

## The North Carolina Food Pantry Organizational Capability and Mapping Study: Research brief and pilot study

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### Abstract

Given the importance of food banks to the availability of accessible food, attention to the resilience of regional systems for bringing food from producers to distributors—including local food pantries—is of prime concern. By utilizing a partnership between Appalachian State University and Feeding America, through the Second Harvest Food Bank of Northwest North Carolina, we gathered information regarding the capabilities of seven regional food pantries. This pilot study focused on the capabilities of the selected food pantries to provide food assistance, promote self-efficacy, and address

root causes of hunger in their communities.

We utilized a cross-sectional survey developed at the University of Oklahoma as well as descriptive statistics to create resource maps utilizing geographic information systems (GIS) software. This approach provided a model for an upcoming survey of three hundred food pantries located throughout the state of North Carolina to be implemented by Appalachian State University and research partners from the University of North Carolina. The larger study will expand knowledge regarding the best practices for food pantry operations, highlight opportunities to strengthen organizational capabilities including nutrition offerings and other wraparound services, support the development of resource maps to optimize the use of regional and self-efficacy-related resources for low-income clients and communities, and promote the

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expansion of opportunities for collaboration and funding.

Ultimately, we plan to utilize statewide data to develop a Food Pantry Capability Index based on selected measures encompassing available food assets, financial resources, size of area served, population-specific demographics, and number and type of auxiliary services offered including economic development initiatives. Such an Index could be used nationwide to assess and improve overall food resiliency and self-efficacy for given communities, counties, regions, and states.

### Keywords

Capability, Capacity, Food Bank, Food Pantry, Food Resilience, Food Resource Center, GIS Mapping, Resilience, Resource Mapping, Self-Efficacy

### Introduction

Given the importance of food banks to the availability of accessible food, attention to the resilience of regional systems for bringing food from producers to distributors—including local food pantries—is of prime concern. This paper provides a description of methods used to conduct a completed pilot study and subsequent research which is now in progress. The long-term aim of this project is to: 1) expand the base of knowledge regarding local food pantries, including the creation of resource maps to promote regional- and state-level optimization of food access, and 2) to develop an easy-to-use, practical instrument to assess the capabilities of food pantries to meet client needs and to support the food resilience of local communities and their greater regions. We believe it is important for the well-being of food pantry clients and their communities to share this brief describing our research in progress to provide other interested researchers with information which could potentially lead to expansions of the geographic scope of this effort. In addition, we hope to prompt productive research collaborations which could benefit the populations served by local food pantries.

### Literature Review

While the concepts of food system resilience and sustainability have been the topic of much

scholarly interest in recent years, the concept of food pantry capabilities has yet to be explored to the same degree (Bazerghi, McKay, & Dunn, 2016; Tendall et al., 2015). A *capable* individual or organization possesses attributes required for performance, or has traits conducive to or permitting the achievement of a desired goal (Merriam-Webster Dictionary, 2018a). Thus, a *capable* food pantry is one with the organizational skills and resources to achieve the desired goals of (1) effectively and efficiently providing clients with a reliable source of safe and nutritious food in times of immediate need, and sustaining an adequate supply of food resources in the face of changing environmental conditions and a variable client base, (2) promoting self-efficacy in clients to enable them to meet their own nutrition needs to the greatest extent possible, and (3) consistently addressing the root causes of hunger in communities (Feeding America, 2018b). Food pantry *capabilities* are those things the food pantry has the potential to do with its human, material, and financial resources (Capability, n.d.).

Nussbaum described *capabilities* in relation to individuals, as "...the answers to the question, 'What is this person able to do and to be?'" (Nussbaum, 2011, p. 20). Capabilities, then, if we extrapolate from the personal to the organizational, include *opportunities* resulting from the unique blend of competences, social and environmental settings, and choices made by an entity at a specific given time (Nussbaum, 2011). Choices made by food pantry leaders in response to their particular situations may enhance or restrict organizations' capabilities (Nussbaum, 2011).

*Capacity* refers to the ability of a facility or organization to hold or accommodate products or people, the physical and mental abilities of individuals, and/or the ability of an individual or organization to perform or produce (Merriam-Webster Dictionary, 2018b). The term *capability* encompasses the meaning of *capacity*, and is considered a synonym (Capability, n.d.). In the food bank literature, both terms are used to express similar concepts. In this paper, we prefer the term *capability*, as it refers to the effective performance of all key functions of the agency.

Capability serves as the vehicle which carries an organization beyond short-term viability toward

resilience and sustainability. A capable food pantry organization makes choices and seizes opportunities supportive of ongoing, stable function. Resilience is the maintenance of function over time in the face of disturbances, and sustainability is the preservation of a system for the long term (Tendall et al., 2015). Optimization of food pantry resilience and sustainability would enhance pantry capabilities and thus, the overall food environment of geographic regions. A tool specifically designed to quantify the capability of individual or regionally grouped food pantries to meet clients' nutrition needs immediately and over time, promote self-efficacy, and address the root causes of hunger would contribute to the evaluation and improvement of geographic regions' food resiliency (Feeding America, 2018b).

Food pantries meet critical needs by providing emergency and short-term access to food and nutrition resources for food-insecure, low-income populations within specific communities (Mousa & Freeland-Graves, 2018; Schumann, Trull, & Noack, 2015). Some food pantries may struggle to meet such needs due to geographic or financial vulnerabilities; for example, rural food pantries may face challenges in maintaining their supply chains due to their distance from common supply chain channels (Miller et al., 2016).

Large hunger relief organizations, such as Feeding America, regularly gather data and report findings from constituent pantries. Actionable knowledge regarding the organizational capabilities of food pantries within given geographic regions enhances the ability of organizations to respond to population needs (Weinfield et al., 2014). The importance of data collection regarding the operation of food pantries is growing, as pantries in developed nations are serving an increasing number of clients who are chronically food insecure; that is, clients who rely on the food pantry as their main source of food over the long term (Bazerghi et al., 2016; Feeding America, 2011; Ford, Lardeau, Blackett, Chatwood, & Kurszewski, 2013; Garratt, 2017).

**Food Pantry Capabilities.** A small but growing body of scholarly literature is focused on food pantry capabilities. Bazerghi, McKay, and Dunn (2016) found that food pantries (referred to as

“food banks” for the purposes of their study) were generally limited in their ability to improve food security outcomes among target populations, and that key indicators of capability included adequate operational resources, availability of perishable foods such as fruits and vegetables, and a focus on identified client needs. Akalis (2014) reported that three factors that often curtail the capability of food pantries to respond to client needs include dependence on volunteer staffing, lack of suitable facilities, and inadequate funding. Wetherill and colleagues described food pantry capability barriers including a lack of nutrition policies to promote nutrition education among clients, and low inventories of healthful foods such as fresh fruits and vegetables (Wetherill et al., 2019).

Increasing interest in the development of food pantry capabilities is indicated by conferences such as the Northern Illinois Food Bank's Access Capability and Engagement (ACE) Conference, workshops focused on building food pantry capacity including those implemented by the Capital Area Food Bank, and capacity-building grant opportunities exemplified by those funded by the Global Food Banking Network (Capital Area Food Bank, n.d.; Northern Illinois Food Bank, 2016; The Global Food Banking Network, 2018). Capability-enhancing efforts have included training and workshops focused on volunteer recruitment, fund raising, grant writing, outreach to diverse populations, community gardening projects, and best practices for managing food distribution chains (Capital Area Food Bank, n.d.; Edwards, 2014; Northern Illinois Food Bank, 2016; The Global Food Banking Network, 2018). Awareness of the importance of nutrition policies (including the provision of nutrition education and healthful foods) as a vehicle to promote food pantry capabilities is evidenced by recent research on this topic (Caspri, Grannon, Wang, Nanney, & King, 2018; Martin, Wolff, Callahan, & Schwartz, 2018; Wetherill et al., 2019).

#### **Toward a Food Pantry Capability Index.**

The concept of a “capability index” is not new. Worstell and Green (2017) analyzed case studies and identified eight qualities common to resilient locally based food systems that could be quantified to create an objective “resiliency/sustainability

index.” The researchers concluded their paper by proposing a list of statements—based on the eight qualities—which could be used to define resilient and sustainable food systems (Worstell & Green, 2017). It is possible that a similar methodology could be applied to describe “capable” food pantries.

In a 2014 report on regional food bank operations completed for the Kate B. Reynolds Charitable Trust, leaders of food banks recognized for their effectiveness described their best practices (Edwards, 2014). Food banks are regional storage and distribution centers for food that is allocated to smaller local food pantries (Feeding America, 2018c). Food pantries are front-line organizations that receive food resources from regional food banks and then distribute that food directly to clients to relieve food insecurity in local communities. Food bank leaders identified the capacity of partner agencies (food pantries) to distribute food as the “weakest link” in regional food distribution systems. The leaders listed tier ratings of constituent agencies as a best practice to identify high-performing pantries whose services could be expanded, those that could benefit from support to increase capacity, and those whose closure might allow better targeting and utilization of resources (Edwards, 2014). This identified best practice implies that an organized system—perhaps a capability index—for assessing food pantry capabilities could be helpful in optimizing resource allocation to better serve clients.

The Food and Agriculture Organization of the United Nations (FAO) developed a “resilience tool” to assess the capacity of individual households to withstand major changes (called “shocks”) in their food security status (Food and Agriculture Organization of the United Nations, 2010). While the tool was designed for the household level, it provides a list of criteria and a mathematical equation to quantify the relationships among the criteria and generate a resiliency score. Thus, the FAO tool may serve as a useful model for the development of a food pantry index. The tool’s criteria for determining household food resiliency include income, access to food, physical assets such as land, availability of food and/or income assistance, access to

services, adaptive capacity that may be enhanced by education level and a variety of income streams, and stability of criteria as time passes (FAO, 2010). It may be that parallel criteria for food pantry resilience could be described. These could include annual budget and access to food supplies; physical facilities of the pantry; availability of government support such as commodity foods; access to expertise and support services; adaptive capacity as determined by the training and education of pantry staff; collaborations and partnerships with larger support organizations such as food banks; number and variety of income and donation sources; and stability of criteria as time passes.

Schumann, Trull, and Noack (2015) assessed and reported on the capacity of food pantries in San Diego County, California, to provide services to clients. The criteria of capacity delineated by the researchers provide helpful suggestions for operational functions to be addressed by a food pantry capacity tool, including sources of food, location of pantry sites, populations served, operating hours, paid and volunteer workforce, storage capacity, nutritive value of foods, availability of transportation, managerial considerations (including office space and technology), communication practices, marketing plan, advocacy activities, compliance and reporting of activities, and fundraising practices (Schumann et al., 2015).

In Puna, a rural region of Hawaii, a coalition of individual citizens and groups came together to determine how to best support and enhance their communities (Hawaii Alliance for Community Based Economic Development, 2016). The report focuses on two topics: disaster preparedness and capacity building of food pantries to support emergency food needs. The authors identified six areas important to food pantry capabilities: sustainability, outreach and communication, going beyond canned food to provide auxiliary services, navigation of regulations, coordination and collaboration with individuals and community organizations, and food as an entry point to community services. The authors present four aspects of resiliency that include connection to others, connection to place and ‘Āina,<sup>1</sup> connection to the past and future, and

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<sup>1</sup> ‘Āina is the Hawaiian term for land or earth (Pukui & Elbert, 1986).

connection to self (Hawaii Alliance for Community Based Economic Development, 2016). These aspects may point to important components of food pantry capability in relation to community networks and connections. Throughout the report, a focus on community assets and strengths, rather than community deficiencies, is encouraged (Hawaii Alliance for Community Based Economic Development, 2016).

Caspi et al. (2018) recognized the need to assess the nutritional quality of food distributed by food pantries. The researchers developed the FAST (Food Assortment Scoring Tool), a 13-item tool to score the overall nutrient content of food selected by food pantry clients. The FAST was compared with the Healthy Eating Index-2010 (HEI-2010), a tool developed by the United States Department of Agriculture to compare particular eating patterns' adherence to the Dietary Guidelines for Americans (USDA Food and Nutrition Service, 2019). The researchers found that the FAST correlated well with the Healthy Eating Index-2010 and was feasible and easy to use in real-life food pantry settings (Caspi et al., 2018). While the nutritive value of foods provided is an important aspect of food pantry operations, FAST does not evaluate overall food pantry operations. It does, however, provide an example of quantifying food pantry functions and the importance of food pantry nutrition policies, and provides useful input toward construction of an overall food pantry capability index.

The literature suggests that developing a food pantry capability index based on specific criteria encompassing identified qualities and characteristics of effective food pantries would be useful and is feasible. Such an index may encourage further research and positive change that could result in improved quality of life and increased self-efficacy for food pantry clients.

### Study Objectives

The specific objectives of the complete research study are threefold. First, the authors seek to address the question: "What is the capability of food pantries to deliver services to specific geographic regions that address root causes of hunger and support nutrition needs and self-efficacy of the

populations served?" Second, the authors seek to develop regional food pantry resource maps to visually disseminate study data for use in assessing regional capabilities by study partners and other interested persons and organizations. Third, the authors seek to develop a Food Pantry Capability Index tool (FPCI) to quantify the ability of individual food pantries to carry out their operations and key functions. The objective of the pilot study described in this paper was to develop and refine a methodology that has the potential to be standardized and used as a model in a statewide food pantry assessment, and to be used as a data gathering tool in regards to developing the FPCI. An additional, overall objective is to increase the body of knowledge of best practices among area food pantries.

### Study Partners

**Feeding America food banks.** Feeding America is the United States' largest hunger relief organization, and encompasses over 200 food banks and 60,000 food pantries nationwide (Feeding America, 2018d). By supplying food pantries, food banks play a key role in the delivery of groceries to food pantry clients (Bazerghi et al., 2016). Seven strategically located Feeding America food banks provide the entire state of North Carolina with food warehousing and distribution services (Feeding America, 2018a, 2018c).

Second Harvest Food Bank of Northwest North Carolina (SHFB NWNC) is one of North Carolina's seven Feeding America food banks. SHFB NWNC's mission statement includes two goals: (1) to provide essential food assistance, and (2) to engage the community in eliminating hunger and its causes (SHFB NWNC, 2015). This mission aligns with Feeding America's mission, which is also twofold: (1) to feed America's hungry through a nationwide network of member food banks, and (2) to engage America in the fight to end hunger (Feeding America, 2018b). Because of the close connection between Feeding America and SHFB NWNC, benchmark measures and best practice guidelines which result from SHFB NWNC operations can be disseminated across the U.S. to address food security issues.

**U.S. Department of Agriculture.** This

investigation received initial input and advice from the U.S. Department of Agriculture, Southeast Regional Office Food and Nutrition Service leadership team (SERO USDA FNS). SERO USDA FNS articulated its specific goals for (1) the development of resource maps for food pantry locations and service areas to support the needs of SNAP-eligible clients, (2) evaluation of pantry customer service practices to effectively meet client needs, and (3) assessment of the capability of food pantries to provide services that promote self-efficacy among food pantry clients in the southeast region of the United States (Barth, 2018). Food pantry resource mapping can provide important information to SERO USDA FNS regarding the ability and resiliency of specific geographic areas of the state of North Carolina to cope with food emergencies and to meet the needs of underserved, low-income populations.

The North Carolina Food Pantry Organizational Capability and Mapping Study, Northwest North Carolina Module (NCFPCM NWNC), was designed to strengthen the ability of Feeding America and its North Carolina affiliate food banks to address their mission by assessing the capabilities of local food pantries to meet client needs. The pilot study on which we report was a component of the NCFPCM NWNC, and of a larger study of food pantries to be implemented throughout the entire state of North Carolina (the full study is referred to as NCFPCM). The pilot study was conducted in cooperation with regional partners including the SHFB NWNC and SERO USDA FNS. The larger study will be conducted by a regional coalition that includes North Carolina's constituent Feeding America Food Banks, SERO USDA FNS, Appalachian State University, and researchers from other University of North Carolina System institutions.

## Research Methods

### *Study Design*

Our study design employs a cross-sectional survey and includes four phases. The preparation (Phase One) and pilot phases (Phase Two) have been completed and are reported here. The implementation phase (Phase Three) of the NCFPCM NWNC

is currently underway and consists of survey delivery to food pantries across SHFB NWNC's service area, with completion of northwest North Carolina data collection anticipated by June 2019. The data analysis and dissemination of study findings phase (Phase Four) is planned for the summer and fall of 2019. IRB oversight was not required by the Appalachian State University Office of Research Protections on the determination that the study did not constitute human subject research.

**Phase One: Preparation.** Prior to conducting the pilot study, research partnerships were established with the University of Oklahoma, SHFB NWNC, and SERO USDA FNS. The Appalachian State University research team was assembled and included experts in clinical nutrition, public health nutrition, and geographic information science. Survey developers from the University of Oklahoma granted permission to utilize the survey that was employed in this study and provided training to the Appalachian State University researchers in the use and implementation of the survey. The survey assessed each participating food pantry's current practices and capabilities with respect to (a) basic organizational information, (b) structure and governance, (c) facilities and operations, (d) use of technology, (e) source(s) of funding and financing, (f) nutrition practices and services, and (g) services and assistance that support economic development and skill-building resulting in living wage opportunities for clients.

We conducted online and in-person meetings with personnel from the SHFB NWNC. During these meetings, SHFB NWNC staff reviewed and made minor changes to the survey language to be consistent with language used by SHFB NWNC. Additional tasks completed during the preparation period included organization of the pilot study and planning for regional implementation of the wider survey in the fall of 2018.

**Phase two: Pilot study (April 2018 through August 2018).** In order to test and evaluate the study methods, including administration of the survey both in person and via online survey software, Appalachian State University research faculty and graduate students implemented a pilot study in April 2018. SHFB NWNC staff recommended seven food pantries in their service area as initial

survey sites, and on-site appointments were scheduled with food pantry directors to administer—or in one case, explain—the survey. Food pantry directors answered the survey questions. Six of seven surveys were completed face-to-face in order to collect participant comments on the survey questions and to evaluate clarity of the survey language as reported by the participant population. The survey was prepared for online administration using Qualtrics survey software, and the seventh pilot survey was administered via online deployment (Qualtrics, 2018). The participant who completed the online pilot survey provided comments and feedback on the experience.

### *Data Analysis*

Data from the face-to-face surveys were entered into Qualtrics software and were combined with data obtained online from the seventh survey. The pilot analysis resulted in descriptive statistics. One of the co-investigators, who is a geographic information scientist, experimented with mapping a variety of study findings. Preliminary mapping of the seven sites was completed in geographic information systems (GIS) software using Environmental Systems Research Institute's (ESRI) ArcMap (2018).

### **Results**

Preliminary analysis of the pilot data revealed that numbers did not always follow a logical pattern. For example, larger budgets did not necessarily equate to larger number of households or clients served. The number of volunteers does not align perfectly with volume or need in every case. These types of misalignments may create challenges in both capability and resilience in some pantries, while others may have more capacity than necessary. Expanded data from the larger overall survey, as well as examination of food pantry criteria such as length of time in service, overall number of labor hours provided by staff and volunteers, and other factors may provide insights into variability in outcomes.

The mean length of time the pantries had been operating was 28 years (median time 34 years). Four of seven pantries were affiliated with religious organizations. Four of seven pantries own the

buildings from which they operate, two lease operating space, and one pantry uses a sponsor-owned building free of charge. The mean percentage of food provided to the pantries by SHFB NWNC was 60%, indicating that SHFB NWNC is a key contributor to pantries' stability and capability to carry out their missions.

Among the seven food pantries, over 11,000 unique clients and 4,000 households receive monthly food assistance. The mean and median labor hours contributed per food pantry per week by volunteers were 476 and 336, respectively. Of the seven food pantries, six offered either a full-choice or semichoice food selection model, indicating that clients may choose foods with varying degrees of independence. One pantry offered mobile food distribution to outlying areas in its service region, and another pantry tailored its hours to shift workers.

Six of seven pantries reported having no written nutrition policy. Food pantry leaders indicated that certain preferred foods (defined as  $\geq$  five of seven food pantries per item) were the focus of increased acquisition efforts, including fruits, vegetables, eggs, nuts and seeds, lean animal protein, dried beans and lentils, dairy, and dairy alternatives. A majority of pantries reported needing additional equipment, in particular commercial-grade refrigerators and freezers. All the pantries offered certain non-food items, such as toiletries and cleaning supplies, when available. Selected preliminary quantitative data results are provided in Table 1.

Participating food pantry leaders identified their desired strategic directions for capability enhancement, including expanding their facilities, developing the client choice model, obtaining commercial-grade refrigerated storage, increasing the number of volunteers, and obtaining reliable and sustainable funding sources. Three of seven food pantries reported providing auxiliary services focused on assisting clients in achieving increased self-efficacy, and two additional food pantries mentioned such auxiliary services as planning a strategic direction for future development. Reported auxiliary services included partnerships with local and regional employers and educational facilities to provide employment training and job opportunities; housing assistance; and referrals to appropriate

**Table 1. Selected Summative Preliminary Quantitative Data from Pilot Survey of Seven Regional Food Pantries in Northwest North Carolina**

Data Collected	Mean	Median
Time in operation (in years)	28	34
Number of unique clients (per month)	1580	2281
Number of households served (per month)	592	350
Pounds of food distributed (per year) <sup>a</sup>	452,648 <sup>b</sup>	255,204 <sup>c</sup>
Number of labor hours provided by volunteers (per week)	476	336
Distance traveled by clients to reach the pantry (in miles)	9	5
Percent of total food distributed provided by Second Harvest Food Bank	60	56
Annual operating budget (non-food, in US\$)	503,410 <sup>b</sup>	633,730 <sup>b</sup>
Annual food budget (in US\$, rounded to the nearest dollar)	227,712 <sup>b</sup>	161,139 <sup>b</sup>

<sup>a</sup> One pantry measured food distribution in “boxes,” for a total of 11,385 boxes per year; another pantry measured food distribution in “meals,” for a total of 150,000 meals per year. <sup>b</sup> Based on 4 pantries that reported food distribution in pounds.

<sup>c</sup> Based on 6 reporting pantries.

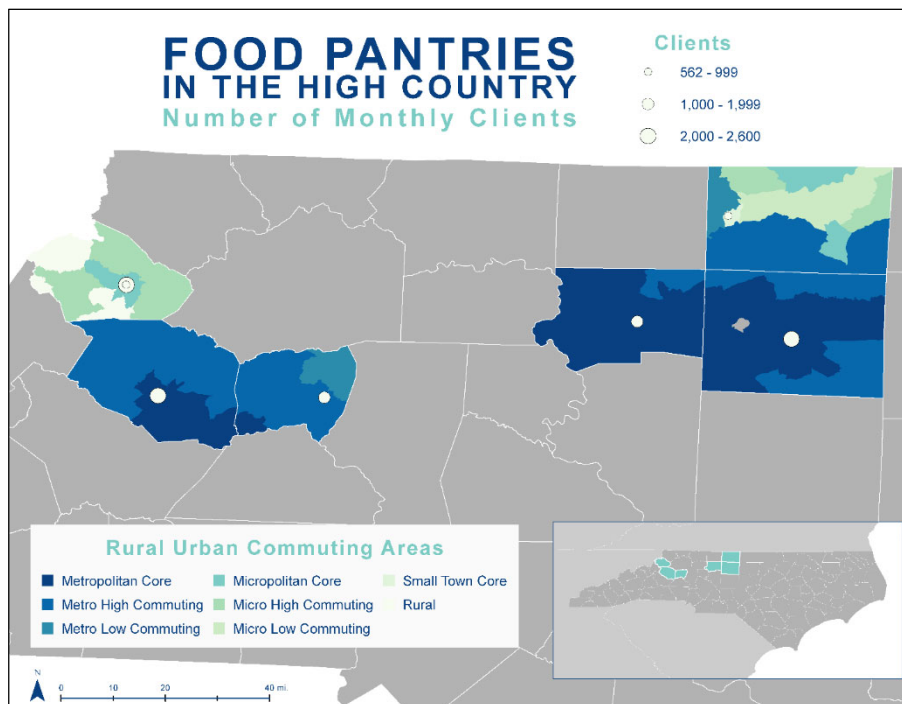
Note: 1 lb.=.45 kg; 1 mile=1.6 km

agencies as needed. The geographic information scientist co-investigator conducted resource mapping of study results. Resource maps may be useful in generating hypotheses and directions for future research by other investigators. Example resource maps are found in Figures 1 and 2.

As a result of data analysis, the investigators identified selected data points that may be useful as measures of food pantry capability. We plan to continue developing the tool as our expanding database provides further information on each of the indicators. We are considering using a Likert

scale to obtain a score for each item, with the overall mean score providing a “capability score”; however, determination of an appropriate scoring mechanism is still evolving. Possible indicators for development of the FPCI, a rationale for utilizing each indicator, and “criterion sentences” based on the methods of Worstell and Green (2017) are found in Table 2.

**Figure 1. Pilot Study GIS Mapping Example: Rural and Urban Continuum Codes and the Number of Monthly Clients at Each Food Pantry**



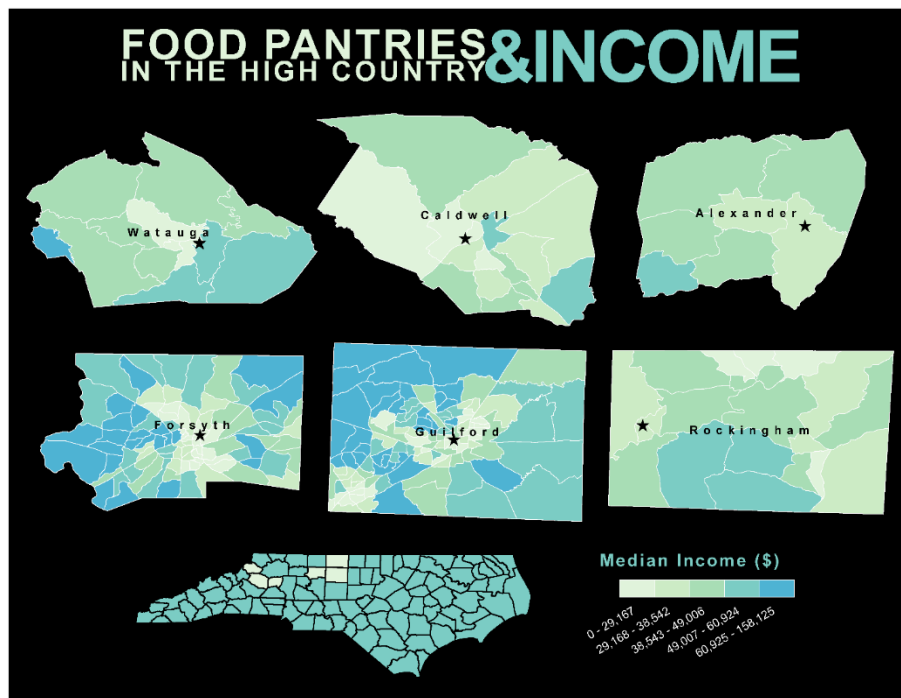
Source: U.S. Census Bureau (2010), U.S. Department of Agriculture (2010).

### Discussion

Lessons learned from the pilot study include the need for minor adaptations of survey wording to align with SHFB NWNC terminology and the identification of specific questions that often



**Figure 2. Pilot Study GIS Mapping Example: Median Income at the Census Tract and Food Pantry Locations**



Source: U.S. Census Bureau (2017).

required clarification for participants by the survey administrator.

Implementation of the survey using Qualtrics software helped the investigators learn how to effectively use this tool, including use and administration of the online survey, techniques for using the survey software for data analysis, and methods for mapping data obtained from the survey. As a result of suggestions during the pilot study from the study geographic information scientist and the SERO USDA FNS leadership team, four additional survey questions were developed and added to the survey. Data for these questions were obtained by phone calls or emails to participants after the initial pilot survey was administered. Following completion of the pilot study, the updated and finalized survey was entered into Qualtrics as a new survey in preparation for administration during Phase Three of the study.

A key observation by the investigators was that despite significant challenges in fulfilling their missions of alleviating hunger in people living with low incomes, food pantry leaders demonstrated core strengths of determination, dedication to their

mission, and focus on the population served. The pantries have been in operation for a median length of 34 years, indicating that the organizations are deeply embedded in their communities. In addition, the number of service hours regularly contributed by volunteer staff came as a surprise to the investigators. Using the median value of 336 volunteer labor hours per week per pantry, about 122,304 hours are donated per year among the small sample of pantries surveyed during the pilot study. This highlights the commitment to community service and altruism indicated by both pantry

leaders and volunteers, and is a key strength to be leveraged for improvement of regional food resiliency.

**Applications to other research.** Tools and assessments used to evaluate food pantries need to be adapted to the local situation in terms of language, culture, and terminology. Using survey software may add to the utility of the survey and the ease of data analysis. Additional questions specific to local situations may be needed. The pilot study helped the researchers realize the importance of identifying strengths in addition to challenges, as strengths may be substantial but are not always obvious. We recognized the need for a validated tool to identify areas for improvement and to help optimize the use of resources by pinpointing focus areas and thus the appropriate expertise needed to address those areas. Overall, we are encouraged that the pilot study supported the strength of our methodology for gathering data, and subsequently using that data to generate not only useful information, but viable and helpful tools. Assessing food pantry capabilities and resilience across locales and regions may be able to promote new linkages for

**Table 2. Food Pantry Capability Index (FPCI) Development Table: Possible Data Indicators for Development of FPCI with Rationale and “Criterion Statements” for Each Item**

Suggested Data Indicators for FPCI		
Indicator	Rationale	Criterion <sup>a</sup>
<b>1. Key Function: Delivery of Food Assistance</b>		
1. Number of individual clients served (per time period)	Indicator of the relative strength and consistency of the demand for services	A capable food pantry has the ability to meet its typical demand for services.
2. Amount of food distributed (per time period, in pounds, boxes, or other units)	Indicator of the ability of the pantry to meet the overall food volume demand of its distribution network	A capable food pantry is able to effectively and efficiently deliver needed volumes of food.
3. Percent of total food received from various sources (food bank, private donations, government surplus)	Indicator of the resilience of the pantry's supply chain, including an understanding of key suppliers, the most reliable suppliers, and the number and diversity of suppliers	A capable food pantry develops strong relationships with key members of its supply chain, seeks to locate reliable suppliers, and diversifies its supply chain as much as possible to promote sustainability.
4. Number of full- and part-time paid staff (in FTEs, per time period)	Indicator of the consistency of ability to operate and carry out key functions, including supervision and management of volunteers, fund-raising, and development of community and stakeholder relationships	A capable food pantry has adequate paid staff (both part-time and full-time) to support consistent operations, to supervise and manage volunteers, and to carry out key functions.
5. Number of volunteer hours donated (in FTEs, per time period)	Indicator of operating capabilities in regards to hours, services, and manpower, and capabilities related to key functions such as food acquisition, inventory management, food delivery and distribution, fund-raising, financial donations, and community and stakeholder relationships	A capable food pantry recruits and retains adequate volunteers to maintain its operating capabilities and perform key functions.
6. Total operating budget (per time period)	Indicator of funding available to pay for operating overhead and distribution-related expenses	A capable food pantry maintains an adequate and sustainable operations budget.
7. Total food budget (per time period)	Indicator of the ability to procure essential, core food ingredients, as well as higher-value foods	A capable food pantry operates with a food budget that is adequate and sustainable to provide core food ingredients and higher-value foods.
8. Funding sources	Indicator of the number and variety of funding sources and fund-raising networks	A capable food pantry develops and maintains multiple funding relationships and funding sources in order to promote consistency and sustainability of operations.
9. Capacity of back-up food supplies and an emergency management plan (in weeks)	Indicator of the effectiveness or existence of contingency or emergency management plan, and of the ability to operate under stressful conditions	A capable food pantry develops contingency plans and maintains appropriate emergency reserves to support and sustain essential operations during periods of stress.
<b>2. Key Function: Client Service, Including Promotion of Self-Efficacy</b>		
10. Mean distance traveled by clients to reach the pantry (in miles), with Rural-Urban Commuting Code included	Indicator of potential barriers to access for clients, such as distance, availability of transportation, and need for mobile distribution networks	A capable food pantry understands its clients' geographic barriers to access and develops effective strategies for ensuring adequate distribution of food, including development of mobile distribution networks when warranted.

*Continued*

11. Mean distance traveled by volunteers to reach the pantry (in miles), with Rural-Urban Commuting Code included	Indicator of possible barriers to maintaining adequate operating capability and the capacity to carry out key functions	A capable food pantry understands its volunteers' geographic barriers to access and develops effective strategies for ensuring that volunteers are able to get to the pantry to provide services.
12. Poverty rate and unemployment rate of population served	Indicator of the demand for food and other services	A capable food pantry understands the characteristics and needs of the population served, and is able to effectively address population needs.
14. Presence of a nutrition policy	Indicator of the promotion of self-efficacy through client choice, provision of healthful foods, and provision of targeted nutrition education	A capable food pantry develops self-efficacy among clients by developing and implementing a nutrition policy designed to promote client choice, provide healthful foods, and provide nutrition education to ameliorate food insecurity and promote good health.

### 3. Key Function: Addressing the Root Causes of Hunger in Communities

15. Breadth and depth of the community network, with consideration of factors such as the number of years operating in the community, number of volunteers, number and type of funding sources, number of community partnerships, number of referrals and/or connections to other community agencies, consistency and amount of community engagement provided by key pantry staff	Indicator of the ability to interact and engage as a key organization in the community, and to serve as a key resource on hunger in the community	A capable food pantry intentionally and consistently seeks to build depth and breadth of relationships within its community and regularly engages with individuals and organizations in order to effectively address the root causes of hunger in the community.
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<sup>a</sup> Based on the methodology of Worstell and Green (Worstell & Green, 2017).

expertise and service to be applied to regional food access needs. Future research may benefit from the development of both resource maps and the FPCI to identify areas for further investigation, as well as assess and evaluate the ability of food pantries to conduct essential operations.

### Conclusion and Future Directions

The pilot study for the NCFPCM NWNC found that substantial amounts of food are distributed to over 11,000 individuals per month by seven food pantries affiliated with SHFB NWNC and located in the food bank's 18-county service area. In addition, the researchers identified core strengths of commitment and altruism among food pantry leaders and volunteers. The study demonstrated the feasibility of adapting and using a previously developed food pantry survey tool, and that tool is being used now to conduct both the full regional study and the statewide study. Initial data analysis

resulted in the identification of data points that could quantify food pantry capabilities. First steps were taken toward developing a FPCI tool and mapping outputs. We anticipate that the full NCFPCM study will result in the identification and dissemination of best practices among food pantries, the development of resource maps to support optimization of regional food resources, and the construction of a FPCI tool that can be used to identify opportunities to improve local and regional food resilience.

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## References

- Akalis, S. (2014, September 10). Strengthening the food chain and growing agency capability with BJ's Charitable Foundation [Blog post]. Retrieved from <https://www.feedingamerica.org/hunger-blog/strengthening-the-food-chain>
- Barth, M. M. [Reporter]. (2018, October 24). Notes taken at a planning meeting of the Southeast Regional Office of the USDA and the Southeastern University Consortium on Hunger, Poverty and Nutrition leadership team for the 2019 Southeastern University Consortium on Hunger, Poverty and Nutrition Symposium. Notes in possession of the reporter.
- Bazerghi, C., McKay, F. H., & Dunn, M. (2016). The role of food banks in addressing food insecurity: A systematic review. *Journal of Community Health, 41*, 732–740. <https://doi.org/10.1007/s10900-015-0147-5>
- Capability. (n.d.). In *Merriam-Webster's online thesaurus*. Retrieved July 9, 2019, from <https://www.merriam-webster.com/thesaurus/capability>
- Capable. (n.d.). In *Merriam-Webster's online dictionary*. Retrieved August 27, 2018, from <https://www.merriam-webster.com/dictionary/capable>
- Capacity. (n.d.). In *Merriam-Webster's online dictionary*. Retrieved August 27, 2018, from <https://www.merriam-webster.com/dictionary/capacity>
- Capital Area Food Bank. (n.d.). Capacity building. Retrieved February 4, 2019, from <https://www.capitalareafoodbank.org/programs/capacity-building/>
- Caspi, C. E., Grannon, K. Y., Wang, Q., Nanne, M. S., & King, R. P. (2018). Refining and implementing the Food Assortment Scoring Tool (FAST) in food pantries. *Public Health Nutrition, 21*(14), 2548–2557. <https://doi.org/10.1017/S1368980018001362>
- Edwards, M. S. (2014). *Trends & best practices in food distribution systems: A focus on food banks & partner agencies*. Winston-Salem, NC: Kate B. Reynolds Charitable Trust. Retrieved from <http://kbr.org/wp-content/uploads/2014/10/Trends-Best-Practices-FINAL.pdf>
- Environmental Systems Research Institute. (2018). ESRI: ArcGIS Desktop. Redlands, California.
- Feeding America. (n.d.-a). Find your local food bank. Retrieved June 12, 2018, from <http://www.feedingamerica.org/find-your-local-foodbank/>
- Feeding America. (n.d.-b). About us. Retrieved June 13, 2018, from <http://www.feedingamerica.org/about-us/>
- Feeding America. (n.d.-c). Our network: Delivering food and services. Retrieved June 11, 2018, from <http://www.feedingamerica.org/our-work/food-bank-network.html>
- Feeding America. (n.d.-d). Working together to end hunger: Our work. Retrieved June 12, 2018, from <http://www.feedingamerica.org/our-work/>
- Feeding America. (2011). *Food banks: Hunger's new staple* [Research brief]. Retrieved from <http://www.feedingamerica.org/research/hungers-new-staple/hungers-new-staple-full-report.pdf>
- Food and Agriculture Organization of the United Nations [FAO]. (n.d.). *Measuring resilience: A concept note on the resilience tool*. Retrieved from <http://www.fao.org/docrep/013/a1920e/a1920e00.pdf>
- Ford, J. D., Lardeau, M.-P., Blackett, H., Chatwood, S., & Kurszewski, D. (2013). Community food program use in Inuvik, Northwest Territories. *BMC Public Health, 13*, 970. <https://doi.org/10.1186/1471-2458-13-970>
- Garratt, E. (2017). Please sir, I want some more: An exploration of repeat foodbank use. *BMC Public Health, 17*, 828. <https://doi.org/10.1186/s12889-017-4847-x>
- Global Food Banking Network, The. (n.d.). *Building capacity: Offering growing food banks the tools to flourish and thrive*. Retrieved February 14, 2019, from <https://www.foodbanking.org/what-we-do/building-capacity/>
- Hawaii Alliance for Community Based Economic Development. (2016). *Puna community resilience and capacity building final report*. Retrieved from <https://www.hacbed.org/wp-content/uploads/2017/04/Puna-Resiliency-Final-Report-UPDATED.pdf>
- Martin, K. S., Wolff, M., Callahan, K., & Schwartz, M. B. (2018). Supporting wellness at pantries: Development of a nutrition stoplight system for food banks and food pantries. *Journal of the Academy of Nutrition and Dietetics, 119*(4), 553–559. <https://doi.org/10.1016/j.jand.2018.03.003>

- Miller, W., Rogalla, D., Spencer, D., Zia, N., Griffith, B. N., & Hinesburg, H. B. (2016). Community adaptations to an impending food desert in rural Appalachia, USA. *Rural Remote Health, 16*(4), 3901. Retrieved from [www.rrh.org.au/journal/article/3901](http://www.rrh.org.au/journal/article/3901)
- Mousa, T. Y., & Freeland-Graves, J. H. (2018). Impact of food pantry donations on diet of a low-income population. *International Journal of Food Sciences and Nutrition, 70*(1), 78-87. <https://doi.org/10.1080/09637486.2018.1466271>
- Northern Illinois Food Bank. (2016, May 18). ACE Conference: Increasing the capabilities of our network [Blog post]. Retrieved from the Full Plate blog: <https://solvehungertoday.org/full-plate-blog/ace-conference-increasing-capabilities-network/>
- Nussbaum, M. C. (2011). *Creating capabilities: The human development approach*. Cambridge, Massachusetts: The Belknap Press of the Harvard University Press. <https://doi.org/10.4159/harvard.9780674061200>
- Pukui, M. K., & Elbert, S. H. (1986). *Hawaiian dictionary: Revised and enlarged edition*. Honolulu, Hawaii: University of Hawaii Press.
- Qualtrics. (2018). Qualtrics (Version May 2018). Provo, Utah, USA. Retrieved from <http://www.qualtrics.com>
- Schumann, M. J., Trull, C., & Noack, C. (2015). *Food and function: An assessment of the capacity of food pantry programs in San Diego County*. Retrieved from [http://catcher.sandiego.edu/items/soles/FoodPantryCapacityReport\\_August2015.pdf](http://catcher.sandiego.edu/items/soles/FoodPantryCapacityReport_August2015.pdf)
- Second Harvest Food Bank of Northwest North Carolina [SHFB NWNC]. (n.d.). About us. Retrieved June 12, 2018, from <http://www.hungernwnc.org/about-us/index.html>
- Tendall, D. M., Joerin, J., Kopainsky, B., Edwards, P., Shreck, A., Le, Q. B., . . . Six, J. (2015). Food system resilience: Defining the concept. *Global Food Security, 6*, 17–23. <https://doi.org/10.1016/j.gfs.2015.08.001>
- U.S. Census Bureau. (2010). *American FactFinder: Census 2010 summary file 1 (SF 1) 100-percent data, table P001: Selected population and housing characteristics* [Data table].
- U.S. Census Bureau. (2017). *TIGER/Line shapefiles: Counties (and equivalent)*. Retrieved August 1, 2018, from <https://www.census.gov/cgi-bin/geo/shapefiles/index.php>
- U.S. Department of Agriculture [USDA]. (2010). *Rural-urban commuting area codes*. Retrieved August 1, 2018, from <https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/>
- USDA Food and Nutrition Service. (2019, January 31). *Healthy Eating Index (HEI)*. Retrieved from <https://www.fns.usda.gov/resource/healthy-eating-index-hei>
- Weinfield, N. S., Mills, G., Borger, C., Gearing, M., Macaluso, T., Montaquila, J., & Zedlewski, S. (2014). *Hunger in America 2014: National report*. Retrieved from <http://help.feedingamerica.org/HungerInAmerica/hunger-in-america-2014-full-report.pdf>
- Wetherill, M. S., Williams, M. B., White, K. C., Li, J., Vidrine, J. I., & Vidrine, D. J. (2019). Food pantries as partners in population health: Assessing organizational and personnel readiness for delivering nutrition-focused charitable food assistance *Journal of Hunger & Environmental Nutrition, 14*(1–2), 50–69. <https://doi.org/10.1080/19320248.2018.1512931>
- Worstell, J., & Green, J. (2017). Eight qualities of resilient food systems: Toward a sustainability/resilience index. *Journal of Agriculture, Food Systems, and Community Development, 7*(3), 23–41. <https://doi.org/10.5304/jafscd.2017.073.001>