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**Evaluating Seeding Galveston:
Assessing Food Security and Health-Related Outcomes**

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**Evaluating Seeding Galveston:
Assessing Food Security and Health-Related Outcomes**

by

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Capstone

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Dedication

I would like to dedicate this to my parents for everything they have done to help me
achieve my dreams.

Acknowledgements

My thanks go to my capstone chair, Dr. Cara Pennel, and my committee members, Dr. Christine Arcari and Dr. Heidi Spratt, for their guidance and support in preparing the capstone. I would especially like to acknowledge Dr. Arcari for continually inspiring me to apply public health knowledge to daily life and being an excellent advisor to MPH students. I would like to recognize my PhD mentor, Dr. Slobodan Paessler, for giving me the flexibility to complete the MPH program while working in his lab. Lastly, I would like to thank Dr. Alan Barrett and the Sealy Center for Vaccine Development for the opportunity to apply the knowledge of the MPH program to an internship at the WHO in Geneva, Switzerland.

**Evaluating Seeding Galveston:
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Program evaluation is a crucial step in the success of community-based programs, as it allows stakeholders and community organizations to determine the success of our efforts and make changes where necessary to improve our community programs. Evaluations are fluid and cannot just be done once, thus the importance of establishing an evaluation program within community organizations. Seeding Galveston, a relatively young non-profit organization on Galveston Island, seeks to increase food security for low-income residents and provide a sustainable food source for all. Seeding Galveston requires an evaluation to determine how to further the growth of their organization and if they are using their resources in the best way possible. The goal of this proposal is to develop and begin implementation of an evaluation plan such that Seeding Galveston can evaluate current programs and make self-evaluation a requirement for all new programs, thus leading to a sustainable evaluation technique for the life of their organization.

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List of Abbreviations

AAP	American Academy of Pediatrics
CDC	Centers for Disease Control and Prevention
CSA	Community sponsored agriculture
ERS	Economic Research Service
FAO	Food and Agriculture Organization of the United Nations
FDA	United States Food and Drug Administration
GCFB	Galveston County Food Bank
HHS	United States Department of Health and Human Services
ODPHP	Office of Disease Prevention and Health Promotion
SG	Seeding Galveston
SNAP	Supplemental Nutrition Assistance Program
USDA	United States Department of Agriculture
UTMB	University of Texas Medical Branch
WHO	World Health Organization

CHAPTER 1: INTRODUCTION

SEEDING GALVESTON

Although efforts have been made in the community over the past years, Galveston Island has lacked a sustainable, community-derived food source and evidence-based nutrition education. Seeding Galveston is a local 501(c)3 organization that aims to increase green space, remove food deserts, and increase access to nutritional foods on Galveston Island by developing unused land into urban farms. Their urban farm project teaches sustainable farming techniques, nutritious food choices, and healthy cooking through the implementation of a small-city urban agriculture model. The organization has already started transforming the city of Galveston through creation of urban farm plots in previously unused public and private land spaces, visible at Postoffice and 25th Street, Avenue N and 33rd Street, and St. Augustine's of Hippo Church at Avenue M1/2 and 41st (Seeding Galveston 2016).

The overall mission of Seeding Galveston (SG) is to: (1) provide sustainable agriculture programs that make island-grown produce, eggs, and goat products available year-round, (2) establish a system to support island food banks and other low-income support systems to share in the local produce, (3) establish education resources on site to promote sustainable food techniques and nutritious food choices, and (4) develop ancillary businesses to support the urban farm concept (Seeding Galveston 2016). They plan to accomplish this mission through some of the following goals and activities: (1) encourage participation of community members that can earn produce shares by donating their time

to urban farm development, (2) create a sustainable agricultural resource using evidence-based farm models, (3) make produce, eggs, and goat dairy products readily available to the community through onsite vending, (4) provide produce to Galveston organizations that serve the needy populations on the island, (5) develop educational programs to promote nutrition and home gardening, (6) collaborate with local school programs to develop a hands-on appreciation for local and seasonal ingredients through the Agricorps programs, and (7) assist local organizations, neighborhoods, and individuals in creating and developing gardens (Seeding Galveston 2016).

Seeding Galveston has demonstrated great success in galvanizing support and assistance from a diverse range of community members and organizations, such as the Galveston Independent School District, the local Girl and Boy Scout Troops, students from UTMB and Texas A&M Galveston, and have had financial support through grant monies from the UTMB's President's Cabinet Award and Harris and Eliza Kempner Fund. Seeding Galveston is also partnered with Urban Harvest, a Houston-based program dedicated to increase food access and nutrition education (Seeding Galveston 2016). This partnership will allow Seeding Galveston to adapt the Houston Urban Harvest programs for use throughout Galveston Island.

It is important to evaluate organizations and their programs to maximize positive outcomes in the communities they serve. In this case, the organization as a whole and in the context of their programs need evaluations to ensure they are effective and appropriate for Galveston Island. Seeding Galveston's ultimate goals are to address two common problems in the United States: food security and nutrition-related health outcomes. Thus, the evaluation will be centered around these items.

SPECIFIC AIMS

Seeding Galveston is a young organization, leaving many questions about the success of current programs and what programs they should pursue in the future. As funding for SG increases, so does the need for a plan to evaluate the success of their community outreach programs and the effects on public health. The purpose of this capstone is to address this need.

Aim 1: Design a program evaluation that allows Seeding Galveston to evaluate: (1) the knowledge and use of their programs, (2) their charitable donations, and (3) nutrition-related health outcomes in Galveston residents.

Aim 2: Conduct the first phase of the program evaluation designed in Aim 1. The program evaluation pieces to be completed as part of this proposal will address: (1) the preliminary knowledge and use of Seeding Galveston's available programs and (2) the amount of food being donated to charitable sources.

CHAPTER 2: BACKGROUND AND SIGNIFICANCE

WHAT IS FOOD SECURITY?

To better understand problems associated with food security, one first needs to understand the concepts and definitions. The World Health Organization (WHO) 1996 World Food Summit defined food security as “when all people at all times have access to sufficient safe, nutritious food to maintain a healthy and active life”. It is a complex sustainable development issue built on three main things: food availability, food access, and food use. Availability means that food is acquired consistently and in proper quantities; access implies that resources are available to obtain nutritious foods; and use is related to knowledge of nutrition, water, and sanitation.

MEASURES OF FOOD SECURITY/INSECURITY

Indicators of low food security include families that worry food will run out, ate less than they should, cut the size of or skipped a meal, were hungry but could not afford food to eat, and did not eat for the whole day (WHO 2016). Surveys evaluating those indicators are sent yearly and analyzed by the Economic Research Service (ERS) of the USDA. An additional USDA measure evaluates low-income individuals living within 0.5-1.0 mile of a food source or grocery store, as living beyond that mileage is considered low access to food (Ploeg and Breneman 2015, USDA-ERS 2016). This measure evaluates food desserts in an area and will be discussed later in the Chapter.

The Food and Agriculture Organization of the United Nations (FAO) have defined two general types of food insecurity: chronic and transitory (FAO 2015). Chronic is a long-term lack of food requirements and often occurs due to extended periods of poverty and

inadequate access to sustainable food sources. Alternatively, transitory food insecurity is temporary and short-term, but occurrences are unpredictable and often sudden. This is usually a result of decreased domestic food production and fluctuations in food availability (FAO 2015).

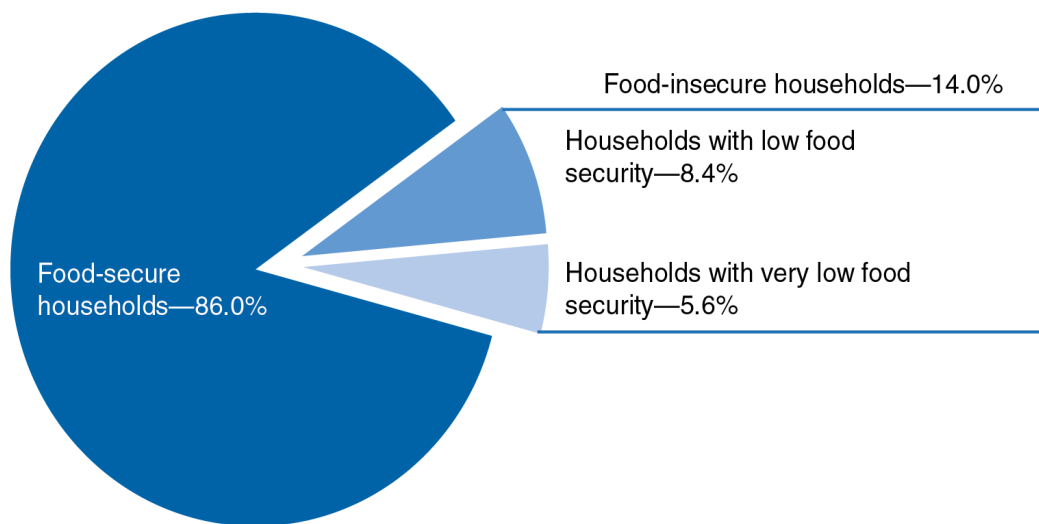
There are four major terms used when discussing food security. What used to be described as “food security” can be referred to as “high food security” and “marginal food security” depending on how many food security indicators were met. The term “food insecurity” is also referred to as “low food security” or “very low food security”, again dependent on how many food security indicators were met. In general, high food security is associated with no reported problems related to food access, while marginal food security meant that there may be anxiety over food sufficiency or shortage of food for a household, but did not lead to a change in diet or decreased food intake for that household. Alternatively, the main distinguishing factor between low and very low food security is related to food intake; households with very low food security describe reduced food intake, while households with low food security have reduced quality food but do not indicate that they are not getting enough to eat. Food insecurity is still used to describe low and very low food security in one inclusive term. It is important to note that their data collection methods did not change with the change in terms and that data from 2006 forward can still be compared to data collected prior to 2006 (USDA 2015).

As evident from above, one simple definition for food security is not available. For the purpose of this capstone, I will keep the broad definition outlined by the WHO and the corrected definitions put forth by the USDA. Both chronic and transitory food security described by the FAO will be referenced, although I may be unable to differentiate between

chronic and transitory in many cases. The USDA's food security measures will be one of the main data sources for presentation of the epidemiologic problem of food security, but other sources will be used as needed when available.

FOOD SECURITY IN THE US, TEXAS, AND GALVESTON

Figure 2.1: U.S. households by food security status, 2014

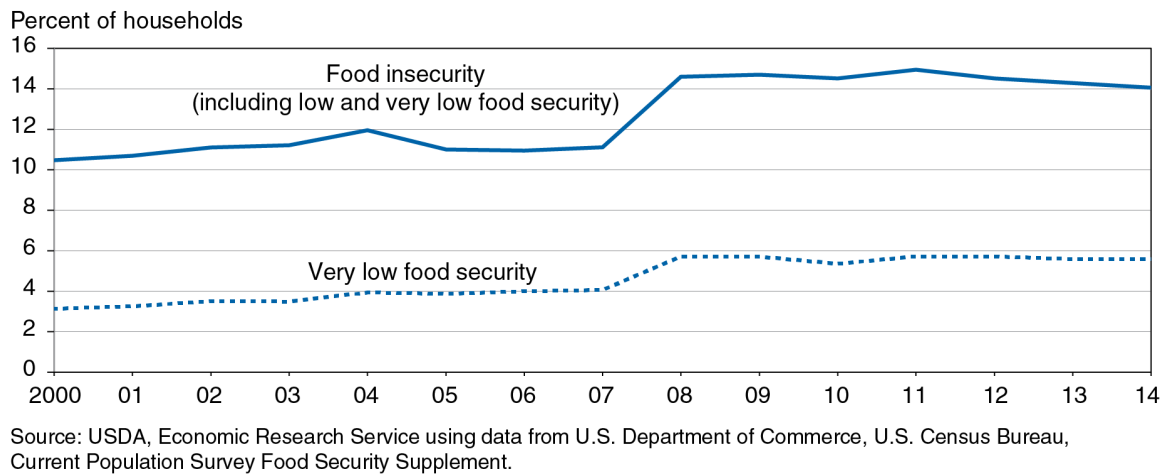


Source: USDA, Economic Research Service using data from U.S. Department of Commerce, U.S. Census Bureau, 2014 Current Population Survey Food Security Supplement.

National estimates from 2014 indicate that 6.9 million households were food insecure at some time during the year, which equates to 14% of US households. This is a slight, although statistically insignificant, improvement from the 14.3% and 14.5% in 2013 and 2012, respectively. When, evaluating the breakdown of the 14%, we learn that 8.4% of households have low food security, while 5.6% of households have very low food security (Figure 2.1) (Coleman-Jensen 2010). The percent of households with very low food security remained unchanged from 2013 to 2014 (Figure 2.2). However, when comparing 2014 data with 2011 data, when 14.9% of households were considered food insecure, researchers at the USDA did find a significant cumulative decline in food

insecurity (Coleman-Jensen 2010). This may indicate a positive outlook on the future of food security, but only with proper preventive measures and continued diligence by public health officials.

Figure 2.2: Prevalence of food insecurity from 2000-2014

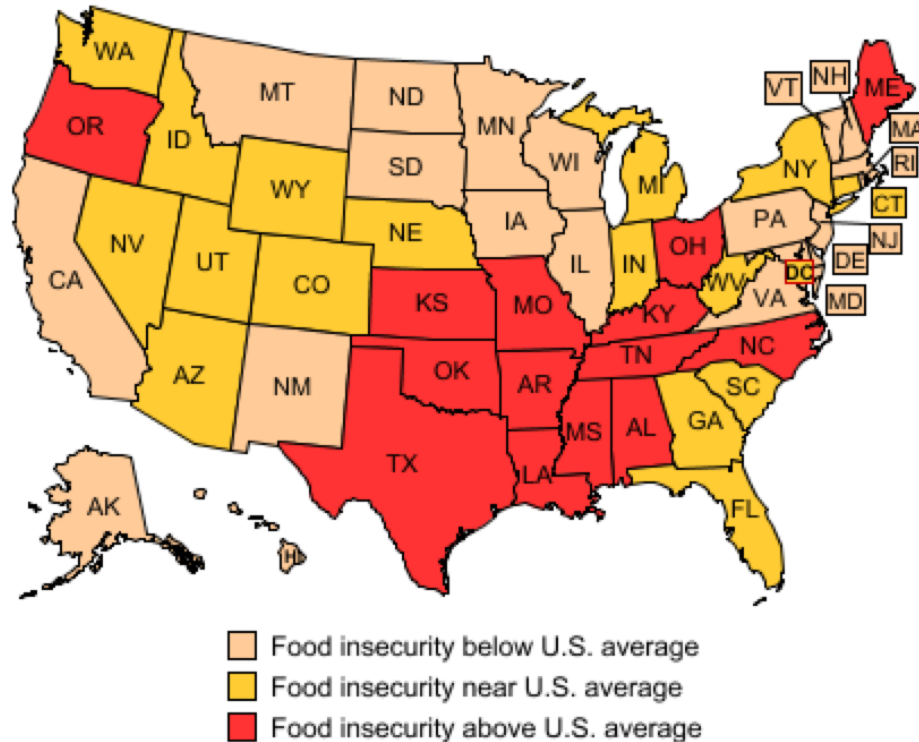


When studying the persistence of food insecurity, one team determined that 16.9% of the US population experienced food insecurity at some point during that 5-year study period and that 1.04% of the population faced chronic food insecurity during that entire time (Wilde et al. 2010). This is one of few studies that evaluates the persistence of food insecurity in the US population within the same households.

When we evaluate the food security crisis by state, Texas ranks amongst the worst (Figure 2.3). Food insecurity rates are much higher in Texas than the US average, at 17.2% for food insecurity as a whole, and 6.2% for very low food security compared to the national 14.0% and 5.6%, respectively. This means that 1.7 million Texas households, which equate to approximately 1 in 6, was food insecure (Coleman-Jensen et al. 2015). In comparison to the other states, Texas ranks 45/50 in general food security levels and ties

with Arizona, Georgia and Tennessee for 35/50 in very low food security (Coleman-Jensen et al. 2015).

Figure 2.3: Prevalence of food insecurity, average 2012-2014



Source: Calculated by ERS based on Current Population Survey Food Security Supplement data.

The Houston Food Bank estimated in 2012 that 18.4% of Galveston County households are food insecure, a rate higher than the state's average of 17.2% and only marginally lower than the average of the entire Houston Food Bank service area (19.07%) (HFB 2013). Galveston County food bank cites Feeding America estimates from 2014 that 1 in 5 Galveston county households suffer from food insecurity at some point throughout the year (GCFB 2013). When evaluating only the food insecurity in children, the Houston Food Bank determined that 23.2% of Galveston county children are food insecure (HFB 2013). Unfortunately, there is no specific data for Galveston Island and the USDA and

Houston Food Bank food desert measures are the only way to evaluate food security on the island at this time.

According to the CDC and the USDA, Galveston scores amongst the lowest in the nation for access to healthy food and lacks a sustainable, community-derived food source and evidence-based nutrition education (CDC 2010). Large regions of Galveston Island are considered a food desert, with low-income populations on the island living beyond 0.5 (green) and 1 (orange) mile from a supermarket (Figures 2.4 and 2.5) (Ploeg and Breneman 2015). As you can see in Figures 2.4 and 2.5, the majority of the island is living in a low-income and low-access area. This same USDA data set also shows the location of the low-income population in Galveston regardless of their distance to a supermarket (Figure 2.6) (Ploeg and Breneman 2015). Low-income households (purple) are distributed throughout the island. Although ease of access to a food source and food security can be related, there is no measure to evaluate the exact effects of this relationship on food security for households.

Figure 2.4: Low-income households >0.5 miles from a food source

Source: USDA Food Access Map



Figure 2.5: Low-income households >1 miles from a food source

Source: USDA Food Access Map

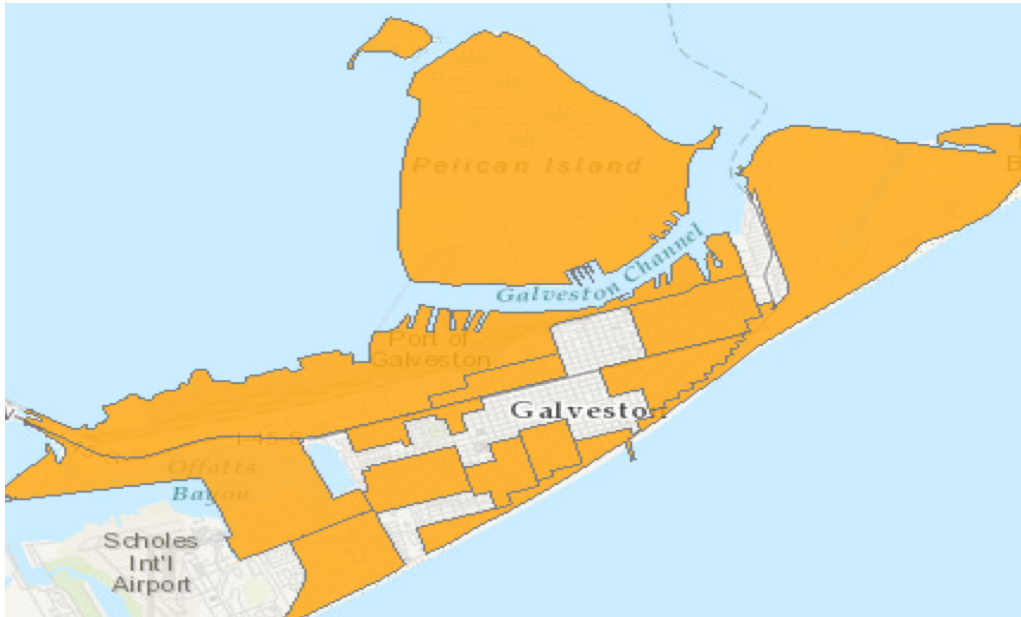
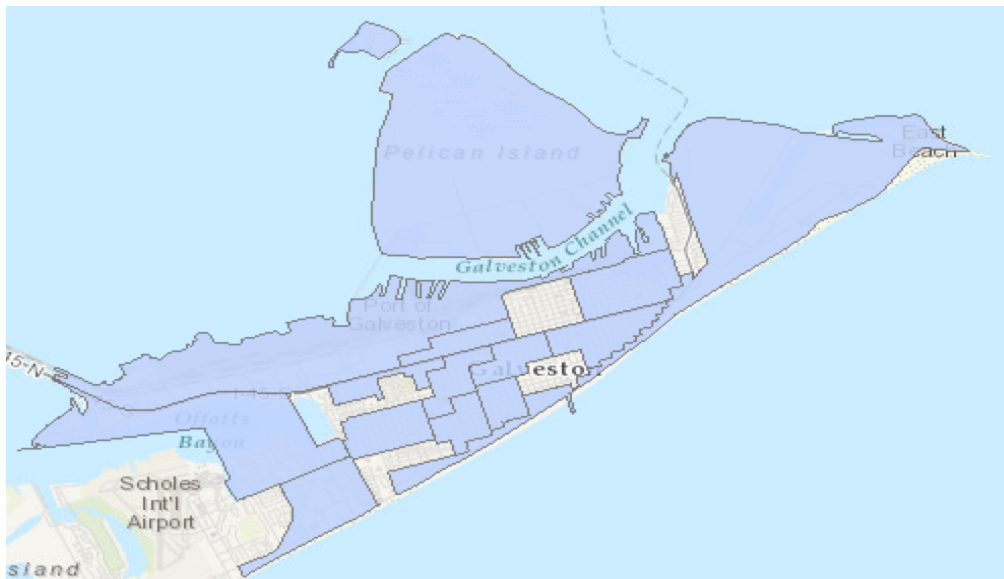


Figure 2.6: Distribution of low-income households on Galveston Island

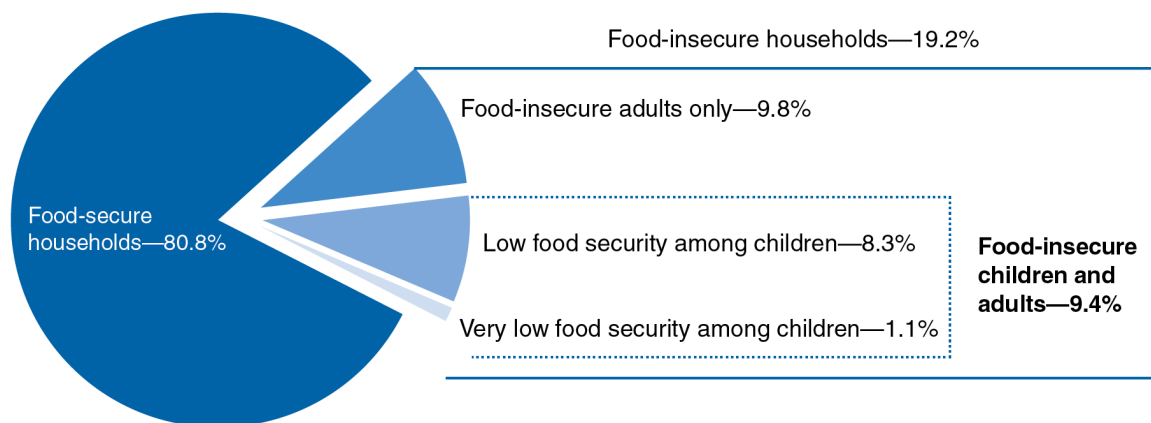
Source: USDA Food Access Map



RISK FACTORS ASSOCIATED WITH FOOD INSECURITY

The USDA 2014 survey indicates that the percentage of households with food insecurity is highest for black and Hispanic households, at 26.1% and 22.4% respectively (Coleman-Jensen et al. 2015). Households with children more often report food insecurity (19.2%) than those household without children (Figures 2.7 and 2.8). When food insecurity was a problem for households with children, 9.8% of those households had food insecure adults only, while 9.4% had both children and adults suffering from food insecurity (Figure 2.7). More households with only one adult report food insecurity than their counterpart households with more than one adult. This is the case for both households with and without children and is reported more in households with a female head than a male head (Figure 2.8). Analyzing the very low food security population within the households described above, we see a similar pattern (Figure 2.9) (Coleman-Jensen 2010, Coleman-Jensen et al. 2015).

Figure 2.7: U.S. household with children by food security status, 2014

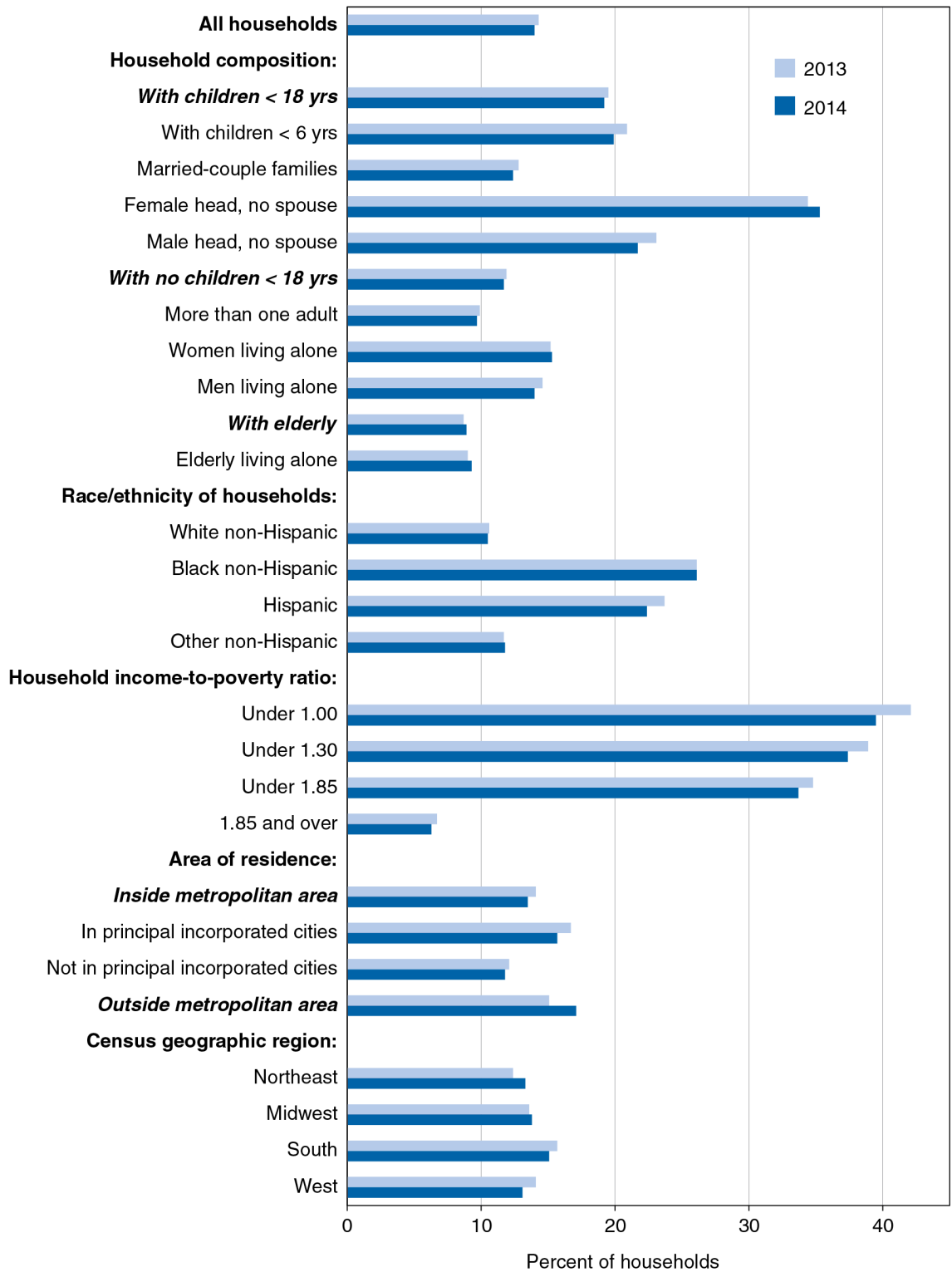


Source: USDA, Economic Research Service using data from U.S. Department of Commerce, U.S. Census Bureau, 2014 Current Population Survey Food Security Supplement.

Income level also appears to have a high impact on food security for households and is one risk-factor. This same USDA report evaluated the income level of households (Figure 2.7 and 2.8). Nearly 34% of households that live 185% below the poverty line are food insecure (Figure 2.8). Food insecurity was highest in households that live with an income to poverty ratio of 1:1 (Figure 2.8) (Coleman-Jensen et al. 2015).

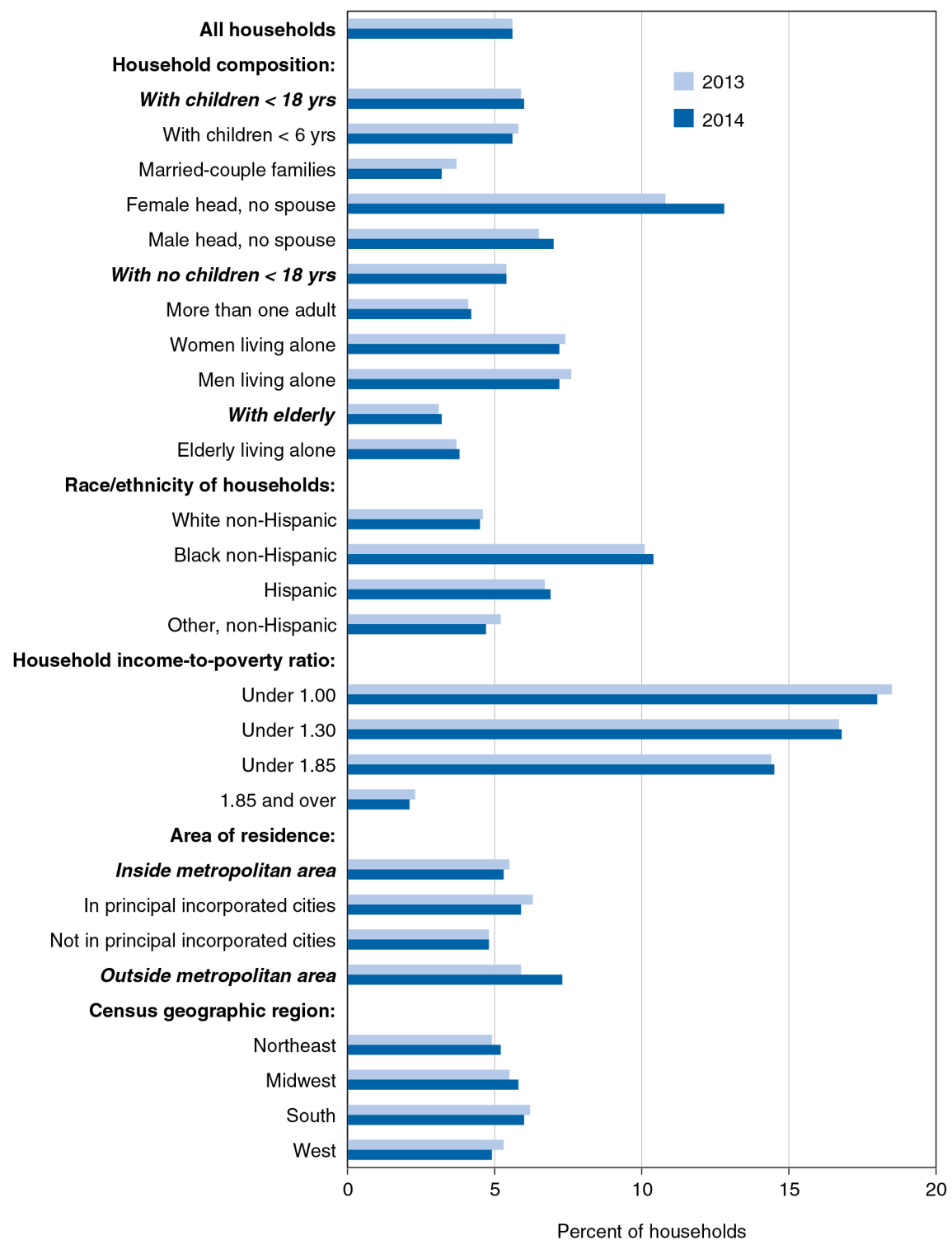
Much like income, additional risk factors have been identified. Nord and colleagues of the USDA used data from 2001-2012 on national household characteristics, including measures of food security, to estimate associations between prevalence of food insecurity and national-level economic measures, such as unemployment (Nord et al. 2014). Their multivariate linear regression models found an association between food insecurity and three economic factors: unemployment rate, annual inflation, and relative price of food. A 1% increase in the unemployment rate or annual inflation was associated with a 0.5-percentage point increase in the prevalence of food security, while a 1% increase in the relative price of food was associated with a 0.6-percentage point increase in the prevalence of food security (Nord et al. 2014). At the state level, for every 1% increase in the unemployment rate, a state's food insecurity rate increases 0.31 percentage points (Tapogna et al. 2004).

Figure 2.8: Prevalence of food insecurity, 2013 and 2014



Source: USDA, Economic Research Service using data from U.S. Department of Commerce, U.S. Census Bureau, 2013 and 2014 Current Population Survey Food Security Supplements.

Figure 2.9: Prevalence of very low food security, 2013 and 2014



Source: USDA, Economic Research Service using data from U.S. Department of Commerce, U.S. Census Bureau, 2013 and 2014 Current Population Survey Food Security Supplements.

FOOD SECURITY AND HEALTH OUTCOMES

Food insecurity has been linked to poor general health, which is exacerbated in low socio-economic households (Radimer et al. 1997, Nelson et al. 2001, Siefert et al. 2001, Tarasuk 2001, Pheley et al. 2002, Vozoris and Tarasuk 2003, Siefert et al. 2004, Stuff et al. 2004, Stuff et al. 2004, Holben and Pheley 2006, Kushel et al. 2006, Walker et al. 2007). An increase in depression is also reported in conjunction with food insecurity (Nelson et al. 2001, Siefert et al. 2001, Casey et al. 2004, Siefert et al. 2004, Heflin et al. 2005, Laraia et al. 2006, Whitaker et al. 2006). Links between food insecurity and chronic disease have also been described, including relationships to diabetes, obesity, and cardiovascular disease (Stanley et al. 2009, Seligman et al. 2010, Ford 2013, Laraia 2013, Crews et al. 2014, Irving et al. 2014, Suarez et al. 2015). The USDA recognizes that more research is needed to understand the links between food security and disease, and thus has put out an agriculture and food research initiative to learn more.

IMPROVING FOOD SECURITY: NATIONAL PROGRAMS

Improving food security is a multi-step process, beginning with emergency food assistance, soup kitchens, and child nutrition programs. This evolves to Supplemental Nutrition Assistance Program (SNAP) and related program education, gardening and urban farming, farmer's markets, and farm production programs. In conjunction with increased food availability, education programs are created to educate the youth and adult populations to take control of their health and nutrition. These steps become even more complicated when food security plays a role in food-related health outcomes.

The US Department of Health and Human Services has been working to increase food security for all Americans by adding food insecurity and other nutrition-based goals to the

Healthy People 2020 campaign (ODPHP 2016). The two defined food insecurity related goals are to eliminate very low food security in children and reduce household food insecurity; 1) reducing very low food insecurity in children from 1.3% to 0.2% and 2) reducing the 14.6% household food insecurity rate to 6.0% by 2020 (ODPHP 2016).

While this goal seems ambitious, other nutrition-related goals include increasing the number of states with nutrition standards for foods and beverages given to children in child-care, increase the number of states that have state-level policies that incentivize food retail outlets to provide foods that are encouraged by the Dietary Guidelines for Americans, and increase the proportion of Americans who have access to a food retail outlet that sells a variety of foods that are encouraged by the Dietary Guidelines for Americans (ODPHP 2016). Additionally, the American Academy of Pediatrics made promoting food security for all children a priority as of December 2015 (AAP 2015). Various branches of the USDA are also working to improve food security. The Center for Nutrition Policy and Promotion has created material for families to assist with healthy eating on a budget (USDA 2015). Together, these items will help combat food security at both the national and state level.

CHAPTER 3: SEEDING GALVESTON'S PROGRAMS

IMPROVING FOOD SECURITY: SEEDING GALVESTON

Seeding Galveston provides food to the community in several ways. The most formal ways are through community vending on the urban farm sites and through community supported agriculture (CSA) programs, where boxes of fresh produce are delivered weekly. Food is also donated to local organizations that serve the homeless and other underserved populations. Educational programs, although still in development, are coupled with food donations to improve the overall health of Seeding Galveston clients and, ultimately, community members. This section serves to describe the various programs in use and in planning for Seeding Galveston.

SEEDING GALVESTON COMMUNITY VENDING PROGRAMS

Community vending, which currently occurs once per week in the morning, is meant to attract local families in the neighborhood where the vending occurs at Avenue N and 33rd street. The produce is sold for much less than market value, currently at \$2 to fill a plastic shopping bag, to make produce more affordable for those families that are low-income. Donations are accepted from families that can afford to pay more.

The vending session occurs early in the morning to encourage families to visit before leaving for work and to encourage stay-at-home or disabled family members to shop while their families are working. New vending sessions have been added recently so that families can attend after work hours. The main purpose of these vending sessions are to serve individuals living within 1 mile of the urban farm. Seeding Galveston would like to know how vending sessions do in reaching the local community and how to improve

attendance at these sessions. If the current community vending session is working for the neighborhood, one long-term goal of the organization is to have multiple urban farm sites, where each has their own vending day to benefit the local neighborhood.

SEEDING GALVESTON: COMMUNITY SUPPORTED AGRICULTURE (CSA) PROGRAMS

The CSA program is a food delivery program entirely separate from the community vending programs. Community members throughout the island buy-in to the urban farm by paying for 1 or 2 months of food delivery in advance. This advance purchase allows Seeding Galveston to purchase seeds, fertilizer, and other items to keep the sites running. The full price of this program is currently \$100 for 1 month or \$75/month if two months are paid in advance. Home deliveries are made 50 out of 52 weeks of the year. The food delivered every week includes produce overflowing in a large mail-bin reusable box and a few recipes on how to prepare greens and other produce that may be unfamiliar to most people. The produce delivered is not expected to create all meals for the entire week, but to supplement a family's eating habits with healthy side dishes and snacks throughout several of the week's meals. This program is subsidized for low-income families and those with health complications that require a specific green diet. Seeding Galveston would like to know the demographics of their vending and CSA programs, as well as the usefulness of the recipes/education that they deliver with these programs.

SEEDING GALVESTON: FOOD DONATION PROGRAMS

Another important aspect of Seeding Galveston's plan is to give back to the community. This is done through food donations to non-profit community organizations in two ways; 1) direct donations from Seeding Galveston to these organizations or 2) garden

space donated to community organizations. Currently, donations are taken to St. Vincent's, Our Daily Bread, Streetscape ministries, and SMART Family literacy. These are all Galveston-based organizations that serve the homeless, low-income families, or those with limited access to health care. Seeding Galveston aims to donate at least one-fourth of their production. The organization would like to evaluate the amount of food they are donating based on what is produced and determine if they have the resources to increase the number of island organizations receiving donations.

SEEDING GALVESTON: EDUCATION PROGRAMS

The most recent program that Seeding Galveston is developing is one aimed to improve health outcomes through nutrition education and sustainable food sources. This program was created to give individuals and families in Galveston the ability to take partial ownership of their health by growing and maintaining their own healthy foods. In addition to evaluating the population reached with these programs, Seeding Galveston would like to understand if these programs are having a positive effect on the health and food security of the individuals and families participating in the program.

CHAPTER 4: EVALUATION METHODS

WHY EVALUATE?

Evaluations are crucial to an organization's progress. Program evaluation requires systematic planning and should be designed prior to implementing new programs to best understand their effectiveness and efficiency. There are several reasons to conduct a program evaluation, these include: assessing the effectiveness of programs and services, improving programs and services, making the best use of limited resources, improving communication amongst partners, and demonstrating importance of programs to key stakeholders (funding agencies, officials, general public). Evaluation can be used to assess the development and implementation of a program. Alternatively, outcomes-based evaluation can be used to examine if the program has achieved the initial desired objectives or goals.

Seeding Galveston needs to evaluate their programs to further growth and successful development as they expand their sites, increase their education offerings, and increase the amount of food produced. Understanding early if they are reaching their desired goals and objectives will allow them to shape the organizations future to successfully benefit the community.

EVALUATION TOOLS

Many options to evaluate organizations, programs, and partnerships are available. The Kellogg Foundation, the Centers for Disease Control and Prevention, and many other organizations have created evaluation handbooks that they have made available to the public (Kellogg 2004, CDC 2016). These handbooks use evaluation matrices and logic

models to determine the steps and timeline to achieving the final outcome. Since the main goals of the evaluation plan for Seeding Galveston is to determine reach, effectiveness, and outcomes, the RE-AIM framework will be used in conjunction with the typical evaluation matrix and logic model (Glasgow et al. 1999). All tools described below will be valuable in evaluating Seeding Galveston and their programs.

The RE-AIM framework was developed in the late 1990s as an additional method of evaluation that evaluates the reach and representativeness of participants and settings. Glasgow and colleagues aimed to develop a method that allowed researchers to evaluate reach, effectiveness, adoption, implementation, and maintenance of a variety of programs and outcomes (Glasgow et al. 1999). This is especially important for evaluations that are analyzing outcomes, and has successfully been used to analyze the outcomes of community-based programs (Glasgow et al. 1999, Glasgow et al. 2001, Glasgow et al. 2006, Glasgow et al. 2006, King et al. 2010, Gaglio et al. 2013, Kessler et al. 2013, Harden et al. 2015, Shoup et al. 2015). The steps of RE-AIM all have general applicable definitions and specific measures associated for the program or outcome being evaluated (Glasgow et al. 1999, Kessler et al. 2013). Since Seeding Galveston is such a young organization, only the reach and effectiveness measures of the RE-AIM framework will be applied at this stage. These definitions to be applied in this evaluation can be found in Table 4.2.

An evaluation matrix is another method to detail activities of an evaluation. A goal is defined and broken down into a measurable output, short-term objective, intermediate objective, and long-term objective to reach the goal. For each stage, descriptors of each outcome is presented using indicators, data sources, data collection methods, and the estimated time frame to completion. Indicators are even more specific and are ways to

measure the objective being described. Data sources indicate how one will get the information about the indicator. Alternatively, the data about the indicator can be collected and would be added to the data collection methods. In an evaluation, it is easy to expect results too soon, so defining a time frame in the beginning is important to make sure that objectives and indicators aren't being evaluated too early. For this evaluation, two matrices will be used to evaluate the two major goals of Seeding Galveston.

Logic models are valuable and closely relate to the theory of change, which defines all the necessary conditions to reach a desired outcome (Weiss et al. 1995, Reisman et al. 2004). The logic model includes inputs, outputs, and outcomes/impact. Inputs include the people, resources, and anything else required to achieve a goal. Outputs are divided into the activities and participants required to achieve a goal. Outcomes measure the impact of a program and are divided into short-term, typically related to increasing knowledge, intermediate, typically related to changing behavior, and long-term, typically related to health indicators (Kellogg 2004). Logic models have been successfully applied to the evaluation of other food-based or behavioral change-related community programs (Medeiros et al. 2005, Kolasa and Lackey 2006, Keller and Bauerle 2009). For the purpose of this evaluation, the logic model will serve as a way to pull together all the ideas and components of the evaluation. Together, these tools will allow Seeding Galveston to evaluate the populations reached with programs, the amount of product being donated, and behavior and health effects of the programs described in the Specific Aims.

EVALUATING KNOWLEDGE AND USE OF SEEDING GALVESTON PROGRAMS

Improving Access to Local and Sustainable Food

The first step of the evaluation is to determine the population being reached with established programs (Tables 4.1 and 4.2). This will be done by checking current records, which are only available for CSA participants, to determine the number of participants, their geographic location, and subsidized/unsubsidized participants. Due to the young age of the community vending program, which began in late April 2016, data regarding these will need to be collected each week of vending. For community vending programs, Seeding Galveston will determine the number of attendees during the vending events (morning and afternoon tracked separately) and compare this to the number of households within 0.5 miles of the site. Two ratios will be determined; attendees to total number of households and attendees to number of households that expressed interest through the on-site and door-to-door surveys. At the end of each year, Seeding Galveston will determine these ratios and compare to baseline (year 1) and to the prior year (years 2 and above). In the first and second years, they aim to increase direct sales to island residents by 2.5%. After these first two years, these methods for measuring participation will be re-evaluated and applied to future years of community vending participation and based on the outcomes of increasing by 2.5%, this value will be evaluated for feasibility and adjusted if necessary. As growing locations and community vending sites expand, these methods will be applied to each vending location and analyzed per vending location.

The next step is to evaluate the effectiveness of advertising on increasing the population reached. Flyers about Seeding Galveston and their services will be placed around town and distributed to neighborhoods surrounding the garden sites. To entice new customers from the neighborhood free gifts, such as T shirts and reusable bags, will be advertised for individuals that bring their flyers. Incentive flyers will be distributed to those

living within 0.5 miles of the sites to better track the geographic location of attendees and the incentive advertised will only be offered if the attendee brings their flyer with them. This will provide a way to differentiate between those individuals that attend events regularly and those that have just learned of the services. It is desired that each outreach campaign will bring 2 new attendees to the vending events each week over the course of 8 weeks. If this goal of 2 new attendees is not met, the advertising campaign will be considered ineffective and will be halted until a new campaign that brings in new attendees can be designed, implemented, and evaluated.

To evaluate the effectiveness of community vending and CSA programs to improving food security and increasing knowledge of sustainable and healthy food, Seeding Galveston will use proxy measures to determine if their overall program has an effect on food security rates in Galveston and on residents' knowledge and attitudes towards food. Volunteers will collect information via door-to-door surveys or through surveys administered to on-site visitors. Door-to-door surveys will be done for community members living within 0.5 miles of each vending site and for CSA participants (See Appendix I). The methods described here are summarized in Tables 4.1 and 4.2.

Table 4.1: Evaluation Matrix to Improve Access to Local, Sustainable Foods

Improve access to local, sustainable foods.				
Objective/Outcome	Indicators	Data Source(s)	Data Collection Method(s)	Time Frame
1a. Increase awareness of Seeding Galveston 30% by May 2017 in residents living within 0.5 miles of each Seeding Galveston site	Website views, email/phone communications, Facebook likes, survey responses	Surveys	On-site surveys, door-to-door surveys over time	Baseline, Yearly
1b. Increase direct sales to island residents by 2.5%	Attendees at vending events, CSA enrollment	On-site surveys, enrollment records	On-site surveys, enrollment records	Baseline, 1 year
1c. Increase food donations to local charities by increasing production so 25% of all product is donated	Square footage dedicated for donation, number of charities benefiting	On-site resource analysis	On-site resource analysis	Baseline, 2 year
1d. Decrease the rate of food insecurity on Galveston Island by 2% in 10 years	USDA measures, Houston Food Bank	USDA, Houston Food Bank, surveys	Secondary data analysis, surveys	Baseline, 10 years

Table 4.2: Reach and Effectiveness Framework

<u>RE-AIM Dimension</u>	<u>Definition</u>	<u>Food security and nutrition specific metrics</u>
<i>Reach</i>	The number of people and percent of target population that are impacted by vending and programs	<ul style="list-style-type: none"> - Observed # of shoppers at vending days/ households within a 0.5 mile radius of vending -Number of CSA participants -Number of subsidized CSA participants/ total number of participants -Number of charitable organizations receiving donations Door-to-door and on-site surveys
<i>Effectiveness</i>	A measure of the impact on health behavior and nutrition, including positive, negative, and unanticipated consequences	<ul style="list-style-type: none"> -Healthy eating surveys (attitudes and knowledge compared over time) -Door-to-door and on-site surveys of food security (rates compared over time)

Community Donations

An additional goal to evaluate access to food through use of Seeding Galveston's programs is to determine the amount of goods and services being provided to community organizations with charitable causes. Seeding Galveston aims to donate at least one-fourth of their production. The organization would like to evaluate the amount of food they are donating based on what is produced and determine if they have the resources to increase the number of organizations receiving donations, as currently only four organizations benefit from the program. Important aspects of evaluating community donations involve determining the number of organizations receiving donations, the number of partner organizations that use Seeding Galveston's sites to produce donations, the number of times per week donations are made (frequency), and the amount of space dedicated to donations.

A list of charitable and partner organizations will be up evaluated monthly for accuracy and updated as new organizations sign up to receive donations. Donation deliveries will be tracked on a weekly basis. This will be done by determining the number of locations visited by Seeding Galveston or their partner organizations and how many times each location received a donation during the week.

The amount of produce donated will not be tracked at each donation, as yield is dependent on many factors. These factors include the growing season, weather, pests, and volunteer power for physical labor and therefore it is not feasible to calculate donations per growing site. Additionally, each site can be responsible for the production of varying items and in different proportions and calculating donations per site would be an inaccurate representation of what is available. Instead, the organization will calculate the total square footage from all the sites dedicated to donations and compare this to the total square footage

in production. This will be determined during each growing season so that adjustments can be made throughout the year to accommodate their goal of donating 25% of their products.

EVALUATING EFFECTS ON NUTRITION-RELATED HEALTH OUTCOMES

The links between food security and health outcomes are still being evaluated, but current data suggests that diabetes, obesity, and many other chronic conditions can be directly related to the food security of an individual (See Chapter 1). To improve food-related health outcomes, such as diabetes and obesity, Seeding Galveston will implement and evaluate an intervention program (Table 3.3). (Appendix II). This program will recruit low-income families with health problems that are directly related by food, such as obesity and diabetes, and increase their knowledge of food choices and health outcomes. The participation of families will be tracked using event participation logs to be filled out by instructors. Families that participate in all events will be rewarded with a home garden plot built free of charge at their home site, or with a dedicated plot at one of Seeding Galveston's locations if the family lives in a housing area that does not have space for a plot. Using survey and educational materials available from the FDA, CDC, and Urban Harvest, Seeding Galveston will track participants' health outcomes, food habits, definitions of healthy eating and healthy foods, and attitudes towards healthy eating at the start and end of the program. It is expected that the positive experience of the participants will attract other families to want to participate in similar programs, which will be offered to new families in the future, and that other families will attend community vending sessions in their neighborhoods to learn more about food available to them and how they can improve their own lives. The major long-term goal is to decrease the prevalence of diabetes in

Galveston through education and availability of healthy foods, although it will be difficult to determine the exact effect of Seeding Galveston on the increase/decrease of diabetes in the Galveston community outside of the participants of this program.

EVALUATION SUMMARY

Overall, this evaluation will provide a framework for current and future programs within Seeding Galveston. This will allow the young organization to define short-, intermediate-, and long-term goals and outcomes as they grow and adapt their programs to benefit the Galveston community and determine what inputs are required for continued success of their organization and completion of their goals (Figure 3.1).

Table 4.3: Evaluation Matrix of Nutrition-Related Health Outcomes

Improve nutrition-related health outcomes in low-income residents.				
Objective/Outcome	Indicators	Data Source(s)	Data Collection Method(s)	Time Frame
2a. Reach 8 new low-income residents/families to participate in community nutrition programs	Attendees at events	Event participation logs	Event participation logs	6 months to enroll participants
2b. Increase knowledge of program participants regarding food choices and health outcomes through a program that lasts up to 1 year	Knowledge of healthy food recipes, types of foods purchased	Pre- and post-program surveys	Pre- and post-program surveys	Baseline, monthly program surveys, 1 year post-program
2c. Improve health indicators for diabetes and obesity in the population defined in 2a	Prevalence, health indicators such as BMI, blood sugar	Seeding Galveston records and program reports, participant self-reports	On-site attendance, CSA enrollment records	Baseline, 1 and 2 year follow ups
2d. Increase direct sales to other low-income residents through community vending, CSA program, and encourage home gardening	Attendees at vending events, subsidized CSA enrollees, attendees at gardening courses	Attendance records, sales	Attendance records, sales	5 years

Figure 4.1 Logic Model.

Seeding Galveston Evaluation: Logic Model

Inputs	Outputs		Outcomes -- Impact		
	Activities	Outputs	Short	Medium	Long
Seeding Galveston staff and volunteers	Expand growing space and partnerships	Sqft growing space dedicated to charity	Increase awareness of CSA Program	Increase community partnerships	Reduce obesity in program participants
Community Partners	Expand advertising, marketing, and incentives	Number of low-income residents visiting sites	Increase awareness about relationships of nutrition and diabetes/disease	Increase land allocated to SG	Reduce incidence of diabetes in program participants
Funding Sources	Expand sites, recruit new staff/volunteers, and create an intern program	Sqft of growing space	Increase awareness of local food sources (CSA, etc)	Increase direct sales to local consumers	Establish additional sites on unused land
Community members	Deliver long-term community education programs	Number of attendees, hours of instruction	Increase awareness of self-sustainable garden food sources	Increase access to home gardening	Decrease food insecurity by having access to healthy food source within 1 mile of home, or receiving produce delivery
WIC/SNAP/subsidy programs	Creation and implementation of diabetes education program	Number of participants, hours of instruction, curriculum plan	Increase knowledge of healthy food prep	Increase access to local food sources (CSA)	
Local schools/universities			Increase nutrition in program participants		
City council/policy makers			Improve attitudes and skills toward home gardening		
Materials					
Business Leaders					

ASSUMPTIONS

Seeding Galveston is a participant in all activities; Residents and community partners value health, well-being, and nutrition in the community.

EXTERNAL FACTORS

Funding availability; volunteers; local policy; transportation availability

CHAPTER 5: CURRENT RESULTS

COMMUNITY VENDING REACH ANALYSIS

Over the initial survey period of one month, four morning vending sessions were scheduled to occur. Based on feedback from the neighborhood after the first two weeks, an evening vending session was added for all future vending sessions. Upon addition of the evening session, attendance was tracked separately for the morning and evening sessions. During the month of May in 2016, an average of 20 people attended the morning sessions, while an average of 10 attended the evening sessions. This means that approximately 30 people visited the farm site and purchased locally grown produce each week. Because we are unable to determine the exact number of households and individuals living within the neighborhood surrounding the vending area of the N and 33rd street site, we have used the 2010 census information. The 2010 census informs us that approximately 1,158 people live within 1 square mile of Galveston. Since our initial target was households within 0.5 square miles, we calculate that we are reaching approximately 2.5% of the individuals we are targeting.

CSA REACH ANALYSIS

The CSA program is an important program both for providing food to locals, but also for the funding of the organization. Currently, there is only capacity for 30 CSA participants and 26 CSA participants are currently enrolled. Of these 26 participants, 1 is currently enrolled full-time (every week) at a discounted rate due to health and income reasons, 4 are enrolled full-time in exchange for volunteer work, 3 are enrolled part-time

on an every-other-week basis, and 18 are enrolled unsubsidized to receive a CSA box 25 out of the 50 weeks that deliveries are made.

Evaluating the geographical reach of the CSA program informs us that six participants live within 0.5 miles of one of Seeding Galveston's sites, five live within one mile, five live within three miles, and ten live within 10 miles. Further evaluation of the CSA program will occur after expansion of the volunteer corps and acquisition of additional sites for development allows for expansion of the program.

COMMUNITY DONATIONS

Seeding Galveston has begun to evaluate the amount of product that is donated to other charitable organizations. Their current records indicate that four organizations are receiving donations; St. Vincent's, Streetscape Ministries, Our Daily Bread, and families involved with SMART Family literacy. Some community partners and volunteers are dedicated specifically to the growth and maintenance of beds dedicated for community donations. These include the "Greenies", a corps of Seeding Galveston volunteers from a variety of Galveston-based educational institutions, including UTMB; SMART family literacy, which is a local non-profit dedicated to education of special needs children, and the Girl Scouts.

In this most recent growing season, 800 of approximately 10,000 square feet (8%) is dedicated entirely to growing foods for these donation programs. However, this does not reflect the total amount of donated foods. After vending sessions, the remaining produce is donated to one of the above organizations and also makes up a large amount of donations. Although this varies weekly, approximately one-eighth to one-half of the goods dedicated to community vending remain to be put towards donations. Square footage dedicated each

growing season will continue to be measured to analyze the amount of donations that are made until the goal is consistently met or exceeded and additional square footage will be dedicated for these purposes as the program expands.

CHAPTER 6: DISCUSSION

LIMITATIONS AND SUSTAINABILITY

The previous chapters have established the links between food security and health, as well as defined the efforts Seeding Galveston is putting forth to increase food security in our communities. Seeding Galveston recognizes that one organization cannot be responsible for producing all the local and sustainable foods for families in Galveston. To truly improve the health of residents, increase food security on Galveston Island, and be a sustainable organization, Seeding Galveston aims to inspire locals to inspire locals to take control of their food.

This percent of individuals reached calculated in the previous chapter (2.5%) does not take into account if individuals visiting the market are from the same household. We anticipate that we are actually reaching more households than calculated here for several reasons; 1) the census population per square mile includes children under the age of 18 and we do not count children that visit the vending location accompanied by a parent and 2) there are a variety of businesses and abandoned homes within the 0.5 square mile zone that we are trying to reach. Although this percent is vastly below the intended 30%, community vending has been operational since the end of April 2016 and it is expected that new outreach techniques and time will help improve this number.

Since community vending is such a young program, Seeding Galveston will continue to track the number of visitors during vending hours and determine the average for each month. Average number of attendees will first be compared between growing seasons and months of the same growing season. After several years of Galveston has

proposed an incentive program to inspire individuals to keep returning during the vending sessions, but this is beyond the scope of this evaluation.

To raise enough funds to sustain the organization on the CSA program, 40 unsubsidized CSA members would need to be enrolled to receive a donation 50 of the 50 weeks that deliveries are made. At the current growing capacity, this is not feasible for the coming year and reaching this number is not currently a goal of the organization. Current CSA participation coupled with community vending programs have created sustainable financials for the next several years. The primary goals are to increase community vending programs and sites within communities to directly benefit those communities. This goal includes increasing the total square feet dedicated to growing foods for donations to local nonprofits, but this will not be feasible until additional land is developed by the organization and their partners. Developing new land plots and increasing donation growing space would also indicate that general growing space for the organization would increase. This would permit Seeding Galveston to continue to be financially stable by adding new community vending programs, CSA members, or supplementing community vending and CSA programs with new produce.

RECOMMENDATIONS AND PUBLIC HEALTH IMPACT

The health of Galveston relies in part on our community's ability to combat food insecurity and negative the health outcomes associated with this lack of access to food, which Seeding Galveston aims to address in part. This evaluation plan will have a positive impact on Seeding Galveston's operations so they can maximize the effectiveness of programs put forth to the community. Effective programs relating to food security and

food-related health outcomes will positively affect the community and lead to an increased quality of life for the community's residents.

We anticipate it will take at least 10 years to measure changes in food security and 20 years to evaluate the effects food security has on health outcomes at a county level. Even then, it will be difficult to analyze the exact effects that Seeding Galveston has on these outcomes outside of the evaluations of their enrolled participants and program attendees. However, understanding how their programs affect a small population in Galveston can provide solutions to benefit the larger population. The results of this evaluation can help Seeding Galveston build additional partnerships to reach their goals while assisting other organizations in reaching their target populations (food insecure families, low-income families, families in neighborhoods that Seeding Galveston serves, etc.) and achieving their goals. At this stage of the evaluation, it is difficult to make recommendations of policy decisions regarding these outcomes, but policies and how they affect food security and nutrition-related health outcomes should be evaluated in the future.

FUTURE DIRECTIONS

After the completion of the aims of this project, Seeding Galveston will have an understanding of the success of their programs and a document to guide them in future evaluations. This will allow them to adapt their programs and optimize success, which will need to be re-evaluated once again in a similar manner. At this stage, the organization and its programs are not large enough to apply a full RE-AIM evaluation. As Seeding Galveston expands and develops new sites, this evaluation will be applied to determine reach and effectiveness of additional community vending, CSA, and donation programs. Additionally, a full RE-AIM evaluation will be conducted. RE-AIM can then be applied to

determine adoption, implementation, and maintenance and its programs in addition to the reach and effectiveness described in previous chapters.

Adoption, which we can refer to as inclusion and approval, evaluates the number and percent of settings that participate in program and the extent to which these settings are reaching the target population. Since there is currently only one Seeding Galveston site for community vending, adopting will not be evaluated until at least 3 sites have active community vending programs. Adoption evaluation can also be applied to the willingness of partner organization to adopt Seeding Galveston's community vending programs and donation programs. For example, partner organizations could take produce from Seeding Galveston's sites and set up vending sites in neighborhoods that do not have space for an entire garden or could dedicate more volunteers, time, and space to the growth of donation foods.

Implementation determines the level of adherences to principles and guidelines, such as determining if all or only some of the criteria from previous steps of RE-AIM are met. This is also the time to evaluate if the ongoing costs are sustainable and what changes, if any, need to be made to improve financial sustainability of the programs.

The final step of the RE-AIM evaluation framework is the determine maintenance at the individual and the setting levels. On the individual level, we can determine if neighborhood members continue to visit the vending locations, prepare healthier meals, and value the shift in eating habits that will be taught during education programs. To evaluate maintenance at the setting level, Seeding Galveston will determine if they have adequate resources to continue their programs and will begin to work with local government and partner organizations to continue to expand and maintain locations, as well

as discuss policy changes that could allow community vending in neighborhoods where vending to residents is not currently permitted due to zoning laws. Conducting a full RE-AIM evaluation upon expansion of Seeding Galveston will determine if new sites are all valuable to the mission and vision of Seeding Galveston.

To ensure evaluation continues at the close of this project, the evaluation plan and a reference guide will be turned in to the founders of Seeding Galveston. The reference guide will include templates to track and analyze the information they collect over time, as well as the steps required to re-evaluate programs over time. Seeding Galveston will also be provided with the online resources for evaluation offered by the Kellogg Foundation, the CDC, the RE-AIM framework, and publications evaluating programs similar to those run by Seeding Galveston.

APPENDIX 1: DOOR-TO-DOOR SURVEY

Have you heard of Seeding Galveston? YES NO

Have you ever been to the urban farm at Avenue N and 33rd? YES NO

Have you ever purchased food from Seeding Galveston? YES NO

Have you heard of their food delivery program? YES NO

Would you be interested in buying discounted produce? YES NO

Do you ever fear that your family's food will run out too quickly? YES NO

APPENDIX II: ON-SITE SURVEY

Have you visited this farm stand before? YES NO

Is our produce affordable? YES NO

Are you comfortable cooking with the produce we sell? YES NO

Have you ever used one of the recipes we provide? YES NO

Are you familiar with our food delivery program? YES NO

Do you ever fear that your family's food will run out too quickly? YES NO

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