Chapter 71
Community–Engaged GIS for Urban Food Justice Research

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ABSTRACT

GIScience research has enhanced citizen engagement through advancements in web-based geospatial techniques and qualitative GIS methodologies, which provide opportunities for new forms of knowledge production. This paper draws on two interrelated approaches to demonstrate the ways qualitative GIS and Web 2.0 can provide nuanced analysis and foster collaborations to advance, in particular, food justice goals, which include developing equity in access to quality nutritious foods. First, the authors create a multicriteria food environment index utilizing GIS-based multicriteria modeling to represent food environments as constituted by multiple food sources and access dimensions. This enables visualization of food environment quality and indicates that food environment quality varies within a single neighborhood. Second, they utilize web GIS technologies to capture and visualize volunteered geographic information about urban food environments, demonstrating the importance of citizen perspectives to developing more nuanced understandings of these environments.

INTRODUCTION

GIScience research has enhanced citizen engagement by narrowing the GIS digital divide, enabling citizens to directly address inequities and reshape the urban environment. Advancements in geospatial web and qualitative GIS provide opportunities for greater collaborations with communities to obtain environmental and social justice. Our paper demonstrates the ways qualitative GIS and Web 2.0 can provide nuanced analysis and foster collaborations to advance the quest for food justice. Food justice broadly refers to equity in all aspects of food production, distribution, and consumption (Gottlieb & Joshi, 2010). Here, we focus specifically on equity in distribution and consumption, in terms of access to nutritious foods.

In efforts to understand dietary health disparities, scholars have examined relationships between the urban food environment—the context in which residents obtain food—population characteristics, and individual behavior (Charreire et al., 2010; Pearce, Witten, & Bartie, 2006). Studies indicate that significant disparities exist, on the basis of race and class, in access to nutritious food for urban residents (Frank et al., 2006; Sharkey, Horel, Han, & Huber, 2009; Zenk et al., 2005). These disparities have a spatial dimension, as individual food access is shaped by neighborhood context (Burns & Inglis, 2007). Scholars hypothesize that areas with poor access to nutritious food—often identified as 'food deserts'—put residents at greater risk for food insecurity and diet-related disease (Larsen & Gilliland, 2008; Larson & Moseley, 2012).

Although urban food insecurity is an undisputed problem, the precise role of urban environmental characteristics in shaping dietary health remains unclear (Walker, Keane, & Burke, 2010). In part, this stems from the limited nature of commonly used urban food research methodologies. Amid calls for developing urban food research methodologies, two prominent concerns emerge regarding the conceptualization and measurement of urban food environments. First, existing metrics and assessment techniques do not sufficiently account for or reflect the complexities of urban food environments (Caspi, Sorensen, Subramanian, & Kawachi, 2012). Studies tend to focus on particular elements of food access while neglecting others. Also, quantitative and qualitative methods have yet to be fully integrated in studies of urban food environments. Second, the conceptualization of urban food environment should be expanded to reflect current dietary practices in low income groups (Walker et al., 2010). Conventional retail sources (grocery stores, fast food restaurants) are supplemented by other food sources (farmers markets, pharmacies, community gardens, food pantries, free meal sites), which affect food accessibility in terms of cost, quality, and availability.

Urban food environments are characterized by the quantity or quality of food accessible within a specified urban area. The precise definition of accessibility, the types of food considered, and the methods of assessing quantity or quality vary substantially. Although food access broadly refers to the supply of food in a particular context, it can be defined specifically in terms of five dimensions: *availability* (food supply quantity), *accessibility* (proximity and ease of transport to food sources), *affordability* (food price and value relative to cost), *acceptability* (degree to which food meets individuals' standards), and *accommodation* (degree to which food sources adapt to consumers' needs, e.g., stores' hours of operation; Charreire et al., 2010). Scholars also distinguish between the *community food environment*—the variety and distribution of food sources within an area—and the *consumer food environment*—the quality, cost, and variety of food within retail stores (Kelly, Flood, & Yeatman, 2011). All are recognized as important influences on urban residents' dietary patterns and associated health outcomes. However, most research defines the food environment, for analytical purposes, in terms of only one or two of the five access dimensions and either the community or the consumer food environment, but not both (Caspi et al., 2012). Consequently, scholars argue for multidimensional approaches based on comprehensive, nuanced evaluation of urban food environments (Kelly et al., 2011; Rose, Bodor, Hutchinson, & Swalm, 2010).

Thus, our goal is to develop a multifaceted conceptualization of the urban food environment and explore two approaches to mapping it through the integration of quantitative and qualitative data. An integrated approach enables inclusion of subjective perceptions of the quality and variety of food, perceptions about the safety of the local environment, and individual time constraints that may shape food access (Hawthorne & Kwan, 2012; Moore, Diez Roux, & Brines, 2008; Richards & Smith, 2007; Rose & Richards, 2004).[1] Scholars contend that understanding lived experiences of health and place is crucial to evaluating problems and developing effective solutions (Dennis, Gaulocher, Carpiano, &

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