# Community Food Resource Assessment in Central City South, Phoenix:

## A Study of Community Capacity Building

by

Carolyn Crouch

A Thesis Presented in Partial Fulfillment
of the Requirements for the Degree
Master of Arts

Approved April 2011 by the
Graduate Supervisory Committee:

Sharon Harlan, Chair
David Aftandilian
Hallie Eakin

ARIZONA STATE UNIVERSITY

May 2011

ABSTRACT

Many studies have shown that access to healthy food in the US is unevenly distributed and that supermarkets and other fresh food retailers are less likely to be located in low-income minority communities, where convenience and dollar stores are more prevalent grocery options. I formed a partnership with Phoenix Revitalization Corporation, a local community development organization engaged in Central City South, Phoenix, to enhance the community's capacity to meet its community health goals by improving access to healthy food. I used a community-based participatory approach that blended qualitative and quantitative elements to accommodate collaboration between both academic and non-academic partners. Utilizing stakeholder interviews, Nutrition Environment Measures Surveys (NEMS), and mapping to analyze the community's food resources, research revealed that the community lacks adequate access to affordable, nutritious food. Community food stores (n=14) scored an average of 10.9 out of a possible 54 points using the NEMS scoring protocol. The community food assessment is an essential step in improving access to healthy food for CCS residents and provides a baseline for tracking progress to improve residents' food access. Recommendations were drafted by the research partnership to equip and empower the community with strategic, community-specific interventions based on the research findings.

ACKNOWLEDGMENTS

Thank you to my committee, Drs. Sharon Harlan, Hallie Eakin, and David Aftandilian, for your guidance, encouragement, and feedback. And to my friends and family, I could not have done this without all of you, who also provided constant support and encouragement.

Thank you to Drs. Seline Szkupinski-Quiroga, Donna Winham, and Christopher Boone for letting me use "The ASU NEMS-S Survey: Adaptation, Validation and Implementation of an Objective Measure to Assess Latino Nutrition Environments." Also, an extra thank you to Dr. Szkupinski-Quiroga and her students for their help during NEMS data collection.

This thesis was generously supported by the Phoenix Revitalization Corporation and by the National Science Foundation Grant No. DEB-0423704, Central Arizona - Phoenix Long-Term Ecological Research, and Grant No. GEO-0816168, Urban Vulnerability to Climate Change. The opinions, findings, and conclusions or recommendations expressed in this thesis are those of the author and do not necessarily reflect the views of the National Science Foundation.

TABLE OF CONTENTS

Page

Page

Page

LIST OF TABLES

LIST OF FIGURES

Chapter 1

# INTRODUCTION

Many studies have shown that access to healthy food in the US is unevenly distributed and that supermarkets and other fresh food retailers are less likely to be located in low-income minority communities. Diets that include fresh fruits, vegetables, and whole grains, which can reduce the risk of obesity and many diet-related diseases (Hung et al., 2004), are less accessible to residents who live in communities where convenience and dollar stores are more prevalent grocery options than supermarkets. Food choices are influenced by the environmental factors of access, availability, and affordability (Azuma et al., 2010). Studies have linked these environmental factors to residents' health risks, finding that obesity and associated health risks are more common among low-income, predominantly African American or Latino communities than in predominately White and Asian communities (Morland et al., 2002). This shows that that the local food environment is shaped by privilege and power, which can result in health outcomes that generate unjust health burdens on low-income, minority populations.

These disparities in access and health are the results of an unsustainable food system. A sustainable food system, as defined by the American Public Health Association (2007), is one that "provides healthy food to meet current food needs while maintaining healthy ecosystems that can also provide food for generations to come with minimal negative impact to the environment. It is

humane and just, protecting farmers and other workers, consumers, and communities." It is important to consider how to increase the sustainability of our food system by addressing the various economic, social, and environmental issues associated with food production, distribution, and consumption. My research focus is on improving food system sustainability by ensuring adequate food access for all people at the community level. Adequate food access encompasses the availability and affordability of healthy, nutritious, and culturally preferred food options.

This thesis is a case study of a low-income, minority community that is struggling with inadequate access to healthy food in Central City South (CCS), Phoenix, Arizona. I formed a partnership with Phoenix Revitalization Corporation (PRC), a local community development organization engaged in CCS, to analyze the community food environment with the goal of enhancing the community's capacity to meet its community health goals by improving access to healthy food. The partnership aimed to establish a basic understanding of food access and availability in the community. Based on this understanding, CCS will be better equipped to address the community-identified problem of the inadequacy of their food resources through strategic, community-specific interventions based on the research findings.

**Study Site**

Central City South is a roughly two-square-mile area of eight neighborhoods in Phoenix, Arizona. The community boundaries are I-17 to the south and west, Grant Street to the north, and Central Avenue to the east, as seen in the lower left-hand corner of Figure 1. By conducting my research in a smaller, well-defined site, rather than across a whole city or county, as many place-based food assessments do, I was able to conduct an in-depth analysis of the food environment that was tailored to this specific community.

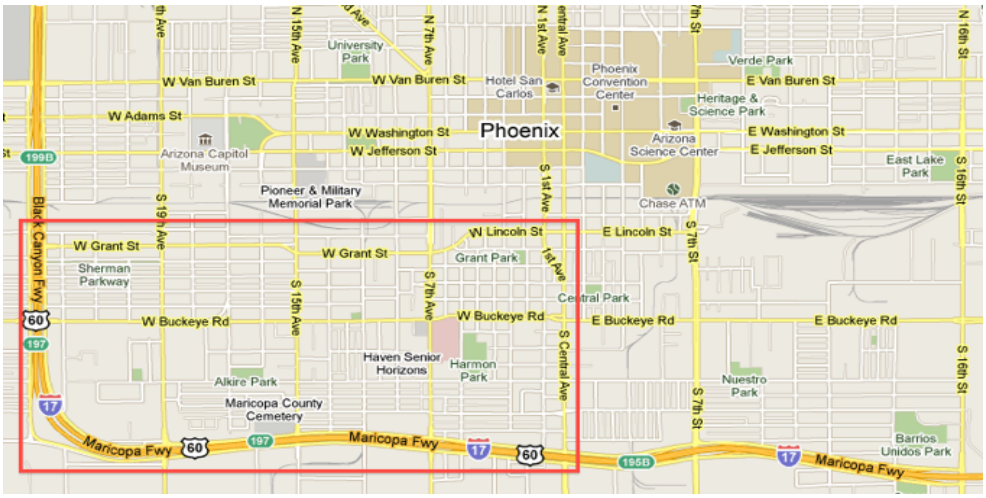



Figure 1: Map of Central City South, Phoenix 2010 Source: Google Maps

PRC worked with Arizona State University researchers to improve their community gardening programming in 2009 and found many community residents strongly associated gardens with extra food and improving access to nutritious produce (Bleasdale et al., 2010). Over the course of that study, residents and community organizers repeatedly expressed their frustration with food availability in their community. Based on these concerns voiced by residents, and building on

previously established trust and relationships in the area, my research transitioned from community gardens to the adequacy of the community's food environment. The partnership between researchers and PRC was crucial to ensure that the research design and outcomes were relevant and applicable for CCS.

PRC recently facilitated the development of a Quality of Life Plan, which involved community organizers engaging in round-table discussions with residents to envision the future of the CCS community. The Quality of Life Plan draft revealed a community-wide desire to create more social, physical, and environmental amenities. Desired amenities identified by residents ranged from better parks and affordable health care providers to increased social services, including improving community well-being through increasing awareness of and education regarding healthy eating (PRC, 2010). This plan for the future of the community is both the basis for my research design and a testament to what residents feel they deserve to have in their community, but have not had up to this point.

A complex combination of drivers, including racial exclusion and political disenfranchisement, have shaped the land use and socio-economic patterns of CCS. Post-WWII Phoenix experienced rapid industrial growth due to defense industry contracts, as well as rapid population growth. Bolin et al. (2005) described the historically marginalized urban core of Phoenix as a 'hazardscape' produced from racism and class privilege through practices of industrial and transportation

encroachment, bank redlining, and neighborhood disinvestment. After the war, white residents migrated out of southwest Phoenix neighborhoods into newly developed areas on the outskirts of Phoenix. Known as 'white flight,' this population shift was common in many US cities at the time and resulted in the concentration of Latino residents to the south and west of central Phoenix (Grineski, 2006). The community's built environment reflects the past underinvestment and marginalization south of the railroad tracks from downtown Phoenix.

These historical socio-spatial processes have shaped today's community environment and continue to influence the lived experience of the residents of CCS. Residents are faced with the burdens of hosting multiple industrial and waste sites in the area, which is "crisscrossed by freeways and railroads, as well as lying beneath the primary flight path of the Phoenix Sky Harbor airport, the sixth busiest airport in the US" (Bolin et al., 2005, p. 157), which is three miles east of the community. Because of these industrial burdens, CCS, like many other low-income minority neighborhoods, has struggled against crime, poverty, and pollution (Sicotte, 2008).

Figure 2 illustrates the land-use patterns of CCS today. The pink and fuchsia areas denote residential housing, which is punctuated by the light and dark blue of commercial and industrial land. In this two-square-mile area, there are 49 industrial sites and 91 commercial sites, 26 of which are auto-related. The black

blocks in Figure 2 show the high rate of vacant parcels in the community. Seven of the eight CCS communities average 40 vacant properties per neighborhood, and one neighborhood alone contains 171 vacant parcels (PRC, 2009).

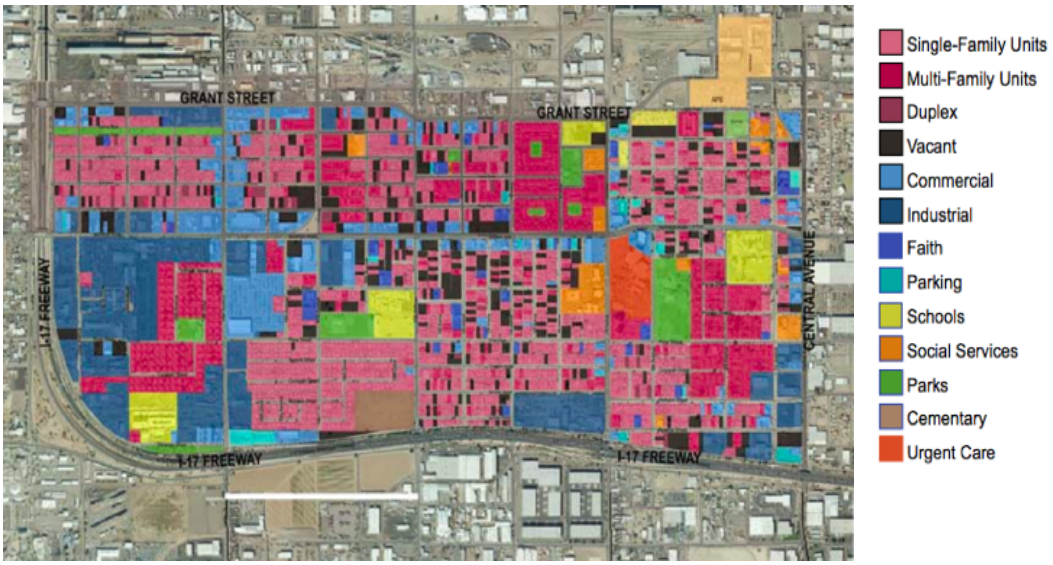



Figure 2: Map of CCS Zoning and Land-Use Source: PRC, 2009

Poverty is evident to neighborhood visitors, illustrated by dilapidated housing stock, the presence of feral animals, and a large number of liquor, dollar, and convenience stores compared to the size of the community. According to the 2000 US Census, CCS had a population of just over 10,000 people, who predominantly rented their homes (72%). The community was 76.2% Hispanic, 16.9% African-American, 4.2% White (Non-Hispanic) and 1% Asian. The highest percent of people who held a bachelor's degree in any one block was 5%, and median annual household incomes ranged by census block from $6,900 to $23,500 (US Bureau of Census, 2000). In 2000, for a family of four with three children, the

poverty line was $17,524 (Dalaker, 2001), which means many CCS residents fell below the federally established poverty level.

**Problem Identification**

Community residents and organizers have expressed concern about the difficulty of finding healthy food in their community. The closest supermarket to these eight neighborhoods is 1.4 miles away from the northwest corner of the community. The most commonly cited grocery store that residents visit is a Wal-mart, but this store is located five miles from CCS. Adequate food access is defined as living within one mile of a supermarket (USDA, 2009, p. 21). Community organizers stated that few residents own vehicles and the public transit routes that run through CCS require at least one bus change to reach a grocery store.

Community residents and organizers have repeatedly voiced the need for better food access and availability. For example, residents have said that, "Most people buy their food at the Circle K or Family Dollar," and "The Dollar Store is one of this community's closest things to a market." Such statements indicate that adequate food options were not available to residents. Community members expressed desires for "better tasting stuff," "some organic food," and the ability to "spend less on better, substantial food." Due to the lack of a grocery store, the majority of food available within the community is from convenience stores, gas stations, or fast food restaurants. Reidpath et al. (2002) found that communities

with the lowest socioeconomic status also have 2.5 times more fast food restaurants than communities with the highest socioeconomic status. The overabundance of fast food outlets in combination with low access to supermarkets may produce an unhealthy food environment that encourages weight gain and obesity (Robert and Reither, 2004).

**Research Questions**

In order to address this need for easier access to healthy food that the community has identified, it is essential to gain a better understanding of the problem by answering the following research questions:

1) What does a community food resource assessment reveal about the access to and availability of healthy food in Central City South, Phoenix, Arizona?

2) How can the researcher facilitate increasing the community's capacity to promote residents' access to healthy food?

Using a community-based participatory research model, PRC and I formed a partnership to address the lack of adequate food resources in the community. Tailored to the goals of this community-academic partnership, the scope of this research was to do a community food assessment and to formulate recommendations for improving food access for residents. Chapter two provides a synthesis of the literature on the role of environmental factors in influencing food access, how food access is currently addressed in the US, and the use and results of community food assessments across the US. The community-based

participatory approach and the various analytic components of this thesis are summarized in chapter three. This study blended qualitative and quantitative elements to accommodate collaboration between both academic and non-academic partners. Chapter four analyzes the research findings: qualitative context of community input, descriptive statistics of the food environment surveys, and mapped results of food access across the neighborhoods and relative to surrounding communities. Recommendations based on the research findings are provided in chapter five. The recommendations are not exhaustive, but identify six potential ways to improve food access that fit the needs and context of the community and have a successful track record in one or more other communities in the US. The concluding chapter revisits the research questions posed and is intended to inform next steps beyond the scope of this thesis.

Chapter 2

# LITERATURE REVIEW

Drawing from the food justice and community food security discourses, I explore the basis of food access disparities by addressing the roles of the nation's obesity epidemic, macro-level drivers of food availability and affordability, and how community food assessments have been used in communities across the US. In a nutshell, residents of low-income minority communities in urban areas across the US are disproportionately at risk of being overweight and obese. Diets that include fresh fruits, vegetables, and whole grains can reduce these risks, as well as those of other diet-related chronic diseases; however, these healthful food choices are less available, of lower quality, and significantly more expensive in low-income communities compared to their higher-income counterparts. To develop community-specific strategies to address the disparity in food access experienced by CCS residents, it is essential to understand the larger context of food access in the US and frame my work within it.

## An Epidemic of Obesity

The last two decades have shown a dramatic increase in obesity in the US, which has particularly affected low-income areas, and minority populations particularly. The Center for Disease Control and Prevention (CDC) uses Body Mass Index (BMI, a weight and height calculation) to define obesity for adults as

a BMI of 30 or higher (CDC, 2009a). According to CDC reports, the nationwide obesity epidemic disproportionately affects minorities, finding strong links between ethnicity and obesity. Race/ethnicity data from 2006-2008 showed that Hispanics had 21% higher obesity prevalence compared to whites, and Hispanics in the Midwest, South or West had higher obesity prevalence than Hispanics in the Northeast (CDC, 2009a). This higher prevalence of obesity of Hispanics is important because they are the dominant ethnic group in the CCS community.

Every state has seen a dramatic increase in obesity. In 2009, only Colorado and the District of Columbia had a prevalence of obesity less than 20%. The Behavioral Risk Factor Surveillance System (BRFSS), an annual CDC telephone survey completed by states, asks questions about various health risk factors and chronic health conditions in a sample of the state population. The most recent data available are from the 2009 survey, which revealed a 65.3% prevalence of overweight or obesity and a 24.7% prevalence of obesity in the Phoenix-Mesa-Scottsdale Metropolitan Statistical Area. The prevalence of obesity in the Phoenix Metro Statistical Area is similar to the overall prevalence of obesity for Arizona at 25.5% (CDC, 2009b).

According to the US Department of Health and Human Services, the prevalence of childhood obesity is increasingly linked to the unavailability of healthy foods where children live. Childhood obesity increases chronic disease risks of developing high cholesterol, hypertension, respiratory ailments, orthopedic

problems, depression, and Type 2 diabetes (US Dept. HHS, 2001). Arizona saw a massive increase in the prevalence of childhood obesity from 2003 to 2007, 46%, which was the largest increase of all the states. By comparison, the next highest increase in that time interval was 32% for children in Illinois and 10% for all US children. Nearly 18% of the children of Arizona are obese (Singh et al., 2010).

This upswing in obesity is affecting the quality of life of individuals and communities. Obesity and chronic diseases such as atherosclerosis and Type 2 diabetes are considered 'diseases of lifestyle' and are directly related to dietary choices. Dietary choices are personal, but are also influenced by environmental factors of availability, quality, and affordability of healthy food options. Access to healthy food is important in terms of an individual's or a community's ability to stay healthy.

**Food Deserts and Food Swamps**

The common description of areas of low food access has become 'food desert.' The 2008 US Farm Bill commissioned research regarding such areas, defining a food desert as "an area in the United States with limited access to affordable and nutritious food, particularly such an area composed of predominantly lower-income neighborhoods and communities" (USDA, 2008, p. 1031). The main concerns of 'food desert' studies are 1) insufficient quality and/or quantity of food and 2) systematically higher prices for food in particular geographic areas (Bitler and Haider, 2010).

More often than not, a food desert (deserted of grocery stores) may also be a 'food swamp,' which refers to the low-income neighborhoods that lack supermarkets but abound in fast-food restaurants and liquor stores (Gottlieb and Joshi, 2010). Convenience stores and fast food outlets have filled the void in inner cities where healthier food options are no longer found and are harder to reach by communities that often lack good transportation options. Because they have easier access to fast food than affordable, nutritious food, residents of these communities are more likely to eat unhealthy diets and less likely to eat healthy alternatives, and thus have higher chances of obesity and chronic diet-related diseases (Edmonds et al., 2001; Moore et al., 2009; Morland et al., 2002). This increased exposure to unhealthy food and the potentially negative effects of such a diet disproportionately affect the health and well being of low-income, minority communities.

The terms 'food desert' and 'food swamp' arose from the food security discourse and they are evocative metaphors; however, they lack empirical data and a specific definition that are needed in academic research. Rather than rely on these metaphors, I used the concept of 'Low Access Area' (LAA), which was used by The Reinvestment Fund for their 2010 nationwide supermarket study. LAAs were determined based on criteria of 1) population density, 2) percent of housing units for which no vehicles were available, and 3) distance from a supermarket. The Reinvestment Fund offers an online mapping tool to illustrate low/moderate-

income communities' that are most affected by the lack of a full-service supermarket (http://www.trfund.com/TRF-LAA-widget.html). One-third of the low-income areas identified across the US were designated as areas with low food access (The Reinvestment Fund, 2010).

**Food Justice and Community Food Security**

The issue of access to healthy food is a sustainability problem and it is intertwined with our economic, socio-cultural, and natural systems. Economically, the expenses related to these "diseases of lifestyle" will cost hundreds of millions of dollars in medical and related expenses that are preventable. Socially, diet-related disease disproportionately affects low-income and minority populations. Environmentally, the industrialized agriculture system, fossil fueled and expansive, continues to degrade the Earth's natural systems.

I explored the issue of food access within the conceptualizations of food justice and community food security, two discourses that incorporate health, justice, and sustainability. Food justice, as defined by Gottlieb and Joshi (2010),

> seeks to ensure that the benefits and risks of where, what, and how food is grown, produced, transported, distributed, accessed and eaten are shared fairly. Food justice represents a transformation of the current food system, including but not limited to eliminating disparities and inequities.

Community food security (CFS), also based on eliminating disparities, is defined as "a condition in which all community residents obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes community self-reliance and social justice" (Hamm and Bellows,

2003, p. 37). CFS scholars and activists have put self-reliance and empowerment as a basis of their conceptualization of food access (Hinrichs and Lyson, 2007; Winne, 2008), and CFS also incorporates the important element of culturally acceptable food, which is particularly important when developing community-specific solutions in a predominately Hispanic community.

Food justice and community food security complementarily frame this research as a sustainability issue based on the conceptualization of Just Sustainability by Agyeman et al. (2003): "the need to ensure a better quality of life for all, now and into the future, in a just and equitable manner, whilst living within the limits of supporting ecosystems" (p. 5). The concepts of eliminating disparities and striving for a better quality of life are echoed in the CCS community's Quality of Life Plan, on which this research is based.

Addressing food inaccessibility is an urgent issue because of the harm done to people who experience it. Food access is not only an important issue to the community, but it is becoming an increasingly important and urgent national and international issue. Studies on food access and food-related health and justice issues have produced disturbing results about the harmfulness of limited food access. For example, obese children may not outlive their Baby Boomer parents (Lee et al., 2010) and the U.S. military struggles to find recruits that are not too fat to fight (Mission: Readiness, 2010).

**Drivers of Food Access**

The larger context of food access in the US can be partially explained by a confluence of macro-level forces that influence the ability of communities to obtain affordable, nutritious food options, such as growing income inequality, shifts in patterns of urban development, racial and social tensions, and the industrialization of the US food system (Winne, 2008). Though these forces cannot uniformly explain the occurrence of areas of low food access across the US, these macro-level drivers have particularly influenced the food access of the residents of CCS.

First, on a national scale, the distribution of income has become less equitable over the past few decades, and the growing gap between rich and poor influences the disparity between income groups regarding what people are able to afford, including food. Figure 3 illustrates the mounting gap between the richest and the poorest people in the US. This gap can be seen as a contributing barrier to food access because a higher proportion of a shrinking share of income is spent on necessities like food (Winne, 2008).

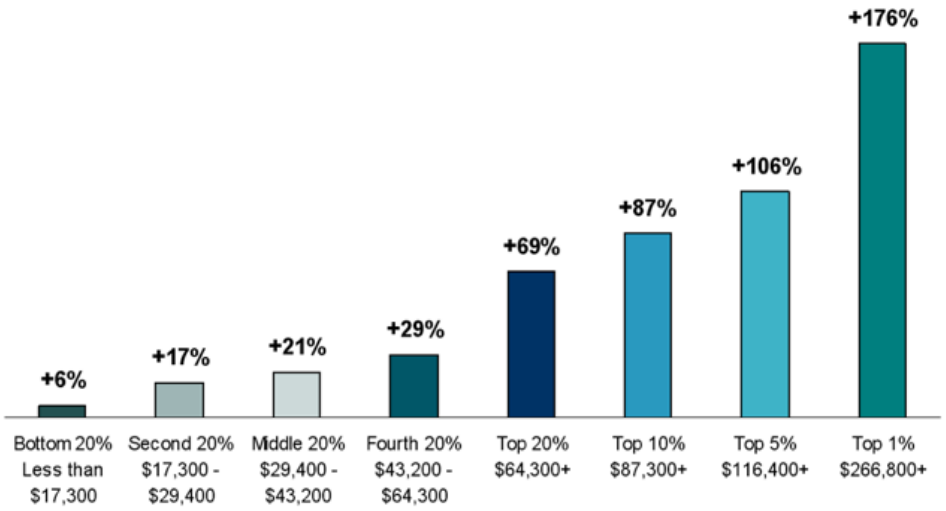



Figure 3: Change in After-Tax Income by Income Group, 1979-2004

Source: Congressional Budget Office (2006)

Second, shifting patterns of urban development from the central core to suburbia have affected the demographic and economic composition of inner cities. This new socio-spatial reality is intertwined with the third macro-level driver, social and racial tensions. The relationship between inner central cities and suburbs, where many higher-income households relocated, was permanently altered by a phenomenon known as "white flight," the exodus of white families out of the city and into the suburbs. This shift in demographic composition of inner cities significantly reduced the buying power of many urban core communities and may have resulted in insufficient support for grocery chains in these neighborhoods. Other unjust practices by banks and government officials added to the disinvestment of inner-city communities through intentional strategies that funneled lending (and thus development) to the suburbs rather than

urban areas. This practice, commonly called "redlining," was documented in Phoenix and thus affected the conditions and urban development of Central City South, Phoenix (Roberts, 1973). These racial and social tensions, combined with the political and economic environment following WWII, resulted in a changing landscape that may have contributed to the dearth of community food resources in the central city area of Phoenix.

The last and arguably the most relevant influence on community food choices is the process of industrializing the US food system. Feenstra et al. (2003) described our industrialized food system as "highly energy and capital-intensive, globally integrated, and increasingly economically consolidated" (p. 100). Our modern industrialized food system has developed and intensified according to a strict production-oriented model that primarily emphasizes efficiency rather than nutrition or health. Thompson (1995) pointed out that productionism linked farmers' economic motivation to producing more food and fiber rather than linking it to the health of soil, crops, and animals (p. 55). The growth of the industrialized food system is heavily fueled by petroleum and by policies to subsidize commodity crops of corn, soy, and wheat. Patty Cantrell, director of the Michigan Land Use Institute, described the result of these subsidies as making highly processed foods with additives (the byproducts of those commodities) more affordable and easier to find than less-processed and whole foods like fruits, vegetables, and whole grains (Cantrell, 2004).

These commodity crops are processed into the majority of the 50,000+ products sold in grocery stores today, which reflects the more than tripling of the amount of products available in grocery stores since 1980 and the dawn of the era of supermarkets (Teton Sands, 2006). Since then, the conventional supermarket and food/drug combination stores typically associated with grocery shopping have lost a great part of their market share to retailers like Wal-Mart Supercenters, Sam's Club, Costco, and a variety of dollar stores. Convenience stores and fast food restaurants have dramatically expanded their reach into this competitive space in recent years, but in 2001 Wal-Mart became the largest seller of food to consumers in the US (Imlay, 2006), taking center stage in the new era of superstores.

Superstores house mountains of goods for sale, but have also contributed to the lack of food options in many inner-city communities as smaller food stores are put out of business by hyper-competitive pricing strategies of big players in the industry. The higher prices in small stores found in the inner city is attributed to insufficient volume to buy from full-line food distributors and thus they have to pass on the cost to their customers. The profit margins in the grocery industry are notoriously low (only 2-3%), operating as close to the red as possible (Teton Sands, 2006). Winne (2008) reiterated this point, but also emphasized that the thin margins of the supermarket business produce results reminiscent of historic redlining due to the disincentives to locate in low-income communities.

The consolidation of food stores from small urban retail outlets to large suburban supercenters has resulted in a national-level shift of food store availability and a net loss of food stores for low- and middle-income communities in the US. In a national study of food store availability and neighborhood characteristics, Powell et al. (2007) found that low-income neighborhoods were found to have greater numbers of non-chain supermarkets and food stores. However, other studies that have found that smaller and/or non-chain stores are less likely to stock healthful foods than chain supermarkets (Horowitz et al., 2004). These smaller stores are also less likely to offer foods at lower prices (Kaufman et al., 1997; Chung and Myers, 1999). And because the availability of supermarkets is associated with increased fruit and vegetable intake and more healthful diets (Morland et al., 2002, 2006; Laraia et al., 2004), the falling numbers of food stores available to low-income communities contributes to limited access to healthy food in these communities across the US.

**Community Food Assessments**

There are many (and increasing) examples of how place-based food assessments are used to analyze and address inadequacies of food environments across the United States. Many food environment studies focus on access to supermarkets, quantified by distance or store concentration in a given area (Bodor et al., 2007). The community food environment, sometimes called the 'foodscape,'

influences the health and well being of communities across the US. Many studies have found disparities of access and availability to supermarket food outlets in low-income communities compared to higher-income communities (Alwitt and Donley, 1997; Baker et al., 2006; Block and Kouba, 2006). Supermarkets and other fresh food retailers are less likely to be located in low-income minority communities, where convenience and dollar stores are more prevalent grocery options (Farley et al., 2009). Larson et al. (2009) reviewed 54 studies published between 1985 and 2008 that examined neighborhood differences in food access in the US. Both national- and local-scale studies reviewed by Larson et al. (2009) show that residents of low-income, minority communities and rural neighborhoods are most often affected by limited access to healthy food options. Their results suggest that better access to supermarkets and less access to convenience stores tend to lead to better health outcomes for neighborhood residents.

USDA (2009) measured access as the distance to the nearest supermarket; "supermarkets" were defined using the industry standard definition of "annual sales of $2 million and contain all major food departments found in a traditional supermarket, including fresh meat and poultry, produce, dairy, dry and packaged foods, and frozen foods" (p.15). Acceptable distance to a grocery store was defined as one mile, but research found that people eligible for the Supplemental Nutrition Assistance Program (the new name for food stamps since 2008) traveled an average of 4.9 miles to their most frequented food store. This finding is

consistent with that of Mantovani and Welsh (1996), who reported that food stamp shoppers tended to use their benefits outside of the zip code in which they live (p. 62). The USDA (2009) report concluded that due to the distance to food stores in these low access areas, which are typically low-income also, vehicle access is perhaps the most important determinant of whether a family can access affordable, nutritious food. This distance and restriction of transportation options translates to a "large and statistically significant" difference in time cost to supermarket for those with low access in low-income areas (19.5 minutes one-way) compared to the national average of 15 minutes one-way (USDA, 2009, p. 30).

Though distance is a significant barrier to healthy food options, research findings are unclear about whether distance to food outlets or income constraints are a greater barrier for low-income households (USDA, 2009). It is not just the price of healthy food that is higher, but research findings also suggest higher price-sensitivity of lower-income people compared to higher income people for the purchase of fresh fruits and vegetables (Powell et al., 2009). A review of national food prices found that supermarket prices are 10 percent lower, on average, than those of smaller food stores, partially due to economies of scale resulting in lower margins over cost of goods sold (Kaufman et al., 1997).

Revealing relationships and associations between community and food source attributes is an important process, and communities across the US are

using knowledge gained from food environment assessments to improve health disparities and build healthier neighborhoods. A well-known example is the Gallagher Group (2006) food desert study of Chicago neighborhoods, which compared neighborhood access to healthy food retailers according to racial composition, and documented relationships between diet-related health and food access. In this example, and in many other food access studies in the US, analyzing the distribution and characteristics of communities and their food resources can help communities identify areas for strategic, targeted interventions to improve access to healthy food.

The genesis of food access inequities are still being researched to identify the drivers of disparity and address the complex blend of factors that link local environment to quality of life and health. My research contributes to the growing field of community-based research to improve health equity, social justice, and community sustainability. This literature review explored urban food system sustainability in the United States through the lens of access, and provided a synthesis of the literature on the macro-level drivers of food access, the role of local environmental factors of availability and affordability, and how food access is currently addressed in the US.

Chapter 3

# METHODS

This thesis blended qualitative and quantitative elements to accommodate collaboration between academic and non-academic partners. I examined a specific community-identified problem - inadequate access to healthy food - within the specific context of that community and through engagement with those affected by this problem. This approach is community-based participatory research (CBPR), which offers an alternative to traditional research. CBPR calls for partnership in the research process to combine systematic inquiry, participation, and action (Hall, 1992). As described by Brown et al. (2003), CBPR includes a wide range of activities based on mutual interest and benefit, as well as shared learning between researchers and practitioners in a variety of arenas.

CBPR is well suited to address complex urban health problems, such as inadequate access to healthy food, because it involves cooperation between academic and non-academic researchers in creating knowledge intended to inform change (Israel, 1998). Such engagement enables practitioners, researchers and those affected by a problem of mutual interest to combine perspectives to build insights and practical innovations that no one group could produce on their own (Brown et al., 2003). A central tenet of CBPR is to empower community stakeholders while generating scientific knowledge. Combining knowledge and action through stakeholder involvement empowers those affected by a problem (Minkler, 2005). I

used the CBPR approach to create strategies to address food access and empower local actors to improve their community's health.

Orientation toward near-term solutions creates positive feedbacks and a sense of progress, empowerment, and shared mission, which are essential to achieve the research objectives within this sustainability and food access study. Glanz and Yaroch (2004, p. S75) emphasize that "innovative strategies, partnerships, grass roots action involving economic development for low-income communities, and sustainability are important considerations" to increase the intake of healthful food among community residents. Clark and Dickson (2003) state that sustainability science demands close collaboration between scholars and practitioners. This study's stakeholder-driven research was designed to find local solutions using local knowledge for a specific community. Ostrom et al. (2007) stated that specificity is essential to addressing sustainability problems because contextually embedded problems require contextually embedded solutions. Though sustainability issues have high-level impacts and long-term effects, solutions can be enacted at individual- and community-levels to eliminate disparities and inequities and ensure a better quality of life for all.

Semenza et al. (2006) define the following five elements as necessary for successful community-based research partnerships: 1) involve a core group of committed participants, including residents; 2) possess strengths and resources to be leveraged; 3) collaborate equitably with all partners in all phases of the research;

4) employ a cyclical and iterative process; and 5) empower all partners for their mutual benefit. This study fulfilled each of these areas by: 1) collaborating with a dedicated team of community organizers; 2) utilizing the different types of knowledge and tools at the disposal of each partner; 3) fostering relationships and maintaining constant communication; 4) regularly reflecting on progress and suggesting future work; and 5) treating each partner as a valuable contributing member of a team. The partnership's working environment was enthusiastic and supportive throughout the research process.

CBPR combines the benefits of lay knowledge, expert or informed researcher knowledge, and advocacy. This research process and the success of this project greatly depended on planning and working according to the principles of community-based participatory research that support successful partnerships and ensure the empowerment of community stakeholders. The CBPR approach enabled the combination of research and action to tailor the research design to the specific needs of the neighborhoods, which will hopefully result in increased likelihood of success in development and transformation of community food resources to the benefit of CCS residents.

**Community Food Assessment as Boundary Object**

Food environment assessments serve as boundary objects between different groups of stakeholders when they are working toward solutions to

inadequate food access. Wenger (1998) described boundary objects as entities that can link communities together as they allow different groups to collaborate on a common task. Boundary objects serve as a means of translation and they entail working arrangements, adjusted as needed, to meet the needs of different communities of knowledge and experience. These various groups are referred to as communities of interest, defined by their collective concern with the resolution of a problem (Arias and Fischer, 2000). These groups have different perspectives, areas of expertise, and ways of processing and using information. Members of communities of interest learn to communicate with and learn from each other by establishing a shared understanding of the issue being addressed. By utilizing boundary objects, communities of interest can build a shared understanding of the task at hand, and understanding usually evolves collaboratively throughout working together (Arias & Fischer, 2000).

Kimble et al. (2010) argue that boundary objects need to be seen in the context of the motivations of the people that choose the object as well as their communicative role. I proposed the food environment assessment for this thesis in response to past work with the CCS community. As a community of interest, we agreed that conducting a community food assessment provided the necessary characteristics to both collaborate and communicate the findings to the residents of CCS and other area service providers.

**Research Objectives**

My research objectives were to: 1) assess and analyze the community food stores using the Nutrition Environment Measure Survey (NEMS), 2) represent the current level of food access and availability by mapping the community food resources in CCS, and 3) work with community partners to co-create recommendations to improve food access and availability based on the knowledge gained through the research process. Rather than just providing a baseline analysis of community food resources, the partnership goal was to provide actionable recommendations for improving residents' access to healthy food options. Sawicki and Craig (1996) emphasized that community groups not only need access to the data, but they also need help translating the data into concrete action steps and applying data to action. My research is essential to meeting the community's health goals through strategic, targeted interventions to improve residents' access to food choices. Only by applying the research recommendations can the community-academic partnership make a difference in the community.

**Research Design**

In accordance with the community's Quality of Life Plan, the research objectives of this study were aligned with the community's intention to improve access to healthy food options. By combining analytic research tools and the knowledge and experience of community stakeholders, more could be

accomplished than through either research or practice alone to improve community health.

By utilizing community input to complement the NEMS survey data, as well as mapping the community food environment, this thesis captured multiple types of access to healthy food experienced by CCS residents. Stakeholders' narrative excerpts provided a layer of lived experience to the food environment assessment that included social, physical, and economic barriers. The NEMS and GIS analysis provided insights into the distance and travel time associated with accessing food resource locations, the quality of food items, and the affordability of healthy options compared to unhealthy options. By evaluating both physical and social aspects of the community food environment, a holistic snapshot of food access and availability in the community was used to formulate strategies to increase access to healthy food options.

**Data Collection**

Data collection took place between May 2010 and February 2011, and both quantitative and qualitative data collection methods were utilized. I collected qualitative data through scheduled meetings and informal conversations with community stakeholders. Stakeholder input provided a community perspective on what aspects of community food resources are most important for inclusion in the food environment assessment and ongoing insight into and feedback on research objectives and outcomes. Quantitative data collection included surveying community food resources using the Nutrition Environment Measures Survey

(NEMS). The survey information was used to produce descriptive statistics of the community and consumer food environment. Geographic Information System (GIS) software was used to map data on the relative quality and level of food access. Qualitative and quantitative methods employed in this study are detailed below.

**Qualitative Data**

Community engagement throughout this study added a layer of lived experience to the data analysis of the local food environment. I interviewed seven people in person or over the phone between October 2010 and February 2011. I recorded the seven semi-structured interviews and took notes after informal conversations with community residents during monthly community meetings. Each participant was over 18 years old and either works or resides in CCS. Because this thesis pertains to a specific set of events and a level of trust and familiarity was established with PRC, I used convenience sampling to contact staff and residents involved in PRC programming and in the food environment research. The goal of these interviews was to gain insight into the perceptions of mapping as a tool to improve food access, what issues (e.g., transportation or price) seemed most important, and what might be gained from research findings. The Institutional Review Board oversight and approval form can be found in Appendix A, and a copy of the information letter provided to interview respondents can be found in Appendix B.

Through formal and informal discussions, community organizers and residents conveyed the desired outcomes, defined priorities, and identified obstacles of this research process. The community input also provided general reactions to the idea of food environment assessment and mapping as a tool and part of the community's Quality of Life Plan for improving access to healthy food in the community. Discussion topics included food stores in the community, food that is and is not available to eat in the community, distance traveled or time taken to obtain food, whether food access is an issue of concern to the community, and reaction to the research process for improving access to healthy food.

To analyze the qualitative content of the interviews, I used non-software based methods to identify themes and overall concepts linked to the community food resources in CCS. Ryan and Bernard (2003) found that cutting and sorting word lists yields intermediate number of themes in a given study. I underlined key words and phrases within the transcribed text of the interviews and highlighted during multiple readings. Key words and phrases were sorted into categories and the immediate context of key words and phrases were analyzed for theme formulation. I also analyzed the texts for repetitions and similarities and differences across and within concepts brought up during interviews. The qualitative content analysis resulted in one meta-theme and three sub-themes. Narrative excerpts from interviews and information shared by community residents added a layer of lived experience to the quantitative elements.

**Quantitative Data**

The level of access to food in CCS was assessed using Geographic Information System (GIS) software to analyze locations of food stores. The maps illustrate the relative food access in community food stores using the NEMS composite and component scores. The ASU GIS repository provided the data to inform the GIS analysis of community food resources. Census data, road networks, bus stops and public transit routes were identified and mapped using this resource. To generate initial maps of community food resources, ArcMap 9.3 and the ArcGIS online mapping platform were used.

Because CCS is only two square miles, proximity measures of buffers around food outlets to represent walking accessibility of the stores within the community only show that all community food stores are within walking distance for all residents. However, this distance does not equate to the walkability of this distance, which was not quantitatively assessed in the study. These maps showed the geographical prevalence of food stores, the relative accessibility of healthy food options based on availability and price, and the relationship between residents' population concentration and food sources within CCS.

I used NEMS surveys to research the consumer nutrition environment of retail food outlets by surveying the type and location of food outlets, availability of healthful choices and information, food pricing, promotions, and placement of healthier food products. Farley et al. (2009) emphasized that "very few studies have considered liquor stores and drug stores as sources of food, even though

these stores may be important sources of food for families that do not own cars or live in neighborhoods that are distant from supermarkets" (p. 679). NEMS was originally developed at the University of Pennsylvania by Dr. Karen Glanz to address the need for valid observational measures to evaluate the nutrition environment of retail food stores (Glanz et al., 2007). Restaurants can be rated with NEMS, but for this study I only used the food store measure. The original version of the NEMS survey (referred to as 'Standard NEMS') included eleven food categories to measure the availability and pricing differences between healthier and less-healthy options: milk, fresh fruits and vegetables, ground beef, hot dogs, frozen dinners, baked goods, beverages (soda/juice), whole grain bread, baked chips, and cereal. Each food category has a defined healthy option and regular option to compare, such as skim or low-fat versus whole milk or low-sugar versus high-sugar cereal. Table 1 illustrates the variables measured for each food item within the store using the Standard NEMS survey. Quality was measured only for fruits and vegetables, while availability and price were measured for all food items.

Dr. Seline Szkupinski-Quiroga, Dr. Donna Winham, and Dr. Christopher Boone of Arizona State University developed an adaptation to the Standard NEMS, which is named the ASU Latino Nutrition Environment Measures Survey and is still in the pilot stage. The ASU Latino NEMS (referred to as 'Latino NEMS') survey adaptation was designed to measure the food environment of

Hispanic communities better than the Standard NEMS by incorporating additional food measures specific to Latino communities.

Table 1: Variable Measures of Standard NEMS version

| | Variables measured | | | |
|---|---|---|---|---|
| | Availability | Quality | Price[a] | |
| Type of Food | | | Absolute | Comparative |
| Fruit (fresh): 10 types | X | X | X | |
| Vegetables (fresh): 10 types | X | X | X | |
| Milk: skim/low-fat versus whole | X | | | X |
| Ground beef: lean versus regular | X | | | X |
| Hot dogs: low-fat versus regular | X | | | X |
| Frozen dinners: Reduced-calorie versus regular | X | | | X |
| Beverages | | | | X |
| Soda: diet/low-calorie versus regular | X | | | |
| Fruit juice: 100% juice versus juice drinks | X | | | X |
| Baked goods: lower fat versus regular | X | | | X |
| Bread: 100% whole grain versus refined | X | | | X |
| Snack chips: baked/low-fat versus regular | X | | | X |

[a]Comparative price applies when there is price information for a healthier food option and the equivalent "regular" comparison (e.g., skim milk vs whole milk), while absolute price applies when the item is compared across store type and neighborhood characteristics.

Source: Glanz et al. (2007)

The Latino NEMS survey protocol incorporates four main additions to the standard NEMS survey: 1) records food stores' exterior advertisements; 2) includes additional food measures of beefsteak, chicken, tortillas, cheeses, and beans; 3) adds specific food items popular to Latino communities within the beverage, fruit, and vegetable measures; and 4) measures not only fresh produce, but also whether fruits and vegetables are canned, frozen, and/or organic. A more detailed description of differences between the Standard and Latino NEMS versions can be found in Appendix C, and sample pages of both the Standard and Latino NEMS can be found in Appendix D.

NEMS data collection took place during October and November 2009 within a 4-week period. I identified the CCS community food retail stores using windshield surveys, web search engines, Maricopa county databases, and store site visits. All food retail outlets were visited to verify the address. I enumerated the stores for data analysis by store type category: grocery store, ethnic food store, carnicería, convenience store, or other. There are no grocery stores in operation in CCS. For the purposes of this study, a grocery store was defined as "a retailer that must have annual sales of at least $2 million and contain all the major food departments found in a traditional supermarket, including fresh meat and poultry, produce, dairy, dry and packaged foods, and frozen foods (USDA, 2009, p. 15). Ethnic food stores are defined as a type of non-chain grocery store which sells food items that are distinctly Latino, items that are hard to find elsewhere, and often cater to Latino immigrants by conducting business and having signage in Spanish. Carnicerías are defined as a type of specialty store with signage in Spanish, a meat counter with butcher that sells fresh meat including products not readily available in mainstream supermarkets, and which also sell a variety of pre-packaged food items, beverages, kitchen items, and produce including tomatoes, limes, and onions. Convenience store is a small retail store that is open long hours and that typically sells only staple groceries, mostly snack items, and sometimes gasoline. 'Other' stores are stores that did not easily fit another store definition, but sell food within the community. The survey sample included a total of 14 stores: 6 convenience stores, 2 ethnic food stores, and 6

stores classified as other. The 'Other' stores in the sample were dollar stores and liquor stores that also sold food.

Each store was assigned a coded number by store type in the enumeration database and assigned randomly to the NEMS survey research teams. The NEMS research team members received University of Pennsylvania online rater certification training (http://www.med.upenn.edu/nems), and I briefed each of them on research protocol for this study prior to data collection. Research teams approached the store managers of each surveyed store to obtain permission to complete the surveys. All raters had a bilingual (English and Spanish) information letter about the project and researcher contact information was provided (see Appendix E). NEMS survey research team members conducted surveys in pairs on multiple days to calculate inter-rater and test-retest reliability. Eight researchers (four pairs) conducted Standard and Latino NEMS survey in CCS food stores on two different days. A total of fourteen Standard NEMS surveys were conducted (one for each food store), and thirty-nine Latino NEMS surveys were conducted (at least two completed surveys per store and most stores were tested an extra time for calculating the test-retest reliability measure).

**NEMS Scoring**

The Standard NEMS survey was administered once for each store during data collection to obtain a NEMS composite food environment quality score. All

NEMS scores reflect Standard NEMS surveys because a scoring rubric has not been developed for the Latino NEMS pilot yet. Descriptive statistics incorporate all data collected using the Latino NEMS surveys. The Standard NEMS scoring rubric awarded points using three dimensions (availability, quality, and price), and the highest possible composite score is a 54. Availability scores, with a highest possible score of 30, assigned two points per indicator for the availability of healthier options, and an extra point for more varieties (e.g., two extra points for three or more varieties of lean meat). Up to three points were assigned for having more produce of acceptable quality, and the quality score ranged from 0 to 6. Affordability scores assigned two points for a lower-priced healthier option, no point for a higher-priced healthier option, -1 for a higher-priced less healthy item, and the highest possible affordability score is 18.

Total scores were calculated for each store, which provided a means of comparison among community stores relative to food access and availability. The maximum availability score was 30 possible points, the maximum price score was 18 possible points, and the maximum quality score was 6 possible points, which summed to total composite scores out of a possible 54 points. The negative points awarded for high prices of healthy items was the only component score that could be a negative number if stores had no healthy food items that were less expensive than the less healthy item.

**Inter-rater and Test-retest Reliability**

Survey teams conducted NEMS surveys independently, but in pairs at the same time, to provide a measure of inter-rater reliability. One of the two members of the survey team returned to the same store within two weeks to complete the survey again. This second visit ensured test-retest reliability. Inter-rater reliability calculations were computed for 78.6% (11) of the stores and test-retest reliability calculations were computed for 64.3% (9) of the stores rated. The reliability measures were calculated for all completed surveys. Some store managers asked raters to leave before the survey was complete, and some raters could not get back to the store to complete a retest survey. Eleven stores were available for inter-rater reliability and nine stores for test-retest reliability.

The store types varied in complexity of offerings and layout and this created differences in the amount of time needed to rate each one. Each survey took between twenty and ninety minutes to complete. The inter-rater and test-retest reliability measures are presented as overall averages as well as by types of store - convenience store, ethnic food store, and other.

The inter-rater reliability was computed by calculating agreement between two surveys completed on the same day by two raters independently rating the same items. Overall inter-rater reliability was 94.2% agreement. Table 2 shows the percent agreement between raters for each type of store included in the survey sample, as well as for each dimension of the survey (availability, price, and quality).

Table 2: Inter-rater reliability of Latino NEMS Surveys

| | Ethnic Food Stores (% Agreement) | Convenience Stores (% Agreement) | Other Stores (% Agreement) | All Stores (% Agreement) |
|---|---|---|---|---|
| Availability | 89.8 | 97.0 | 96.8 | 95.6 |
| Price | 88.9 | 97.8 | 94.9 | 95.1 |
| Quality | 66.1 | 99.4 | 95.2 | 91.8 |
| Mean Agreement | 81.6 | 98.0 | 95.6 | 94.2 |

Though raters were scoring the same items during the same timeframe, quality is shown not to be a very reliable rated dimension. Ethnic stores had more fresh produce and this suggests that the quality measure increased in disagreement when there are more produce items to be rated in a single store. Quality is a subjective measure and further training may result in a reduction of disagreement between rater responses.

Test-retest reliability was calculated for the nine of the same stores used in the inter-rater reliability calculations. It is equal to the agreement between the responses by one rater performing the same survey in the same store on different days. Overall test-retest reliability was 93.1%. Table 3 shows the percent retest agreement between the raters' surveys for each type of store included in the survey sample, as well as for each dimension of the survey (availability, price, and quality).

Table 3: Test-retest Reliability of Latino NEMS Surveys

| | Ethnic Food Stores (% Agreement) | Convenience Stores (% Agreement) | Other Stores (% Agreement) | All Stores (% Agreement) |
|---|---|---|---|---|
| Availability | 91.7 | 91.0 | 95.4 | 92.1 |
| Price | 80.6 | 95.9 | 96.3 | 92.6 |
| Quality | 80.7 | 98.1 | 100 | 94.6 |
| Mean Agreement | 84.3 | 95.0 | 97.2 | 93.1 |

The reliability of price varied between trips to the community stores, suggesting that prices may change noticeably from week-to-week. This could be due to some raters' inability to differentiate between a promotional price and the regular price. Also the price was not labeled in many stores and required asking the storeowner or manager, which could introduce variability. Pricing systems vary greatly among stores in the community, as illustrated by observed haggling with customers over price in contrast to the set prices at corporate chain stores.

Because there were relatively few raters, even one of them marking a measure differently affected these figures, but overall the NEMS store survey exhibited a high degree of inter-rater and test-retest reliability. These findings were consistent with those by Glanz et al. (2007), who calculated inter-rater reliability between 84% to 100% and test-retest reliability between 73% and 100% for the NEMS store measure. The NEMS survey is an effective observational measure of the community food environment and has proven to be a valid measure to evaluate the CCS food stores.

Chapter 4

# DATA ANALYSIS

This chapter provides a summary of the interviews, mapping elements, and NEMS surveys. The results of the community food resources assessment are fully discussed here. I also provided the assessment in a separate report to PRC, which is to be displayed on their website and distributed to other service providers and the public. The following analysis of the qualitative and quantitative components formed the basis of the recommendations for improving food access in CCS.

## Interview Respondent Input

The qualitative aspect of this thesis establishes the priority of respondents' concerns regarding the project, maintains a connection to and continual feedback from community stakeholders, and provides insight for appropriate recommendations to address community food access. Through attending community meetings and conducting interviews with community organizers and residents, I was able to incorporate various perspectives and insights into the data analysis and recommendations.

The meta-theme of the interviews conducted during this study was barriers: social barriers of stigma based on fear and Otherness, physical barriers of distance and lack of physical ability, and economic barriers of affordability and investment (varying in scale from individual- to community-level). I outline each

of these barriers as described by respondents, providing examples of recurrent themes as narrative excerpts.

**Social Barriers**

Respondents expressed stigma as a community-wide social barrier to a better future. Though progress has been made to revitalize CCS, residents still felt the stigma of past struggles with poverty and crime, as one community organizer described:

> You know, if you were here two years, you would not recognize it. It has such a history of not being safe. We're having to live down our history. How do we have people have a different view of this place?

Another expression of this community-wide stigma and social barriers was the descriptions of individual-level struggles with fear and disconnection. When discussing the neighborhoods in general, and community food stores in particular, multiple respondents used words with connotations of fear to describe the stores and areas around them. The word "scary" or phrase "very scary" was used four times in one interview regarding two of the local markets. Another interviewee used the word "sketchy" twice in conjunction with the suggestions for researchers to "take precautions" in the area and to "stay in pairs" when visiting CCS food stores.

Reported crime has decreased significantly over the past few years in the CCS community. The Phoenix Police Department crime statistics show low

reported violent crime in the area, but the crime hotspots map available on the Phoenix PD website showed a pocket of moderate violent crime reported in two of the CCS neighborhoods (Phoenix PD, 2011). However, not all crime is reported and respondents suggested that the threat of violence remains. It is also important to remember that the actual occurrence of violence and the perceived threat may not have been reduced in the same measure. A community organizer described some of the stores in the area as undesirable places to visit, forcing residents to potentially pay more elsewhere:

> [A]nd then there's like the little market that like nobody will even stand close to except for the drug dealers. And that [other market] over there. I mean there was a murder there. You know, there are some scary places that people don't go to. They would rather go to [a convenience store] and pay more money, you know.

The social context of these stores and the overall social context of the community influence the food choices residents are able to make within their neighborhoods.

The stigma of Otherness, as it related to racial tensions within the community (as opposed to the racial tensions between communities described in the introduction), is a social barrier of disconnection. One community leader described this disconnection as isolation:

> [Residents] are isolated in a different kind of way in Central City South. It's like oh I don't know what's going on, or I'm afraid, you know I think there is a lot of fear, especially with all the immigration issues and all of that.

These social barriers can be either overt or structural. Described above as isolation, the CCS community has historically been marginalized. This community isolation

is the result of the rationalization and justification of Otherness, both socially and geographically (Bolin et al., 2005).

The racial tensions within the community mentioned in interviews were systemic rather than individual acts of discrimination, which results in chronic and cumulative adverse outcomes, sometimes termed 'structural racism' (Lawrence and Keleher, 2004). I observed overt cases of racism were seen during NEMS fieldwork. NEMS survey raters were asked to leave a community store and were told that the store did not serve Hispanics. One of the research team members in the store was Hispanic and the team was asked to leave before fully completing the NEMS survey. The storeowner elaborated that he caters to the poor white and black residents, not the Hispanic residents. He did not explain this choice to the research team members, despite the impression that it might be better for business to serve everyone with such a high percentage of Hispanic residents in the area.

Fear, stigma, and disconnection are intertwined social barriers of food access experienced by CCS residents. These examples of social barriers to community food stores point to an additional layer of food inaccessibility that is not represented by the physical distance to a store or the affordability of the items on the shelves. The presence or absence of resources may be as important to residents as their quality, their social meaning, or local perceptions of their accessibility (Macintyre, 2007).

**Physical Barriers**

In addition to social barriers, interview respondents described two main types of physical barriers to food options in CCS. The first and most prominent barrier is physical distance to a grocery store. Although adequate access to a supermarket is defined by the USDA as within one mile of residence (USDA, 2009), the most cited source of groceries for CCS residents is a Wal-Mart Super Center that is five miles away. This is a 10-17 minute one-way trip by car, depending on where one lives in CCS. Reaching this Wal-Mart by bus requires at least one route change, and according to the Phoenix public transportation website, the minimum one-way trip takes 31 minutes (valleymetro.org). Biking would also take at least half an hour, and walking would take much longer. Though respondents did not specifically comment on the walking conditions, summertime temperatures, distance, and safety may deter residents from walking long distances to obtain food. Even if the physical distance were short, the strength to carry food or to walk to and from the store is a physical burden of food access in CCS as described by a community organizer:

> […] like Wendy, she has a car. But Sydney, he walks everywhere. So I mean and they have limited transportation means to get [there]. And they need to get there and they need to carry groceries back. You can only carry what you can bring back. You can't carry anything else.

Though the role of heat was not mentioned in interviews for this thesis, previous community engagement regarding community gardens in the area provided input that summer temperatures greatly restrict outside activity, which

would include walking to and from a food store (Bleasdale et al., In Review). Community organizers have said that many elderly residents in the community cannot be in direct sunlight for extended periods of time due to medications and physical exertion.

The second physical barrier, which is less apparent but no less important, is the physical ability of residents to carry groceries. There are multiple senior centers in CCS and the Matthew Henson neighborhood has affordable housing specifically for seniors. For senior residents, both proximity and physical ability affect food access. A community organizer mentioned that many senior residents are on medications that restrict their ability to be out in the sun, which is one of many potential factors that limit the physical mobility of CCS residents.

**Economic Barriers**

Poverty is also a barrier to healthy food options, particularly when the healthy options are both more expensive. It also costs more to reach the places where those items are sold. CCS residents bear the burden of limited healthy food options in neighborhood stores, which is outlined below, and thus must incur extra costs of traveling outside their community to obtain healthful groceries. For some residents, these extra costs are too high and they must rely on charitable sources closer to home.

Many residents rely on food box programs of faith-based organizations as well as food pantry donations. Families and individuals are "relying on emergency food sources not just in emergencies but as a regular source of food over long periods of time" (Winne, 2008, p. 179). As described by a community leader:

> I see residents sourcing a lot of food from the food banks. They'll take the food. I don't know about getting it back, they carry it home…I know that they do get some produce from food banks, but I don't think it's a lot. I don't think it's a lot of fresh vegetables.

Other residents have children who bring home food donations from school. An interview respondent described this as a depressingly humorous occurrence when small children try to carry home their family's groceries for the week. Her description of a small girl trying to fit a big bag of food in her backpack is both encouraging because it shows that residents have access to these food options and unfortunate that residents must rely on these sources for adequate food access.

Interviewees did not know how many residents used food banks or the degree of dependence on food donations. The nearest food bank has a policy that individuals can only pick up food bags six times per year. Regardless of the level of dependence, food pantries and food donations are intended to be used in emergency situations only. The fact that residents do rely on them is evidence that the community's food resources are not adequate, either in terms of availability, affordability, and/or quality.

Respondents attributed some of the inadequacy of food options in the community to the level of economic investment by the City of Phoenix. As

described in the introduction, disinvestment in CCS by the City of Phoenix has contributed to structural causes of poverty in the area. When asked to identify the obstacles to community development in this area, a community organizer responded, "Oh my god, it is going to take so much money." This same respondent went on to say that this area has trouble enticing business to develop in CCS:

> [I]t's just not an appealing place for people to develop. You know, retail can't come in here because the income levels are so low. [Residents] can afford the dollar stores, but to have major retail in here, they would never make it…things that are in your neighborhood [to researcher] but they're not here.

Despite this community organizer stating that a retail grocer probably can't make it in CCS, multiple respondents said that the community needs a grocery store. Community organizers endeavor to attract business with limited success, and have started to apply for grants for other forms of food options, such as a mobile farmers' market. Proposed solutions and ideas for improving food access for residents are outlined in the recommendations section of this thesis.

Regardless of the various barriers to food access experienced by residents of CCS, the main goal expressed by community organizers is create choices. The issue is not whether residents should eat healthy foods, but rather to frame the issue in terms of health, justice, and sustainability. Residents should have a choice of healthy, nutritious food accessible from where they live. A community

organizer described the overall mission of this participatory research project and of food justice advocates everywhere:

> [W]hat we want are choices. And that's the goal: being able to provide choices so people can make up their own minds of what they want to do. Right now, they have no choices. There's nothing. So yeah. They could have a grocery store but then choose not to go there and that's fine, you know, but that's their choice from what is available.

There is more than one perspective on why improving access to healthy food is important. Though this research was designed to bolster the health goals of the community, at least one respondent associated the availability of healthy and affordable food as a justice issue. When it comes to working toward improving access to healthy food for residents, people can have more than one motive for working on this important issue.

**Community Stakeholder Expectations of the Community Food Assessment**

Respondents stated multiple times that residents lack quality, affordable food. The overall expectation before data collection commenced was that residents had very few food stores near them and these stores were not providing quality, healthy food options. A community organizer emphasized the limitations of both the number of stores and the healthy choices that residents have access to:

> I expect to see tiny, little pockets of availability in the form of little neighborhood stores, but there's not that many. There is limited, there is not very, you know, a very limited number of stores in this community that provide groceries…I mean, if you walk in some of those stores sometimes, you're like 'oh my gosh, I would never eat food from here.'

And as the results below confirm, community stakeholder expectations were correct that the small number of stores did not offer healthy affordable food options for CCS residents. The visualization of these data will serve multiple purposes, which were identified in the qualitative portion of the research process. The main goals stated by respondents were to inform residents and other service providers of what options were available and to empower them to help improve the quality of food access in CCS. PRC also wants to leverage the information to attract new resources into the community:

> [This research] will really help with us having some leverage to entice people to come here to build and to do things, build things that are in your neighborhood [to researcher], but they're not here.

The idea that adequate resources were available in researchers' neighborhoods but not in CCS was repeated multiple times. This seemed to indicate an understanding that the City of Phoenix and businesses have disinvested in their area. CCS community leaders and residents aspire to be like other communities that have the easy access to multiple types of retail and amenities, particularly a full-service grocery store.

Early on in the research process, the community organizers embraced the idea of a community food assessment and a map of community food resources that would illustrate the level of food access in CCS. The community organizers continually referred to the research as "mapping," even though other forms of analysis were conducted. The maps, shown below, as well as the supplemental

data gathered on the CCS food environment, provided independent confirmation of the views about low food access expressed by respondents since this research commenced.

**Geographic Analysis**

The community food stores are generally found along Buckeye Road, the major roadway that runs east to west roughly through the middle of Central City South (see Figure 4). Though each neighborhood includes one boundary side of Buckeye Road the stores are not evenly distributed among the neighborhoods. A nation-wide study of supermarket access by The Reinvestment Fund identified three of the eight neighborhoods of CCS as Low Access Areas, which are outlined in blue in Figure 4 (The Reinvestment Fund, 2010). Two neighborhoods do not have any stores located within their bounds: Matthew Henson and Coffelt.


Figure 4: Map of Surveyed CCS Food Stores (2010) Source: Google Maps

The ArcOnline map (Figures 5 and 6) shows the lack of availability of a full-service grocery store for the CCS community. Figures 5 and 6 blend multiple datasets to show that CCS is situated in a pocket of food inaccessibility. Figure 5 provides a comparison of one-mile access to full-service grocery stores in the communities surrounding CCS. Supermarkets are clustered to the northwest of the community, as well as one supermarket each to the southeast and northwest corners of CCS. All full-service grocery stores are beyond an acceptable one-mile distance (USDA, 2009) that would provide adequate service to CCS residents. The graduated red circles represent the low access population in and around CCS, which means that these people experience a disproportionate burden of distance and travel time to reach healthy food options. Figure 6 utilizes the same base map as Figure 5, but includes the nearest farmer's market, as well as markers for the NEMS-rated community food stores.

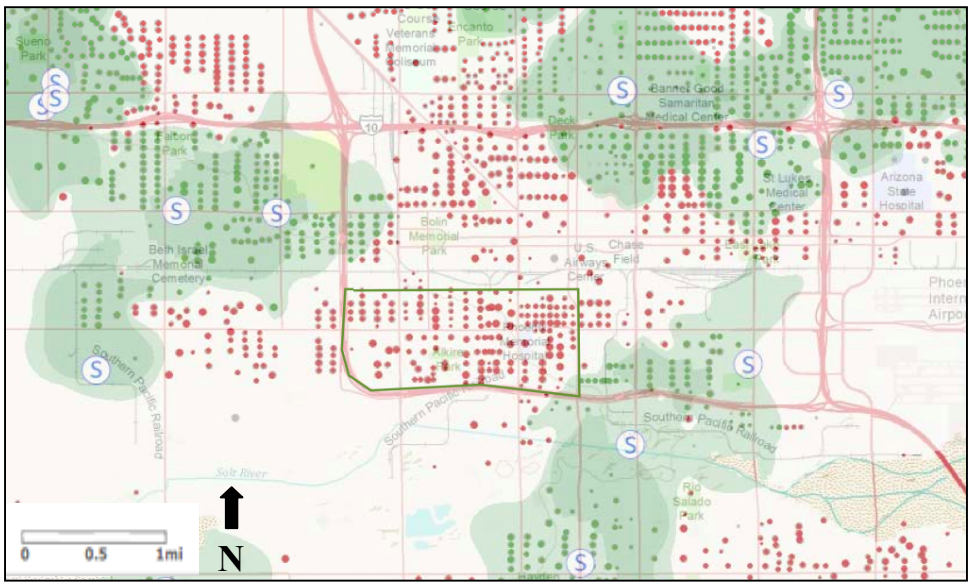



Figure 5: Map CCS Supermarket Access Source: ArcGIS.com

**Supermarket Access Map Service**

Supermarkets

Supermarkets included in analysis

T = Supermarket, included

People

People in Poverty with Low Access

- 1 - 4 people
- 5 - 10
- 11 - 50
- 51 - 100
- 101 - 1468

People in Poverty with High Access

- 1 - 4 people
- 5 - 10
- 11 - 50
- 51 - 100
- 101 - 6991

2009 Total Population

- 1 - 4 people
- 5 - 10
- 11 - 50
- 51 - 100
- 101 - 28733

Access

Supermarkets within 1 Mile Walk

- 11 or more supermarkets
- 3 to 10 supermarkets
- 2 supermarkets
- 1 supermarket


Figure 6: CCS Supermarket Access Map and Community Resources
Source: ArcGIS.com

**NEMS Data Analysis**

Healthy food options were significantly less available in CCS than less healthy options. Of a possible 54 points, CCS stores scored between 1 and 23 on the NEMS scoring rubric for healthy foods. The average total score for the 14 neighborhood stores was 10.9 out of 54. The affordability score (price of healthier food options compared to that of less healthy options) for the community stores ranged from -2 to 10 out of a possible 18 points. The average affordability score for CCS stores was 1.5 out of 18. The average quality score was 4.4 out of a possible 6 points. Because not all of the community food stores stocked fresh produce, the quality score reflects only the stores that did. To provide a scoring comparison, a grocery store near ASU campus where I personally did my shopping scored a total of 30 out of 54 points, and the availability score was three times the average of CCS stores (a 21 for my supermarket compared to an average of 7.1 for CCS stores).

Accessibility to fresh fruits and vegetables is often used as a proximate measure for overall availability of healthy food items in a community. Nine of the 14 stores sold at least one type of fresh produce, two of which were gas stations that sold only fresh bananas at the cash register. The other seven food stores sold other fresh produce, but three of the seven had moderate to low quality produce. Because data collection took place in a 4-week period during the winter, seasonality of certain fresh produce items is reflected in the findings. These figures are meant to represent presence and diversity of produce availability rather than

availability of specific types of fresh produce which will fluctuate in price and availability seasonally.

Figures 7 shows that other than bananas, fresh produce is difficult to find in CCS food stores. Peaches and pineapple were the easiest items to find since they were mainly available in cans. Almost half the types of fruit were available fresh in only three of the fourteen community food stores, an ethnic food store and two 'other' stores (one of the 'other' stores is more of a small produce warehouse than store). Strawberries were 75% more likely to be found canned than fresh, and pears were 67% more likely to be found canned than fresh. Mangoes were found canned half the time, as well as oranges, but oranges were twice as common as mangoes in CCS food stores.

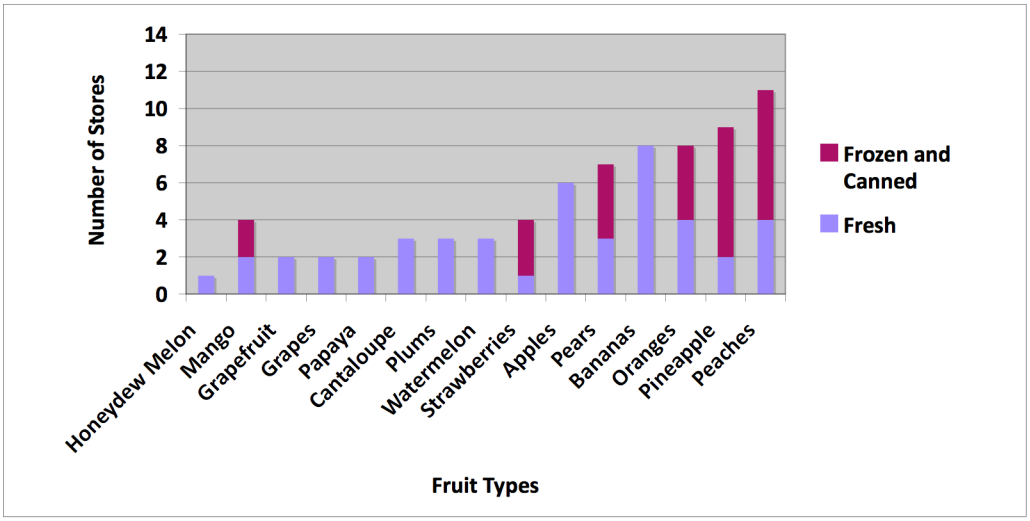



Figure 7: Fruit Availability in CCS Food Stores
Fresh was counted first, and if fresh was not available, frozen and canned were counted.

Figure 8 shows the availability of vegetables in CCS food stores. Corn was most commonly found, but it was 4 times more likely to be frozen or in a can than fresh. Corn was the only vegetable that was found frozen in the community food stores. Tomatoes were almost as commonly found as corn, but more often fresh than in cans. Spinach, carrots, and cactus were also found both fresh and canned.

Overall, the majority of the fresh fruits and vegetables found in CCS food stores came from only two of the fourteen stores. No store had every item from either the fruit or vegetable types on the survey. Jars and cans of preserved fruits and vegetables are a main source of produce for CCS residents. Vegetables are commonly canned in liquid that is typically high in sodium to preserve the pre-cooked food. Canned fruit comes stored in varying levels of sugary syrup, significantly affecting the health benefits compared to fresh fruit.

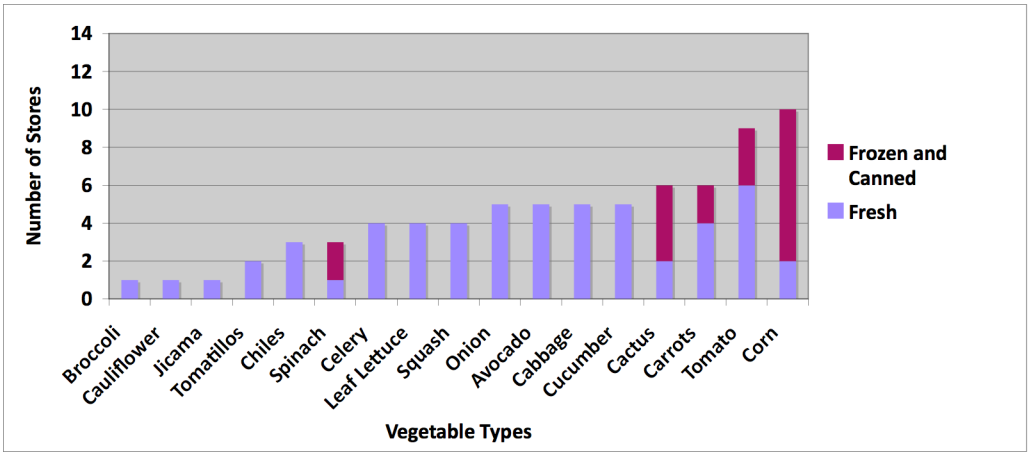



Figure 8: Vegetable Availability in CCS Food Stores
Fresh was counted first, and if fresh was not available, frozen and canned were counted.

Figure 9 compares the availability of healthy versus regular options available within CCS stores for the remaining food categories. Each healthier food option included in the NEMS survey is more difficult to find than its higher-calorie, higher-fat counterpart. Lean meat, lean chicken and low-fat hot dogs (both fresh or frozen) were uncommon. Fresh meat is available at a meat shop just outside the boundary of CCS, but it only sells pork products.

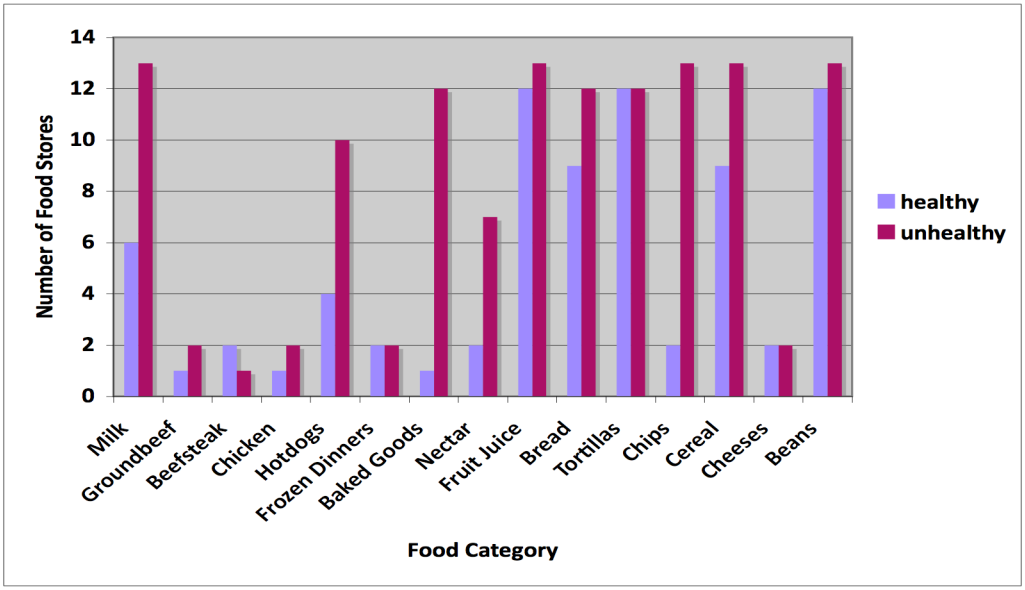



Figure 9: Availability of Healthy vs. Unhealthy Food Options in CCS Food Stores

The only example of a healthy option being easier to find than an unhealthy option is for beefsteak, though a healthy version was only found in two stores and an unhealthy option found in one store. Low-fat milk was found only half as often as whole milk, and Mexican cheeses were available in only two of the fourteen stores. Nectar of 40% or greater real fruit juice was only available in two stores. Regular chips were found over six times as often as baked chips, and low-

fat baked goods were found in only one store while high-fat, high-calorie baked goods were found in 86% of CCS stores.

Figure 10 shows the affordability scores across all surveyed food stores in CCS. When the NEMS scores were calculated for affordability of healthy items compared to unhealthy items, CCS food stores averaged 1.5 points each, and the range of affordability scores was from -2 to 10 on a scale of 18. Whole wheat bread was more expensive than refined-flour bread in 80% of the stores, and 100% fruit juice was more expensive than a juice drink in 36% of the stores in which these items were available. For stores that carried both low-fat and whole milk, the price was the same for both the healthy and less healthy option. Also worth noting is that the food store with the highest affordability score is for a dollar store which does not sell any fresh produce. The rest of the stores scored similarly and extremely low on the affordability scale.


Figure 10: Affordability Scores of CCS Food Stores

The Latino NEMS survey included counting the number and type of advertisements displayed on the exterior of all community food stores, which are displayed in Figure 11 for CCS food stores. At the point of purchase, exterior advertisements of CCS food stores do not encourage healthy eating or healthy lifestyles. Figure 11 shows that roughly a third of CCS food stores had advertisements for food. The food ads were typically for high-fat, high-calorie foods, as shown in the example picture to the right of Figure 11. Over half of the community food stores had advertising for alcohol on the outside of the buildings, and some of the large store signs were printed on banners for beer companies. Also, four of the fourteen community food stores have exterior ads for cigarettes and other tobacco products. These ads may influence consumer behavior toward less healthy foods and products.




Figure 11: Types of Exterior Ads

**NEMS Score Maps**

Using ArcMap 9.3, the relative food access scores for each community food store was displayed with the normalized populations density of US Census block groups (2000 data), which line up almost exactly with the CCS boundaries used for this study. Graduated symbol colors (green = highest score, red = lowest score) were assigned to the community food stores to illustrate relative food access across stores. This red light/green light representation of access was layered over the normalized population density of the neighborhoods to assess which neighborhoods have the least access to a food outlet with healthy food options within the community.

Retail grocery store provision was mapped to show comparative grocery store access of CCS to that of surrounding communities in Phoenix. This map was created to provide a large picture of surrounding areas compared to CCS and includes graduated buffers around full-service grocery stores to represent access within 1 mile. Food options outside of the CCS boundaries were highlighted using this tool including supermarkets over five miles away from CCS, the nearest farmer's market, and each of the NEMS-rated community food stores.

The NEMS scores were mapped to illustrate the adequacy of community food stores relative to each other (Figures 12 and 13). The highest possible score for the composite NEMS score and the component scores are not represented on the map because no community food store scored that high. To accurately portray

the scale of scores, the store with the highest score among CCS food stores is used as the highest value (green) in the graduated color scale. Because CCS food stores scored in the lower half of the total NEMS score range, this method of mapping the graduated colors was chosen to best reflect the relative quality across the community. The quality score is not mapped here because so few stores had fresh produce that the representation does not convey much information, and the low incidence of fresh produce items is addressed in the recommendations chapter.

Two stores near the center of each map are across the street from each other and overlap in the visualization, but have similar scores and colors for each of the NEMS score maps. The Availability Score map looks very similar to the Total Score map (Figure 12) because the Availability Score is the largest component of the composite score. However, significant variation across the stores is visible in Figure 13, the Price Score map. The Price scores show the relative affordability of community stores, and it is interesting that the ones that score highly on availability do not necessarily have a very good affordability score. This is partially explained by the prevalence of dollar stores in the area.

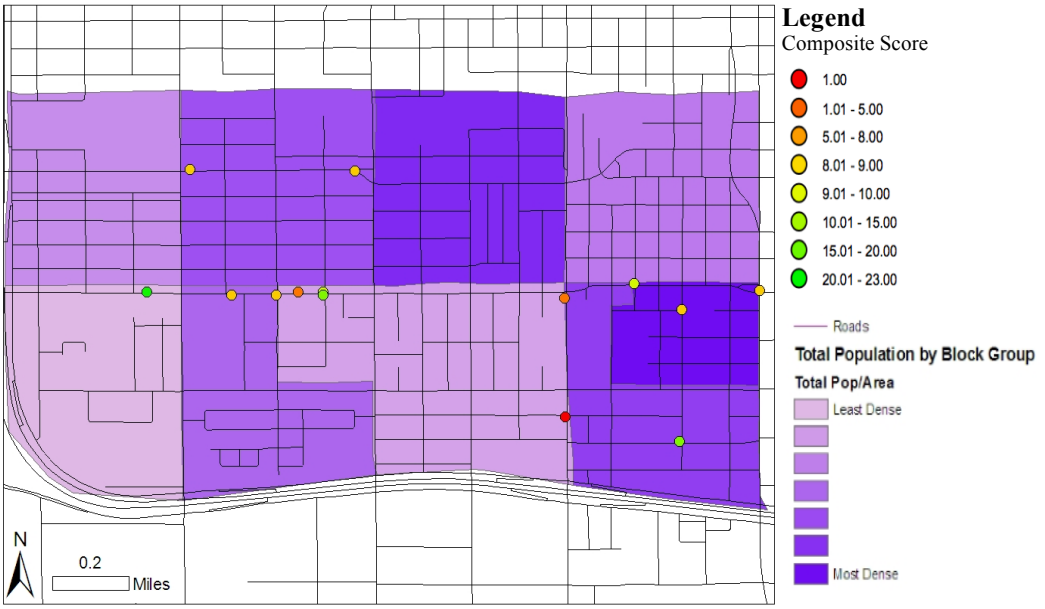



Figure 12: Relative NEMS Composite Scores of CCS Food Stores

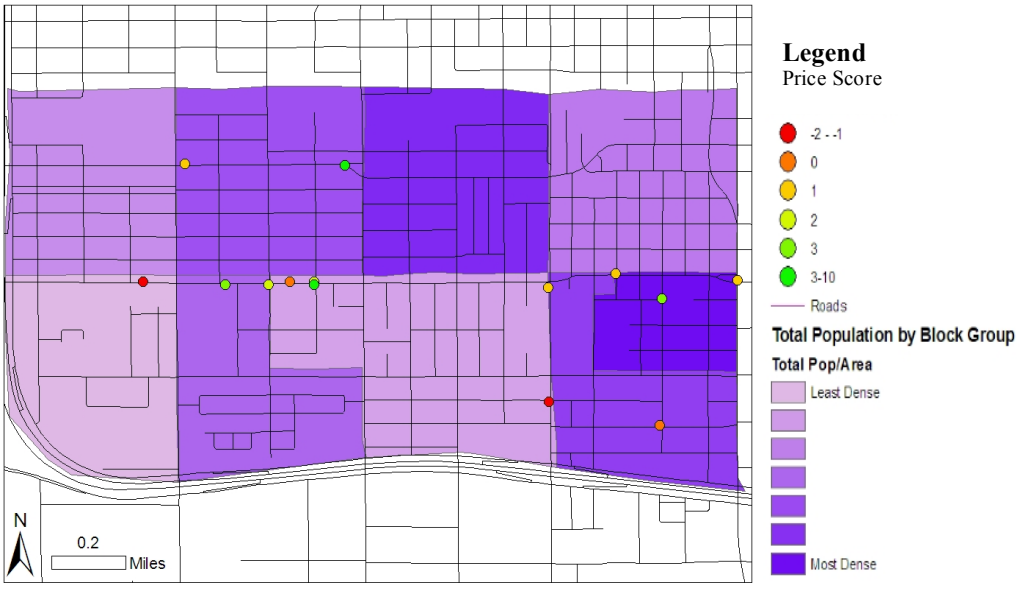



Figure 13: Relative NEMS Price Scores of CCS Food Stores

Figures 12 and 13 include the population density of the neighborhoods normalized by area to inform the recommendations for priority areas to address access to healthy food for CCS residents. Based on these figures, the neighborhood with the best food access (relative to the community only) is the Marcos De Niza neighborhood in the southeast corner of CCS. These visualizations illustrate the links between the dimensions measured with the NEMS survey by showing availability, affordability, and quality in an accessible way.

Based on these visualizations and the rest of the analytic components described in this chapter, the research findings informed the partnership of the current state of food access in CCS – low availability, low affordability, and low to moderate quality of fresh fruits and vegetables, which were scarcely available in community stores. The interview responses highlighted the social, physical, and economic barriers experienced by residents, and the geographical analysis of the NEMS scores helped to identify priority areas of intervention. These qualitative and quantitative components comprised the multi-method assessment designed to enable the partnership to create community-specific recommendations, which are outlined in the next chapter.

Chapter 5

# RECOMMENDATIONS

Though all of the CCS neighborhoods experience inadequate access to healthy food, some neighborhoods have fewer options than others based on the NEMS survey findings. Three neighborhoods in particular - Matthew Henson, Coffelt, and 7-11 - are priority areas for actions to improve food access based on the community-specific recommendations in this chapter.

## Priority Neighborhoods

The first priority neighborhood is the Matthew Henson neighborhood, which is designated as a low access area by The Reinvestment Fund study and has no food stores within its bounds. Residents of this neighborhood do engage in urban gardening to supplement their food sources (Bleasdale et al., In Review), but not at a level that makes a significant difference for very many people. Also, Matthew Henson has senior housing in the HOPE VI housing complex in the neighborhood. Residents in the senior housing said they find it difficult to obtain groceries, particularly when they cannot drive themselves or it takes undue effort to use other transit options.

Coffelt neighborhood is the second priority area. Tucked in the curve of I-17 in the southwest corner of CCS, Coffelt lies in a pocket of light industrial land with no food stores within the neighborhood bounds. The Coffelt neighborhood

has four times as many industrial parcels of land as residential parcels. The closest food store is located in the adjacent Sherman Park neighborhood, which has the highest score of all neighborhood food stores in CCS. This provides some options for residents, though the Coffelt neighborhood is among the least food accessible neighborhoods in CCS.

The third priority area is the 7-11 neighborhood. In this neighborhood, over a fourth of the total parcels are vacant (27.4%), totaling 171 vacant properties as of 2009. Though only one property is industrially zoned, it is a very large brickyard that dominates the neighborhood. There are two corner markets and a dollar store within the 7-11 neighborhood that sell groceries. 7-11 hosts the store with the lowest overall NEMS score (1), as well as the third lowest NEMS scoring store (5). The neighborhood stores scored very poorly for affordability and no fresh produce was found in this neighborhood. Also, based on communication with community organizers about which residents need access the most, the 7-11 neighborhood was identified as another neighborhood with a high proportion of seniors who cannot easily get around.

**Recommendations for Improving Community Food Access**

Each of the six recommendations in this chapter varies in degree of social, physical, and economic barriers to its implementation, such as the amount of planning, coordinating, and funding required. I have listed the recommendations in

the order in which I discussed them with community partners to reflect how the conversations of how to address food access in CSS evolved over the course of the food environment assessment. These first four recommendations represent conversations that began before or during my community food environment assessment. The recommendations of community gardening, a farmers' market, and mobile food stand are great examples of the primary strategies used by food justice and community food security advocates to address food access for low-income minority communities, but they are also general suggestions and do not necessarily reflect the assets and infrastructure that currently exist already in the community. These recommendations could be enacted utilizing many community resources that are already in place, thereby requiring less planning, coordination, and funding. The final two recommendations particularly highlight the assets and partnerships already in place in CCS. These recommendations are based on community food projects in the US that have been instituted within the last 10 years, are successfully still operating to alleviate food access issues, and that suit the needs of the CCS community.

*A New Supermarket*

Before beginning the community food assessment, my discussion with community stakeholders revealed that their preferred course of action they preferred was to get a large grocery retailer to move into the neighborhoods. A

"reputable grocery store" was the only solution specifically proposed to researchers by the residents during community meetings. In reference to retail food stores in low-income communities, Winne (2008) emphasized "when it comes to price, quality, and selection, they do not compare to the shiny supermarket cathedrals of the suburbs" (p. 94). A new grocery store would increase food access for residents, but it is a solution that does not embrace and utilize the relationships and assets available within the community.

My research was designed to address access in terms of price and distance and to propose community-based solutions. Further research can establish the amount of monetary leakage from CCS neighborhoods to other stores outside the area, as well as the potential revenue stream available for a grocer who locates within CCS. Working with a market analytics firm, such as Buxton Company, could be a way to assess the feasibility of a full-service grocery store to locate in CCS. Buxton (www.buxtonco.com) specializes in market analytics and retail site selection. A branch of their business model is tailored to community redevelopment in underserved areas by matching their needs with retail grocery chains.

The skill set offered by market analytics firms could be a next step to attracting a grocery store to CCS if a new store is the recommendation most preferred by community members. However, it is also important to consider the unintended consequences associated with any proposed solution to a problem.

Any new retail food store will have an effect on the other food establishments currently operating in CCS, and another important consideration is whether a new supermarket or other brand-new amenities would lead to gentrification in the area.

*Community Gardens*

PRC has established a partnership with the City of Phoenix to provide water for community gardening, as well as with Home Depot to supply seeds, tools, and soil amendments. However, the community gardens in CCS currently have low membership and only a handful of residents are eating food grown in them. The garden program would need to be seriously changed if the neighborhood gardens were going to become productive pockets of urban agriculture that could augment the healthy food available in CCS. PRC would like to see the gardens provide produce to a local market. Community gardens are explicitly mentioned in the community's Quality of Life Plan, and PRC is actively pursuing funding and discussing plans for expanding the community gardening program in CCS.

A new, large garden plot has become available for PRC to partner with a faith-based organization, but discussion with community organizers have left doubt as to whether this garden would contribute any significant quantities of produce for consumption or sale within the community. The faith-based organization is interested in providing meditative space and focusing on programming for senior residents. This focus is not uncommon, and though food

may not be a main outcome of this future garden, it will still likely contribute to improving the quality of life for residents of CCS. As Winne (2008) said, "the power of community gardening and other similarly organized small-scale farming efforts in nontraditional areas such as urban America is not found so much in the rate of return to the food supply but in the rate of return to society" (p. 62).

*A Farmers' Market*

A farmers' market would greatly increase the food options in CCS, and PRC is particularly interested in providing fresh produce for residents. PRC has expressed interest in a farmers' market in CCS that would be a satellite location of the Downtown Phoenix Public Market, which is located three miles away from CCS. The Downtown Public Market accepts vouchers for the Farmers' Market Nutrition Program, which provides farmers' market coupons for eligible participants of federal food assistance programs. PRC was an original partnering organization of the Downtown Public Market and believes it can leverage those past relationships to better assess the feasibility of this recommendation for the future.

Another option for a farmers' market in CCS is that residents could sell food produced within the community. PRC would like to see the community gardening program linked to a farmers' market in order to mutually support both programs. Though the community gardens are not currently equipped or designed

to provide large quantities of food for sale, PRC and some residents view this recommendation favorably.

*A Mobile Food Stand*

Across the US, the mobile farm stand model has operated as a point-of-purchase system or as a CSA, a community-supported agriculture subscription program. CSAs supply fresh produce to pre-paying customers only. Some programs may blend models to incorporate both point-of-purchase and subscription services to encourage more participation. Some mobile farm stands also provide recipes and tips for preparing and storing the produce sold, particularly those that operate as a CSA.

The Food Bank of San Joaquin County, California banded together with over 30 nutrition agencies, churches, and schools to create strategies aimed at reducing hunger and food insecurity. This partnership resulted in a mobile food stand that visits 54 sites per month in low-income communities, providing cooking and tasting demonstrations at each stop to introduce people to unfamiliar produce so that they might be more likely to use it. About 90% of the produce distributed is donated by various suppliers, which range from small individual gardens to supermarkets and commercial food distributors (HEAC, 2011).

A CCS resident has been working to convert his van for use as a mobile produce stand, and has applied for the necessary permits. PRC has submitted a

grant to help support this endeavor, but it is unclear how profitable this model will be or how many neighborhoods the mobile farm stand will serve. By utilizing the findings of this study, neighborhoods with the least food access have been identified and could be among the first stop sites of a new mobile farm stand.

*Virtual Supermarket*

Baltimore's Virtual Supermarket Project, called Baltimarket, utilizes online grocery shopping, but adapts the model to consumers who cannot afford the delivery fees, may not have access to the Internet, or cannot meet a high minimum purchase amount typical of online grocery shopping. Originally funded with a $60,000 grant from the 2009 federal stimulus package, Baltimarket partners with local grocers and other sponsors to cover the extra costs associated with online grocery shopping for residents of Baltimore neighborhoods with low food access. This project currently serves two communities in Baltimore, Orleans and Washington Village.

Because CCS residents have low access to personal vehicles, a virtual supermarket program could be based out of the local library branch, one of the four elementary schools, and/or one of the two senior centers located in the community so that ordering groceries is within a walkable distance. A virtual supermarket allows residents to order groceries once a week on designated ordering days and pick up their groceries the next day at the same location. In addition to the grocery

ordering and delivery service, the program also provides healthy eating recipe books and a $10 incentive to purchase healthy food items every fourth order. According to the Baltimore program's website, participant surveys showed that 91% of participants indicated that the Baltimarket "has improved their access to fresh and affordable groceries," and 73% of people indicated that it has enabled them to make healthier purchases (Baltimore City Health Department, 2011).

A smaller-scale partnership could be established with the grocer Safeway, which already has in place the infrastructure for online grocery ordering and delivery. A virtual supermarket in CCS could alleviate the extra cost and time that residents currently face to obtain their groceries. However, community organizers feel that residents would resist this recommendation. CCS residents have low access to the internet and are uncomfortable using computers. Internet assistance could be provided, and this is an important aspect of the Baltimarket program, but CCS residents will need to be convinced before there will be a virtual supermarket in the area.

*Healthy Corner Store Initiative*

The small corner stores have a potential role in providing healthy and affordable food to neighborhood residents. Raja et al. (2008) suggest that supporting small food stores with funding for refrigeration and other retrofits and providing incentives for partnering with local producers may be a more effective

strategy than recruiting grocery store chains to move into a community. The value may be in developing what is already there rather than solely focusing on a new supermarket. Developing local assets are more likely to capture this value than trying to attract assets the community does not have.

A leading example of this strategy is the Healthy Bodega Initiative in New York City. The city government sponsors an Adopt-a-Bodega program to encourage storeowners to offer more healthy options. The Healthy Bodega Initiative started much like my thesis research did, by surveying community stores and sharing the results with community organizations, as well as local merchant associations, local nutrition networks, and Community Boards (Bronx Health Reach, 2010). After sharing the results, community focus groups discussed the survey results and next steps. Based on community engagement, community-specific campaigns were designed to improve healthy food options by working with storeowners and local organizations.

Projects like the Healthy Bodega Initiative are beginning to be established across the US. One of the most successful funding options was in Pennsylvania, called the Fresh Food Financing Initiative. Inspired by the success of this program to increase healthy options for communities across Pennsylvania, President Obama proposed the Healthy Food Financing Initiative in the 2011 Federal Budget, a $400 million program to promote healthy food retailers in underserved urban and rural communities (Bitler and Haider, 2010).

PRC felt that the Healthy Corner Store Initiative was the most feasible recommendation to begin pursuing in CCS because eleven of the fourteen CCS stores are non-chain, locally owned stores. The stores to partner with first can be targeted by referring to the NEMS scores, which could also be used to track progress of the CCS Healthy Corner Store Initiative. The stores that scored the lowest should most likely be addressed first. There is a community food store that scored a one, which indicates that significant progress with that store could be made immediately. This recommendation is also the one that would require the least amount of funding necessary to launch, and PRC has already begun hosting business breakfasts to network with local business owners. PRC has begun to approach food storeowners to start working together right away.

For each of these recommendations, the first step is community feedback. The residents must accept my suggested recommendations before they have any chance of success. Community communication and education is just as important to enacting any one of these recommendations as funding. An essential step to facilitate residents' involvement is translating the food resource report and presentation version into Spanish, and PRC has expressed their willingness to translate the document and presentation as soon as they can.

The implementation of any or all recommendations based on these research findings would augment CCS residents' access to more available food sources and

more nutritious, healthful food choices. The difficulty of implementation and locating funding sources varies by recommendation, but each one represents a step that CCS can take as a community to increase access to healthy food and collectively achieve health goals.

# Chapter 6

# CONCLUSIONS

This study has contributed to the field of community-based participatory research by facilitating a collaborative partnership to address health, justice and sustainability outcomes of food access in a low-income, minority community. My findings were consistent with other studies that have found smaller and/or non-chain stores are less likely to stock healthful foods than chain supermarkets (Horowitz et al., 2004). These smaller stores are also less likely to offer foods at lower prices (Kaufman et al., 1997; Chung and Myers, 1999). This research partnership culminated in the creation of community-specific recommendations for collaborative food projects to improve food access for CCS residents.

I have answered my first research question, 'What does a community food resource assessment reveal about the access to and availability of healthy food in Central City South, Phoenix, Arizona?' by demonstrating the inadequacy of community food stores. The NEMS survey findings and the GIS maps provided independent confirmation of what respondents had expected to see in a visualization of the community food environment - low availability, low affordability, and low to moderate quality of fresh fruits and vegetables. Community responses also provided locally informed social commentary on food access that would not have been apparent with a strictly quantitative approach.

My second research question, 'How can the researcher facilitate increasing the community's capacity to promote residents' access to healthy food?' is a work in progress, but significant steps have been taken. In an effort to equip this community with the information and tools needed to take action, we identified recommendations to empower the community to improve the quality of the community food environment.

A detailed report of the NEMS survey results was drafted for PRC and other service providers in CCS, which will be released and available by summer 2011 on PRC's website (http://www.phxrevitalization.org/). The report provides a summary assessment of availability, affordability, and quality for each store and presented findings as both community-level and neighborhood-level summaries. This report outlined which neighborhoods have food stores, which community stores provide healthy options to residents, and what conclusions can be drawn from these findings. A Powerpoint version of the partnership research will also be made available.

The process of community empowerment was initiated by establishing community relationships during my community garden research, which evolved into a research partnership, and will continue beyond the scope of my thesis. The benefits of this assessment and the partnership were to hopefully increase healthy food options, and therefore the ability of residents to make healthy choices. These outcomes would increase the quality of the community food environment, a goal

which was identified in the Health Strategy of the community's Quality of Life Plan. My work mainly established a platform for interaction, education, and action, fulfilling the role of a boundary object around which various stakeholders can connect.

It is my hope that through equipping the community with actionable steps created with them and for them, PRC and the residents will be empowered and inspired within the community without my involvement. By using a community-based participatory approach, I have worked to make sure the community feels ownership over the outcomes and feels that we have accomplished our partnership objectives. PRC has already said it is enthusiastic about distributing my community food resources report, as well as presenting the assessment findings and recommendations at community meetings.

**The Role of Mapping**

My use of maps was both a visualization tool for community education, but also an important shift in the role maps have historically played in the lives of CCS residents. Maps were previously used in a manner that reduced the quality of life for low-income minority communities through the practice of redlining, introduced in Chapter 2, and the effects of that practice are still apparent in the zoning and land-use patterns of the community today. In sharp contrast to the injustices redlining maps helped to create, my maps are meant to empower

residents and encourage discussion to provide starting points for stakeholder conversations that can create positive change for the neighborhoods. Rather than a symbol of exclusion and marginalization, mapping can be used in CCS to reclaim power and work to create healthier neighborhoods.

It is important to note how maps are used and how they can help to frame an issue. Maps can limit the information analyzed and thus the potential solutions. For example, I was not able to map the qualitative aspects of the community food environment assessment and, therefore, the maps of NEMS scores predisposed the recommendations to address the economic and physical barriers to access rather than the social barriers discussed by respondents. The limitations of the maps of this study can potentially be addressed through participatory mapping.

The use of participatory mapping may provide a way to create more holistic recommendations for increasing the community's quality of life. Participatory mapping could provide the opportunity to map the social barriers to food access that I have mentioned, such as fear or discrimination, and generate ideas of how to minimize these barriers. For example, crime statistics could be overlaid on the community food resources GIS maps to provide insight on the robbery and assault that occurs around CCS food stores. NiJeL, a Phoenix-based company that specializes in participatory mapping and training workshops to encourage community participation, submitted a proposal in September 2010 to PRC. If PRC can fund this initiative, NiJeL can drastically expand the capacity of

PRC and the CCS community to use participatory mapping to improve food access and to address many of the other strategies in the Quality of Life Plan as well.

**Next Steps**

The community-based research of this thesis provided a venue for the democratization of knowledge and potential solutions to increase access to healthy food. To treat this work as a partnership rather than a terminal project, I have worked to create a foundation for continued efforts. My work is documented in the ASU Ongoing Food Research Efforts Report and the university-community liaison to maintains information and contacts for my research. I have mentored undergraduate and graduate students interested in food access research and/or working with low-income minority communities in Phoenix. All of my data has been transferred to PRC and will be published on PRC's website for use in future research.

Updating the NEMS data periodically would keep the research relevant and up-to-date for its various uses. PRC expressed interest in yearly updates. A current project in another Phoenix community is translating the Latino NEMS instrument and training materials into Spanish and training community members to conduct the store surveys in their neighborhoods. Implementing this program in CCS could help maintain the food resources assessment as a community tool for

years to come, as well as encourage community members to participate in store monitoring.

Progress can be made on increasing food access based on the strategic interventions informed by the collaborative analysis of the research partnership. My research provided a platform for increase residents' access to healthy food, but further investigation is needed to continue this process. Another ASU graduate student is conducting research on the intersection of sustainability, vulnerability, and walkability in CCS, which could further inform the recommendations pursued to improve food access in the community. Further investigation would be beneficial in the following areas: shopping and eating habits of residents, nutritional analysis of residents' food options and available choices, assessment of the food donation programs available to residents, and surveys of the restaurants in CCS using the NEMS restaurant measure.

**Lessons Learned**

The foundation has been laid and first steps taken to make positive change and improve the quality of life of residents through increasing access to healthy food, as well as to generating enthusiasm across the other seven strategies of the Quality of Life Plan. Utilizing a community-based participatory approach provided me with the opportunity to engage with the community and resulted in combining the insights of practice with a research approach to produce new

knowledge and introduce innovative solutions to improve access to healthy food in CCS. Working with PRC was crucial to establishing the credibility of this research in the community, which has historically been wary of outside researchers. This research was a continual process of negotiation to establish goals, build relationships, maintain research standards, and produce a final collaborative report. Established trust with a community partner demanded a higher level of accountability, but also allowed me to build my research over time. I am grateful I had the chance to earn the respect of my community partner and create something meaningful with them. I now know what to strive for in other projects and partnerships – momentum that is catalyzed by my involvement.

REFERENCES

Agyeman, J., Bullard, R.D., and Evans, B. eds. (2003) *Just Sustainabilities: Development in an Unequal World*. London: Earthscan/MIT Press.

Alwitt, L.F. and Donley, T.D. (1997). Retail stores in poor urban neighborhoods. *The Journal of Consumer Affairs*. 31: 139-163.

American Public Health Association (2007). Toward a healthy, sustainable food system. *Policy Statement Database*. Accessed December 2010 at: http://www.apha.org/advocacy/policy/policysearch/default.htm?id=1361

Arias, E. G. and Fischer, G. (2000). Boundary Objects: Their Role in Articulating the Task at Hand and Making Information Relevant to It. *International ICSC Symposium on Interactive & Collaborative Computing*, 567-574. Wetaskiwin, Canada: ICSC Academic Press.

Azuma, A.M., Gilliland, S., Vallianatos, M., and Gottlieb, R. (2010). Food access, availability, and affordability in 3 Los Angeles communities, Project CAFE, 2004- 2006. *Preventing Chronic Disease*. 7(2): 1-9.

Baker, E.A., Schootman, M., and Barnidge, E. (2006) The role of race and poverty in access to foods that enable individuals to adhere to dietary guidelines. *Preventative Chronic Disease*. Available from: URL: http://www.cdc.gov/pcd/issues/2006/jul/05_0217.htm

Baltimore City Health Department (2011). *Baltimarket: The Virtual Supermarket Project*. Accessed February 2011 at http://www.baltimorehealth.org/virtualsupermarket.html.

Bitler, M. and Haider, S. J. (2010). An Economic View of Food Deserts in the United States. *Research Conference on Understanding the Economic Concepts and Characteristics of Food Access*. Washington, DC: USDA, Economic Research Service and University of Michigan National Poverty Center.

Bleasdale, T., Crouch, C., & Harlan, S. (2010) "Community Gardening in Disadvantaged Neighborhoods in Phoenix, Arizona: Aligning Programs with Perceptions." Poster presentation at 16th Annual International Interdisciplinary Environmental Association Conference. Tucson, Arizona, September 22-24, 2010. Also presented at CAP LTER Urban Ecology and Sustainability Symposium, Arizona State University, Tempe,

Arizona, January 12-13, 2011. Available online at http://caplter.asu.edu/publications/cap-lter-symposia/thirteenth-annual-poster-symposium-and-all-scientist-meeting/

Bleasdale, T., Crouch, C., & Harlan, S. (In Review) "Community Gardening in Disadvantaged Neighborhoods in Phoenix, Arizona: Aligning Programs with Perceptions." *Journal of Agriculture, Food Systems, and Community Development*.

Block, D. and Kouba, J. (2006) A comparison of the availability and affordability of a market basket in two communities in the Chicago area. *Public Health Nutrition.* 9: 837-845.

Bodor, J.N., Rose, D., Farley, T.A., Swalm, C., and Scott, S.K. (2007). Neighborhood fruit and vegetable availability and consumption: the role of small food stores in an urban environment. *Public Health & Nutrition*. 11(4): 413-420.

Bolin, B., Greneski, S., Collins, T. (2005). The geography of despair: Environmental racism and the making of south Phoenix, Arizona, USA. *Human Ecology Review*. 12(2): 156-168.

Bronx Health Reach (2010). Bodega Initiative Information. Accessed January 2011. Found online at: http://www.institute2000.org/bhr/work/nutrition_and_fitness/bodega_initiative

Brown, L.D., Bammer, G., Batliwala, S., and Kunreuther, F. (2003). Framing practice-research engagement for democratizing knowledge. *Action Research*. 1(1): 81-102.

Cantrell, P. (June 26, 2004). "Big Boxes, Little Boxes, and Farmland Protection: Reforming farm subsidies can slow sprawl, trim waistlines." Accessed online March 2011 at http://yubanet.com/opinions/Big_Boxes_Little_Boxes_and_Farmland_Prote ction_10995.php

Chung, C. and Myers Jr., S.L. (1999). Do the poor pay more for food? an analysis of grocery store availability and food price disparities. *Journal of Consumer Affairs*. 33(2): 276–296.

Clark, W.C. & Dickson, N. M. (2003). Sustainability science: The emerging research program. *PNAS. (100)*14: 8059-8061.

CDC (2009a) Obesity by Race/Ethnicity, 2006-2008. Centers for Disease Control and Prevention. Accessed November 2010 online at: http://www.cdc.gov/obesity/data/trends.html.

CDC (2009b). Behavioral Risk Factor Surveillance System: SMART: BRFSS City and County Data. Centers for Disease Control and Prevention. Accessed online March 2011 at http://apps.nccd.cdc.gov/BRFSS-SMART/

Congressional Budget Office (2006). Historical Effective Federal Tax Rates: 1979 to 2004, Table 1C, December 2006. Accessed online at: http://www.demos.org/inequality/numbers.cfm

Dalaker, J. (2001). Poverty in the United States: 2000. U.S. Census Bureau. *Current Population Reports* Series P60-214. Washington, D.C.: US Government Printing Office. Available at: http://www.census.gov/prod/2001pubs/p60-214.pdf

Edmonds, J., Baranowski, T., Cullen. K.W., and Myres, D. (2001). Ecological and socioeconomic correlates of fruit, juice, and vegetable consumption among African-American boys. *Preventative Medicine*. 32: 476-481.

Farley, T. A., Rice, J., Bodor, J. N., & Cohen, D. A. (2009). Measuring the Food Environment: Shelf Space of Fruits, Vegetables, and Snack Foods in Stores. *Journal of Urban Health*, 86(5), 672-682.

Feenstra, G.W., Lewis, CC, Hinrichs, C., Gillespie, GW, and Hilchey, D. (2003). "Entrepreneurial outcomes and enterprise size in US retail farmers' markets." *American Journal of Alternative Agriculture*. 46 (10).

Gallagher Group (2006). Examining the impact of food deserts on public health in Chicago. Mari Gallagher Research & Consulting Group, available at http://marigallagher.com/projects/

Glanz, K., Sallis, J. F., Saelens, B. E., & Frank, L. D. (2007). Nutrition Environment Measures Survey in Stores (NEMS-S): Development and Evaluation. *American Journal of Preventive Medicine, 32*(4), 282–289.

Glanz, K. and Yaroch, A. L. (2004). Strategies for increasing fruit and vegetable intake in grocery stores and communities: policy, pricing, and environmental change. *Preventive Medicine, 39*, S75-S80.

Gottlieb, R. and Joshi, A. (2010). *Food justice: A book about an emerging movement*. Cambridge, MA: MIT Press.

Grineski, S. (2006). Local struggles for environmental justice: activating knowledge for change. *Journal of Poverty* 10(3), 25-49.

Hall, B. L. (1992). From margins to center: the development and purpose of participatory action research. *American Sociologist, 23*, 15-28.

Hamm, M. W. and Bellows, A. C. (2003). Community food security and nutrition educators. *Journal of Nutrition Education and Behavior*. 35(1): 37–43.

HEAC (2011). Mobile Farmers Market Delivers Fresh Produce and a Side of Nutrition Education to Low-Income Communities in San Joaquin County. Healthy Eating, Active Communities. Accessed January 2010 at: http://www.healthyeatingactivecommunities.org/communicatio ns3_15.php

Herries, J. (2010). Food desert research tools and data: supermarket access study. Blended datasets from USGS, FAO, NPS, EPA, DeLorme, TANA, and USDA. Accessed March 2011 online at www.arcgis.com.

Hinrichs, C.C. and Lyson, T.A. (Eds.). (2007). *Remaking the North American Food System*. University of Nebraska Press: Lincoln.

Horowitz, Z., Colson, K.A., Herbert, P.L., and Lancaster, K. (2004). Barriers to buying healthy foods for people with diabetes: Evidence of environmental disparities. *American Journal of Public Health*. 94 (9): 1549-54.

Hung, H.C., Joshipura, K.J., Jiang, R., Hu, F., Hunter, D., Smith-Warner, S., (2004). Fruit and vegetable intake and risk of major chronic disease. *Journal of the National Cancer Institute*. 96:1577-84.

Imlay, T. (2006). Challenges in Today's U.S. Supermarket Industry. Microsoft Retail and Hospitality, solutions specialist report. Accessed March 2011, available online at: http://msdn.microsoft.com/en-us/library/aa479076.aspx

Israel, B. A., Schulz, A. J., Parker, E. A., & Becker, A. B. (1998). Review of community-based research: Assessing partnership approaches to improve public health. *Annual Review of Public Health, 19*, 173-202.

Kaufman, P.R., MacDonald, J.M., Lutz, S.M., and Smallwood, D.M. (1997). Do the poor pay more for food? Item Selection and prices differences affect low- income household food costs. Washington D.C.: Economic Research

Service, U.S. Department of Agriculture, Agricultural Economic Report No. 759.

Kimble, C., Grenier, C., and Goglio-Primard. K. (2010). Innovation and Knowledge Sharing Across Professional Boundaries: Political Interplay between Boundary Objects and Brokers. *International Journal of Information Management.* 30(5): 437 - 444.

Laraia, B.A., Siega-Riz, A.M., Kaufman, J.S., and Jones, S.J. (2004) Proximity of supermarkets is positively associated with diet quality index for pregnancy. *Preventative Medicine*. 39: 869–875.

Larson, N. I., Story, M. T., & Nelson, M. C., (2009). Neighborhood Environments: Disparities in Access to Healthy Foods in the US. *American Journal of Preventive Medicine.* 36(1): 74-81.

Lawrence, K. and Keleher, T. (2004). Structural racism. Chronic Disparity: Strong and Pervasive Evidence of Racial Inequities. Presented in 2004 National Race and Public Policy Conference, Berkley, CA.

Lee, J. M., Pilli, S., Gebremariam, A., Keirns, C. C., Davis, M. M., Vijan, S., Freed, G. L., Herman, W. H., Gurney, J. G. (2010). Getting heavier, younger: trajectories of obesity over the life course. *International Journal of Obesity*. 34(4):614-623.

Macintyre, S. (2007). Deprivation amplification revisited; or, is it always true that poorer places have poorer access to resources for healthy diets and physical activity? *International Journal of Behavioral Nutrition and Physical Activity*. 4:32-39.

Mantovani, R.E. and Welsh, J. (1996). *Authorized Food Retailer Characteristics Study (Technical Report III): Geographic Analysis of Retailer Access*, report submitted to U.S. Department of Agriculture, Food and Nutrition Service, by Macro International, Inc.

Minkler, M. (2005). Community-Based Research Partnerships: Challenges and Opportunities. *Journal of Urban Health, 82*(2), ii3-ii12.

Mission: Readiness (2010). *Too fat to fight*. Washington, DC. Available online at: www.missionreadiness.com.

Moore, L. V., Diez Roux, A. V., Nettleton, J. A., Jacobs, D, R., & Franco, M., (2009). Fast-Food Consumption, Diet Quality, and Neighborhood Exposure to Fast Food: The Multi-Ethnic Study of Atherosclerosis. *American Journal of Epidemiology* 170(1): 29-36.

Morland, K., Diez Roux, A., and Wing, S. (2006). Supermarkets, other food stores, and obesity: The Atherosclerosis risk in communities study. *American Journal of Preventative Medicine*. 30(4): 333-339.

Morland, K., Wing, S., and Diez Roux, A. (2002). Neighborhood characteristics associated with the location of food stores and food service places. *American Journal of Preventative Medicine.* 22: 23-29.

Ostrom, E., Janssen, M.A. and Anderies, J.M. (2007). Going beyong panaceas. *PNAS.* 104 (39): 15176-15178.

Phoenix Police Dept, (2011). *Interactive Crime Statistics and Crime Hotspots Maps.* Accessed April 2011 at: http://www.phoenix.gov/police/part1v1.html

Powell, L.M., Slater, S., Mirtcheva, D., Bao, Y., and Chaloupka, F.J. (2007). Food store availability and neighborhood characteristics in the United States. *Preventive Medicine.* 44:189-195.

Powell, L., Zhao, Z., & Wang, Y. (2009). Food prices and fruit and vegetable consumption among young American adults. *Health and Place*. 5(4): 1064-1070.

PRC (2009). *Central City South at a Glance: Inventory, Assets and Existing Conditions*. Phoenix Revitalization Corporation Report. April 2009. Available online at: http://www.phxrevitalization.org/index.htm

PRC (2010). *Central City South Phoenix, Arizona: Our community, our vision, our quality of life plan*. Available online at: www.ccsqlp.org

Raja, S., Ma, C., Yadav, P. (2008). Beyond food deserts: measuring and mapping racial disparities in neighborhood food environments. *Journal of Planning Education and Research.* 27(4): 469-82.

Reidpath, D. D., Burns, C., Garrard, J., Mahoney, M., and Townsend, M. (2002). An ecological study of the relationship between social and environmental determinants of obesity. *Health and Place*. 8(2): 141–145.

Robert, S.A. and Reither, E.N. (2004). A multilevel analysis of race, community disadvantage, and body mass index among adults in the US. *Social Science & Medicine*. 59: 2421–2434.

Roberts, S. (1973). Minority group poverty in Phoenix. *Journal of Arizona History* 14:347–62.

Ryan, G.W. and Bernard,H.R. (2003). Techniques to identify themes. *Field Methods*. 15(1): 85–109.

Sawicki, D. and Craig, W. (1996). The democratization of data: bridging the gap for community groups. *Journal of the American Planning Association*, 62(4): 512–23.

Semenza, J. C., March, T. L., & Bontempo, B. D. (2006). Community-Initiated Urban Development: An Ecological Intervention. *Journal of Urban Health, 84*(1), 8-20.

Sicotte, D. (2008). Dealing in toxins on the wrong side of the tracks: lessons from a hazardous waste controversy in Phoenix. Social Science Quarterly. 89(5): 1136-1152.

Singh, G.K., Kogan, M.D., and van Dyck, P.C. (2010). Changes in State-Specific Childhood Obesity and Overweight Prevalence in the United States From 2003 to 2007. *Archives of Pediatrics & Adolescent Medicine*.164(7): 598 – 607.

The Reinvestment Fund. (2010). *Estimating Supermarket Access: Summary of TRF's Research and Analysis*. Philadelphia, PA. Available online at: http://www.trfund.com/resource/policypubs.html

Teton Sands Group (2006). Grocery Industry: Origins, Culture, Practices. White paper. Accessed online March 2011 at: www.tetonsands.org/docs/GroceryIndustry.pdf

Thompson, P.B. (1995). *The spirit of the soil: agriculture and environmental ethics*. The productionist paradigm. London: Routledge.

U.S. Bureau of Census (2000). Census Block information, 2000 demographic data. Washington (DC): US Census Bureau.

US Dept of Agriculture. (2009). Access to affordable and nutritious food: measuring and understanding food deserts and their consequences. June 2009. Economic Research Service.

US Dept of Agriculture (2008). 2008 Farm Bill: Public law version 6124 of the Farm Bill. Accessed December 2010 online at: http://www.usda.gov/wps/portal/usda/mimedetector?url=/documents/Bill_6124.pdf&text=/documents/Bill_6124.pdf

U.S. Department of Health and Human Services (2001). *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity*. Rockville, MD: Public Health Service, Office of the Surgeon General.

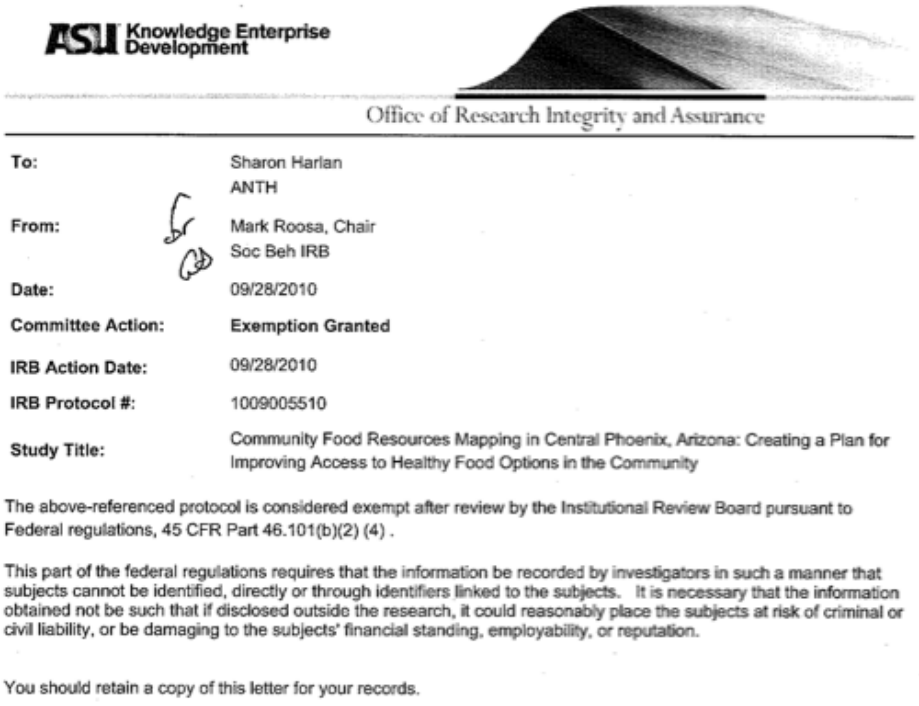
Wenger, E. (1998). *Communities of Practice: Learning, Meaning, and Identity*. Cambridge: Cambridge University Press.

Winne, M., (2008). *Closing the Food Gap: Resetting the Table in the Land of Plenty*. Boston: Beacon Press.

# APPENDIX A

# INSTITUTIONAL REVIEW BOARD REQUIREMENTS

This study was granted exempt status by the Arizona State University Institutional Review Board for conducting research involving human subjects. Practices followed protect participants and do no harm include voluntary participation, informed consent via agreement to letter of project overview and terms of participation, and confidentiality of any quoted participant. ASU IRB granted Exempt Status for this study on September 28, 2010 (IRB Protocol # 1009005510). The IRB exempt status applies to the data collection and analysis involving human subjects. The NEMS data collection was not required to have IRB oversight under Federal Regulations 45 CFR Part 46.



ASU Knowledge Enterprise Development

Office of Research Integrity and Assurance

| | |
|---|---|
| **To:** | Sharon Harlan<br>ANTH |
| **From:** | Mark Roosa, Chair<br>Soc Beh IRB |
| **Date:** | 09/28/2010 |
| **Committee Action:** | **Exemption Granted** |
| **IRB Action Date:** | 09/28/2010 |
| **IRB Protocol #:** | 1009005510 |
| **Study Title:** | Community Food Resources Mapping in Central Phoenix, Arizona: Creating a Plan for Improving Access to Healthy Food Options in the Community |

The above-referenced protocol is considered exempt after review by the Institutional Review Board pursuant to Federal regulations, 45 CFR Part 46.101(b)(2) (4) .

This part of the federal regulations requires that the information be recorded by investigators in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. It is necessary that the information obtained not be such that if disclosed outside the research, it could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

You should retain a copy of this letter for your records.

# APPENDIX B

## INFORMATION LETTER FOR INTERVIEW RESPONDENTS

Dear Research Participant:

Our research team is working with Dr. Sharon Harlan in the School of Human Evolution and Social Change at Arizona State University. We are conducting a study to record your thoughts about mapping the food resources available in Central City South, Phoenix, Arizona. The results of this study will provide meaningful contributions to the PRC programs for the benefit of your community. Your participation will ensure that your opinion is a part of the formulation of a strategic plan to improve community food access. Participants are key to the success and progress of the mapping program through PRC aimed at community development.

I am inviting your participation, which involves a short interview that will take approximately forty minutes.

Your participation in this study is voluntary. You can skip questions if you wish. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. There are no foreseeable risks to your participation. All participants in this research study must be over 18 years of age or older.

Your responses will be confidential. Data collection methods will ensure the anonymity of participants. The results of this study may be used in reports, presentations, or publications but your name will not be used. Only summaries of the answers will be reported. Although specific excerpts may be mentioned, no means of identification by an outside party will be allowed.

If you have any questions concerning the research study, please contact the research team at: (xxx) xxx-xxxx or xxxxxxxxx.xxxxx@asu.edu. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (xxx) xxx-xxxx.

Please let me know if you wish to be interviewed.

Sincerely,

Carolyn Crouch

# APPENDIX C

# DETAILED DESCRIPTION OF DIFFERENCES BETWEEN STANDARD AND ASU LATINO NEMS INSTRUMENTS

The ASU Latino Nutrition Environment Measures Survey:

1) Records number and type of advertisements on (and around) the outside of the food establishment (including photos of the exterior); also allows for raters to comment on what things and activities were outside a store (for instance a yard sale in front of a store during data collection);
2) Includes food measures of beefsteak, chicken, tortillas, cheeses, and beans;
3) Adds specific items within food categories that are popular to Latino communities, such as nectars in the beverage section, and extra fruits (e.g., papaya) and vegetables (e.g., nopales/cactus) that are more popular in Hispanic communities;
4) Produce items added for the ASU Latino NEMS: plums, grapefruit, mango, papaya, pineapple, avocado, spinach, leaf lettuce, onion, squash, jicama, cactus, chiles, and tomatillos;
5) Standard NEMS has binary option of acceptable and unacceptable for the quality of fresh produce. ASU Latino version provides a range from which raters can identify the quality level: $\leq 25\%$, $\leq 50\%$, $\leq 75\%$, and $\geq 75\%$.
6) Measures not only fresh produce, but also whether fruits and vegetables are canned, frozen, and/or organic; and
7) Latino NEMS version provides space at the bottom of survey pages to fill in brand name suggestions for inclusion in the final version of the assessment.

# APPENDIX D

## EXAMPLES OF STANDARD AND ASU LATINO NEMS SURVEY PAGES

Standard NEMS:

**Availability and Price**

| Produce Item | | Available Yes | Available No | Price | Unit # | Unit pc | Unit lb | Quality A | Quality UA | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. **Bananas** | | ○ | ○ | $ .□□ | □ | ○ | ○ | ○ | ○ | |
| 2. **Apples** | ○ Red delicious ○ _____ | ○ | ○ | $ .□□ | □ | ○ | ○ | ○ | ○ | |
| 3. **Oranges** | ○ Navel ○ _____ | ○ | ○ | $ .□□ | □ | ○ | ○ | ○ | ○ | |
| 4. **Grapes** | ○ Red seedless ○ _____ | ○ | ○ | $ .□□ | □ | ○ | ○ | ○ | ○ | |
| 5. **Cantaloupe** | | ○ | ○ | $ .□□ | □ | ○ | ○ | ○ | ○ | |
| 6. **Peaches** | | ○ | ○ | $ .□□ | □ | ○ | ○ | ○ | ○ | |
| 7. **Strawberries** | | ○ | ○ | $ .□□ | □ | ○ | ○ | ○ | ○ | |
| 8. **Honeydew Melon** | | ○ | ○ | $ .□□ | □ | ○ | ○ | ○ | ○ | |
| 9. **Watermelon** | ○ Seedless ○ _____ | ○ | ○ | $ .□□ | □ | ○ | ○ | ○ | ○ | |
| 10. **Pears** | ○ Anjou ○ _____ | ○ | ○ | $ .□□ | □ | ○ | ○ | ○ | ○ | |

11. **Total Types:** (Count # of yes responses) □□

Latino NEMS:

***Acceptable Quality*** = in peak condition, top quality, good color, fresh, firm, and clean.

***Unacceptable Quality*** = bruised, old looking, mushy, dry, overripe, dark sunken spots in irregular patches, cracked or broken surfaces, signs of shriveling, mold, or excessive softening

| Produce Item | Available | Lowest Price | # units | Per Unit | Percent Acceptable | Comments |
|---|---|---|---|---|---|---|
| 1. Apples/Manzana ○ Red Delicious ○ _____ | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |
| 2. Bananas/Platano | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |
| 3. Plums/Ciruelas ○ Black ○ _____ | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |
| 4. Cantaloupe/Melon | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |
| 5. Grapefruit/Toronja ○ Red ○ _____ | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |
| 6. Grapes/Uvas ○ Red Seedless ○ _____ | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |
| 7. Honeydew Melon | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |
| 8. Mango | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |
| 9. Oranges/Naranja ○ Navel ○ _____ | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |
| 10. Papaya ○ Mexican ○ _____ | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |
| 11. Peaches/Durazno | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |
| 12. Pears/Peras ○ Anjou ○ _____ | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |
| 13. Strawberries/Fresa | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |
| 14. Watermelon/Sandia ○ Seedless ○ _____ | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |
| 15. Pineapple/Piña | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |
| 16. | ○fresh ○frozen ○organic ○canned | $ | □ | ○ Pc ○ Lb Size (oz.)_____ | ○ ≤ 25% ○ ≤ 50% ○ ≤ 75 % ○ >75% | |

17. Total # of fresh fruits available _____

Standard NEMS:

**Availability and Price**

| Produce Item | | Available Yes | Available No | Price | # | Unit pc | Unit lb | Quality A | Quality UA | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Carrots | O 1 lb bag O_____ | O | O | $ □.□□ | □ | O | O | O | O | |
| 2. Tomatoes | O Loose O_____ | O | O | $ □.□□ | □ | O | O | O | O | |
| 3. Sweet Peppers | O Green bell peppers O_____ | O | O | $ □.□□ | □ | O | O | O | O | |
| 4. Broccoli | O Bunch O_____ | O | O | $ □.□□ | □ | O | O | O | O | |
| 5. Lettuce | O Green leaf O_____ | O | O | $ □.□□ | □ | O | O | O | O | |
| 6. Corn | | O | O | $ □.□□ | □ | O | O | O | O | |
| 7. Celery | | O | O | $ □.□□ | □ | O | O | O | O | |
| 8. Cucumbers | O Regular O_____ | O | O | $ □.□□ | □ | O | O | O | O | |
| 9. Cabbage | O Head O_____ | O | O | $ □.□□ | □ | O | O | O | O | |
| 10. Cauliflower | | O | O | $ □.□□ | □ | O | O | O | O | |

11. **Total Types:** (Count # of yes responses) □□

Latino NEMS:

***Acceptable Quality*** = in peak condition, top quality, good color, fresh, firm, and clean.

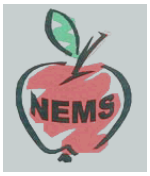
***Unacceptable Quality*** = bruised, old looking, mushy, dry, overripe, dark sunken spots in irregular patches, cracked or broken surfaces, signs of shriveling, mold, or excessive softening

| Produce Item | Available | Lowest Price | # units | Per Unit | Percent Acceptable | Comments |
|---|---|---|---|---|---|---|
| 1. Avocado/Aguacate O Hass O _____ | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 2. Broccoli/Brocoli | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 3. Cabbage/Repollo | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 4. Cauliflower/Coliflor | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 5. Carrots/Zanahoria | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 6. Celery/Apio | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 7. Spinach/Espinaca | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 8. Corn/Elote | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 9. Cucumber/Pepino | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 10. Leaf Lettuce/Lechuga | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 11. Onion/Cebolla O White onion O _____ | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 12. Tomatoes/Tomato | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 13. Squash/Calabacita O Zucchini O _____ | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 14. Jicama | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 15. Cactus/Nopal | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 16. Chiles O Anaheim O _____ | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |
| 17. Tomatillos | Ofresh Ofrozen Oorganic Ocanned | $ | □ | O Pc O Lb Size (oz)____ | O ≤ 25% O ≤ 50% O ≤ 75 % O >75% | |

18. Total # of fresh vegetables available _____

# APPENDIX E

## NEMS BILINGUAL INFORMATION LETTER FOR STORE MANAGERS




ARIZONA STATE UNIVERSITY

Fall 2010

Hello,

I am a student at Arizona State University, and this letter is to give you information about a research assignment that I am doing.

I will be making observations of your business, and taking notes on what I observe. My notes will go to support a research study conducted by Dr. Seline Szkupinski Quiroga, Professor of Transborder Chicana/o and Latina/o Studies, Arizona State University, and Dr. Donna Winham, Professor of Nutrition, Arizona State University. They are developing a survey tool to objectively measure the food environment in Phoenix. Such a tool has been developed elsewhere but this one will take into account the Hispanic presence in Phoenix.

I will do all that is possible so that my presence is not disruptive. There is no payment for your business's participation in the study other than my thanks.

All information obtained in this study is strictly confidential. The results of this research study may be used in reports, presentations, and publications, but the researchers will not identify you or your business.

If you have any questions, please call Carolyn Crouch at xxx-xxx-xxxx.

Thank you!

Otoño 2010

Hola,

Soy estudiante de la Universidad Estatal de Arizona (ASU), y esta carta le informará sobre una investigación que hago.

Con su permisión, voy a observar su negocio, y tomar notas sobre lo que observo. Mis notas van a informar una investigación dirigida por la Dra. Seline Szkupinski Quiroga, Profesora de Estudios transfronterizos Chicanas/os y Latinas/os, y la Dra. Donna Winham, Profesora de Nutrición en ASU. Ellas están desarrollando una herramienta de encuestas para medir objetivamente el ambiente alimentario en Phoenix. Esta herramienta ha sido desarrollada en otras ciudades, pero la nuestra va a considerar la presencia de Chicanas/os y Latinas/os en Phoenix.

Voy a hacer todo lo posible para que mi presencia no interrumpa en sus operaciones. No existe recompensa por su participación en el estudio, aparte de mi agradecimiento.

Toda la información que obtengamos en el estudio es completamente confidencial. Los resultados del estudio podrían aparecer en reportes, presentaciones, y publicaciones, pero los investigadores no le identificarán a usted ni a su negocio.

Si tienes alguna pregunta o duda, favor de llamar a la Srita. Carolyn Crouch al teléfono xxx-xxx-xxxx.

Muchas gracias!