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Do Farmers' Markets Increase Access to Healthy Foods for All Communities?

Comparing Markets in 24 Neighborhoods in Los Angeles

Bryce Lowery, David Sloane, Denise Payán, Jacqueline Illum, and Lavonna Lewis

Problem, research strategy, and findings: Farmers' markets provide one option for remedying the startling decline in fresh vegetable and fruit consumption in the United States, particularly in low-income, non-White neighborhoods where opportunities to access these components of a healthy diet are often limited. We lack empirical research on whether farmer's markets provide fresh vegetables and fruits consistently across locations. We audited product offerings at 24 farmers' markets in Los Angeles at two points in time and interviewed a sample of market managers to compare market offerings across neighborhoods to determine whether farmers' markets alleviate disparities experienced by low-income and non-White communities. Farmers' markets in low-income and non-White communities are smaller and provide fewer fresh fruits and vegetables than markets situated in more affluent communities. Managers suggest that their first priority is to stock fresh produce, but other factors such as competition and farmer recruitment and retention often influence market offerings. **Takeaway for practice:** Planners cannot count on farmers' markets to fully remedy disparities in the availability of fresh vegetables and fruits. We need additional research to understand the range of social, ecological, and health benefits created by farmers' markets in a neighborhood. Planners should begin working with other agencies to conduct community food assessments to better evaluate strategies for addressing inequalities seen in neighborhood access to healthy food.

Keywords: food security, neighborhood effects, spatial inequality

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Planners and policymakers are working to improve the quality of life of neighborhoods through improvements to the food system. Farmers' markets can provide an alternative to local brick-and-mortar grocery stores for providing low-income and disadvantaged communities with access to fresh vegetables and fruit in places where opportunities to eat a healthy diet are limited. We evaluate whether farmers' markets contribute to community access to fresh vegetables and fruits as well as alleviate spatial disparities in access to these healthy foods. We focus on the availability of fruits and vegetables because of their potential to improve individual and community health outcomes as well as evidence that suggests a continued decline in their consumption across America.

However, research on the products sold at farmers' markets is limited. Using an audit of product offerings at 24 farmers' markets and interviews with managers of eight farmers' markets in socioeconomically different neighborhoods in Los Angeles County (CA), we answer three questions: First, do farmers' markets serve as a consistent source of fresh vegetables and fruits? Second, do farmers' markets alleviate disparities in food security experienced by low-income and non-White communities, as measured by differential community access to fresh

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fruits and vegetables? Third, are farmers' markets a remedy for the disparate impacts of food insecurity?

Our findings suggest that the role farmers' markets play differs in important ways by neighborhood. Farmer's markets do provide a source of fresh vegetables and fruits for many neighborhoods, yet markets in low-income and non-White neighborhoods are smaller and provide fewer fresh fruits and vegetables than those located in more affluent neighborhoods. The fresh vegetables and fruits offered at farmers' markets in lower-income neighborhoods more resemble the offerings at a convenience store than a grocery store. The managers of farmers' markets reported that providing fresh produce was their first priority, but that they have difficulty in dealing directly with farmers and face increasing competition from the expanding number of farmers' markets in the region. Thus, farmers' markets may not significantly improve disparities in access to fresh fruits and vegetables in lower-income and non-White neighborhoods.

Farmers' markets, however, may still provide important community benefits even if they do not dramatically increase access to fresh fruits and vegetables; they offer an opportunity for residents to interact socially and to learn about public and human service agencies that often staff booths there. We suggest additional research is needed to fully understand how farmers' markets in conjunction with local brick-and-mortar stores affect the lives of nearby residents.

We begin below by describing the spatial inequality of food security, particularly access to and the availability of fresh vegetables and fruits. We explore how farmers' markets can influence local eating habits by increasing the availability of healthy food. Next we describe how farmers' markets are regulated in Los Angeles County. We describe our assessment of the offerings at the 24 farmers' markets at two points in time. We then discuss the need for additional research on the impact of farmers' markets on neighborhood residents and local brick-and-mortar stores. We conclude by suggesting that city planners can play an important role in comprehensive efforts to end food insecurity, beginning by working with other agencies and stakeholders to undertake community food assessments and strategically evaluating the proper role and placement of farmers' markets in communities.

The Spatial Inequality of Food Systems

Food insecurity represents an area of continuing concern for planners, public health professionals, and communities. In 2013, 17.5 million households in the United States were unable to consistently access enough safe and nutritious food to maintain a healthy and active lifestyle (Coleman-Jensen, Gregory, & Singh, 2014; UN Food and Agriculture Organization [FAO], 1996). Food insecurity represents a complex set of interacting natural, social, and physical factors (Godfray et al., 2010) that contribute to whether people want to eat or can pay for healthy food or access the locations where it is sold (Jones, Ngure, Pelto, & Young, 2013). Individuals who are unable to obtain and eat nutritious food are prone both to hunger and, paradoxically, weight gain. Children who experience hunger as a result of food insecurity are more likely to experience developmental delays (Jyoti, Frongillo, & Jones, 2005) as well as declines in social functioning (Olson, 1999). Individuals who experience food insecurity, particularly women, are prone to obesity (Adams, Grummer-Strawn, & Chavez, 2003; Dinour, Bergen, & Yeh, 2007; T. M. Smith, Colón-Ramos, Pinard, & Yaroch, 2016; Wilde & Peterman, 2006).

Fresh vegetables and fruits make an important contribution to food security, the wellbeing of individuals, and the health of a community. The Centers for Disease Control and Prevention (CDC, 2016) advise users of their national survey that "eating fruits and vegetables contributes important under-consumed nutrients to the diet, reduces the risk of many chronic diseases, and may help individuals achieve and maintain a healthy weight when consumed instead of higher calorie foods" (p. 1). Research demonstrates that a diet rich in fruits and vegetables is supportive of weight management and weight loss (Mytton, Nnoaham, Eyles, Scarborough, & Mhurchu, 2014). Individuals who consume a diet rich in fruits and vegetables experience decreased risk of cardiovascular-related death and overall mortality (Dauchet, Amouyel, Hercberg, & Dallongeville, 2006; X. Wang et al., 2014).

Communities across America continue to experience the effects of a diet lacking in sufficient quantities of vegetables and fruits. American adults consume only about one serving of fruits and one and one-half servings of vegetables a day; 36% of American adolescents report eating less than one fruit or vegetable a day according to the CDC (2013). These individuals experience food insecurity because access is likely inhibited by factors such as affordability, the spatial allocation of nutritional resources, and consumer preferences (Gregory, Ingram, & Brklacich, 2005).

Communities of color living with the uncertainty of poverty are often at increased risk. Residents in these neighborhoods often lack large-scale grocery stores (Lamichhane et al., 2013; Powell, Slater, Mirtcheva, Bao, & Chaloupka, 2007) or convenience store chains (Morland, Wing, Diez Roux, & Poole, 2002). Members of these communities may instead depend on smaller grocers and markets (Bower, Thorpe, Rohde, & Gaskin, 2014; Powell et al., 2007; Raja, Ma, & Yadav, 2008) that are more likely to have higher prices and fewer healthy items (Short, Guthman, & Raskin,

2007). Brick-and-mortar stores in low-income, non-White neighborhoods, moreover, are more likely to go out of business within five years than those in wealthy, predominantly White communities (Filomena, Scanlin, & Morland, 2013).

Residents of low-income, non-White communities are also more likely to face additional barriers to making healthy dietary choices such as price vulnerability (Cohen & Garrett, 2010), increased cost (Breyer &Voss-Andreae, 2013; Walker, Keane, & Burke, 2010), and the preponderance of unhealthy food alternatives such as fast-food restaurants (Larson, Story, & Nelson, 2009). These challenges are exacerbated because residents cannot afford to purchase expensive fresh-food items (Pothukuchi & Kaufman, 1999) and are inundated with advertising promoting high-calorie, low-nutrition food such as fast food and sugary drinks (Lowery & Sloane, 2014).

Non-White residents of many low-income communities experience a nutritional environment rich in opportunities to consume unhealthy food (Hilmers, Hilmers, & Dave, 2012; Larson et al., 2009; Lewis et al., 2005) combined with limited options for healthy food (Black, Moon, & Baird, 2014). Low-income minority residents who lack local access to affordable, quality sources of nutrition have to travel outside their immediate neighborhood to find better sources of food to feed themselves and their families (Hillier et al., 2011; Krukowski, Sparks, DiCarlo, McSweeney, & West, 2013; LeDoux & Vojnovic, 2013; Zenk et al., 2014).

The lack of locally available healthy food often exacerbates the rates of obesity in many of these communities (Ghosh-Dastidar et al., 2014) since it is often difficult or expensive to travel long distances on a regular basis to shop for food (Clifton, 2004). In contrast, individuals who are provided convenient access to healthy food experience an overall improvement in diet (Cheadle et al., 1991; Moore, Diez Roux, Nettleton, & Jacobs, 2008) and a decreased incidence of overweight and obesity (Morland, Diez Roux, & Wing, 2006; Rundle et al., 2009).

Farmers' markets can constitute an important part of the local nutritional environment (Glanz, Sallis, Saelens, & Frank, 2005; Larson et al., 2009). Farmers' markets provide a unique opportunity for planners and policy analysts to improve the healthy food options available in low-income, non-White communities disproportionately affected by food insecurity (Ruelas, Iverson, Kiekel, & Peters, 2012; Sadler, 2016; H. Wang, Qiu, & Swallow, 2014).

The Value of Farmers' Markets

Farmers' markets are generally a place where two or more farmers gather on a recurring basis to sell fresh produce and other farm products directly to consumers (Payne, 2002). They are frequently found outdoors, in parks or parking lots, adjacent to public facilities. Since farmers bring products directly from the farm to the consumer, these one-day markets differ from grocery stores, public markets, and produce markets that are often located in permanent structures and might include such farmers but also might include resellers of wholesale produce (Bell, 2013). Community advocates view farmers' markets as beneficial both because they provide healthy foods to neighborhoods with limited brick-and-mortar grocery stores and because they potentially serve as community institutions, creating social capital.

Most cities and states require the vendors at farmers' markets to sell local products or to purchase fruits and vegetables directly from farmers, although this depends on the jurisdiction (Bell, 2013). The mix of vendors and offerings at farmers' markets varies considerably and is the focus of our research; some vendors sell fresh fruits and vegetables while others sell cheese, meats, honey, jams, and prepared and cooked-to-order foods. Other vendors sell arts and crafts or clothing, and local nonprofit as well as commercial entities frequently operate booths at farmers' markets to advertise their services to local residents. Most farmers' markets operate one day a week in each neighborhood; the vendors may move from one market to another over the week.

Farmers' markets have a venerable history in America, stretching back to the colonial period (Pyle, 1971). One-day markets, rather than what are known as "public markets," such as the public market once housed in Fanueil Hall in Boston and the market that remains open at Grand Central Market in Los Angeles, declined dramatically in the post–World War II period (A. Brown, 2001). By the 1970s, the number of recognized farmers' markets in the United States had dwindled to a mere 345 nationwide, and commentators predicted their ultimate demise (Pyle, 1971). Since then the number has grown dramatically, driven by changes in public policy, consumer attitudes, and the rise of the food reform movement. Today, more than 8,000 farmers' markets are in operation across the country (A. Brown, 2001; U.S. Department of Agriculture [USDA], 2014). We focus on markets that occur on a regular basis but are not permanently attached to a brick-and-mortar location; they usually operate one day a week in the same location and thus are different than markets housed in permanent structures such as public markets, with deep historical roots in the community.

Advocates suggest that farmers' markets play a number of economic, social, and health-related roles. Some suggest that farmers' markets are influential sociocultural and financial institutions (Gillespie, Hilchey, Hinrichs, & Feenstra, 2007; Pine & Gilmore, 2011) that fuel the economic and social vibrancy of neighborhoods by satisfying the desire to taste local food and consume local culture (Silkes, 2012; S. L. J.

Smith & Xiao, 2008). In this way, farmers' markets are a form of civic agriculture, enabling both social and economic development (Lyson, 2004) through their placement and usage. A review of the existing literature on the economic impact of farmers' markets confirms some of these ideas, finding that markets sometimes encourage community and economic development locally and regionally (C. Brown & Miller, 2008).

In communities lacking a robust selection of fresh vegetables and fruits, farmers' markets may influence local dietary practices by enhancing the opportunity to make healthy dietary choices. A review of 16 empirical studies of the trends among farmers' market consumers revealed that farmers' markets have the potential to be particularly effective at alleviating food insecurity because their impacts are largely local; the shoppers at farmers' markets tend to live nearby (Byker, Shanks, Misyak, & Serrano, 2012). Research also suggests that proximity to fruits and vegetables through supermarkets, specialty markets, and health food stores is associated with lower body mass index (BMI), a measure of obesity (Rundle et al., 2009).

Farmers' markets provide a potentially effective means of countering the barriers to healthy eating that cluster in non-White, low-income communities. They may be particularly important in obesogenic environments, places where the physical environment promotes unhealthy dietary habits and unhealthy weight gain (Swinburn, Egger, & Raza, 1999). A survey of market customers in low-income communities in Los Angeles suggests improvements in physical activity and diet are associated with proximity to a farmers' market (Ruelas et al., 2012). Empirical evidence also suggests that proximity to a farmers' market enhances fruit and vegetable consumption among women (Jilcott Pitts et al., 2013).

Studies of individuals living in food desert communities find similar results. A study in Edmonton (Canada) suggests that farmers' markets increase the variety and access to healthy food in places lacking nutritional resources (X. Wang et al., 2014). A survey of 844 farmers' market shoppers in Flint (MI) finds that a centrally located farmers' market can serve to attract low-income and limited-mobility shoppers (Sadler, 2016). Researchers in England find that the introduction of a farmers' market increases availability of fresh produce and reduces the overall cost of groceries in an existing food desert (Larsen & Gilliland, 2009).

Farmers' markets may be particularly influential in urban locations where the interaction among those farmers' markets, community-supported agriculture, and locally grown foods can serve as a pathway to creating healthy landscapes (Francis et al., 2005). In a survey of consumers and growers, Hunt (2007) finds that farmers' markets create a pedagogical space that enhances our understanding of the ecological nature of urban and rural life. Alkon (2008) finds that whether located in a White, affluent community or in a low-income community of color, farmers' markets promote increased awareness of ecological principles such as the origin of food, biodiversity, and environmental justice, concepts that are becoming increasingly valuable in efforts to increase the sustainability and ecological resiliency of human and non-human communities.

A Role for Planning

The problems created by the food system are no longer a "stranger to the planning field" (Pothukuchi & Kaufman, 2000), if they ever truly were (Vitiello & Brinkley, 2013). Today, planners and policymakers are actively working to improve the quality of life and sustainability of neighborhoods by addressing the social, economic, and physical facets of the food system (APA, 2005, 2007; Clancy, 2004; Morales, 2010; Raja, Born, & Kozlowski Russell, 2008). However, crafting public policy to regulate the location of nutritional resources such as farmers' markets remains a challenge because farmers' markets, like any other marketplace, are not a natural occurrence; their form, function, and purpose must be instigated and maintained through carefully crafted public policies (Morales, 2011).

There is limited literature on the role that planners can play in encouraging farmers' markets, particularly in low income, non-White communities. A majority (70%) of planners in the United States believe food systems planning is a high-priority issue for local planning agencies, but much of their concern is directed at agricultural land preservation rather than the role of nutritional resources such as farmers' markets in fighting hunger and food insecurity (Raja, Whittaker, Hall, Hodgson, & Khojasteh, in press). The same research suggests, however, that only about 30% of practicing planners actually engage in work related to planning for food systems. Still, this is a dramatic change from 2000, when Pothukuchi and Kaufman (2000) found that food systems were a low priority for the profession.

The potential to influence public health outcomes through land use regulation is heightened as communities attempt new and innovative ways to improve local food systems (Williams, 2014). A number of organizations are now involved in efforts to promote farmers' markets through land use policies. Preparing for Healthy Places, a project of Public Health Law & Policy (PHLP), suggests three types of land use policies that can help foster farmers' markets:

1. Remove barriers such as burdensome permitting processes and zoning codes that fail to recognize farmers' markets as a permitted land use.

2. Optimize location by helping communities to collectively determine the most appropriate site for a farmers' market.
3. Increase access for low-income residents by promoting acceptance of food assistance programs (PHLP, 2009).

Many municipalities have zoning codes that fail to properly recognize farmers' markets as a type of use, often resulting in public policy that, for all practical purposes, makes farmers' markets illegal (Wooten & Ackerman, 2013). Policies that explicitly permit farmers' markets are a first step in ensuring that the direct sale of local produce can happen on public property, on city streets, or in other areas deemed appropriate by local residents.

Planners recognize that more work is needed to improve access to safe and healthy food, particularly in communities where food is inequitably supplied (Academy of Nutrition and Dietetics, American Nurses Association, APA, & American Public Health Association, 2010; APA, 2007). Some recommend that planners should initiate community food assessments that determine the appropriate role and placement of farmers' markets, as well as other food options, in individual communities (Campbell, 2004; Pothukuchi, 2004, 2015; Pothukuchi & Kaufman, 2000; Raja, Picard, Baek, & Delgado, 2014; Sloane et al., 2003). Others suggest that public–nonprofit alliances might also help planners promote farmers' markets as part of an overall strategy of eliminating health disparities brought about by food insecurity, particularly in areas not often part of the localized planning process (Pothukuchi & Kaufman, 1999; Wekerle, 2004). The establishment of food policy councils in a growing number of cities, often including planners and planning agencies, offers a possible venue for such assessments and the development of alliances between public and nonprofit agencies (APA, 2011).

Farmers' Markets in Los Angeles

We undertake an audit of a sample of farmers' markets in Los Angeles County. Farmers' markets in California are regulated by the state, the county, and the local municipality in which they operate. Farmers' markets must directly buy from agricultural sources to obtain a state license, creating a chain from the grower to the consumer; these markets may not purchase goods through wholesale vendors. Farmers' markets must also be certified by the local county agricultural commissioner (California Code of Regulations, 2016).

Local jurisdictions in California largely control the location of licensed and certified farmers' markets within their boundaries. There are 88 cities in Los Angeles County, each of which controls any farmers' markets within its borders; those in unincorporated areas of the county are allowed to operate in all zones when given a conditional use permit or approval by the director of planning (Los Angeles County, 2016). Farmers' markets in the city of Los Angeles are allowed by permit in all zones except in restricted industrial (MR1), restricted light industrial (MR2), and commercial manufacturing (CM) zones if the market meets certain requirements regarding hours of operation, traffic management, noise, trash, and clean up. Farmers' markets in residential zones are permitted on paved parking lots serving a church, school, or other philanthropic institution or in public parks designated by the Board of Recreation and Parks Commissions for that purpose (City of Los Angeles Municipal Code, n.d.).

All of the markets included in our study are located in the city of Los Angeles with two exceptions. The markets in Topanga Canyon and East Los Angeles are located in the unincorporated areas of Los Angeles County. A total of 142 certified farmers' markets were operating in Los Angeles County at the time of this study (California Department of Food and Agriculture, 2016). All of the markets are licensed by the State of California and certified by the County Agricultural Commissioner. All of the farmers' markets we study are under the direction of a market manager who coordinates the layout, marketing, and the quantity and types of goods being sold. Figure 1 provides a spatial overview of the neighborhood setting of each of the farmers' markets included in the study.

Identifying What Is Sold at Farmers' Markets in Los Angeles and Why

If—and how well—a farmers' market provides any of the hypothesized or observed health benefits depends on what kinds of foods that market sells, particularly in low-income neighborhoods. We know that low-income neighborhoods are less likely to have major grocery stores and more likely to have only small grocery and convenience stores (Bower et al., 2014; Lamichhane et al., 2013; Morland et al., 2002; Powell et al., 2007; Raja et al., 2008). Farley et al.'s (2009) research suggests that different types of stores give varying emphasis to different types of fruits and vegetables (e.g., fresh or frozen, or canned or dried).

As Table 1 shows, convenience stores dedicate 10% or less of their total shelf space, on average, to vegetables and fruits. In contrast, small food stores dedicate between 18% and 30% of their shelf space to vegetables and fruits, while larger food stores and supermarkets have many more vegetables and fruit, giving between 40% and 72% of their shelf space to those products (Farley et al., 2009). Thus, the types of stores more frequently found in low-income neighborhoods are less likely to sell fresh fruits and vegetables.

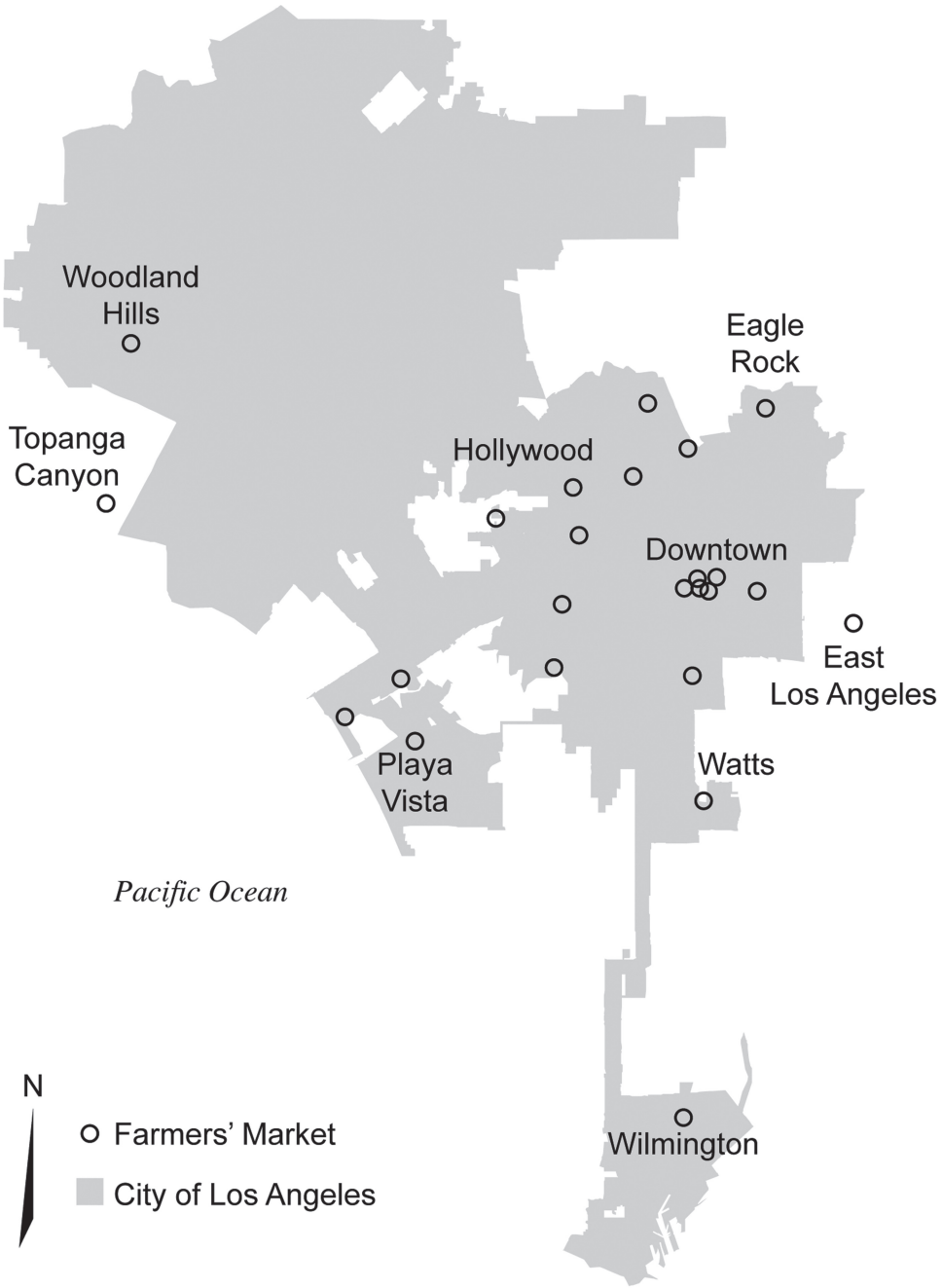

Figure 1. Map of case study farmers' markets.

Table 1. Food store types and sizes.

Type	Size	Shelf space dedicated to fruits and vegetables
Small food store	Primary items sold are food and beverages; <2,152 square feet	18%–30%
Medium food store	Primary items sold are food and beverages; >2,1,52 square feet; 3 or fewer cash registers	40%–61%
Supermarket	Primary items sold are food and beverages; 4 or more cash registers	55%–72%
Convenience store	Primary items sold include non-food items; often adjacent to gasoline sales	<10%

Source: *Journal of Urban Health*, "Measuring the Food Environment: Shelf Space of Fruits, Vegetables, and Snack Foods in Stores," Vol. 86, No. 5, 2009, pp. 672–682, T. A. Farley, J. Rice, J. N. Bodor, D. A. Cohen, R. N. Bluthenthal, and D. Rose. © The New York Academy of Medicine. Adapted with permission of Springer.

Researchers, however, have not yet fully studied what farmers' markets sell and in what types of neighborhoods. We also lack a commonly accepted standard for identifying the quantity, let alone the consistency, of fresh vegetables and fruits provided at farmers' markets. Audits are a common method of identifying the availability of goods at brick-and-mortar stores (Gustafson, Hankins, & Jillcot, 2012), and fruits and vegetables are commonly identified as important components of understanding a healthy food system (Neff, Palmer, McKenzie, & Lawrence, 2009). While audits have not been used to assess the type and quantity of goods provided by farmers' markets, they provide an opportunity to do so.

We audit products found at 24 markets located in a diverse set of neighborhoods in Los Angeles to understand what is being sold at farmers' markets, whether farmers' markets are a consistent source of fresh fruits and vegetables, and if market offerings contribute to food security in low-income, non-White communities. One or more vendors at each of the markets in our sample accept electronic benefit transfer, previously known as food stamps, a program to help low-income consumers purchase produce. We also interview managers of some of the markets included in the study to better understand why market offerings differ by location. We examine the type and quantity of fresh fruits and vegetables for sale at two points in time to observe changes in those offerings over time.

Student research assistants collected information about the type and quantities of product offerings at individual booths at each market in December 2013 and again in June 2014. We trained students to use a two-page audit tool that we adapted from the Nutrition Environment Measurement Study for Stores (NEMS-S) developed at the University of Pennsylvania (http://www.med.upenn.edu/nems/measures.shtml). Each student research assistant piloted the tool at one farmers' market prior to December 2013; we then collectively discussed this experience and finalized it for use based on this input. To provide a comparable measure of the quantity of products sold at each market, we convert the amount of product into linear feet, with students measuring the frontage of each booth and its offerings by pace using Bardon's (2002) approach.

We divide products sold at each farmer's market into two categories: 1) fresh vegetables and fruits; and 2) all other offerings such as eggs, dairy, seafood, and meat; cooked and prepared foods; and non-food products such as flowers, arts, crafts, and clothing. We also include in the second category any booths that provide entertainment or are staffed to advertise or promote for-profit and nonprofit organizations. We classify cooked, prepared, or dried fruits and vegetables as well as those included as part of a meal in the second category. We categorize booths selling more than one category of product proportionately based on the overall frontage dedicated to each product category.

We aggregate the markets in our sample by their socioeconomic characteristics to determine if farmers' markets in non-White, low-income communities offer proportionately fewer fresh vegetables and fruits than their counterparts in higher-income White communities. We use data from the 2010 U.S. Census and 2010 American Community Survey data for Los Angeles County to categorize the neighborhoods surrounding each farmers' market. We aggregate census tracts within a quarter-mile walking distance to determine neighborhood characteristics and sort the farmers' markets according to the racial, ethnic, and income characteristics of the surrounding community.

We then sort markets into two groups: those located in predominately White communities (51% or more of total population is White) and those in predominately non-White communities (more than 51% of total population is Black, American Indian or Alaska Native, Asian, Pacific Islander and other, or Latino). Several markets are situated in communities without an apparent population majority, or in neighborhoods with two or more large groups of people from different racial/ethnic backgrounds. We include these markets in the descriptive analysis but exclude them from the comparison of markets situated in predominantly White or predominantly non-White communities. Next, using all the markets in our sample, we categorize the location of markets according to income, aggregating those neighborhoods where the number of individuals living in poverty is greater than one standard deviation (n = 509) above the population mean (n = 563). Table 2 provides population and economic data for the census tracts for each of the farmers' markets included in this study.

A member of our team then interviewed the managers from 8 of the 24 markets we study to understand what incentives would encourage farmers' markets to provide more fresh fruits and vegetables, and what barriers they face in doing so. There is little empirical research on the role of the managers of farmers' markets. One report suggests that those who manage one market may be responsible for additional markets. The managers of farmers' markets work for a variety of organizations; they may be full or part time (Greenbelt Farmers' Market Network, 2013). The same report suggests that the average pay for the position is likely around $15 an hour.

We asked those managers five questions about how the mix of fresh products was determined and who made the determination, how difficult it was to maintain a balance between fresh food and other items, the trends in farmers' markets, and the shared challenges farmers' markets faced going forward.

Table 2. Descriptive statistics for population characteristics in census tracts within a quarter-mile of sample farmers' markets.

	No. census tracts	Total population	Latino population	Non-White population	White population	Population falling below poverty in last year
Atwater	2	6,790	45%	46%	50%	8%
Autry	2	4,090	56%	39%	55%	16%
Baldwin Hills	5	21,481	10%	**91%**	5%	13%
Boyle Hts.	3	10,702	**85%**	**54%**	42%	**28%**
Central	6	25,147	**88%**	**61%**	34%	**40%**
DTLA 5th	6	24,317	20%	**59%**	36%	6%
DTLA 7th	6	20,568	45%	**58%**	37%	**29%**
DTLA BofA	5	13,181	20%	**56%**	40%	12%
DTLA Pershing	4	13,391	18%	50%	45%	9%
Eagle Rock	4	18,427	33%	42%	**53%**	8%
East LA	5	18,400	93%	46%	51%	17%
Hollywood	5	14,855	42%	36%	**59%**	22%
Larchmont	4	15,213	16%	37%	**59%**	7%
Little Tokyo	8	30,864	26%	**59%**	37%	14%
Los Feliz	7	22,066	23%	26%	**69%**	13%
Mar Vista	6	18,791	37%	35%	**60%**	21%
Melrose Place	4	16,232	9%	11%	**85%**	5%
Playa Vista	2	11,533	14%	30%	**62%**	2%
Topanga	1	7,078	6%	7%	**89%**	2%
Venice	3	9,524	11%	12%	**83%**	8%
Watts	6	30,155	**70%**	**70%**	26%	**30%**
Wellington	4	13,383	**51%**	**70%**	25%	19%
Wilmington	3	11,208	**94%**	50%	46%	**26%**
Woodland Hills	3	11,043	11%	15%	**79%**	3%

Notes: Bold text signifies characteristic of interest to this investigation. DTLA indicates downtown Los Angeles.

The Impact of Farmers' Markets on Disadvantaged Communities

We begin our research with three research questions:

1. Do farmers' markets consistently offer fresh vegetables and fruits?
2. Do farmers' markets bridge the gap in access to fresh fruits and vegetables between disadvantaged and more affluent communities?
3. Are farmers' markets a remedy for the disparate impacts of food insecurity?

Below we explain what we have learned.

Do Farmers' Markets Serve as a Consistent Source of Fresh Vegetables and Fruits?

We find that farmers' markets do offer a range of fresh vegetables and fruits in most neighborhoods, but to varying degrees. We find a diverse array of markets that range widely in the number of booths and the availability of fresh vegetables and fruits. Table 3 provides an overview of the size and offerings of fresh vegetables and fruits at each of the 24 markets in both December 2013 and June 2014. We note a net gain in the number of booths selling fresh vegetables and fruits at these farmers' markets during the six-month period, as would be expected, since June is the height of the California growing season. Only one market out of 24 closed during the six-month study period.

Some markets are highly stable, such as the markets of Downtown Los Angeles (DTLA) at 7th Street and the market at Bank of America Plaza (BofA). These markets host many of the same vendors with the same offerings in both December and June. A number of markets, however, experience a decrease in the number of booths during the six-month period. Markets in four low-income communities (Boyle Heights, Central, Watts, and Wilmington) decrease in size by a total of 23 booths, even though the second inventory took place during the height of the California growing season.

Table 3. Descriptive statistics for farmers' market size and availability of fresh vegetables and fruits (FVF).

Location	Poverty risk	Race/ethnicity	December booths	June booths	Change	December FVF	June FVF
Atwater		—	47	44	–3	42%	51%
Autry		—	15	Closed	–15	60%	0%
Baldwin Hills		NW	31	34	+3	31%	25%
Boyle Heights	X	NW	25	12	–13	13%	13%
Central	X	NW	10	6	–4	60%	67%
DTLA 5th		NW	16	29	+13	36%	29%
DTLA 7th	X	NW	18	18	0	49%	38%
DTLA BofA		NW	30	30	0	31%	32%
DTLA Pershing		—	35	36	+1	35%	38%
Eagle Rock		W	24	20	–4	37%	44%
East LA		—	24	24	0	45%	38%
Hollywood		W	172	186	+14	41%	42%
Larchmont		W	56	54	–2	33%	46%
Little Tokyo		NW	32	33	+1	25%	14%
Los Feliz		W	23	24	+1	36%	45%
Mar Vista		W	85	90	+5	38%	37%
Melrose Place		W	52	56	+4	36%	32%
Playa Vista		W	58	54	–4	17%	22%
Topanga		W	15	16	+1	34%	24%
Venice		W	20	36	+16	49%	54%
Watts	X	NW	19	16	–3	54%	47%
Wellington		NW	21	20	–1	32%	29%
Wilmington	X	NW	21	18	–3	27%	23%
Woodland Hills		W	22	21	–1	41%	39%
Mean			36	36.5	.25		

Note: DTLA indicates downtown Los Angeles; NW, non-White community; W, White community.

The markets situated in the four most affluent communities (Topanga, Woodland Hills, Melrose Place, and Playa Vista) see no appreciable change in the number of booths. Two of the markets situated in economically at-risk communities are smaller markets to begin with, suggesting that perhaps smaller markets may be more vulnerable to decline.

The percentage of fresh vegetable and fruit offerings at each of the inventoried markets varies widely, ranging between 13% at the Boyle Heights Farmers' Market and 67% at the Central Farmers' Market. Most farmers' markets use the same amount of space to offer vegetables and fruits as do small food stores. The farmers' markets in some communities, however, only dedicate roughly the same amount of their space for fresh vegetables and fruits as do convenience stores. At the same time, some farmers' markets are competitive with large-scale grocery stores in providing opportunities to explore and purchase vegetables and fruits, including the Central Farmers' Market and the Atwater Farmers' Market. Our research suggests that, to the extent that farmers' markets exist in parallel with other food options, they can be an important source of fresh vegetables and fruits in the communities where they are located.

Farmers' markets typically operate only one day a week, suggesting that they may actually increase the supply of fresh fruits and vegetables in the areas they serve because they are unlikely to provide destructive competition to brick-and-mortar stores. Moreover, farmers' markets may even increase demand for their products in these communities by offering vegetables and fruits in a more attractive manner than convenience and small food stores. We need additional research to understand how these markets work in conjunction or competition with other sources of food in such neighborhoods.

Do Farmers' Markets Help Alleviate Disparities in Food Security Seen in Low-Income and Non-White Communities?

Our results suggest a relationship between the racial composition of the neighborhood and the ability of residents to access fresh vegetables and fruits at the local farmers'

Table 4. Comparison of farmers' markets in White and non-White enclaves.

	December				June			
Location	Total feet	Total booths	FVF feet	FVF booths	Total feet	Total booths	FVF feet	FVF booths
Mean rank non-White	8.10	8.20	7.10	7.45	7.70	7.50	7.00	6.70
Mean rank White	12.90	12.80	13.90	13.55	13.30	13.50	14.00	14.30
Mann-Whitney *U*	26	27	16	19.5	22	20	15	12
Wilcoxon *W*	81	82	71	74.5	77	75	70	67
Z	–1.814	–1.739	–2.571	–2.319	2.117	–2.271	–2.270	–2.876
Asymp. significance (2-tailed)	.070	.082	.010*	.020*	.034*	.023*	.008**	.004**

Note: We calculated the differences between white and non-White enclaves based on the Mann-Whitney nonparametric test. FVF indicates fresh vegetables and fruit.
*$p < .05$; **$p < .01$.

market. Table 4 shows that there are significantly fewer fresh vegetables and fruits offered in farmers' markets situated in predominately non-White communities both in December and in June. The farmers' markets in non-White communities also have significantly fewer and smaller booths in June, despite an overall increase in the number of booths in the 24 markets over time. This may mean that farmers' markets in these communities are less likely to provide a consistent source of fruits and vegetables.

Our results do show a relationship between neighborhood poverty and the overall size and number of booths at farmers' markets in the sample. Table 5 illustrates that farmers' markets in low-income communities are significantly smaller and have fewer booths compared with those in more affluent communities. Further, although the difference in the number of booths and overall offering of fresh fruits and vegetables in poor and affluent neighborhoods is not statistically significant in December, it is statistically significant in June.

The farmers' markets in our sample generally offer fresh vegetables and fruits, but the amounts provided are not the same across the city. Farmers' markets provide wealthier and predominantly White communities more access to fresh fruits and vegetables. Our findings suggest that the location and activities of the farmers' markets might exacerbate differences between rich and poor, White and non-White communities, in the availability of healthy foods.

Barriers Impeding Access to Fresh Vegetables and Fruits at Farmers' Markets: The Managers' Perspective

We interviewed the managers of 8 of the 24 markets to answer the following questions:

- Who determines the type and variety of items sold at the farmers' market they manage? Does consumer demand or farmers influence those decisions?
- Do managers attempt to provide a certain ratio between fresh vegetables and fruits and prepared foods and non-food items?

Table 5. Comparison of farmers' markets in poor and affluent enclaves.

	December				June			
Location	Total feet	Total booths	FVF feet	FVF booths	Total feet	Total booths	FVF feet	FVF booths
Mean rank poor	6.80	6.90	7.10	8.90	5.20	4.50	6.60	6.80
Mean rank affluent	14.00	13.97	13.92	13.45	14.42	14.61	14.05	14.00
Mann–Whitney *U*	19	19.5	20.5	29.5	11	7.5	18	19
Wilcoxon *W*	34	34.5	35.5	44.5	26	22.5	33	34
Z	–2.2026	–1.992	–1.920	.199	–2.594	–2.847	–2.097	–2.027
Asymp. significance (2-tailed)	.043*	.046*	.055	.199	.009**	.004**	.036*	.043*

Note: We calculated the differences between poor and affluent enclaves based on the Mann–Whitney nonparametric test.
*$p < .05$; **$p < .01$.

- Do managers find it challenging to maintain a balance of goods (fresh fruits and vegetables, prepared food, crafts, service organizations, other food) at the market they manage?
- Do other factors influence the availability of fresh vegetables and fruits at the market?
- What trends do managers see occurring in markets they manage? What is the biggest challenge facing the future of farmers' markets?

We attempted to interview all 24 managers but their willingness and availability, and the timeframe for completing this study, constrained us. We were only able to speak to a subset of the market managers. The managers we interviewed were promised anonymity, but they represent a cross-section of the markets included in the study: three of the markets are situated in more affluent White communities, one market is situated in a mixed-race community, one market is situated in a more affluent non-White community, and three markets are situated in low-income, non-White communities. We expected to find some differences in their overall responses to our questions, but ultimately most managers have the same goals and aspirations for the markets they manage.

All of the managers note that the primary goal of a farmers' market is to provide a consistent and high-quality assortment of locally grown fresh vegetables and fruits. One manager suggests that customers at a farmers' market should be able to find "basics you would normally expect from a green grocer" or large-scale grocery store. The managers tell us that their first priority is to attract and retain individual farmers and to ensure a diverse selection of fresh vegetables and fruits. Their second priority is to fill market booths with specialty items such as nuts, dairy, seafood, and meat. Finally, the third priority of the managers that we interviewed is to offer space for prepared and cooked food as well as arts and crafts.

Market managers are often stymied in meeting their first priority, offering a wide range of fresh vegetables and fruits, by a range of difficulties. The most significant problem is finding and retaining produce farmers. One manager remarked, "It is challenging to find new farmers…we have no difficulty at all recruiting food preparers or prepackaged food." Managers suggest, for example, that "curating" a market is a "complicated process" contingent upon a number of components of the global and local food systems. For instance, each market faces competition from the growing number of other farmers' markets as well as brick-and-mortar stores that increasingly stock organic and local produce. Competition with grocery chains makes it difficult to attract both customers and farmers to any specific market.

Managers also mention how difficult it is to balance the diversity of market offerings and deal with competition between local farmers, who often want to be the only vendor selling a particular product. Too little diversity among market offerings can reduce consumer interest, but too much diversity increases competition between farmers and decreases farmer participation and retention. Seasonality and agricultural uncertainty also complicate the availability of products at a particular market at a given time. Managers mention that the recent drought in California changed the size and availability of products; less water means smaller, more pungent fruit, and the appearance of the fruit greatly reduced consumer demand.

What do managers think about the future of farmers' markets? One manager observes that the popularity of farmers' markets has led a number of communities to "create and promote them in settings where they…do not often succeed." Many communities want farmers' markets nearby, but do not recognize that too much competition makes it difficult to achieve both a sustainable supply of goods and viable consumer demand. Growing competition combined with the other concerns shared by the managers we interviewed can affect the success of any given market.

What Don't We Know About Farmers' Markets?

Farmers' markets remain an understudied component of the contemporary nutritional environments in communities, creating opportunities for researchers interested in contributing to our knowledge of food system planning. We need a deeper knowledge of how these markets function and the role of supply and demand factors. We also need to understand the extent to which farmers' markets create substitution or complementary effects with traditional brick-and-mortar food resources. Do residents with access to formerly unknown fruits and vegetables create a new neighborhood demand for those products that ultimately may be supplied by the brick-and-mortar stores locally? Or do they buy products from farmers' markets that they normally would have bought at local stores?

We also need to learn much more about the impact of farmers' markets on individuals and neighborhoods, including the neighborhood effects (Sampson, 2012) associated with proximity to the markets. Moreover, we need empirical research to better define the roles and opportunities for city planners to work with others to address food disparities experienced by low-income and non-White communities.

Are Farmers' Markets a Remedy for the Disparate Impacts of Food Insecurity?

Many planners and policy analysts believe that farmers' markets can improve access to fresh fruits and vegetables in low-income, non-White communities, addressing the lack of food security and the resulting health issues common to

such neighborhoods. We extend previous research in the field of food systems planning, finding that farmers' markets in low-income communities of color are less likely to provide fresh fruits and vegetables and are less likely to consistently provide those products than those in more affluent neighborhoods. The offerings at farmers' markets in disadvantaged neighborhoods look a lot like those in convenience stores, although the products sold in farmers' markets in affluent neighborhoods sometimes equal those in brick-and-mortar grocery stores. Managers of farmers' markets face multiple challenges in ensuring a consistent supply of fresh fruits and vegetables, even though that is their first priority. Moreover, managers believe that the caché of farmers' markets and the fact that they are considered a solution to food deserts may lead to the creation of too many markets and destructive competition for agricultural products.

Overall, farmers' markets alone may be an uncertain remedy to the problem of food insecurity in low-income, non-White communities. At the same time, farmers' markets in low-income, non-White communities may have indirect nutritional as well as social advantages. They may introduce residents to previously unknown fresh fruits and vegetables, leading them to seek those products in local markets, perhaps increasing demand to the point where those stores begin supplying them. Farmers' markets may also introduce residents to the prepared foods of other cultures or allow them to purchase prepared foods from their own culture that are difficult to prepare at home. Moreover, farmers' markets may contribute to a sense of community, and provide a venue for a variety of public and nonprofit organizations to identify and market the products and services that can assist neighborhood residents.

Farmers' markets are not the answer to food insecurity in low-income communities, but they may well be part of a comprehensive package of solutions that, over time, attacks the serious problems at the heart of poor health outcomes in such communities. Moreover, they offer other nonnutritional benefits that we should not overlook. Planners can lead a comprehensive approach to ending food insecurity in low-income, non-White communities because they are often trained to understand the systems and structures underpinning important urban issues. Such an approach could begin with a community food assessment, as suggested by a number of scholars (most recently, Pothukuchi, 2015), to determine the appropriate role and placement of farmers' markets or other food stores in a particular community. The process may conclude by finding ways to provide financial and other meaningful incentives to increase the availability of healthy food in parts of the city that lack such options.

Los Angeles has already begun an exciting process to foster greater synergy between food systems and city planning efforts. Building on the formal establishment of a food policy council in 2011, and efforts by community advocates to integrate food and other health issues into the city's plans, in 2015, the Los Angeles City Council approved PLAN for a Healthy Los Angeles (http://healthyplan.la), a collaborative effort between the Los Angeles Department of City Planning, the Los Angeles County Department of Public Health, and the California Endowment, a private philanthropic organization. The plan provides tangible goals for the city in reducing food insecurity and increasing access to food, including efforts to increase the number of grocery stores in low-income communities as well as efforts to increase the number of residents who live within a mile of a farmers' market. More generally, it seeks to address disadvantaged communities by bringing all communities into parity with a city average for availability of fresh fruits and vegetables.

Our study provides a snapshot of the availability of fresh vegetables and fruits at a sample of farmers' markets in communities with very different sociodemographic characteristics. Building on that growing knowledge, and led by concern with increasing the health and wellbeing of disadvantaged communities, we believe there are multiple opportunities for city planners to work cooperatively with public health planners and community organizers to increase the supply of fresh fruits and vegetables in low-income, non-White communities where sources of healthy food are limited and sources of unhealthy food are abundant.

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