2021

Food Assistance Deserts in Central Florida: Identifying Service Gaps Using Spatial Analysis

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Abstract

Food assistance works to relieve food insecurity, a persistent problem in the United States disproportionately affecting marginalized communities. In this study, we take a closer look at geographical service gaps in food assistance using QGIS to measure food assistance deserts, a term for areas where the nearest food assistance location is more than a mile away from the population centroid of a block group. By combining geographic data with data from the American Community Survey, we identified characteristics and predictors of food assistance deserts. Our results indicate that locations of food assistance in Central Florida are generally responsive to the needs of the community but are lacking in more affluent areas. This research was made possible through a partnership between our institution and Second Harvest Food Bank of Central Florida. The affordability and accessibility of this project should serve as a model for assessing spatial inequality in social service agencies through collaborative community-based research.

Introduction

Despite the United States' position among the wealthiest countries in the world, food insecurity continues to be a problem for a significant part of the U.S. population. Public assistance programs, like the Supplemental Nutrition Assistance Program (SNAP), address only part of the need. Private, nonprofit agencies step in to fill a critical role meeting this gap with access to free groceries and meals for those who need them. These community-based agencies face their own challenges, however, in terms of funding and other resources.

In this paper, we share a model of a collaborative research project between a university research team (faculty/student) and a community-based agency, aimed at three primary objectives:

1) fostering data-driven social service models,
2) strengthening the connections between the academy and community partners, and
3) developing research skills in student investigators.

We partnered with Second Harvest Food Bank of Central Florida (Second Harvest) to carry out a geographic information systems (GIS) analysis of food assistance locations in Central Florida. We made use of Second Harvest data on 355 food assistance programs and publicly available data from the U.S. Census Bureau on the 1,436 census block groups in the service area.

We begin by looking at predictors of geographically accessible food assistance in the six counties of Central Florida, using Waity's (2016) concept of food assistance deserts and distance to nearest food pantry as dependent variables. Next, we look more closely at census

[1] This is the accepted version of manuscript published in the *Journal of Applied Social Science.* *https://journals.sagepub.com/doi/10.1177/1936724420984401*

block groups identified as food assistance deserts, to identify their predictors and characteristics. Finally, we assess particular issues that community agencies might address with service adjustments.

Literature Review

Food insecurity and food assistance

Food insecurity plagues communities, families, and individuals in the United States, and exists "whenever the availability of nutritionally adequate foods… is limited or unknown" (Bazerghi, McKay, and Dunn 2015:732). The United States Department of Agriculture's (USDA) index for measuring food insecurity is the most commonly accepted by social scientists and makes use of information about a family's hunger levels, access to food, and household information. It is generally perceived as conservative so many households who do not meet the criteria are still struggling to get the food they need (Coleman-Jensen 2010).

What the index has shown is that a sizeable number of households in the United States continue to be food insecure, even in a healthy economy. The percentage of households that were food insecure for a portion of the year was 11.1% in 2018 (Coleman-Jensen 2018). Generally, female headed households, families with children, lower income families, underemployed individuals, racial minorities, individuals without a college degree, and non-citizens are all more likely to have marginal food security than their more privileged counterparts (Coleman-Jensen 2010). Food insecurity also appears to be influenced by intersectional factors, as prior research finds that low-income Black households are even more disadvantaged than other groups (Balistereri 2016).

The long-term consequences of food insecurity are tremendous, especially when experienced for prolonged periods of time. In children, poor health and a decline in school performance are the most common effects of limited access to nutritionally adequate food (Coleman-Jensen 2010). Poor health leads to higher healthcare costs, which becomes an economic burden that further exacerbates food insecurity (Gundersen, Engelhard, and Hake 2017). In addition, mental and social effects of food insecurity can lead to developmental and behavioral problems (Morrissey et al. 2016). In adults, long periods of food insecurity decreases lifespan (Coleman-Jensen 2010). Overall, "food insecurity has multiple, well documented interactions with chronic diseases including infectious, non-communicable, and mental illness" (Whittle et al. 2015:155). Food insecurity may also be associated with social disadvantages as well, as Phojanakong et al. (2019) find that household food insecurity, depressive symptoms, and poor physical health are significantly associated with experiences of racial and ethnic discrimination by police and the courts, in public places, and in school and workplaces.

Access to food is hindered by economic disadvantage, to be sure, but also by other barriers. "Deprivation amplification" occurs when "individuals in the community are affected by social, geographical, or environmental issues that create compounding barriers to healthy living" (Lewis et al. 2018:43). In a study of extended-stay motel residents (a segment of the homeless population), lack of transportation intensified food insecurity, impeding access to higher quality, balanced diets (Gonzalez Guittar 2017). Since the motels were concentrated in nonresidential areas, food shopping options were limited and often a car was required to travel to the nearest grocery store (Gonzalez Guittar 2017). Although the experiences of this population may not be generalizable to all, it is important to note how location can prevent overall food stability.

Food assistance is one solution to food insecurity that is vitally important to low income and marginalized communities (Bazerghi et al. 2015). Food assistance comes in the form of government and community-based aid. The Supplemental Nutrition Assistance Program (SNAP) is the main form of governmental aid (Waity 2016). Unfortunately, most SNAP users find that SNAP alone is not enough to increase their food security (Will and Milligan 2013). Community-based aid works to close this gap. Community-based aid includes food pantries, which "allow clients to receive free supplemental groceries," and soup kitchens that "provide free, prepared meals, either to eat in or take away" (Waity 2016:106). Sometimes receiving assistance even becomes the divide between households that are food insecure and those that are secure, especially in low income and marginalized communities who are most likely to find themselves in periods of prolonged food insecurity (Bazerghi et al. 2015). Food insecurity exists in higher income communities too, so assistance needs to be available to all who are affected (Morrissey et al. 2016). The idea that private sources of food assistance augment, rather than replace, public sources of food assistance is supported by Bhattarai, Duffy, and Raymond's (2005) study that found that SNAP receipt positively predicted food pantry use.

Despite the important role of food assistance to relieve food insecurity, community-based aid faces its own set of struggles. Food banks in general struggle because "the number of food bank clients are increasing, donations are not increasing with demand, and food bank staffs are not highly enough trained around nutrition to provide advice and education to clients" (Bazerghi et al. 2015:738). Just as individuals lack the ability to access balanced food, it is a challenge for food banks to source nutritionally adequate amounts of food for their users (Bazerghi et al. 2015). In a survey given to food assistance users in North Florida, "respondents discussed the need for more meat, fresh fruit and vegetables, milk, and diabetic food choices" (Will and Milligan 2013:71). Without necessary refrigerators and freezers, food assistance locations cannot properly store the items most in demand (Vissing et al. 2017).

In addition to the challenges faced by the food pantries and soup kitchens, food insecure individuals also face difficulties accessing the services provided. Some food pantry users feel dissatisfied with their treatment at the community-based sites they frequent. Pantry volunteers may not be aware or sensitive enough of the obstacles that users face when using a food pantry (Kicinski 2012). This is complicated by the reality that "asking for food changes power dynamics in normal relationships, especially as people in need attempt to protect their dignity" (Vissing et al. 2017:463).

Outside of stigma, there are concrete obstacles that exacerbate one's ability to use this assistance. Some food pantries and soup kitchens require their users to wait outside which poses difficulties in harsh winters up north and scorching summer days in the south (Kicinski 2012). Research on food assistance users in North Florida suggests that "including shelter for clients waiting in line, transportation or delivery for those unable to visit the pantry, and more services or information about surrounding areas" may mitigate this problem (Will and Milligan 2013:71).

While families of color may be more likely to need food assistance, Kamdar et al's (2018) meta-analysis does not suggest much different in the propensity of different racial/ethnic group to access food pantries, with the exception that undocumented migrants may be fearful of using services that might require documentation.

Transportation is also a common challenge for the food insecure (Martin et al. 2003). Food pantries and soup kitchens require in person attendance to receive assistance. Inaccessible hours also provide a barrier to usage. Some food assistance locations are just open a few times a month, which is limiting for users who do not have flexible work hours. Often, the food they receive is not enough to last until the next time the location offers their services (Will and Milligan 2013). Transportation and time, therefore, can become large barriers for access especially in rural communities "where hunger relief agencies are not in close proximity to those who need assistance" (Waity 2016:123). A number of these challenges highlight the importance spatial dimensions of food assistance, aspects that have been less examined in scholarly research.

Space and Inequality

The importance of transportation and other geographic barriers to food access prompts us to heed Tickamyer's (2000) call to integrate spatial processes into our understandings of inequality. In this particular case, her insights suggest consideration of appropriate scale and measurement in exploring the spatial dimensions of inequality.

While space and place are often ignored in large surveys that do not account for local characteristics, some scholarship on social services has incorporated spatial understandings of inequality and access. In her qualitative research, Kissane (2010) examines the symbolic meaning of geography through the experiences of poor, non-Hispanic white and Puerto Rican women in high need areas of Philadelphia. She finds that subjective understandings of space and place shape where social service clients are comfortable traveling for services. This holds significance both for the community-based aid site that might struggle to access enough resources in locations far from affluent and altruistic suburbs and for those that need food assistance the most (Kissane 2010).

Waity's (2016) study provides the clearest direction on spatial analysis and food assistance. She used Geographic Information System Mapping (GIS) to map population centers and food assistance in a sample of Indiana counties to analyze the impact of spatial inequality on serving food insecure populations. She developed the concept of "food assistance deserts" which occur when "the population center of a census block group is more than one mile from a food assistance agency" (Waity 2016:112). She looked particularly at the urban-rural divide and found that in high-poverty census blocks, "84% of rural areas are food assistance deserts," while only "50% of urban high-poverty counties are food assistance deserts" (Waity 2016:119). She further examined this phenomenon in lower poverty areas because food insecurity is not exclusively faced by low-income communities. Her findings suggest that food assistance is mostly absent from higher income communities even though a need for a supplemental food source is present. This demonstrates the need for varied access points to food assistance that mirror the needs of the population.

Although her research offers a new perspective to food insecurity, it is based solely in Indiana which only allows a glimpse into the larger problem of spatial inequality and food assistance nationwide. Through the application of her methodology to the Central Florida area, her findings can become useful for alleviating food insecurity in our own community.

A Collaborative Model for Community Based Research on Food Assistance Access

For this project, we make use of a collaboration between academic researchers (a faculty/student team) at [institution redacted] and Second Harvest Food Bank of Central Florida to explore questions of food assistance access. Sociology, as a discipline, has a long history of community-based research as a way of making linkages with community partners,

applying social research to social problems in the community, and validating the knowledge of clients and service providers in research on social problems (Breese 2011). In addition, such projects become a laboratory for students to develop research skills that may be of use in future careers.

Community-based research projects face frequent challenges, both in drawing interested parties, and in the actual research project. MacLean, Warr, and Pyett (2009) note difficulties of building relationships between community agencies and academia, and a lack of funding to conduct such research.

Our project arises from a long-term relationship between the community partner and our institution. Community engagement leadership at our institution has recognized that relationships with community partners need to be sustained and multidimensional to build trust and understanding of the needs and objectives of both parties. This process set in motion an ongoing discussion of research partnerships that has led to three different projects (including this one), rather than fragmented approaches to agencies that lead to a one-time project. We also make use of internal college funding for student-faculty collaborative research to meet the dual aims of training students and bridging the classroom to the community.

In Fall 2019, we discussed the agency's recent strategic plan to identify areas where data collection might fruitfully inform their work. In this strategic plan, they set a goal to better understand the needs of their clients, as their agency distributes resources to local community partners and does not often regularly interact with food insecure clients. Two research partnerships were designed on this charge, this quantitative GIS approach, and another project, using qualitative interviews to gather information from pantry clients. Proposals were written in Spring 2020 and the data analysis conducted in the summer of 2020.

In this paper, we aim to understand spatial inequality as it pertains to food assistance in Central Florida, drawing on Waity's (2016) methods of identifying food assistance deserts. Her work serves as a starting point to guide the central questions of the research: To what extent do food assistance deserts exist in the Central Florida region? What characteristics of geographical areas predict the existence of food assistance deserts? And, what gaps in service remain for those who reside in food assistance deserts?

Methodology

Data and Methods

Secondary data from both Second Harvest Food Bank of Central Florida (Second Harvest) and the American Community Survey (ACS) were used to address these questions on spatial inequality. Second Harvest is a private, nonprofit organization with over six hundred partner agencies in six counties in Florida. Their central distribution center purchases food in bulk and receives donations from corporations and local farms to redistribute to their partners in the community. The community partners have direct contact with individuals and families who are food insecure. Second Harvest provided information to the researchers regarding their partner agencies' hours of operation, location, capacity, and their type of service. In these analyses we include only the 355 emergency pantries open to the public, and exclude the remainder of the partner agencies which were "closed" sites, like schools or rehabilitation facilities open only to a limited service population.

Alongside the data from Second Harvest, this project utilized data from the 2018 ACS. The ACS offers social, economic, housing, and demographic characteristics of communities in the country (Bureau 2018). In larger geographic regions with populations over 65,000, ACS data is available yearly. In smaller areas, including the block groups we use here, estimates are produced from averaging five years of data. To ensure consistency among Census data, the ACS data is weighted based on population information. In these analyses, we use the block group as our unit of analysis, a subgroup of a census tract that contains around 600 to 3,000 people (Bureau 2018).

Geographic Location

Our analysis covers the census block groups of the six counties of Central Florida Served by Second Harvest. These six counties include the denser metropolitan areas of Orlando and Daytona Beach, as well as suburban and rural locations. Within these counties, there are 1,441 census block groups. Five of these block groups are unpopulated and were dropped from the analysis leaving a final N = 1,436 census block groups.

Dependent Variables

The dependent variables, the presence of a food assistance desert, the quality of assistance available, and the distance to the nearest food assistance agency were calculated using a GIS analysis in QGIS. QGIS generates spatial data by combining layers of geographical points, vectors, and polygons into one map. Second Harvest's data on agency locations and characteristics was geocoded and imported into QGIS, where it was combined with data on the census block groups. We used centroid points within each census block group that represented the population center. By drawing from a population center instead of a geographic center, we were able to assess access to food assistance based on where the highest concentration of people were located. A standard one-mile radius was constructed around each block group centroid, and a count was generated of the number of agencies within that one-mile radius. One mile from a grocery store is a standard indicator of food deserts. Waity (2016) applied that same logic to generate information on food assistance deserts in Indiana. By applying a standard measurement to all block groups, regardless of population density, we were able to generalize barriers to food assistance as it relates to the specific geographical characteristics of Central Florida.

The number of food assistance locations within a one-mile radius of each population centroid was recoded into a binary variable, food assistance desert, that indicated a lack of any agencies within one mile. We also calculated the distance from each centroid to the nearest food assistance location.

Independent Variables

The data for our independent variables come from the 2018 ACS five-year summary files for the census block groups in the six counties of Central Florida. As our primary purpose is to see whether food assistance locations correspond to the locations of populations in need, we examined relationships with demographic and economic variables that would be related to food insecurity, including income, education, employment, and receipt of public assistance. Given the strong collinearity between these variables, we represented these economic needs with one variable: the percentage of the block group population with incomes below 200% of the poverty line. In addition, we wanted to examine whether access to food assistance was related to other social inequalities, namely race and ethnicity, and we included the percentage of the population that identifies as Black non-Hispanic; and Hispanic/Latinx. We also included geographic characteristics of the land area of each block

group (in square miles) and the population density. Table 1 displays the descriptive statistics for the census block groups on these independent variables.

We merged the dependent variables created in QGIS with the ACS block group data and completed all analyses and regression models in Stata v. 16.

Results

The Prevalence of Food Assistance Deserts

Our first task was to estimate the prevalence of food assistance deserts in the six Central Florida counties. Of the 1,436 block groups analyzed, 757 are food assistance deserts. Therefore, slightly more than half (52.72%) of block groups do not have access to community-based food assistance within a mile of their population center.

Figure 1 illustrates the six counties served by Second Harvest accounting for food assistance deserts. The type of food assistance desert is distinguished by the shading of the block group. Shaded block groups are food assistance deserts, with darker shading indicating a "high need" block group, where more than a third of the population is low-income. As visible from the map, larger, rural block groups seem more likely to be food assistance deserts than smaller, urban block groups. Waity (2016) had similar findings in Indiana when she analyzed the distinctions between urban and rural counties.

Predicting Food Assistance Deserts

On average, the population centroid in each block group is 1.52 miles away from food assistance (standard deviation: 1.47). The closest food assistance location to a block group's population centroid is only .0198 miles away, while the furthest is 17.45 miles away.

The characteristics of food assistance deserts were explored through a logistic regression model in Table 2. Results indicate that the presence of a food assistance desert is responsive to poverty, area, and race. Population density is not a significant predictor when area is included and was therefore dropped from the model.

When poverty and other demographic characteristics were accounted for, larger block groups are more likely to be food assistance deserts than their smaller (and more urban) counterparts. This reflects the initial analysis of Figure 1 and the current literature on urban and rural food assistance deserts. With each increase in square mile of a block group, the block group is 35% more likely to be a food assistance desert ($p<0.001$). High need block groups, with more than 36% of their population living below 200% of the poverty line, are less likely to be food assistance deserts. This is encouraging as it indicates that food assistance is generally accessible to those experiencing financial insecurity in the Central Florida area. With each percent increase in the population living below 200% of the poverty line, a block group is 98% as likely to be a food assistance desert ($p<0.001$). The same is reflected for minority populations. With each percent increase in the Hispanic/Latinx population, a block group is 99% as likely to be a food assistance desert ($p<0.05$). Similarly, with each percent increase in the population of non-Hispanic Blacks, a block group is 97% as likely to be a food assistance desert ($p<0.001$). Since race is often an indicator of financial insecurity that might not be directly captured by income, the results for population demographics are to be expected.

Predicting Distance to Food Assistance

The characteristics predicting distance to the nearest food assistance location were explored through a multiple regression model depicted in Table 3. Results indicate that the distance to a food assistance location is significantly affected by population demographics,

and geographic characteristics. Unlike in the logistic regression model, density is a significant characteristic of how far away the nearest food assistance location is from a block group's population centroid even when area is controlled for. Density squared was added to the regression because the relationship between density and distance was fit more accurately with a quadratic than a linear model.

Larger block groups are more likely to have food assistance locations further from their population centroid. This reinforces earlier findings that supports Waity's (2016) understanding of urban and rural food deserts. Similarly, block groups that are more densely populated have population centroids that are closer to a food assistance location. For every square mile increase in block group area, there is an expected .029 mile increase in distance to the nearest food assistance location ($p<0.001$). For every thousands per square mile increase in population density there is an estimated main effect of a .406 mile decrease in distance to the nearest food assistance location ($p<0.001$), which is attenuated at higher densities by the squared density term.

Population demographic variables characterize distance to a food assistance location similarly to how they predict a food assistance desert. Block groups with higher percentages of the population living below 200% of the poverty line and block groups with higher minority populations (Black or Hispanic/Latinx) are all more likely to have population centroids that are closer to the nearest food assistance location. For every additional percent increase in the population living below 200% of the poverty line, there is an estimated .009 mile decrease in the distance to the nearest food assistance location ($p<0.001$). The percentage of the Hispanic/Latinx population was a not significant predictor in this model. Finally, for every percent increase in the Black, non-Hispanic population, there is an expected .009 mile decrease to the nearest food assistance location ($p<0.001$). The adjusted R^2 value for this model is .36.

Unmet Need Analysis

To understand outstanding service gaps in the Central Florida area, the practical significance of food assistance deserts and how they impact high need populations was explored. High need food assistance deserts are defined as areas where 1) more than a 36% of the population's income falls under 200% of the poverty line and 2) the block group population centroid is more than a mile away from the nearest food assistance location. We chose 36.21% below that income level, because that was the mean percentage of all of the block groups. Among all six counties, approximately one-third of food assistance deserts, or 236 block groups, are "high need," with 627,010 people living within those block groups. The distance to a food assistance location in a high need food assistance desert ranges from 1.00 to 17.45 miles, with a mean of 2.32 miles (SD: 2.00). Although high need food assistance deserts are particularly concerning, people at risk of food insecurity are not absent in other areas. There are 323,187 people in total with incomes below 200% of the poverty line living in food assistance deserts that do not qualify as "high need" by this standard, indicating a need for accessible food assistance regardless of general affluence in an area.

Discussion

Both spatial models in our analysis indicate that geographic characteristics are significant predictors of food assistance deserts and proximity of a population centroid to the nearest food assistance location. Larger block groups are more likely to be food assistance deserts and high-density areas are closer to a food assistance location than their more rural

counterparts. This is consistent with Waity's (2016) understanding of food assistance deserts and their unique impacts on rural and urban counties. Given that low-income and minority communities are at higher need of food assistance (Coleman-Jensen 2010), it is reassuring that food assistance locations are more likely to be located near these communities.

Overall, these results show that the locations of Second Harvest's community partners are generally responsive to the needs of the community. This will be communicated to Second Harvest with a report written for a lay audience, in consultation with their staff. In addition to an overview of the results, the report will include detailed maps of the six counties accounting for food assistance deserts, locations of food assistance, high need food assistance deserts, and high need areas to help guide future community partnerships. Although somewhat encouraging, it is important to recognize that food insecure populations reside in affluent block groups as well. Specifically, we estimate from the ACS data that there are 618,871 people with incomes below 200% of the poverty line in food assistance deserts of Central Florida. Out of the 618,871 people, 323,187of those individuals are living in affluent food assistance deserts while 295,684 people are living in high need food assistance deserts. When the practical significance of these findings are considered, access to accessible food assistance, regardless of the affluence of an area, is an important gap in service for Central Florida.

This project reflects a collaborative effort between the researchers and Second Harvest. Effective communication between the involved parties culminated in a final product which we hope advances Second Harvest's strategic plan, addresses areas of success and challenge, and offers guidance on ways that Second Harvest can better serve their community. [Institution redacted] has a longstanding relationship with Second Harvest that was strengthened with this project and will be expanded on through our report and a subsequent qualitative project aiming to understand the experiences of food assistance recipients in the near future. The history of this partnership encouraged conscious communication and research; a goal for all community-based collaborations.

Although this research offered insight into the state of community-based aid in Central Florida, the results cannot necessarily be generalized to the broader issues of food insecurity and food assistance nationwide, though we provide a useful model for future research. Block group data were utilized because they offered the smallest unit of measurement to understand spatial gaps in Central Florida's community-based food aid, but because of the small population, the Census Bureau only releases some data as 5-year estimates and suppresses other variables altogether. ACS data are collected through surveys mailed to specific addresses, not individuals. Since this does not capture the non-institutionalized homeless population residing in motels, hotels, or on the streets, the scope of these findings are limited. This is a particularly relevant issue in Central Florida where a sizeable part of the homeless population in resides in extended-stay motels, a location that provides additional obstacles for getting, storing, and preparing food (Gonzalez Guittar 2017). Without accounting for motel residents, it is possible that the gaps in service to high need areas are even larger than what the data indicates. These shortcomings offer direction for future research as we seek to more accurately assess and generalize food assistance shortages.

Another potential avenue for future research involves the quality of services food assistance locations provide. By evaluating the capacity, storage types, and frequency of distribution, a more expansive model of food assistance deserts could be examined. This

could be included into conversations with community leaders, partners, and pantry users to improve the overall quality of services offered.

One advantage of this type of analysis, however, is the low-cost nature of the research. ACS data are updated yearly and are freely available from the Census Bureau. No additional data collection is required on the researchers' part. So, even if larger conclusions cannot be extracted from this project, the process of assessing spatial inequality can be applied to other social service agencies quite easily and repeated regularly to update service strategies. Community-based aid may only provide temporary relief from larger systemic issues, but the importance of geographically accessible sites for resource allocation in a community is needed, nonetheless.

Figures and Tables

FIGURE 1 Geographical characterization of access to food assistance in block groups served by Second Harvest Food Bank of Central Florida.

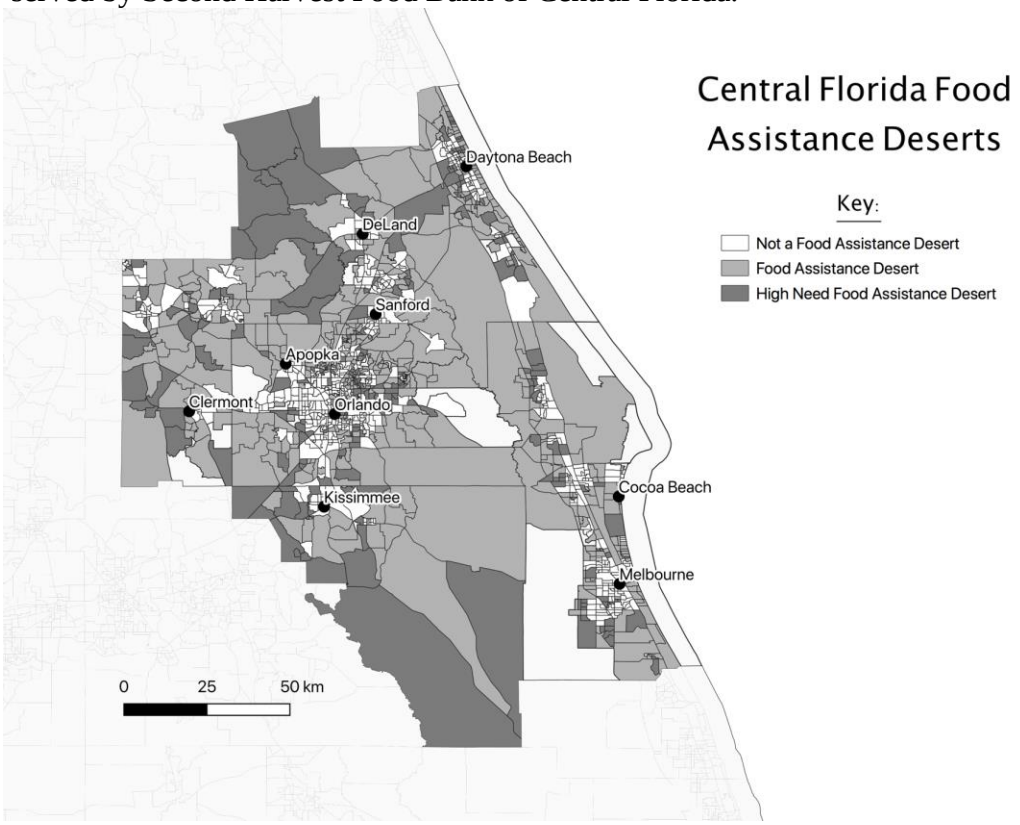

TABLE 1 Description of Central Florida Block Groups

	Mean	Standard Deviation
Population Demographics		
Percent living below 200% of the poverty line	36.21%	18.63%
Percent White, non-Hispanic/Latino	63.28%	25.62%
Percent Black, non-Hispanic/Latino	13.47%	19.81%
Percent Hispanic/Latino	17.82%	16.59%
Geographic Characteristics		
Population density (in thousands, per square	2.95	2.17

mile)			
Area of block group in square miles	3.87	18.49	

Number of Block Groups = 1,436

TABLE 2 Logistic Regression Model Predicting Food Assistance Deserts in Central Florida Block Groups

	Coefficient	Standard Error	Odds Ratio
Population Demographics			
Percent living below 200% of the poverty line	-.025	.004	.975***
Percent Hispanic/Latino	-.009	.004	.991*
Percent Black, non-Hispanic	-.026	.005	.974***
Area of block group in square miles	.289	.053	1.335***
Constant	1.040	.426	2.828***

Number of Block Groups	= 1,436
Likelihood Ratio χ^2	= 375.62***
df	= 4
Pseudo R^2	= .1891

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

TABLE 3 Multiple Regression Model Characterizing Distance to the Nearest Food Assistance Location in Central Florida Block Groups

	Coefficient	Standard Error	Beta
Population Demographics			
Percent living below 200% of the poverty line	-.009***	.002	-.119
Percent Hispanic/Latino	-.004	.002	-.044
Percent Black, non-Hispanic	-.009***	.002	-.118
Geographic Characteristics			
Area of block group in square miles	.029***	.002	.364
Population density (in thousands, per square mile)	-.406***	.034	-.598
Population density squared	.028***	.003	.420
Constant	2.755***	.091	

Number of Block Groups	= 1,436
F-ratio	= 137.23
df	= 6, 1429
Adjusted R^2	= .36

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

Acknowledgements

We would like to thank Karen Broussard, Patti Delacruz, Ajay Goberdhan, Stephanie Gonzalez Guittar, and Alex Hill for their valuable assistance on this project. This project was supported with funding from the Social Innovation Program, the John Hauck Foundation, and the Edward W. and Stella C. Van Houten Memorial Fund at Rollins College.

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