge. Beyond that though I really feel like all my needs were met. That was something that my supervisor was always really intentional about was, "What do you need from me? Is there anything that you don't have in this program that would be helpful?" Yeah. Of course there's challenges, but on a personal basis I always felt like I had what I needed to do my job. (INTERVIEW 5 LINES 268-277 IND-RESOURCES/STRATEGY-TECH, ORG-LEADMANAGER)
- I guess just continuing to be creative with the project and seeing with each season there's a degree of reflection, like what was successful? What could have gone better? How can we break down barriers to participation or perceived barriers to participation? Is the garden used to its full capacity? If not, how can we further that mission? Yeah. There's a degree of creativity that comes into it that is I think my favorite part of being in this role is like how can we innovate? How can we collaborate more? Yeah. A lot of things have sprouted up out of that. (INTERVIEW 5 LINES 305-312 IND-RESOURCES/STRATEGY-QA, IND-KSE)
- Then a whole lot of outreach. I do a lot of outreach in the winter months too, like talking to WIC participants about the garden, going to other ... Last year I kind of

broadened my outreach pool. I went to food pantries and talked to people there. I went to low income housing communities and other places, so that the garden could be utilized to its full potential. Then continuing to forge that connection with the health center. I meet with them too every year leading up to the beginning of the season, so that they can tell their physicians when to start writing prescriptions again. Then continuing to extend that relationship to other healthcare providers that might want to use the garden as a referral source. The question is ...? I just started talking, but ...(INTERVIEW 5 LINES 292-300 IND-RESOURCES/STRATEGIES)

- I already knew a lot about community gardens going in, the different styles and types of community gardens but I think just learning about how different ones worked. I was more accustomed to a community garden where you went in and you rented a plot and you maintained your piece of ground. This is truly a community garden where no one has a plot assigned to them but all plots are assigned to all people. That concept of that more of a social aspect of the community garden and not mean social like party but like social like equal, equal opportunity for all people. (INTERVIEW 6 LINES 378-384 IND-RESOURCES/STRATEGY-TRAIN, IND-EXPERIENCE)
- I would say in a lot of ways that is the resource that I offer, the quality assurance that we've got good soil, that we've got good plants, that we're producing good food, healthy food to put on folks' table. Then the next step of that puzzle I would relay to the Family Nutrition Program and once we have raw produce then they help folks with recipes and cooking demos and what to do with that produce. Us paired together we offer a lot of that technical type of support. Now, in some cases if I need help like if there's a question out there, if there's a disease or a new bug or something that I'm not accustomed to then I have the resources and specialist at Virginia Tech that I can call on and ask them and that helps bridging the gaps we might see and so I have that technical resource as well. (INTERVIEW 6 LINES 107-116 IND-RESOURCES/STRATEGY-QA, IND-RESOURCES/STRATEGY-TECH, ORG-INSTLINK)
- We don't have any formal memorandums of understanding or any type of agreements. The way cooperative extension works is there's cooperative extension in every county and we ultimately work for the two land-grants in the state. I not only work for Virginia Tech but I also work for Virginia State. Those two universities together formed the cooperative extension service. Cooperative extension, the reason we're in every county is because it's a way to take the research that's created from land-grant university and make that applicable to the common person, that's basically what my job is. I committed to the Farmacy garden and I've made it a part of my plan

		<p>of work so we have to do annual reporting every year and so I have a certain buy-in to how much time I'm spending at the Farmacy garden. (INTERVIEW 6 153-162 RESOURCES/STRATEGIES-QA, ORG-INSTLINK, IND-TIME)**</p>
	<p>Time (IND-TIME)</p>	<ul style="list-style-type: none"> ● "I think you need to have the time and the space and then you have to devote resources to allow for, whether it be networking or professional development opportunities for individuals to be able to explore new ideas and new paths." (interview 1 lines 150-153 ORGINTEL-PLANNING, ORG-ORGSTRUC, TIME)** ● The need needs to continue to be there and we need the support from the Health Department of course because they're probably the largest player in the collaboration. They are the ones that actually supports Maureen's position, the part-time gardening position and that is needed. With my best efforts, best intentions, if it were up to me to keep the plants alive, I mean I can go out there and say, "You've got a disease," or, "You've got these insects and this is what we need to do about it." If I had to go look at it everyday and water and I don't have the time in my daily schedule to achieve that. That garden position is critical in my mind. I don't think the garden would have ever been successful without the Health Department seeing value in that position and funding it for the past three years. (interview 6 lines 223-240 ORG-HUMAN RESOURCES, ORGPHYSRES, IND-TIME) ● I don't know what the response would be. If you count, I give a lot of my time to the garden in the Summer. I give every Friday, at least, and then a lot of meeting time. In that sector, that's a lot of staff paid time. We also give a paid intern to the garden every Summer for the past three summers. I feel like the capacity of the organization has been pretty high. (Interview 4 lines 27-32 ORG-PHYSRES, IND-TIME, ORG-HUMANRESOURCES)** ● We don't have any formal memorandums of understanding or any type of agreements. The way cooperative extension works is there's cooperative extension in every county and we ultimately work for the two land-grants in the state. I not only work for Virginia Tech but I also work for Virginia State. Those two universities together formed the cooperative extension service. Cooperative extension, the reason we're in every county is because it's a way to take the research that's created from land-grant university and make that applicable to the common person, that's basically what my job is. I committed to the Farmacy garden and I've made it a part of my plan of work so we have to do annual reporting every year and so I have a certain buy-in to how much time I'm spending at the Farmacy garden. (INTERVIEW 6 153-162 RESOURCES/STRATEGIES-QA, ORG-INSTLINK, IND-TIME) ● Okay. My time has been the biggest resource. The resources that I bring with me

		<p>through cooperative extension, best management practices or how to do certain things, that's been a huge resource. Then also looking to my other partners. Not only the partners that helped establish the garden, the New River Valley Health District and the Family Nutrition Program but also the partners directly out of this office. I also run the New River Valley Master Gardener Program and so that's been a good source for volunteers and also folks with horticulture knowledge that can help advance this project or move it along. Also because of my location, I'm here in Montgomery County so students often call on me in need of service project or they need a community partner to connect to and because I'm next to them I get called on a lot. Last semester for example I had seven students that were tied to me as a community partner, they were looking for some volunteer service so I'm able to use those students at the Farmacy garden as well and that's been a good connection. (INTERVIEW 6 LINES 80-93 IND-RESOURCES/STRATEGIES-TOOLS, IND-RELATIONSHIPS, IND-TIME)**</p> <ul style="list-style-type: none"> ● Yeah, I definitely think attitude was really important. I mean, not only do you need to be a good team player and a collaborator but you need to find the value in it. Someone that has a position like mine, a cooperative extension job in a county or someone who's working in local government, it's really easy to have a full plate all the time. You've got to be passionate about certain projects so you can find the time to get out there and develop and implement those projects otherwise it's just going to get lost in the shuffle. It's also about improving the quality of life of folks that we're serving and I feel like that you've got to have that rooted in somewhere, you have to have that initial want to give to people to improve their lives, to assess need and find out how you can create classes or programming to make that a better situation altogether. Yeah, I think attitude is really important. You not only have to have the passion that you can find the time to devote to the project but then you also have to have a holistic view of what are the goals of the project and sometimes you have to be creative about how you can achieve those goals. (Interview 6 lines 57-70 IND-ATTITUDE, IND-BV, IND-TIME) ●
<p>Organizational – “anything that will influence an organization’s performance”^{1,13}</p>	<p>Human Resources (ORG-HUMAN RESOURCES)</p>	<ul style="list-style-type: none"> ● To have a garden coordinator who understands community-based work and gets along well with people and is able to oversee students and other volunteers. It's a complex skill-set. It just can't be a hippy gardener who wants to grow things. There are other skills involved for sure to make this project thrive. (Interview 2 lines 198-201 ORG-HUMANRESOURCES)

		<ul style="list-style-type: none"> ● A third entity who helped us start the garden is the Montgomery County ag agent. Her expertise with agriculture. She was a horticulture person in her background so she knew small farm production basically ... which is what we're doing, garden production ... really well. That was helpful. I didn't have to know that stuff. The two gardeners who have run the garden also didn't really have that kind of a expertise, so she provided that. She still does to this day. She does trainings for people at the garden. We'll do a monthly potluck, people will come and they'll learn how to do container gardening. (interview 4 lines 450-460 ORG-HUMANRESOURCES) ● Also in addition to just basic money that we need like operating funds used to manage the garden each year, Maureen, the garden coordinator, she's part-time. If we could get that more of a full-time position and look at it not only as a garden coordinator but that nutrition education person as well, that would beef up our status at the garden and what we're trying to do. (interview 6 lines 100-104 ORG-HUMANRESOURCES) ● The need needs to continue to be there and we need the support from the Health Department of course because they're probably the largest player in the collaboration. They are the ones that actually supports Maureen's position, the part-time gardening position and that is needed. With my best efforts, best intentions, if it were up to me to keep the plants alive, I mean I can go out there and say, "You've got a disease," or, "You've got these insects and this is what we need to do about it." If I had to go look at it everyday and water and I don't have the time in my daily schedule to achieve that. That garden position is critical in my mind. I don't think the garden would have ever been successful without the Health Department seeing value in that position and funding it for the past three years. (interview 6 lines 223-240 ORG-HUMAN RESOURCES, ORGPHYSRES, IND-TIME, ORG-TIME)
	<p>Physical Resources (ORG-PHYSRES)</p>	<ul style="list-style-type: none"> ● "In terms of resources, what I did was I allowed for staff time to be used in order to work on the project. Like I said I devoted some budget items to be devoted to the project." (interview 1 lines 60-62 ORG-PHYSRES, ORG-LEADOMANAGER, ORG-TIME) ** ● It's all about having those relationships, partnerships, having really receptive partners who are open minded and can see a big picture and the potential, and then having them also dedicate time and resources to it." (interview 1 lines 101-104 ORG-PHYSRES, ORG-INSTLINK, IND-RELATIONSHIP, TIME)** ● To be able to actually create the garden and have money to hire somebody with the knowledge, skills, and ability to actually do the garden and also engage the WIC

customers, that's what it was all about. Then, I needed to be able to let ... It was kind of an internship (maybe interesting) process. I knew that it would take off on a life of its own, which it has, and I needed to know enough to let that happen and not try and micromanage everything (interview 2 lines 49-54 ORG-PHYSRES, ORG-LEADOFMANAGER, IND-KSE)

- We just asked the owners. One was the county and one was the owner, "Hey, can we use the space for a garden?" The answer was, "Yes." Again, it's just creativity and vision. (interview lines 99-101 ORG-PHYSRES)
- We have so many materials. That really wasn't an issue. Once, we made a commitment to support the garden There are lots of resources already within the health department, pads, pencils. That's where our partners brought tremendous resources to the program through the cooperative extension and SNAP-ED and EFNEP. All the partners had something to value-add. Once we put our stake in the ground and said, "Okay, we're going to have it and we will have a dedicated person to make this happen." It makes it much easier for other people to collaborate. (interview 2 lines 111-119 ORG-PHYSRES, ORG-INSTLINK)
- Well they provided me with the recipes ...And things like that to take there and then just the equipment that I use like the mixing bowls and knives and stuff like that, that I used if we were making salsa or things like that in there, so just kitchen equipment ... You know, bowls and cups and things like that and then the print outs that I took. Just things like how to ... How fruits and vegetables are healthier for you, and what nutrition they provide, and ways to get children to eat more and different thing. (Interview 3 lines 299-308 ORG-PHYSRES)
- I don't know what the response would be. If you count, I give a lot of my time to the garden in the Summer. I give every Friday, at least, and then a lot of meeting time. In that sector, that's a lot of staff paid time. We also give a paid intern to the garden every Summer for the past three summers. I feel like the capacity of the organization has been pretty high. (Interview 4 lines 27-32 ORG-PHYSRES,IND-TIME, ORG-HUMANRESOURCES)
- No. That's okay. As far as marketing tools, we have a Facebook page. We post on that periodically. A lot of our gardeners are linked to that too, so we'll post pictures, and we'll post updates about the garden, and cool ideas about gardening in general, and that sort of thing. That's a nice just connect into the broader community, so people that are curious about what it is can go to our Facebook page and find out more information. We also have a logo that's really cool that we had somebody design. It's like the mortar and pestle, but instead of the mortar it's the two leaves.

That's a traditional sign for pharmacy, if you've seen that before. That serves as just a nice visual representation of what we try to strive for and our mission. Then I also have an A-frame board that I leave out in the lobby of the Health and Human Services building that has information about the garden, and how to get involved. When we get produce dropped off from the New River Value Glean Team we'll set it up on that table with information about the garden. That's kind of a standing outreach where people can read that and be like, "Oh. At the end of the parking lot?" Then they can drive down and if one of us is there, which we are during the garden hours, we can talk to them about how to get involved. Beyond that, we have tons of recipes that we hand out to people. We have a whole book from the Family Nutrition Program of their recipes specifically. Then we have a bunch of cook books that the Health Department bought called Good and Cheap. We always give gardeners those so that they know how to use different produce, because one of our intentions is to grow produce that people are less familiar with as a way to basically show people the breadth of food that's out there and available as opposed to your kind of narrowed in vegetables, like corn, and potatoes and things that people are really familiar with, green beans. We have those cookbooks. We also have curriculum from the Just Say Yes curriculum that Meredith uses in doing farmer's market demonstrations. It's basically a nutrition education curriculum that is meant to be done at farmer's markets, so how to use fresh, local produce. We have a cooking kit with a hot plate and stuff where we can do cooking demonstrations. Those are some resources that we have available to do. We've used those some in doing WIC nutrition education down in the garden actually. There's that. I mean, we have tools. We have seeds. We provide all of that, that kind of basic infrastructure to have a community garden where people don't need to bring anything in in order to participate. That's one of our main missions is to create an accessible environment for everybody. (interview 5 lines 229-261 ORG-PHYSRES, ENV-TECHNOLOGY)

- I wasn't actually in this position at the time, but they created the Farmacy Garden as a way better community garden model in a better region where people would utilize the resources more than in Floyd county. It's on a public transportation line. It's central to all these resources. There's more population density in this region than there is in Floyd. Basically what was needed in order to get this garden off the ground was obviously initial funding to build the garden and construct it, which I think it cost around \$13,000 to construct. Yeah. Not too bad. I'm not even sure where the initial funding came from. I don't know if they got grant funding to do it or if the Health Department had extra funds that they allocated to it specifically, but then

along funding lines too, my position needed to be funded. For awhile it was funded I think exclusively through the WIC program, but now the funding streams are diversified, so it's funded through WIC and through the cooperative budget, which I think is like a mixed Health Department budget. Yeah. Those were the funding streams. Then there's ongoing funding that's needed too just to support the day to day costs of the garden, but we also get additional funding through grant programs that we apply for and that sort of thing. (Interview 5 lines 344-360 ORG-PHYSRES)

- Another thing is our water tank, so having irrigation is really essential. We have a 1,500 gallon water tank. Obviously it's not ideal, and a spigot would be much preferable, but for now it works. Irrigation is really essential. Then we have a garden shed to store all of our tools and stuff. That's really essential as well. We have a fence, so fencing to keep the critters out, especially if you're in more of a rural area, critters become an issue, like groundhogs and deer. That's a big consideration point. We haven't had any trouble, just because we're more in a suburban area, but that's a consideration point. In an ideal world we would have electricity and we would have a water source, like a water spigot, but we have neither of those and we're still working and operating fine, but it'd be nice if we had both of those too. (Interview 5 lines 404-413 ORG-PHYSRES)
- Obviously a sustained funding stream supporting my position, but the fact that I'm no longer funded specifically through WIC actually creates more sustainability in my program, because I have a more diversified funding stream, so that's good. Then continued funding for the day to day operations of the garden, which now that most of the infrastructure's built we can pretty easily support that. (Interview 5 lines 477-488 ORG-PHYSRES)
- We knew we had to build the garden up and we had to get a lot of natural components to be able to do that. We had to have topsoil and compost and wood chips and wood material to create a raised bed. There were a lot of physical natural elements that needed to be involved for the garden to be created. The other environmental thing about the gardener natural aspect is water, we don't have any water at the garden but you got to have water to garden. We thought how can we overcome that and we'd looked at other community gardens and saw the implementation of a cistern, like a big huge tank that holds water. We purchased one of those and it was 1,500 gallons and it's got a top, it's got a screen at the top that will collect rainfall but we learned very quickly that we'd have to leave it, we'd have to not use it for like a year and let the rain collect for it to fill up. Then we started thinking, "How can we get enough water to fill this cistern?" and then we had the

		<p>genius idea, let's call the fire department and they'll bring their fire truck over. We did and they were willing and they come see us a couple of times a year now. That water resource is huge. Most anyone else in Christiansburg would have a water bill. We don't have that and so that's been an advantage. (Interview 6 lines 264-279 ORG-PHYSRES, ENV-SOCIAL)</p>
	<p>Intellectual Resources: Organizational strategy (ORG-INTEL-ORGSTRAT) Strategic planning (ORG-INTEL-PLAN) Business know-how (ORG-INTEL-BUS) Program management (ORG-INTEL-PROGRAMMGMT) Process management (ORG-INTEL-PROCESSMGMT)</p>	<ul style="list-style-type: none"> ● 'We need to keep the vision, keep the momentum going and continue funding the position and support the community partners. (interview 2 lines 125-126 ORG-INTEL-ORGSTRAT, ORG-PHYSRES) ● Now we're trying to think of ways to enlarge the programming that's offered there in a way that isn't a headache. So you can get as creative as you want but can you actually sustain that high level with the lack of staff? We're trying to think of new ways to do outreach. Also because there is a new farmers market two blocks away. We're trying to create a green health zone in downtown [crosstalk 00:16:41], yeah. Trying to get that going through vouchers. If you go to the clinic, you get a prescription to the garden and you get a two-dollar coupon to the farmers market. Will you go to both? Will you go to one? We're trying to figure out how to get people to use both more. They're so closely tied and the department of health helps fund the farmers market. That's kind of the focus. Spreading the amount of people who come to the garden, getting it bigger and also trying to think about ... Let's say more people do come, do we have enough food? Do we have enough capacity to feed everyone who comes, what they deserve for working in the garden? You get like one or two pounds of stuff. We have not had that problem yet, but I do want to start thinking about it now. (interview 4 lines 230-251 ORG-INTEL-PLAN, ORG-INTEL-BUS, ORG-INTEL-PROGRAMMGMT, ORG-INTEL-PROCESSMGMT) ● Yeah. I can speak again on the Farmacy Garden task team and how having the group when we all come from slightly different points of view, and so having the multiple perspectives on the season and creative ways that we can move forward using our shared resources is really essential. We always meet up, moving into the season, to kind of look at next steps and what we want to do next year, what we might want to launch next year, how can we get the funding for that, what kind of evaluation do we want to have in place to show our outcomes, that sort of thing. Yeah. I have a new supervisor now, [Tiffany 00:43:39], so I always meet with her on a monthly basis and just assess from a Health Department view what kind of funding might be available for this, what do you think of this idea, is this in conflict with our mission, or whatever it might be. Within the Health Department specifically. Yeah. Then I go

to the WIC meetings too. I meet with the WIC director, like I'm meeting with her this afternoon, periodically, just to touch base on some of the ideas I have that are directly related to WIC. (Interview 5 lines 417-ORG-INTEL-ORGSTRAT, ORG-INSTLINK, ORG-INTEL-PLAN)

- The Farmacy garden has gotten a lot of positive press and because it is fitting a need, I went through this process the way it was supposed to be in cooperative extension. I saw a need, I started to work with collaborative partners, we created a program to address that need because we went through that process and also because this has been a successful model that's gotten a lot of good press. Cooperative extension is very happy about it. It's giving them a good name and it's also when I say it's gotten a lot of press it was Robbie Harris from the local NPR at VT. She did an interview with us and it went national. (Interview 6 lines 202-208 ORG-INTEL-ORGSTRAT, ORG-INSTLINK)
- "I think you need to have the time and the space and then you have to devote resources to allow for, whether it be networking or professional development opportunities for individuals to be able to explore new ideas and new paths." (interview 1 lines 150-153 ORGINTEL-PLANNING, ORG-ORGSTRUC,IND-TIME)
- I would say when you start a garden as part of an agency, obviously you want to talk to your clientele about will they use it? Also, you want to clarify for yourself, "Why am I thinking this is a good idea? Did I see it somewhere else? Do I just like garden ..." What is the ultimate objective so that you're shaping your decisions around that. That's like any program but I think people really forget to do that pretty often. Then, "How do I pitch the idea to other people to get them on board in a way that it serves their need? "So you're not selling something as much. You don't have to do it as hard. As opposed to pushing it on people. (interview 4 lines 579-592 ORG-INTEL-PLAN)
- If you want to boil down successful program planning, that is the sentence. It's like, if you're going to run a program that works, you have to figure out what your partners need from you and how you can give it to them and how they can get you back what you need. (interview 4 lines 275-278 ORG-INTEL-PLAN, ORG-INSTLINK)
- Because these shifts in the way that we change the way we do things, and the way we access food, and the way we operate around food is going to take a long time to change. You have to be in it for the long term. If you are expecting to launch a project like this and see huge changes immediately, it's going to take a while. It

		<p>requires a real shift in cultural norms and values. And it's going to require a lot of time to get buy-in from community members. Even if you impact only a few individuals and families, that's still more than no individuals and families. I think that's important. It's about partnerships and collaborations, and patience in investment in the long term vision. (Interview 1 lines 264-271 ORGINTEL-ORGSTRAT, ENV-CULTURE, IND-TIME, ORG-TIME)**</p> <ul style="list-style-type: none"> ● It just takes persistence. You need to pay attention to what either the community needs or you have to pay attention to what the soil conditions are. If you want to do this, it's not something you just do on paper, but it requires significant amount of physical labor as well as relationship work. A lot of gardening is intense in spring and summer. Then, the planning and visioning and all that can take place in January or February. There's different seasonal aspects to the work. Interview 2 lines 190-195 ORG-INTEL-BUS, ORG-INTEL-PLAN)
	<p>Inter-organizational Linkage (ORG-INSTLINK)</p>	<ul style="list-style-type: none"> ● But it's really the foundation is partnerships and communication. One person can think of the idea, but not one person can execute it. It's all about having those relationships, partnerships, having really receptive partners who are open minded and can see a big picture and the potential, and then having them also dedicate time and resources to it. (Interview 1 lines 100-104 ORG-INSTLINK, IND-RELATIONSHIP, IND-ATTITUDE, ORG-INTEL-PROCESSMGMT, ORG-TIME)** ● I think just continued, collective investment in the project is required on all those levels. If one partner were to back out then I don't know how it could move forward. Especially Department of Health and the free clinic which is housing those projects. I think it's a collective effort of all of the partners in all of these different capacities. (interview 1 lines 246-250 ORG-INSTLINK, ENV-SOCIAL ● I think it's important for people to know this is a collective effort. You need to have strong partners and relationships just like with any other community-based program. Without that collective effort, it would be challenging to implement a program like this. (interview 1 lines 258-260 ORG-INSTLINK, IND-RELATIONSHIPS, ENV-SOCIAL) ● Because these shifts in the way that we change the way we do things, and the way we access food, and the way we operate around food is going to take a long time to change. You have to be in it for the long term. If you are expecting to launch a project like this and see huge changes immediately, it's going to take a while. It requires a real shift in cultural norms and values. And it's going to require a lot of time to get buy-in from community members. Even if you impact only a few

individuals and families, that's still more than no individuals and families. I think that's important. It's about partnerships and collaborations, and patience in investment in the long term vision. (Interview 1 lines 264-271 ORG-INSTLINK, IND-ATTITUDE, TIME ENV-CULTURAL, ORG-INTEL-ORGSTRAT, ORG-TIME, IND-TIME)**

- The secondary important thing to me is that we were at the table and we were equal partners with these other agencies. I felt like it brought out the best in all of the agencies. Everybody has a distinct role in how they interact and address needs of limited-income audiences and it maximized what each of those agencies could do, and then we were a part of it. I think those were the two. (interview 1 lines 283-287 ORG-INSTLINK, ENV-SOCIAL)
- We have so many materials. That really wasn't an issue. Once, we made a commitment to support the garden There are lots of resources already within the health department, pads, pencils. That's where our partners brought tremendous resources to the program through the cooperative extension and SNAP-ED and EFNEP. All the partners had something to value-add. Once we put our stake in the ground and said, "Okay, we're going to have it and we will have a dedicated person to make this happen." It makes it much easier for other people to collaborate. (Interview 2 lines 111-119 ORG-INSTLINK, ORG-PHYSRES, ORG-HUMANRESOURCES)
- That's where the partners were so invaluable. We were able to extend the accessibility to the garden space, particularly in Montgomery, by virtue of our partners. In terms of, our partners had times when they could supervise people in the garden. This is particularly in the Montgomery garden. Time was a problem in Floyd because people just didn't have time to drive from their homes to come to the ... There are a few people that come to the WIC garden in Floyd, but it's not as popular. (Interview 2 lines 151-156 ORG-INSTLINK, ENV-SOCIALCAPITAL)
- Again, I never asked for funding for the garden from FNP, other than the intern. I'm sure I could have. We are allowed in our grant to do that kind of stuff sometimes but I just never did it. Partly because when we started the garden we were in a funding dip. It was sequestration time and crap was kind of hitting the fan funding wise, so I just didn't. Luckily we have a really excellent partner who has never been like, "So this is now ours." They've been really willing to share with us and share the fame and all of that good stuff. That's really good because someone could be a crappy partner and be like, "This is our garden, now. Our gardener. Why are you here?" So, that doesn't happen which is great. So, not really but only because I didn't ask. (interview

4 lines 155-181 ORG-INSTLINK, IND-RESOURCES/STRATEGY- TOOL, IND-RESOURCES/STRATEGY-TECH)**DUPLICATE BELOW

- Then it extends even further out into the community. Obviously our relationship with the Family Nutrition Program has been really essential. Meredith helps in a number of ways, running garden hours, providing programming support, providing resources. She also provides us with a summer intern, who is really essential during those busy months. Then we partner on grants to get funding. We partner on even tangential projects that are not directly related to the garden, but that are related to food security in the region. Then [Sarah 00:09:12] [MISYAK 00:09:14] also partners on the garden, and she provides evaluation support too. She's helped a lot with this evaluation, working with Olivia on her grad research, and then also applying for grants, doing a lot of editing to our proposals that we have, and that sort of thing. (interview 5 lines 86-95 ORG-INSTLINK)
- We have a partnership with the Community Health Center of the New River Valley where the doctors write prescriptions for people to work in the garden as a way to get fresh fruits and vegetables. That partnership's really strong, because the garden's right next to the Community Health Center. They'll even sometimes walk patients out to the garden and show them where it is. They do a lot of outreach for us, and even just having the vicinity of the clinic right next to the garden, we have a lot of gardeners that end up coming to the garden just because they were in the parking lot, and they saw the garden, and were curious about what we were doing. That's a great partnership. Then we've begun to forge more of a partnership with Social Services too to try to get referrals from their client base, but there's a lot of cross clients. A lot of the people that are at WIC are also getting SNAP and are also going to the Community Health Center. The idea is to get as many referrals as possible, whether or not it's the same clients. (interview 5 lines 134-145 ORG-INSTLINK)
- By we I mean that Farmacy Garden task team. It's basically comprised of a lot of the people I talked about, Sarah, Meredith, Kelli, basically those three people. Yeah. They're like the representatives from their organizations, and together we create the foundation of the Farmacy Garden. **It's hard for me to talk just about myself, because I'm just one piece of the bigger picture.** (Interview 5 lines 155-159 ORG-INSTLINK, IND-RELATIONSHIP, ENV-SOCIAL)
- To do this? Finding willing partners, you got to find those people that are willing to collaborate with you not just in name or on the phone but they'll get their hands dirty and they'll get in there and they'll do some work. Not only do they have to have time in their schedule, their plan of work but they've also got to have some passion for

		<p>this type of a project. If you wanted to continue, there's a lot of community garden models out there but I was just directly tied to nutrition and nutrition education so we need to continue to have the folks that are able to supply that. That's not my subject matter background and I need to continue to partner with those nutrition-ed folks so they can do their side of the project. (Interview 6 lines 367-375 ORG-INSTLINK, TIME, ORG-ORGSTRUC-HUMANASSET OR ORG-HUMANRESOURCES)</p> <ul style="list-style-type: none"> • Then beyond that there's even broader support from the bigger community. We get tons of student volunteers, service learning students, nutrition students that want to help throughout the summer. We get New River Valley Master Gardeners that come and help run garden shifts throughout the summer as well. We have support from the Christiansburg Fire Department to fill our water tank, because we don't have irrigation. We just have a big 1,500 gallon water tank. They come out periodically and fill that. We have a partnership with the New River Valley Glean Team, who glean produce at different farms and then redistributes it through hunger relief agencies. We're one of their drop off sites, and we redistribute the produce they drop off through the garden to our participants, and then also through the Health and Human Services building, and then through the Community Health Center too. (Interview 5 lines 123-133 ORG-INSTLINK, ORG-HUMANRESOURCES)
	<p>Organizational Structure and Management Methods: Organizational culture (ORG-ORGSTRUC-ORGCUTLURE) Incentive and reward system (ORG-ORGSTRUC-REWARDSYSTEM)</p>	<ul style="list-style-type: none"> • "I think you have to have a space within organizations for people to be able to have opportunities to be exposed to new ideas, and to talk about new ideas, and to pursue new ideas. I think that's really important within the intellectual resources. Again, you can't have a rigid organization if you want to inspire innovative-ness. You see that with businesses as well. The creative businesses, the ones that are developing new and novel products, they function much differently than those that are just creating the same product over and over again like a manufacturer." (Interview 1 lines 144-150 ORG-ORGSTRUC-HUMANASSETS OR ORG-HUMANRES, ORG-ORGSTRUC-ORGCULTURE) • "In terms of the organizational culture, I think you have to be okay with the possibility of failure. If you're extremely rigid in trying out new projects then you're less likely to pursue innovative, novel projects. You have to allow in your organization the opportunity to try something recognizing that it may or may not work, or that there may be bumps in the road. From our organization, I think we've tried to shift to that. It's okay, we're trying something new. It's okay if it's a failure. It's not really a failure, it's lessons that we've learned. And maybe we can change the

way we do it to be more successful, or maybe our example can be used by other people who are considering doing the same thing. But I think you definitely need to have an open culture in order to support a project like this. If you have really rigid metrics that staff need to follow, it may not be conducive to a project like this. So I think that's important" (interview 1 lines 115-125 ORG-ORGSTRUC-ORGCULTURE)

- She saw how gardening impacted her own life in a positive way, so just having that personal competency in knowing how to garden and knowing the impact that it can have allowed her to want to support a project like this. That might be reflected more in her ... I know Olivia interviewed her. As far as other organizational competencies, I'm not really totally sure. It goes along with our mission. Obviously our mission is to promote health in all its forms, and so this is just one facet of that. As far as the broader scope of public health, there's definitely more of a drive to go toward population health where you're working directly with the communities, and this project really fits that ticket. We are building community. We are directly interfacing with the community on this project. Yeah. I don't know. (interview 5 lines 464-473 ORG-ORGSTRUC-ORGCULTURE)
- Also, another important piece to the way cooperative extension works is you have to assess the need in each county and your locality where you work. I work for cooperative extension Montgomery County, someone that's working for cooperative extension Arlington County up in Northern Virginia, our needs are going to be totally different. Maybe not totally different, maybe that's a stretch. We probably do have somethings in common but because they are up near D.C., very urban, you know, hustle and bustle. We're down here in Southwest Virginia, we've got the university, our demographics are different. The way we operate are different. It's my job as an agent to look at the need within the county. We do that through situational analysis. It's actually scientific way of collecting data. We use focus groups and surveys and all of this type stuff. We update that situational analysis every three years in the county. From the situational analysis that I had for Montgomery County, local food, connection to food, knowing where your food comes from and supporting the relationship between food and health has been a big concern for people in our area. It was a defined need. It wasn't something that I just liked, I mean, I do like it but it wasn't just solely that or it wasn't just that I already had a relationship with Meredith and I liked working with her. This project would actually address some of the need that we see here in the county. That's the way I work in my organizational structure and it will be really similar to the Family Nutrition Program. The folks at

		<p>the health district they have their own organizational structure. (interview 6 lines 163-182 ORG-ORGSTRUC-ORGCULTURE, ORG-INTEL-PLAN)</p> <ul style="list-style-type: none"> • I don't think so. Not that I know of. Is that like monetary incentives or basically anything? No. I don't think I've ever been incentivized. Yeah. It's just kind of like let's see how this goes. If it doesn't work, then we can take a new path type of thing. (interview 5 lines 437-443 ORG-ORGSTRUC-REWARDSYSTEM)
	<p>Leadership of Managers (ORG-LEADMANAGER)</p>	<ul style="list-style-type: none"> • Yeah. Cool. There's a lot of relationships in this project. I think that's one of the biggest strengthening factors is that we have such extensive collaborations and support. It's what enables this project to grow and thrive like it has. Within the Health Department specifically there's definitely the relationship that I had with my supervisor, who has now retired. She was the health director, the medical director of the Health Department. She was the person that started this whole project in the first place, the idea maker. She had the idea for this, and then kind of got it going, and hired a coordinator, and then got it off the ground. Having her support for this project was incredibly essential, especially in the first few years of it. She was just an incredible support system throughout the whole process and was never the type of person that had limiting ideals I guess. She was very open to seeing where it goes, and expanding it, and then also ensuring that there were resources to support the project in a sustainable way. She was really great. (Interview 5 lines 55-70 ORG-LEADOFMANAGER, IND-RELATIONSHIP, IND-ATTITUDE) • I guess that goes hand-in-hand with leadership in that if you have a leader that invokes fear in failure then you're not going to be willing to try a project, and staff members won't try if they're worried that they're going to be evaluated for whatever success metrics there are. You definitely have to have leadership that's positive and says, let's test it out, this is how we're going to test it, and we'll learn lessons along the way being open to that. I think along the same lines, maybe that gets back to individual capacity. I'll jump around a little." (Interview 1 lines 126-132 ORG-LEADOFMANAGER) • I think what naturally happens in projects like this is that there's a lot of initial excitement and then over time that wanes. Probably over time maybe more leadership is required to help encourage and keep the momentum going. (interview 1 lines 165-168 ORG-LEADOFMANAGER, ORG-TIME) • "You definitely have to have leadership that's positive and says, let's test it out, this is how we're going to test it, and we'll learn lessons along the way being open to that" (interview 1 lines 129-ORG-LEADOFMANAGER)

- To be able to actually create the garden and have money to hire somebody with the knowledge, skills, and ability to actually do the garden and also engage the WIC customers, that's what it was all about. Then, I needed to be able to let ... It was kind of an internship (maybe interesting) process. I knew that it would take off on a life of it's own, which it has, and I needed to know enough to let that happen and not try and micromanage everything. (interview 2 lines 49-54 ORG-LEADOFMANAGER, ORG-PHYSRES)**DUPLICATE
- All I needed was my supervisors approval ...To let me go and spend that time there, which I got, they were eager to let me help and I thought that was very nice of them. I think they saw the importance of it .. (Interview 3 lines 287-290 ORG-LEADOFMANAGER, ORG-HUMANRESOURCES, ORG-TIME)
- Yeah. No one said to me anything. No one said, "Where are you going?" every Friday all summer. No one said, "30 people is not a lot." They've been really supportive of it. Which is great. (interview 4 lines 329-338 ORG-LEADOFMANAGER)
- I mean, there's definitely been a learning curve in terms of vegetable production. I had a basic knowledge, and I had enough knowledge to definitely grow things, but with that every year you learn something new based on the environmental factors. I wouldn't say that I didn't have that, because I've had Kelli as a great resource along the whole way. If something's going wrong with a plant, I can call on her, and she'll give me that assistance, but just as a basis knowledge. Beyond that though I really feel like all my needs were met. **That was something that my supervisor was always really intentional about was, "What do you need from me? Is there anything that you don't have in this program that would be helpful?" Yeah. Of course there's challenges, but on a personal basis I always felt like I had what I needed to do my job.** (Interview 5 lines ORG- LEADOFMANAGER, IND-RESOURCES/STRATEGY-TECH)**DUPLICATE
- Yeah. I'll just speak a little bit about having the support of the health director. As the leader of the whole district, having her support was really I think essential in this project, just because even though this type of project doesn't always take priority, she continued to make it a priority and ensure its sustainability and viability. I don't know how that would look with having a supervisor that wasn't the director of the district, but I would imagine having a supervisor that's in support of this project who is the director of the district strengthens that more than it could be otherwise. Yeah. Just having support from up top and then even beyond that, having support from the state WIC program. She was in direct communication with them in order to get

		funding streams and that sort of thing, so that was important too. (Interview 5 lines 446-455 ORG-LEADOFMANAGER)
	Time (ORG-TIME)	<ul style="list-style-type: none"> ● I don't think its an expensive program. Once you've built the garden, which I think took about three or 4000 dollars, because they did it the nice way. Then it's staff time for Maureen. So I don't think it cost the Department of health very much. We are gathering that data for the toolkit so other WIC's, if they want to implement it, know what what it costs. You could do it cheaper even. If you didn't have a fence and all that stuff. (INTERVIEW 4 LINES 470-482 ORG-TIME, ENV-ECONOMIC)** ● All I needed was my supervisors approval ...To let me go and spend that time there, which I got, they were eager to let me help and I thought that was very nice of them. I think they saw the importance of it .. (Interview 3 lines 287-290 ORG-LEADOFMANAGER, ORG-HUMANRESOURCES, ORG-TIME) ● I think what naturally happens in projects like this is that there's a lot of initial excitement and then over time that wanes. Probably over time maybe more leadership is required to help encourage and keep the momentum going. (interview 1 lines 165-168 ORG-LEADOFMANAGER, ORG-TIME) ● Because these shifts in the way that we change the way we do things, and the way we access food, and the way we operate around food is going to take a long time to change. You have to be in it for the long term. If you are expecting to launch a project like this and see huge changes immediately, it's going to take a while. It requires a real shift in cultural norms and values. And it's going to require a lot of time to get buy-in from community members. Even if you impact only a few individuals and families, that's still more than no individuals and families. I think that's important. It's about partnerships and collaborations, and patience in investment in the long term vision. (Interview 1 lines 264-271 IND-TIME, ORG-TIME, ORG-INSTLINK, IND-ATTITUDE, TIME ENV-CULTURAL, ORG-INTEL-ORGSTRAT) ● But it's really the foundation is partnerships and communication. One person can think of the idea, but not one person can execute it. It's all about having those relationships, partnerships, having really receptive partners who are open minded and can see a big picture and the potential, and then having them also dedicate time and resources to it. (Interview 1 lines 100-104 ORG-INSTLINK, IND-RELATIONSHIP, IND-ATTITUDE, ORG-INTEL-PROCESSMGMT, ORG-TIME) ● "In terms of resources, what I did was I allowed for staff time to be used in order to work on the project. Like I said I devoted some budget items to be devoted to the

		project." (interview 1 lines 60-62 ORG-PHYSRES, ORG-LEADOMANAGER, ORG-TIME)
<p>Environmental- “Environmental factors necessary to start and maintain the Pharmacy Garden and “the conditions necessary for demonstrating capacity at the individual and organizational levels.”¹</p>	<p>Administrative (ENV-ADMIN)</p>	<ul style="list-style-type: none"> • "I guess in general we needed to have the skill level to teach people how to garden and and we needed to have the skill level to build the garden, to train everybody on how the project would work. I think that's an administrative." (interview 1 lines 229-232 ENV-ADMIN, ENV-TECHNOLOGY) • We followed the same rules and regulations and guidelines that we always use for the Virginia Department of Health so, again, we didn't take anybody's picture and post it. We used the VDH policies and procedures, I guess. (Interview 2 lines 160-162 ENV-ADMIN) • Yeah. It just has to be done. It's kind of our mission around here is we'll just trudge on through the bureaucratic work that we need to do in order to do these kind of innovative things that we want to do. That's one piece. Then paperwork. I mean, obviously as far as receiving grants, there's a lot. Our whole business administrative side of things work really hard to ensure that everything, all the Is are dotted and Ts are crossed, so that we can receive grants and have them properly documented, and all of that. I don't even know everything that goes in, but every time I want to do something new I am sure to go over to the administrative side and say, "Okay. What do I need to do in order to do this?" There's always paperwork that's associated, and they're really patient with that. That's one side of things. It makes their job more complicated. I know it does, but they're willing to do it, because they believe in the project. (INTERVIEW 5 527-537 ENV-ADMIN) • We try to keep the burden of reporting low and it's because of our programs so far, WIC and FNP, have been so supportive of the garden, we haven't really had to be very pre-post testing people or anything like that. Purposefully to make it fun for the clients and not like a clinic visit, but also because we know that our bosses don't seem to need that kind of data from the garden so far. (Interview 4 lines 432-436 ENV-ADMIN)
	<p>Legal (ENV-LEGAL)</p>	<ul style="list-style-type: none"> • Yeah. One thing I'll speak on specifically is just having a relationship with the town of Christiansburg, who has enabled us to use the land, which I think other places struggle with that, working with their local government to basically take the space and turn it into something. I feel like sometimes there's insurance liability issues connected to that, but we didn't actually encounter any of that in this program. They have been really supportive of our programming through and through. That is something to keep in mind for other places wanting to develop a community garden

is you might have some challenges, even if you find a parcel of land, being able to use it. (Interview 5 lines 396-403 ENV-LEGAL, ORG-PHYSRES, ORG-INSTLINK,)

- Environmentally speaking, we needed land to have the garden and we knew we wanted it near the Health Department. There's already a garden attached to the Montgomery County Museum who was a neighbor of the Health Department. We looked at that idea, how could we maybe incorporate into that garden or expand that garden but then we saw that there really are two gardens had really separate missions even though they were both growing plants. They had very separate missions and it would be best for us to implement our own little space. We went to Montgomery County and told them what we wanted to and they gave us an MOU for the land which was huge because we had no cost in purchasing land or renting land. They basically said, "Here's a spot," we went out there with them with some of the ground maintenance folks and we looked at some potential sites and they ended up giving us that little corner where the Farmacy garden is now. Now, that used to be a parking lot and there's broken up asphalt all underneath there and we knew we couldn't go into the ground or if we did go into the ground that would be a huge endeavor with a lot of big equipment and stuff and we knew we couldn't do that. (Interview 6 lines 249-263 ENV-LEGAL)
- And finally, legally, because we are all publicly funded, we needed to make sure that whatever resources we did devote on an organizational level was within the guidance of our funding sources. I would say not from our perspective but probably from Department of Health perspective that, well I guess for ours too, that legally if anything were to happen to anybody as a result of the project that we had some kind of risk management or coverage for that. You have to have legal policies that say, if someone is gardening and they get injured what does that mean in terms of liability and legality? So you have to have those established already. All of our agencies are used to that kind of stuff, but you do have to have a risk management plan in place for something like that. (interview 1 lines 215-223 ENV-LEGAL)
- Yeah. There's a lot of the behind the scenes, like being a bureaucratic organization. We have MOAs with all of our partners, or at least we're required to. Now that we have a new business manager we're ensuring that all of that's in place, but even within working with service learning students we have to have a contract with the department in order to get students. Once that contract's set, then we're good to go for years and years, as long as it still meets what it says, but we have to have that in place. We saw that this year working for the first time with civic agriculture students.

		<p>We had to create an MOA and then get it signed on these different levels. That's a challenge actually to make sure that what we're doing is legal. Beyond that, all of the service learning students, if they're working directly with our clientele, have to go through a background investigation. (Interview 5 lines 516-525 ENV-LEGAL)</p> <ul style="list-style-type: none"> • Legal. I don't know if this falls within legal, but there's regulations on we need to have all the chemicals that we use documented, but we are an organic garden, so we do use some organic chemicals, but all of those need to be documented. Obviously following HIPAA protocol, that sort of thing. As part of my working here we're required to go through different trainings, in order to be onboarded, to learn about all of those different legal protocols that we have to follow as a Health Department employee. That's essential just working in the Health Department. All of that translates into the external world and into the project, ensuring people's personal information is secure, that sort of thing. (Interview 5 lines 540-548 ENV-LEGAL)
	<p>Technological (ENV-TECHNOLOGY)</p>	<ul style="list-style-type: none"> • Definitely Facebook, definitely e-mail, telephone and then just the technology of knowing the right agricultural practices. That's actually a technology. You've got to know when to plant Spinach. You can't plant spinach in July. You've got to have some agri-tech skills. (Interview 2 lines 168-171 ENV-TECHNOLOGY) • The volunteers went in and signed up for different time spot. So, I'm sure she used that a lot more and you know she used the spreadsheets and things like that for how much produce came out of the garden ... We kept track of every day when we harvested, we kept track of how many pounds of each thing that we harvested and kept track of that so that at the end of the year we would know how much. (Interview 3 lines 388-395 ENV-TECHNOLOGY) • A third entity who helped us start the garden is the Montgomery County ag agent. Her expertise with agriculture. She was a horticulture person in her background so she knew small farm production basically ... which is what we're doing, garden production ... really well. That was helpful. I didn't have to know that stuff. The two gardeners who have run the garden also didn't really have that kind of a expertise, so she provided that. She still does to this day. She does trainings for people at the garden. We'll do a monthly pot luck, people will come and they'll learn how to do container gardening. (Interview 4 lines 450-460 ENV-TECHNOLOGY)**DUPLICATE • Yeah. We have a Facebook page, a Facebook presence. Oh. Another thing is we have somebody, like a public relations guy. He always sends off blurbs on our updates out through the commissioner. We've gotten a lot of publicity that way, just

		<p>through all the health departments in the state. The commissioner sends out an email that has like, "The New River Health District is launching this new project," so that way we get just more network within the health departments in the state. That's really great. We've had media presences in the Roanoke Times and stuff too.</p> <p>Technological. Yeah. It's pretty simple. We don't need complex technology really. It's more going back to the Earth. It's always interesting to see how technology can be used to better this sort of thing. (Interview 5 lines 554-562 ENV-TECHNOLOGY)</p>
	<p>Political (ENV-POLITICAL)</p>	<ul style="list-style-type: none"> ● "When this number of agencies devote financial resources of some kind to a project like this, all the agencies have to be prepared for, especially when they're publicly funded which all of the agencies are in some shape or form, you have to acknowledge that you probably wouldn't move forward unless you knew that there was political support from your community. Because the last thing you want to do is have bad press by investing in something that is not considered politically acceptable or a good use of public funds. So I think you have to have the political culture that this is a project that benefits the community and it's a good investment of financial resources. I feel like we did have that and that we would all be very proud if political legislators of the town, the county, the state, or even the feds came in and were to review the project. I think we all felt like this was something that deserved the investment and would be politically favorable. You definitely need to have political support especially in this day and age because you want to be a good steward of public funds. If that's questionable and you're not sure then you probably shouldn't be pursuing an endeavor, or initiative like this. I think we all felt like this was a good, that we had political support for it. I think you can say that because the newspapers always shed a really positive light on the project. We've got a lot of press for it and it was always positive. I think that that's a good reflection of the political environment." (interview 1 lines 183-200 ENV-POLITICAL, ENV-CULTURAL) ● Yeah. I think the political climate of, "Let's move," and all that. Gardens in the White House definitely didn't hurt. (Interview 4 lines 428-429 ENV-START-POLITICAL) ● Yeah because that also trickled down form the White House to the USDA, to snap in saying, "Yes. Let's do gardening." For the first time ever. (Interview 4 lines 508-509 ENV-POLITICAL) ● We need to keep the county happy so they continue to renew the MOU and there hasn't been any squabbles there. It's been totally fine but still any time we change anything or do anything I make sure that I call folks within the county and just keep

		<p>them abreast of what’s happening. Also, because of my job I have to report to the county board of supervisors on a quarterly basis. The board of supervisors represent the counties, the different districts of the counties and that’s like our local decision making, legislative type thing. I’m able to talk to them about what the Farmacy garden is and how well we’re doing. They have buy-in, the local government has buy-in. Of course we need for the Health Department to continue to think that this is a priority. As I just mentioned, the director is changing. Molly O’Dell retired and so I don’t know who the new director is going to be or what their focus is going to be but we need them to believe in and support the Farmacy garden for it to continue. We need them to continue to fund that garden position and we need to continue to seek external funding to keep going. (INTERVIEW 6 LINES 340-353 ENV-POLITICAL, ENV-LEGAL)</p> <ul style="list-style-type: none"> ● I know that in this climate now if there were something politically negative that that would be a real deterrent so there would have to be a lot of work to support it politically. But like I said, the history has not been negative in any way' (INTERVIEW 1 LINES 244-246 ENV-POLITICAL) ● I mean, just ensuring that the federal government continues to support the WIC program, since that is one of our major funding streams. That's a consideration. The WIC program has been going since the 70s, but that could change with a new administration. Then political. Like I said, this program is more sustainable now that I have a more diversified funding stream for my position. Yeah. Beyond that, I'm not sure. It's just ensuring that the politics of what's happening continues to support the programs that are in place that support the Farmacy Garden. (INTERVIEW 5 LINES 578-584 ENV-POLITICAL)
	<p>Economic (ENV-ECONOMIC)</p>	<ul style="list-style-type: none"> ● In terms of the economics, I would say that there's a lot there. First of all, because we're talking about limited income populations that we're trying to reach, there is not the economic capacity among these audiences necessarily to have access to affordable, safe, culturally appropriate fruits and vegetables. In some ways the lack of economic capacity in that area lead to the capacity for the project. But you have to have that economic capacity and flexibility within budgets and human resources at all of the agencies to allow for a project like this because it's not directly aligned with the mission of any one organization. You have to have that capacity. (INTERVIEW 1 LINES 201-208 ENV-ECONOMIC) ● They have buy-in, the local government has buy-in. Of course we need for the Health Department to continue to think that this is a priority. As I just mentioned, the

director is changing. Molly O'Dell retired and so I don't know who the new director is going to be or what their focus is going to be but we need them to believe in and support the Farmacy garden for it to continue. We need them to continue to fund that garden position and we need to continue to seek external funding to keep going. (INTERVIEW 6 LINES 348-353 ENV-ECONOMIC, ENV- POLITICAL)

- I don't think its an expensive program. Once you've built the garden, which I think took about three or 4000 dollars, because they did it the nice way. Then it's staff time for Maureen. So I don't think it cost the Department of health very much. We are gathering that data for the toolkit so other WIC's, if they want to implement it, know what what it costs. You could do it cheaper even. If you didn't have a fence and all that stuff. (INTERVIEW 4 LINES 470-482 ENV-ECONOMIC, ORG-TIME)
- Oh. Another thing to touch upon is purchasing. Within the Health Department purchasing is really complicated, because we have certain regulations that we're required to prioritize. We prioritize certain vendors that are SWaM or like independently owned, women run businesses. I don't have a credit card too, so everything that I want to purchase I have to go through the business team or whoever does have access to a credit card and connect with them in order to make purchases. One thing that I have done is set up a couple accounts at Southern States and at Seven Springs Farm Supply, and so that when I want to go somewhere quick and pick something up on the fly I can hopefully go to one of those places and get my bases covered. Otherwise, purchasing, it becomes more complicated, because I need to plan ahead of time and send them an order of what I'm looking for. If it's something big, then they need to cross check with other vendors and that sort of thing. I'm not sure exactly what goes on behind the scenes in that process, but I know it's a little bit complicated. (INTERVIEW 5 LINES 564-576 ENV- ECONOMIC)
- Well, one thing I've noticed is, and my supervisor talked to me about this too, is when working with low income populations there is people that are really low income. They are really having a hard, hard time getting even their most basic needs met. They might be homeless. They might be not having enough food for a day, day by day, just barely scraping by. Then there are people that are still low income, but they're closer to having their basic needs met, and having a sustainable income source, and all of that. In some ways the Farmacy garden, it can serve the lowest of low. It's available as a resource, but what I've noticed is the people that tend to get most involved are the people that are low income, but they're not struggling day by day. They have the freedom and flexibility in their lives to still come to the garden, work in the garden, and take some fresh produce home. I feel like that fits in

		<p>somehow. As far as just factors that impact who comes to the garden, that's something I've noticed as a trend is that we're reaching more the people on the cusp, but not exclusively. People in this realm come, but they might come one time, or they might come and take some produce with them, but not necessarily work. I don't know if that fits in, but I feel like that's important to say somewhere. (INTERVIEW 5 LINES 640-655 ENV-ECONOMIC)</p>
	<p>Social Capital (ENV-SOCIAL)</p>	<ul style="list-style-type: none"> ● It kind of goes with political, but you need to have social capacity. You need to have people who are interested in it and who are positive about the project, and encouraging and supporting the project for it to also be effective. That means that when a participant tells another person about it that there's generally support for the concept and the notion of the project. You have to just have cultural norms that gardening is a great avenue for physical activity, but also getting fresh fruits and vegetables. (Interview 1 lines 209-214 ENV-SOCIAL, ENV-CULTURE) ● I think a part of that was going up and talking to the moms at the WIC clinic and then me introducing my classes to the Farmacy Garden and going down to the Community Health Center and introducing it to them too. (lines 423-425 ENV-SOCIAL) ● It's really strong. I don't see it weakening. We did have Molly Odell who is the director, so Maureen's boss, did retire. I was really nervous for Maureen about that but they hired, so far, someone from inside who's supportive and gets the garden. So that's been good. The free clinic ... they were highlighted by the Surgeon General when he came to visit for working with the Farmacy garden. I feel like that was a stroke on our favorite for their continued partnership. Then, the planners ... it's me, Kelly the agent and then Maureen from the garden and then Sarah helped us with evaluation. We just personally really get along and again it's also something where Maureen is the only one doing the garden at the department of health, so she needs help. She needs someone to bounce ideas off of. (interview 4 lines 555-568 ENV-SOCIAL) ● Yeah. Definitely the first two. Just working across agencies, ensuring that we're all on board with what we're doing and that it's an accurate reflection of our organization's missions. I love working with the women that I work with. We work really well together, and so that definitely strengthens the program. We haven't encountered any problems in terms of working as a team. (Interview 5 lines 590-594 ENV-SOCIAL, IND-RELATIONSHIP, ORG-INSTLINK) ● I started saying it earlier, but it wasn't the right question. We try to reach low income

populations. As an agency that's our ... Our priority population is WIC mothers and children first, pregnant women and children under the 200% poverty line. Then it's like anybody under the 200% poverty line. Then below that it's like anybody in the community. We're not exclusive to serving low income populations, even though those are our priority populations, but that's something I want to highlight is that even as an agency with our mandated requirements, and reporting guidelines, and all of that, the Farmacy Garden, what we try to have the Farmacy Garden be is just a space for anybody in the community to come, and so to kind of break down that labeling process of low income, or not low income, or poverty, and all the ...I believe anyway that the beauty of the program is in the diversity that it brings, whether that's socioeconomic diversity, cultural diversity, intergenerational diversity. Just knowing that it's a community based project that isn't only serving the people, quote unquote, that most need it, but rather serving the whole community and bringing the whole community together, from people from all different walks of life. Right. Exactly, because regardless of socioeconomic status, there's surely people that need health improvement that are making \$100,000 a year. (Interview 5 lines 660-679 ENV-SOCIAL, ENV-CULTURAL)

- Oh. Another thing that has been really just cool, and I think I touched upon this a little bit, was the garden serves as a context for people to share in food ways. Basically everybody that comes to the garden is bringing with them some form of human capital. They're bringing something that they can share, whether that's just a personal experience that they've gone through, or a listening ear, or maybe they have gardened their whole lives and they have a lot of knowledge around different ways to do things, or maybe they come from another country, and they know how to grow this really interesting variety of something or other, and they want to share that with people, or maybe they have building skills, or maybe whatever it might be, just honoring that everybody who's coming to the garden has a knowledge base that you don't. With that viewpoint it becomes a really open place for people to feel like they have something to offer and also develop a sense of ownership over the project themselves. That's been a mission that I've been trying to incorporate more and more and trying to figure out how can this be a project of the people, as opposed to me delegating? Where delegating is important and it's important to do things a certain way so that things grow properly, there's I think a fine balance of people having ownership over the project and there being a level of order and organization, if that makes sense. (Interview 5 lines 694-710 ENV-SOCIAL, ORG-ORGSTRUC-ORGCULTURE)

- Right, and how they can feel like their skills and knowledge are a part of something bigger. One example of that is we have a woman that loves to do arts and crafts. She's done that her whole life. She really wanted to lead the kids arts and crafts activities at some of our potlucks. That was great. That was something that she wanted to contribute to the garden on her own volition. We supported her in doing that, but that was very much her project. Then another woman has come and she loves to build things. She worked with another one of our partners to construct this little hobby greenhouse that we had bought. She has ideas for other building projects that she wants to do maybe at some point down the line. Honoring people's skillsets, so that they ... Yeah. If that makes sense. because people are coming in with so much great information. Similarly, if someone has a growing technique that it meets our standards, like we want to grow organically, and we want to do it a certain way, but if they say, "Oh. My whole life I've done it this way," "Okay. Let's try it that way." It's very much a learning space where people can share and learn together. We still want to have production, but even if we grow something and it doesn't produce well, it's still a learning opportunity and a place to experiment without much risk.
(interview 5 lines 715-732 ENV-SOCIAL, ORG-ORGSTRUC-ORGCULTURE)
- I guess some of the social capital that I can help bring to the Farmacy garden is my understanding of education, facilitation, community development. Just that understanding of there's one thing to know how to garden or how to implement horticulture but then how do you teach that to other people. A lot of people might have one or the other, they don't always have both. I always have that advantage that my job has taught me to do both. Also through social, it's one thing to teach people how to garden, be in the garden and they take home their share of produce at the end of the day and you feel good about them having healthy options on their plate. It's another thing while you're at the garden with them you began to build those relationships. You began to talk to them and find out maybe why they can't garden at home or some of the limitations or barriers they may be facing and maybe I can come up with some creative solutions to overcome some of those barriers. I feel like just being an active listener and engaging that audience. Not only being there as a teacher but just being there as a compassionate human being I think is often a huge ... We're talking about low income folks that are often marginalized in society. They don't often get the care or the consideration or the attention paid to them that someone else may get. How can I treat them with respect that I would treat anyone else? That's for my effort to the clients or the volunteers that are working in the garden. The garden as a whole has done a lot to build community and social capital

		<p>through offering monthly potlucks. This happens during the growing season, it's not 12 months out of the year like right now we're on a break because nobody wants to be out there when it's cold. I'd say like May through October we offer monthly potlucks. It's the opportunity for anyone and they're offered in the evening, anyone who is volunteering in the garden during the day or is getting prescriptions from the community clinic or benefiting from nutrition education at the WIC clinic, they can come to the garden for a potluck and just engage with other folks that like to garden, like to share recipes, just to form some type of a community. We've seen a lot of success through that and we try to offer something educational at the potlucks but the real goal is just forming those relationships. (Interview 6 lines 284-312 ENV-SOCIAL, ENV-ECONOMIC, IND-KSE)** DUPLICATE</p> <ul style="list-style-type: none"> ● Just what a big benefit it's going to be, it's going to be work getting it started but it really benefits the clients ...The people in the community ... Healthy ... It helps them get out, it helps them form new social groups ...A lot ... They met different people in the community and formed friendships from that, so it really helps not just physically for them to get out and eat healthier but it helps them mentally too. (interview 3 lines 533-541 ENV-SOCIAL)
	<p>Cultural Capital (ENV-CULTURAL)</p>	<ul style="list-style-type: none"> ● I think it helped that they already had a gardener on staff. It's in WIC culture to have a gardener there. I think if I had come to them and said, "Hey, you should totally start a garden[inaudible 00:29:55]" I know that that wouldn't have gone well. I also think it's ... The WIC package is protein heavy, it's not produce heavy. I think they wanted to find a way to plug that hole a little bit. That kind of helped. I also think being in a rural, semi-rural area helped because when I work with a client in the garden they're often like, "Oh, I grew up having a garden. My grandparents had a garden." I often try to change behavior by tapping into those memories of, "Doing this with grandma, what foods did you eat? How did she prepare them? Don't you want your kids to have those memories?" Kind of guilt them. That cultural history already existed for me to tap into. Not that it doesn't in urban areas. I ran a mental health garden at a half-way house for people who are recovering or things like that. Or had mental health issues. They also had these memories because they were older. They were the grandchildren of the great migration north, this was in Harlem. The great migration north of people from the south going to the cities to look for work, but they were bringing with them an agricultural history. And still grew... I don't know, black eyed pea or whatever. So I did kind of did tap it also there, but it's kind of interesting. I guess we all have that history. (Interview 4 lines 407-424 ENV-


CULTURAL)

- As far as cultural competencies, the beauty of this region is that it's agricultural at its roots and heritage, so something I encounter is there's a lot of folks that pop their heads over the fence that grew up having gardens, or gardening with their grandparents, or gardening with their parents, or even having their own home garden at one point, and then moving and not having the space to do it, or losing their physical capabilities, so not being able to do it physically anymore. That's really beautiful, because people come in with pre-existing knowledge and a pre-existing context for what they're doing, and it reminds them of, you know, a part of their lives that's been foregone. In that way it's really lovely just to connect with people through gardening, because they already have that existing connection. That's not everybody, but that's some people. There is another cohort of people, usually of the younger generation, that similarly might have had some gardening aspect in their lives, but don't have the same skill sets or knowledge base, so it's this resurgence of teaching people how to do what their ancestors have done, their direct ancestors. Surely if they're from this region, somebody in their family lived on a farm. There's that, like reforming these connections. Then there's another whole population through Virginia Tech, the international folks that are on the WIC program that get WIC benefits, and then come from another country where they farmed or gardened, especially I've encountered this a lot with Asian populations that grow really interesting varieties of foods. That's really interesting to talk to people from other countries and hear about what their life was like before they came to the United States and what kind of land they farmed, or what kind of vegetables they grew, and that sort of thing. That's kind of cool. (Interview 5 lines 595-616 ENV-CULTURAL)
- It's been really well-accepted. People really like it from the very get-go. People are really interested in what we were doing. Not only does it sit right there behind the Health Department but it's kind of embedded into a residential area as well. People could see the garden from the beginning, from our development of it. People would come over, "What's going on here?" we've got people that work at the Health Department or work at the community health clinic. They'll spend their lunch time in the garden or if they get a break they'll walk-through the garden. We've got gates on both ends of the garden and they're not locked gates but we did that intentionally because we wanted it to be a walk-through area. We wanted it to be inviting. We knew we needed a fence just to protect the garden and its integrity but we didn't want that to be like a fortress type of a fence. We wanted it to be welcoming. (Interview 6 lines 314-324 ENV-CULTURAL)

		<ul style="list-style-type: none">● Because these shifts in the way that we change the way we do things, and the way we access food, and the way we operate around food is going to take a long time to change. You have to be in it for the long term. If you are expecting to launch a project like this and see huge changes immediately, it's going to take a while. It requires a real shift in cultural norms and values. And it's going to require a lot of time to get buy-in from community members. Even if you impact only a few individuals and families, that's still more than no individuals and families. I think that's important. It's about partnerships and collaborations, and patience in investment in the long-term vision. (Interview 1 lines 264-272 ENV-CULTURAL, IND-ATTITUDE, ORG-INSTLINK, IND-RELATIONSHIPS, ORG-INTEL-ORGSTRAT, IND-TIME, ORG-TIME)
--	--	---

Reference: Matachi A, International Institute for Capacity Building in A. *Capacity building framework: UNESCO-IICBA*. Addis Ababa, Ethiopia: United Nations Economic Commission for Africa; 2006.

Appendix F. Garden Prescription



The Pharmacy Project



Garden Prescription Program

Fresh vegetables are the most important part of a healthy diet. Moderate physical activity, such as gardening, is key to maintaining a healthy weight, reducing stress and maintaining overall health in both adults and children.

I prescribe _____ to participate in the Pharmacy Project, a garden program at the Montgomery County Health Department in Christiansburg that gives participants fresh vegetables from April to October in exchange for help gardening.

Signature

Date

Patients visiting the garden for the first time will receive a free sample of vegetables when garden produce is available.

Medical Staff: Please fill out the bottom of this sheet and tear off before giving Garden Rx to patient. Please put form in the Pharmacy Project envelope for the Garden Coordinators to follow up with patient.

Today's Date: _____ Referring Physician: _____

Patient Name: _____

Phone: _____

Email: _____

Recommended form of participation in Pharmacy Project (circle one)

1. **GardenShare:** Patients spend 1 or 2 hours per week gardening for 6 weeks and receive fresh vegetables each visit.
2. **Nutrition and Cooking Class:** Patients meet for a series of 6 classes on healthy eating and cooking techniques with a Family Nutrition Program specialist.
3. **Walking club:** Patients join a 6 week walking club that meets at the garden.
4. **Nutrition newsletter:** Patients receive a weekly e-newsletter on healthy eating and cooking topics for 6 weeks.

Appendix G. Pictures of the Collaborative Fruit and Vegetable Program



Entrance to the Garden



Raised Beds Construction



Lettuce and Greens Growing in the Raised Beds



Cabbage and Broccoli



Garden Harvest



The Garden in Mid-Summer



Garden Harvest

References

1. Ward BW, Schiller JS, Goodman RA. Multiple chronic conditions among US adults: A 2012 update. *Preventing Chronic Disease*. 2014;11:E62.
2. Xu J, Murphy SL, Kochanek KD, Bastian BA. Deaths: Final data for 2013. *Natl Vital Stat Rep*. 2016;64(2):1-119.
3. Gerteis J, Izrael D, Deitz D, et al. *Multiple chronic conditions chartbook*. Rockville, MD Agency for Healthcare Research and Quality,;2014.
4. National Heart L, and Blood Institute,. *Managing Overweight and Obesity in Adults: Systematic Evidence Review from the Obesity Expert Panel*. U.S. Department of Health and Human Services 2013.
5. Ogden CL, Carroll MD, Fryar CD, Flegal KM. Prevalence of obesity among adults and youth: United States, 2011-2014. *NCHS Data Brief*. 2015(219):1-8.
6. National Center for Health Statistics. *United States, 2015: With special feature on racial and ethnic health disparities* Hyattsville, MD 2015.
7. Ogden CL, Lamb MM, Carroll MD, Flegal KM. Obesity and socioeconomic status in adults: United States, 2005-2008. *NCHS Data Brief*. 2010(50):1-8.
8. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the united states, 2011-2012. *JAMA*. 2014;311(8):806-814.
9. Davison KK, Birch LL. Childhood overweight: a contextual model and recommendations for future research. *Obesity reviews : an official journal of the International Association for the Study of Obesity*. 2001;2(3):159-171.
10. U.S. Department of Health and Human Services and U.S. Department of Agriculture. *2015-2020 Dietary Guidelines for Americans*. December 2015.
11. U.S. Department of Health and Human Services and U.S. Department of Agriculture. *2015-2020 Dietary Guidelines for Americans Healthy U.S.-Style Eating Pattern: Recommended Amounts of Food From Each Food Group at 12 Calorie Levels*. 2015.
12. National Cancer Institute Division of Cancer Control & Population Sciences. Usual dietary intakes: Food intakes, U.S. population, 2007-10. 2015; <http://epi.grants.cancer.gov/diet/usualintakes/pop/2007-10/>. Accessed August 27, 2016.
13. Economic Research Service. *U.S. Food Commodity Consumption Broken Down by Demographics, 1994-2008 : Economic Research Reports;2016 ASI 1506-9.190;Economic Research Rpt. No. 206*. 2016.
14. Latetia V. Moore, Thompson FE. *Adults meeting fruit and vegetable intake recommendations--United States, 2013*. Centers for Disease Control and Prevention ;2015.
15. Pomerleau JJ. Interventions designed to increase adult fruit and vegetable intake can be effective: a systematic review of the literature. *The Journal of nutrition*.135(10):2486.
16. Al-Sheraji SH, Ismail A, Manap MY, Mustafa S, Yusof RM, Hassan FA. Prebiotics as functional foods: A review. *Journal of Functional Foods*. 2013;5(4):1542-1553.

17. Jamieson HM. Carotenoids and health. *The FASEB Journal*. 2013;27(1 Supplement):638-610.
18. Moeller SM, Parekh N, Tinker L, et al. Associations between intermediate age-related macular degeneration and lutein and zeaxanthin in the carotenoids in age-related eye disease study (careds): Ancillary study of the women's health initiative. *Archives of Ophthalmology*. 2006;124(8):1151-1162.
19. Rautiainen S, Lindblad B, Morgenstern R, Wolk A. Total antioxidant capacity of the diet and risk of age-related cataract: A population-based prospective cohort of women. *JAMA Ophthalmology*. 2014;132(3):247-252.
20. Chiu LC, Kong CK, Ooi VE. The chlorophyllin-induced cell cycle arrest and apoptosis in human breast cancer MCF-7 cells is associated with ERK deactivation and Cyclin D1 depletion. *International journal of molecular medicine*. 2005;16(4):735-740.
21. Diaz GD, Li Q, Dashwood RH. Caspase-8 and apoptosis-inducing factor mediate a cytochrome c-independent pathway of apoptosis in human colon cancer cells induced by the dietary phytochemical chlorophyllin. *Cancer research*. 2003;63(6):1254-1261.
22. Boeing H, Bechthold A, Bub A, et al. Critical review: vegetables and fruit in the prevention of chronic diseases. *European journal of nutrition*. 2012;51(6):637-663.
23. United States Department of Agriculture. Choose MyPlate all about the fruit group. 2016; <https://www.choosemyplate.gov/fruit>. Accessed August 15, 2016.
24. United States Department of Agriculture. Choose My Plate all about the vegetable group. 2016; <https://www.choosemyplate.gov/vegetables>. Accessed August 15, 2016.
25. Centers for Disease Control and Prevention. *State Indicator Report on Fruits and Vegetables, 2013*. Atlanta, GA: Centers for Disease Control and Prevention, U.S. Department of Health and Human Services;2013.
26. Moore LV, Dodd KW, Thompson FE, Grimm KA, Kim SA, Scanlon KS. Using Behavioral Risk Factor Surveillance System data to estimate the percent of the population meeting USDA Food Patterns fruit and vegetable intake recommendations. *American journal of epidemiology*. 2015;181(12):979-988.
27. National Cancer Institute. Understanding cancer: Cancer statistics. 2016; <http://www.cancer.gov/about-cancer/understanding/statistics>. Accessed July 7, 2016.
28. American Cancer Society. Guidelines on nutrition and physical activity for cancer prevention. 2016; <http://www.cancer.org/acs/groups/cid/documents/webcontent/002577-pdf.pdf>. Accessed September 1, 2016.
29. Bingham S. Diet and cancer — the European Prospective Investigation into cancer and nutrition. *Nature reviews Cancer*.4(3):206-215.
30. Bradbury KE, Appleby PN, Key TJ. Fruit, vegetable, and fiber intake in relation to cancer risk: findings from the European Prospective Investigation into Cancer and Nutrition (EPIC). *The American Journal of Clinical Nutrition*. 2014;100(Supplement 1):394S-398S.

31. Danaei G, Vander Hoorn S, Lopez AD, Murray CJ, Ezzati M. Causes of cancer in the world: comparative risk assessment of nine behavioural and environmental risk factors. *Lancet (London, England)*. 2005;366(9499):1784-1793.
32. Awad AB, Williams H, Fink CS. Effect of phytosterols on cholesterol metabolism and MAP kinase in MDA-MB-231 human breast cancer cells. *The Journal of nutritional biochemistry*. 2003;14(2):111-119.
33. Kampa M, Nifli AP, Notas G, Castanas E. Polyphenols and cancer cell growth. *Reviews of physiology, biochemistry and pharmacology*. 2007;159:79-113.
34. Holick CN, Michaud DS, Stolzenberg-Solomon R, et al. Dietary carotenoids, serum beta-carotene, and retinol and risk of lung cancer in the alpha-tocopherol, beta-carotene cohort study. *Am J Epidemiol*. 2002;156(6):536-547.
35. Hui C, Qi X, Qianyong Z, Xiaoli P, Jundong Z, Mantian M. Flavonoids, flavonoid subclasses and breast cancer risk: a meta-analysis of epidemiologic studies. *PLoS One*. 2013;8(1):e54318.
36. Schatzmayr G, Streit E. Global occurrence of mycotoxins in the food and feed chain: facts and figures. *World Mycotoxin Journal*. 2013;6(3):213-222.
37. U.S. Food and Drug Administration. Background paper in support of fumonisin levels in corn and corn products intended for human consumption. 2001; <http://www.fda.gov/Food/FoodborneIllnessContaminants/NaturalToxins/ucm212899.htm>. Accessed August 5, 2016.
38. Tchounwou PB, Yedjou CG, Patlolla AK, Sutton DJ. Heavy metals toxicity and the environment. *EXS*. 2012;101:133-164.
39. Seifried HE. Oxidative stress and antioxidants: a link to disease and prevention? *The Journal of nutritional biochemistry*. 2007;18(3):168-171.
40. Kirsh VA, Peters U, Mayne ST, et al. Prospective study of fruit and vegetable intake and risk of prostate cancer. *J Natl Cancer Inst*. 2007;99(15):1200-1209.
41. Millen AE, Subar AF, Graubard BI, et al. Fruit and vegetable intake and prevalence of colorectal adenoma in a cancer screening trial. *Am J Clin Nutr*. 2007;86(6):1754-1764.
42. Obermuller-Jevic UC, Olano-Martin E, Corbacho AM, et al. Lycopene inhibits the growth of normal human prostate epithelial cells in vitro. *J Nutr*. 2003;133(11):3356-3360.
43. Ford NA, Elsen AC, Zuniga K, Lindshield BL, Erdman JW, Jr. Lycopene and apo-12'-lycopenal reduce cell proliferation and alter cell cycle progression in human prostate cancer cells. *Nutrition and cancer*. 2011;63(2):256-263.
44. Yang CM, Lu IH, Chen HY, Hu ML. Lycopene inhibits the proliferation of androgen-dependent human prostate tumor cells through activation of PPARgamma-LXRalpha-ABCA1 pathway. *The Journal of nutritional biochemistry*. 2012;23(1):8-17.
45. Jubert C, Mata J, Bench G, et al. Effects of chlorophyll and chlorophyllin on low-dose aflatoxin B1 pharmacokinetics in human volunteers. *Cancer Prevention Research*. 2009;2(12):1015-1022.
46. Centers for Disease Control and Prevention. *National diabetes statistics report: Estimates of diabetes and its burden in the United States, 2014*. Atlanta, GA: U.S. Department of Health and Human Services 2014.

47. Giacco F, Brownlee M. Oxidative stress and diabetic complications. *Circulation research*. 2010;107(9):1058-1070.
48. Fiorentino TV, Prioletta A, Zuo P, Folli F. Hyperglycemia-induced oxidative stress and its role in diabetes mellitus related cardiovascular diseases. *Current pharmaceutical design*. 2013;19(32):5695-5703.
49. National Institute of Diabetes and Digestive and Kidney Disease. Diabetes, heart disease, and stroke. 2014; <https://www.niddk.nih.gov/health-information/diabetes/preventing-diabetes-problems/heart-disease-stroke>. Accessed July 29, 2016.
50. Cooper AJ, Sharp SJ, Lentjes MAH, et al. A prospective study of the association between quantity and variety of fruit and vegetable intake and incident type 2 diabetes. *Diabetes Care*. 2012;35(6):1293-1300.
51. Muraki I, Imamura F, Manson JE, et al. Fruit consumption and risk of type 2 diabetes: results from three prospective longitudinal cohort studies. *BMJ*. 2013;347.
52. Bravo K, Osorio E. Characterization of polyphenol oxidase from Cape gooseberry (*Physalis peruviana* L.) fruit. *Food Chem*. 2016;197(Pt A):185-190.
53. Curtis PJ, Sampson M, Potter J, Dhatariya K, Kroon PA, Cassidy A. Chronic ingestion of glavan-3-ols and isoflavones improves insulin sensitivity and lipoprotein status and attenuates estimated 10-year CVD risk in medicated postmenopausal women With type 2 diabetes. *A 1-year, double-blind, randomized, controlled trial*. 2012;35(2):226-232.
54. Zamora-Ros R, Forouhi NG, Sharp SJ, et al. The association between dietary flavonoid and lignan intakes and incident type 2 diabetes in European populations: the EPIC-InterAct study. *Diabetes Care*. 2013;36(12):3961-3970.
55. Wedick NM, Pan A, Cassidy A, et al. Dietary flavonoid intakes and risk of type 2 diabetes in US men and women. *The American Journal of Clinical Nutrition*. 2012;95(4):925-933.
56. CDC/NCHS. National health and nutrition examination survey. 1999-2010; <http://www.cdc.gov/nchs/products/databriefs/db103.htm>. Accessed September 19, 2016.
57. McCall DO, McGartland CP, McKinley MC, et al. Dietary intake of fruits and vegetables improves microvascular function in hypertensive subjects in a dose-dependent manner. *Circulation*. 2009;119(16):2153-2160.
58. Erlund I, Koli R, Alfthan G, et al. Favorable effects of berry consumption on platelet function, blood pressure, and HDL cholesterol. *The American Journal of Clinical Nutrition*. 2008;87(2):323-331.
59. Bhupathiraju SN, Wedick NM, Pan A, et al. Quantity and variety in fruit and vegetable intake and risk of coronary heart disease. *Am J Clin Nutr*. 2013;98(6):1514-1523.
60. American Heart Association. Can antioxidants in fruits and vegetables protect you and your heart? http://www.heart.org/HEARTORG/HealthyLiving/HealthyEating/Nutrition/Can-antioxidants-in-fruits-and-vegetables-protect-you-and-your-heart_UCM_454424_Article.jsp-.V8nnl5MrJE5. Accessed July 20, 2016.

61. Wright NC. The recent prevalence of osteoporosis and low bone mass in the United States based on bone mineral density at the femoral neck or lumbar spine recent U.S. prevalence of osteoporosis and low bone mass. *Journal of bone and mineral research*. 2014;29(11):2520-2526.
62. Johnell O, Kanis JA. An estimate of the worldwide prevalence and disability associated with osteoporotic fractures. *Osteoporosis international : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA*. 2006;17(12):1726-1733.
63. Macdonald HM, Black AJ, Aucott L, et al. Effect of potassium citrate supplementation or increased fruit and vegetable intake on bone metabolism in healthy postmenopausal women: a randomized controlled trial. *Am J Clin Nutr*. 2008;88(2):465-474.
64. McTiernan A, Wactawski-Wende J, Wu L, et al. Low-fat, increased fruit, vegetable, and grain dietary pattern, fractures, and bone mineral density: the Women's Health Initiative Dietary Modification Trial. *Am J Clin Nutr*. 2009;89(6):1864-1876.
65. Lin PH, Ginty F, Appel LJ, et al. The DASH diet and sodium reduction improve markers of bone turnover and calcium metabolism in adults. *J Nutr*. 2003;133(10):3130-3136.
66. Cole ZA, Gale CR, Javaid MK, et al. Maternal dietary patterns during pregnancy and childhood bone mass: a longitudinal study. *J Bone Miner Res*. 2009;24(4):663-668.
67. Ganpule A, Yajnik CS, Fall CH, et al. Bone mass in Indian children--relationships to maternal nutritional status and diet during pregnancy: the Pune Maternal Nutrition Study. *J Clin Endocrinol Metab*. 2006;91(8):2994-3001.
68. Kaptoge S, Welch A, McTaggart A, et al. Effects of dietary nutrients and food groups on bone loss from the proximal femur in men and women in the 7th and 8th decades of age. *Osteoporosis international : a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA*. 2003;14(5):418-428.
69. Tucker KL, Hannan MT, Kiel DP. The acid-base hypothesis: diet and bone in the Framingham Osteoporosis Study. *European journal of nutrition*. 2001;40(5):231-237.
70. The Eye Diseases Prevalence Research G. Causes and prevalence of visual impairment among adults in the united states. *Archives of Ophthalmology*. 2004;122(4):477-485.
71. National Eye Institute. Facts about cataracts. 2015; https://nei.nih.gov/health/cataract/cataract_facts. Accessed September 19, 2016.
72. National Eye Institute. Facts about age-related macular degeneration 2015; https://nei.nih.gov/health/maculardegen/armd_facts. Accessed September 19, 2016.
73. Klein R, Chou CF, Klein BE, Zhang X, Meuer SM, Saaddine JB. Prevalence of age-related macular degeneration in the US population. *Archives of ophthalmology (Chicago, Ill : 1960)*. 2011;129(1):75-80.

74. Abdel-Aal E-SM, Akhtar H, Zaheer K, Ali R. Dietary sources of lutein and zeaxanthin carotenoids and their role in eye health. *Nutrients*. 2013;5(4):1169-1185.
75. Krinsky NI, Landrum JT, Bone RA. Biologic mechanisms of the protective role of lutein and zeaxanthin in the eye. *Annual review of nutrition*. 2003;23:171-201.
76. Blaser MJ, Kirschner D. The equilibria that allow bacterial persistence in human hosts. *Nature*. 2007;449(7164):843-849.
77. Frank DN, St Amand AL, Feldman RA, Boedeker EC, Harpaz N, Pace NR. Molecular-phylogenetic characterization of microbial community imbalances in human inflammatory bowel diseases. *Proceedings of the National Academy of Sciences of the United States of America*. 2007;104(34):13780-13785.
78. Barnich N, Darfeuille-Michaud A. Role of bacteria in the etiopathogenesis of inflammatory bowel disease. *World journal of gastroenterology*. 2007;13(42):5571-5576.
79. O'Toole PW, Claesson MJ. Gut microbiota: Changes throughout the lifespan from infancy to elderly. *International Dairy Journal*. 2010;20(4):281-291.
80. Kassinen A, Krogius-Kurikka L, Makivuokko H, et al. The fecal microbiota of irritable bowel syndrome patients differs significantly from that of healthy subjects. *Gastroenterology*. 2007;133(1):24-33.
81. Sekirov I, Russell SL, Antunes LC, Finlay BB. Gut microbiota in health and disease. *Physiological reviews*. 2010;90(3):859-904.
82. Larsen N. Gut microbiota in human adults with type 2 diabetes differs from non-diabetic adults. *PloS one*. 5(2):e9085.
83. Ley RE, Turnbaugh PJ, Klein S, Gordon JI. Microbial ecology: Human gut microbes associated with obesity. *Nature*. 2006;444(7122):1022-1023.
84. Armougom F. Monitoring bacterial community of human gut microbiota reveals an increase in lactobacillus in obese patients and methanogens in anorexic patients. *PloS one*. 4(9):e7125.
85. Stenman LK, Burcelin R, Lahtinen S. Establishing a causal link between gut microbes, body weight gain and glucose metabolism in humans – towards treatment with probiotics. *Beneficial Microbes*. 2016;7(1):11-22.
86. Clemente Jose C, Ursell Luke K, Parfrey Laura W, Knight R. The impact of the gut microbiota on human health: An integrative view. *Cell*. 148(6):1258-1270.
87. Hill C, Guarner F, Reid G, et al. Expert consensus document: The International Scientific Association for Probiotics and Prebiotics consensus statement on the scope and appropriate use of the term probiotic. *Nat Rev Gastroenterol Hepatol*. 2014;11(8):506-514.
88. Gibson GR, Scott KP, Rastall RA, et al. Dietary prebiotics: current status and new definition. *Food Science & Technology Bulletin: Functional Foods*. 2010;7(1):1-19.
89. Louis P, Scott KP, Duncan SH, Flint HJ. Understanding the effects of diet on bacterial metabolism in the large intestine. *Journal of applied microbiology*. 2007;102(5):1197-1208.
90. Murphy MM, Douglass JS, Birkett A. Resistant starch intakes in the United States. *Journal of the American Dietetic Association*. 2008;108(1):67-78.

91. Davis LM, Martinez I, Walter J, Goin C, Hutkins RW. Barcoded pyrosequencing reveals that consumption of galactooligosaccharides results in a highly specific bifidogenic response in humans. *PLoS One*. 2011;6(9):e25200.
92. Ramirez-Farias C, Slezak K, Fuller Z, Duncan A, Holtrop G, Louis P. Effect of inulin on the human gut microbiota: stimulation of *Bifidobacterium adolescentis* and *Faecalibacterium prausnitzii*. *The British journal of nutrition*. 2009;101(4):541-550.
93. Sleeth ML, Thompson EL, Ford HE, Zac-Varghese SE, Frost G. Free fatty acid receptor 2 and nutrient sensing: a proposed role for fibre, fermentable carbohydrates and short-chain fatty acids in appetite regulation. *Nutrition research reviews*. 2010;23(1):135-145.
94. International Food Information Council Foundation. *Food Decision 2016 Food and Health Survey*. 2016.
95. United States Department of Agriculture Nutrition Evidence Library. In adults, what is the relationship between the intake of vegetables and fruits, not including juice, and body weight? http://www.nel.gov/evidence.cfm?evidence_summary_id=250367_body_composition,_etc. Accessed August 1, 2016.
96. Bes-Rastrollo M, Martinez-Gonzalez MA, Sanchez-Villegas A, de la Fuente Arrillaga C, Martinez JA. Association of fiber intake and fruit/vegetable consumption with weight gain in a Mediterranean population. *Nutrition (Burbank, Los Angeles County, Calif)*. 2006;22(5):504-511.
97. Buijsse B, Feskens EJ, Schulze MB, et al. Fruit and vegetable intakes and subsequent changes in body weight in European populations: results from the project on Diet, Obesity, and Genes (DiOGenes). *Am J Clin Nutr*. 2009;90(1):202-209.
98. Davis JN, Hodges VA, Gillham MB. Normal-weight adults consume more fiber and fruit than their age- and height-matched overweight/obese counterparts. *J Am Diet Assoc*. 2006;106(6):833-840.
99. He K, Hu FB, Colditz GA, Manson JE, Willett WC, Liu S. Changes in intake of fruits and vegetables in relation to risk of obesity and weight gain among middle-aged women. *International journal of obesity and related metabolic disorders : journal of the International Association for the Study of Obesity*. 2004;28(12):1569-1574.
100. Vioque J, Weinbrenner T, Castello A, Asensio L, Garcia de la Hera M. Intake of fruits and vegetables in relation to 10-year weight gain among Spanish adults. *Obesity (Silver Spring, Md)*. 2008;16(3):664-670.
101. Bertoa ML, Mukamal KJ, Cahill LE, et al. Correction: Changes in intake of fruits and vegetables and weight change in United States men and women followed for up to 24 years: Analysis from three prospective cohort studies. *PLoS Med*. 2016;13(1):e1001956.
102. Bronfenbrenner U. Toward an experimental ecology of human development. *The American psychologist*. 1977;32(7):513-531.
103. Centers for Disease Control and Prevention. Framing the issue- Social Ecological Model 2013; <http://www.cdc.gov/nccdphp/dnpao/state-local-programs/health-equity/framing-the-issue.html>. Accessed October 25, 2016.

104. Institute of Medicine Committee on Prevention of Obesity in CY. The National Academies Collection: Reports funded by National Institutes of Health. In: Koplan JP, Liverman CT, Kraak VI, eds. *Preventing Childhood Obesity: Health in the Balance*. Washington (DC): National Academies Press (US), National Academy of Sciences; 2005:85.
105. Story M, Kaphingst KM, Robinson-O'Brien R, Glanz K. Creating healthy food and eating environments: policy and environmental approaches. *Annual review of public health*. 2008;29:253-272.
106. Harris G. Development of taste and food preferences in children. *Current opinion in clinical nutrition and metabolic care*. 2008;11(3):315-319.
107. Robinson T. Applying the socio-ecological model to improving fruit and vegetable intake among low-income African Americans. *Journal of community health*. 2008;33(6):395-406.
108. Caton SJ, Ahern SM, Remy E, Nicklaus S, Blundell P, Hetherington MM. Repetition counts: repeated exposure increases intake of a novel vegetable in UK pre-school children compared to flavour-flavour and flavour-nutrient learning. *British Journal of Nutrition*. 2013;109(11):2089-2097.
109. Rudd Center for Food and Policy & Obesity. *Access to healthy foods in low-income neighborhoods opportunities for public policy*. New Haven, CT: Yale University;2008.
110. Coleman-Jensen A, Rabbitt MP, Gregory C, Singh A. *Household food security in the United States in 2015*. Economic Research Service, U.S. Department of Agriculture;September 2016.
111. Anderson S. Core indicators of nutritional state for difficult-to-sample populations. *The Journal of Nutrition*. 1990;120(11 Suppl):1555-1600.
112. Usher KM. Valuing all knowledges through an expanded definition of access. *Journal of Agriculture, Food Systems, and Community Development*. 2015;4(5):109-114.
113. United States Department of Agriculture Economic Research Service. Definition of a food desert. 2015; http://www.ers.usda.gov/dataFiles/Food_Access_Research_Atlas/Download_the_Data/Archived_Version/archived_documentation.pdf. Accessed August 21, 2016.
114. Lopez RP. Neighborhood risk factors for obesity. *Obesity*. 2007;15(8):2111-2119.
115. Morland K, Diez Roux AV, Wing S. Supermarkets, other food stores, and obesity: the atherosclerosis risk in communities study. *American journal of preventive medicine*. 2006;30(4):333-339.
116. Jetter KM, Cassady DL. The availability and cost of healthier food alternatives. *American journal of preventive medicine*. 2006;30(1):38-44.
117. United States Department of Agriculture Economic Research Service. *Access to affordable and nutritious food: Measuring and understanding food deserts and their consequences*. 2009.
118. Haynes-Maslow L, Auvergne L, Mark B, Ammerman A, Weiner BJ. Low-income individuals' perceptions about fruit and vegetable access programs: A qualitative study. *J Nutr Educ Behav*. 2015;47(4):317-324 e311.
119. Grimm KA, Foltz JL, Blanck HM, Scanlon KS. Household income disparities in fruit and vegetable consumption by state and territory: Results of the 2009

- Behavioral Risk Factor Surveillance System. *Journal of the Academy of Nutrition and Dietetics*. 2012;112(12):2014-2021.
120. Zick CD, Smith KR, Fan JX, Brown BB, Yamada I, Kowaleski-Jones L. Running to the store? The relationship between neighborhood environments and the risk of obesity. *Social science & medicine (1982)*. 2009;69(10):1493-1500.
 121. Brug J, Tak NI, te Velde SJ, Bere E, de Bourdeaudhuij I. Taste preferences, liking and other factors related to fruit and vegetable intakes among schoolchildren: results from observational studies. *The British journal of nutrition*. 2008;99 Suppl 1:S7-s14.
 122. Schindler JM, Corbett D, Forestell CA. Assessing the effect of food exposure on children's identification and acceptance of fruit and vegetables. *Eating Behaviors*. 2013;14(1):53-56.
 123. Alkon AH, Block D, Moore K, Gillis C, DiNuccio N, Chavez N. Foodways of the urban poor. *Geoforum*. 2013;48:126-135.
 124. Delind LB. Of bodies, place, and culture: Re-situating local food. *Journal of agricultural & environmental ethics*. 19(2):121-146.
 125. Moore LV, Diez Roux AV, Franco M. Measuring availability of healthy foods: Agreement between directly measured and self-reported data. *American Journal of Epidemiology*. 2012;175(10):1037-1044.
 126. Wakefield S, Yeudall F, Taron C, Reynolds J, Skinner A. Growing urban health: community gardening in South-East Toronto. *Health promotion international*. 2007;22(2):92-101.
 127. Park S-A, Shoemaker CA, Haub MD. Physical and psychological health conditions of older adults classified as gardeners or nongardeners. *HortScience*. 2009;44(1):206-210.
 128. Alaimo K, Packnett E, Miles RA, Kruger DJ. Fruit and vegetable Intake among urban community gardeners. *Journal of Nutrition Education and Behavior*. 2008;40(2):94-101.
 129. Heim S, Stang J, Ireland M. A garden pilot project enhances fruit and vegetable consumption among children. *Journal of the American Dietetic Association*. 2009;109(7):1220-1226.
 130. Appleton KM, Hemingway A, Saulais L, et al. Increasing vegetable intakes: rationale and systematic review of published interventions. *European journal of nutrition*. 2016;55(3):869-896.
 131. Chin MH, Clarke AR, Nocon RS, et al. A roadmap and best practices for organizations to reduce racial and ethnic disparities in health care. *Journal of general internal medicine*. 2012;27(8):992-1000.
 132. Wholesome Wave. Wholesome Wave's fruit and vegetable prescription program, New York City. 2013; http://www.wholesomewave.org/wp-content/uploads/2014/10/FVRx-2013_HHC_Report.pdf. Accessed August 20, 2016.
 133. Jane E. Brody. Prescribing vegetables, not pills. *The New York Times*. December 2, 2014, 2014.
 134. Katherine O'Brien. Prescription food programs for seniors. 2016; <http://www.aplaceformom.com/blog/8-25-16-prescription-food-programs-for-seniors/>. Accessed August 30, 2016.

135. Blair A Robertson. Grass-roots Movement to Prevent Disease and Treat Illness with Food. 2016; <http://www.news-journalonline.com/news/20160905/grass-roots-movement-to-prevent-disease-and-treat-illness-with-food>, September 2, 2016.
136. Maggie Van Dyke. Pediatricians fight hunger with prescriptions for produce. 2016; <http://www.hhnmag.com/articles/7318-pediatricians-fight-hunger-with-prescriptions-for-produce>. Accessed August 15, 2016.
137. Wholesome Wave. Wholesome Wave's fruit and vegetable prescription program. 2014; http://legacy.wholesomewave.org/wp-content/uploads/2014/07/2012_Fruit-and-Vegetable-Prescription-Program-Factsheet-copy.pdf. Accessed September 1, 2016.
138. Payne GH, Wethington H, Olsho L, Jernigan J, Farris R, Walker DK. Implementing a Farmers' Market Incentive Program: Perspectives on the New York City Health Bucks Program. *Preventing Chronic Disease*. 2013;10:E145.
139. Freedman DA, Choi SK, Hurley T, Anadu E, Hébert JR. A farmers' market at a federally qualified health center improves fruit and vegetable intake among low-income diabetics. *Preventive Medicine*. 2013;56(5):288-292.
140. Buyuktuncer Z, Kearney M, Ryan CL, Thurston M, Ellahi B. Fruit and vegetables on prescription: a brief intervention in primary care. *Journal of human nutrition and dietetics : the official journal of the British Dietetic Association*. 2014;27 Suppl 2:186-193.
141. Lusthaus C, Anderson G, Murphy E. *Institutional assessment: A framework for strengthening organizational capacity for IDRC's research partners*. IDRC; 1995.
142. Sobeck J, Agius E. Organizational capacity building: Addressing a research and practice gap. *Evaluation and Program Planning*. 2007;30(3):237-246.
143. Cassidy EF, Leviton LC, Hunter DE. The relationships of program and organizational capacity to program sustainability: What helps programs survive? : Pergamon; 2006.
144. Matachi A, Africa IIFCBI. *Capacity Building Framework: UNESCO-IICBA*. United Nations Economic Commission for Africa; 2006.
145. Morgan P. Capacity and capacity development-some strategies. *Hull: Canadian International Development Agency*. 1998.
146. Centers for Disease Control and Prevention. Social ecological model. 2015; <https://www.cdc.gov/cancer/crcp/sem.htm>. Accessed December 31, 2016.
147. Hawe P, Noort M, King L, Jordens C. Multiplying health gains: the critical role of capacity-building within health promotion programs. *Health policy*. 1997;39(1):29-42.
148. Eichler M, Hoffman D. Strategic engagements: Building community capacity by building relationships. *Boston, MA: Consensus Organizing Institute*. 1998.
149. Chaskin RJ. Building community capacity a definitional framework and case studies from a comprehensive community initiative. *Urban affairs review*. 2001;36(3):291-323.
150. Hilderbrand ME, Grindle MS, Trostle JA, et al. *Getting Good Government: Capacity Building in the Public Sectors of Developing Countries*. Cambridge, MA: Harvard University Press; 1997.

151. Jörgens H, Jänicke M, Weidner H. *National environmental policies: A comparative study of capacity-building*. Springer Science & Business Media; 2012.
152. Moscardo G. *Building community capacity for tourism development*. Cabi; 2008.
153. Meenar MR. Nonprofit-driven community capacity-building efforts in community food systems. 2015.
154. Labonte R, Woodard GB, Chad K, Laverack G. Community capacity building: a parallel track for health promotion programs. *Can J Public Health*. 2002;93(3):181-182.
155. Goodman RM, Speers MA, McLeroy K, et al. Identifying and defining the dimensions of community capacity to provide a basis for measurement. *Health Education & Behavior*. 1998;25(3):258-278.
156. Meyer SE. *Building community capacity: The potential of community foundations*. Minneapolis, MN: Rainbow Research; 1994.
157. Gittell M, Newman K, Ortega I. Building civic capacity: Best CDC practices. Paper presented at: Annual Urban Affairs Association Conference. Portland, OR1995.
158. Liberato SC, Brimblecombe J, Ritchie J, Ferguson M, Coveney J. Measuring capacity building in communities: a review of the literature. *BMC Public Health*. 2011;11:850-850.
159. de Silva-Sanigorski AM, Bell AC, Kremer P, et al. Reducing obesity in early childhood: results from Romp & Chomp, an Australian community-wide intervention program. *The American Journal of Clinical Nutrition*. 2010;91(4):831-840.
160. Sanigorski AM, Bell A, Kremer PJ, Cuttler R, Swinburn BA. Reducing unhealthy weight gain in children through community capacity-building: results of a quasi-experimental intervention program, Be Active Eat Well. *International Journal of Obesity*. 2008;32(7):1060-1067.
161. Viola A. Evaluation of the Outreach School Garden Project: building the capacity of two indigenous remote school communities to integrate nutrition into the core school curriculum. *Health Promotion Journal of Australia*. 2006;17(3):233.
162. MacLean DR, Farquharson J, Heath S, Barkhouse K, Latter C, Joffres C. Building capacity for heart health promotion: results of a 5-year experience in Nova Scotia, Canada. *American journal of health promotion : AJHP*. 2003;17(3):202-212.
163. Andersson CM, Bjärås G, Tillgren P, Östenson C-G. A longitudinal assessment of inter-sectoral participation in a community-based diabetes prevention programme. *Social Science & Medicine*. 2005;61(11):2407-2422.
164. Crisp BR, Swerissen H, Duckett SJ. Four approaches to capacity building in health: consequences for measurement and accountability. *Health promotion international*. 2000;15(2):99-107.
165. Heward S, Hutchins C, Keleher H. Organizational change—key to capacity building and effective health promotion. *Health promotion international*. 2007;22(2):170-178.
166. Harrell MC, Bradley MA. *Data collection methods. Semi-structured interviews and focus groups*. DTIC Document;2009.

167. Creswell JW. *Qualitative inquiry and research design: Choosing among five approaches*. Sage; 2013.
168. Lindseth A, Norberg A. A phenomenological hermeneutical method for researching lived experience. *Scandinavian journal of caring sciences*. 2004;18(2):145-153.
169. Strauss AL. *Qualitative analysis for social scientists*. Cambridge University Press; 1987.
170. Jacobs JA, Dodson EA, Baker EA, Deshpande AD, Brownson RC. Barriers to evidence-based decision making in public Hhealth: A national survey of chronic disease practitioners. *Public Health Reports*. 2010;125(5):736-742.
171. Shediak-Rizkallah MC, Bone LR. Planning for the sustainability of community-based health programs: conceptual frameworks and future directions for research, practice and policy. *Health education research*. 1998;13(1):87-108.
172. Jacobs JA, Jones E, Gabella BA, Spring B, Brownson RC. Tools for implementing an evidence-based approach in public health practice. *Prev Chronic Dis*. 2012;9:E116.
173. Dodson EA, Baker EA, Brownson RC. Use of evidence-based interventions in state health departments: a qualitative assessment of barriers and solutions. *Journal of public health management and practice : JPHMP*. 2010;16(6):E9-e15.
174. Laverack G. *Addressing the contradiction between discourse and practice in health promotion*. Deakin University;1999.
175. Labonte R, Laverack G. Capacity building in health promotion, Part 1: For whom? And for what purpose? *Critical public health*. 2001;11(2):111-127.
176. Oxford Dictionary. Definition of knowledge in English 2017; <https://en.oxforddictionaries.com/definition/knowledge>. Accessed January 24, 2017.
177. Business Dictionary. Skill definition 2017; <http://www.businessdictionary.com/definition/skill.html>. Accessed January 24, 2017.
178. Mirriam Webster Dictionary. Definition of experience 2017; <https://www.merriam-webster.com/dictionary/experience>. Accessed January 24, 2017.
179. Immigration Advisors Authority. Ethics toolkit. 2107; <http://www.iaa.govt.nz/adviser/ethics-toolkit/personal.asp>. Accessed January 24, 2017.
180. Dictionary O. Definition of belief. 2017; <https://en.oxforddictionaries.com/definition/belief>). Accessed January 24, 2017.
181. Oxford Dictionary. Definition of attitude. 2017; <https://en.oxforddictionaries.com/definition/attitude>. Accessed January 24, 2017.
182. Dictionary.com. Definition of relationship 2017; <http://www.dictionary.com/browse/relationship>. Accessed January 24, 2017.
183. Oxford Dictionary. Definition of strategy. 2017; <https://en.oxforddictionaries.com/definition/strategy>. Accessed January 24, 2017.
184. Dictionary.com. Definition of tool 2107; <http://www.dictionary.com/browse/tool>. Accessed January 24, 2017.

185. Dictionary.com. Definition of training. 2017;
<http://www.dictionary.com/browse/training?s=t>. Accessed January 24, 2017.
186. The Free Dictionary. Definition of technical assistance. 2017;
<http://www.thefreedictionary.com/technical+assistance>. Accessed January 24, 2017.
187. Japan International Cooperation Agency. Capacity development handbook for JICA staff. 2004; https://www.jica.go.jp/jica-ri/IFIC_and_JBICI-Studies/english/publications/reports/study/capacity/200403/pdf/200403.pdf. Accessed October 2, 2016.
188. Small Business Chron. What is the meaning of organizational strategy? 2017;
<http://smallbusiness.chron.com/meaning-organizational-strategy-59427.html>. Accessed October 24, 2017.
189. Business Dictionary. Definition of strategic planning 2017;
<http://www.businessdictionary.com/definition/strategic-planning.html>. Accessed January 24, 2017.
190. The Free Dictionary. Definition of know-how. 2017;
<http://www.thefreedictionary.com/know-how>. Accessed January 24, 2017.
191. The Business Dictionary. Definition of program management. 2017;
<http://www.businessdictionary.com/definition/program-management.html>. Accessed January 24, 2017.
192. The Business Dictionary. Definition of organizational culture 2017;
<http://www.businessdictionary.com/definition/organizational-culture.html>. Accessed January 24, 2017.
193. Business Dictionary. Definition of reward system 2017;
<http://www.businessdictionary.com/definition/individual-incentive-program.html>. Accessed January 24, 2017.
194. The Business Dictionary. Definition of leadership of managers. 2017;
<http://www.businessdictionary.com/definition/leadership.html>. Accessed January 24, 2017.
195. Business Dictionary. Definition of political environment. 2017;
<http://www.businessdictionary.com/definition/political-environmental.html>. Accessed January 24, 2017.
196. Business Dictionary. Definition of economic environment. 2017;
<http://www.businessdictionary.com/definition/economic-environment.html>. Accessed January 24, 2017.
197. Department of Sociology at Iowa State University. Community capitals.
<http://www.soc.iastate.edu/staff/cflora/ncrcrd/capitals.html>. Accessed January 24, 2017.