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Avenues into Food Planning: A Review of Scholarly Food System Research

Catherine Brinkley^{*,**}

^{*}Department of City and Regional Planning, School of Design, University of Pennsylvania, Philadelphia, PA, USA

^{**}School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA, USA

Abstract

This review summarizes several avenues of planning inquiry into food systems research, revealing gaps in the literature, allied fields of study and mismatches between scholarly disciplines and the food system life cycle. Planners and scholars in associated fields have identified and defined problems in the food system as ‘wicked’ problems, complex environmental issues that require systemic solutions at the community scale. While food justice scholars have contextualized problem areas, planning scholars have made a broad case for planning involvement in solving these wicked problems while ensuring that the functional and beneficial parts of the food system continue to thrive. This review maps the entry points of scholarly interest in food systems and planning’s contributions to its study, charting a research agenda for the future.

The food system operates over multiple scales: the global scale of international trade, as well as at the cellular level of nutritional uptake and individual metabolism. Urban planners have recently engaged in food system scholarship and practice, nesting their interests in the food system at the neighbourhood and regional scales. In this review, the food system is defined by the commonly used model created by medical scientists; this model combines food chains, food cycles, food webs, and foodsheds — and covers multiple stages: production, processing, distribution, acquisition, preparation, consumption, and waste (Sobal, Khan, and Bisogni 1998). The various stages in the food system are discussed to emphasize planning influence particularly with regard to land-use and transportation aspects of the food system. Food production occurs on farms or gardens and in some cases by collecting foods from the environment by hunting, fishing, gathering, and gleaning. Food may be transported directly from farms to consumers through farmers’ markets, community-supported agriculture, or informal community gardening networks. Food goods may also be transported for processing, storage and/or distribution to wholesalers or retailers, who in turn distribute the food to consumers through supermarkets, food cooperatives, corner stores, street vendors, restaurants, cafeterias, vending machines, and caterers. Food that is not sold may be recycled back through government programmes for feeding the elderly, homeless, poor, or schoolchildren, as well as private assistance in food banks, soup kitchens and food pantries

(Poppendieck 1994). Food waste that is not consumed in these routes is repackaged as animal feed, composted, or landfilled.

Food planning is considered an emergent field to urban planning scholars (Pothukuchi and Kaufman 2000). Over the past decade, scholarly planners have developed multiple entry points for engaging with food system planning. Many of avenues of inquiry do not situate themselves in larger food system theory or practice, nor do they directly communicate with related inquires from allied fields. This review aims to give a comprehensive view of recent and current food planning studies and interventions, explore how planning interacts with the broader world of food planning, and inform cross-disciplinary approaches for more synergistic food planning policies.

The review explores the role of urban planning in informing three main avenues of inquiry into food planning: foodshed analysis, urban food production, and food access. Critical sub-fields within planning are identified from concentrations offered at accredited US Planning graduate schools as well as the planning specializations listed by the American Collegiate Schools of Planning: Land-use, Transportation, Economic Development, Environmental Planning, Social Development, and Urban Design. I employed computerized bibliographic databases to screen relevant references, their useful citations, and trace these forward with citation indexes. Manual searches of relevant journals, books, and reports were also conducted to form a comprehensive landscape of current scholarly engagement with food planning. To identify allied fields of study, authors' fields of expertise are identified by the departments listed in their publications.

The Price Is Not Right: Defining the Problems for Modern Food Planning

Though nontraditional planners have engaged in some version of food system planning since the nineteenth century (Vitiello and Brinkley 2013), this paper traces the literature around food system planning over the last 50 years, encompassing the drastic changes in food policy and subsequently the foodscape which ultimately spurred formal academic engagement from the fields of planning, geography, and sociology. In the 1960s, economists and agronomists thought that hunger was caused by high food prices and low purchasing power of the urban poor. After the 1972 food crisis, the United Nations organized a World Food Conference (1974) where agroeconomists recommended stockpiling grain, national self-sufficiency and dismantling trade barriers as solutions that would lower the price of food (Chisholm, Tyers, and East-West Resource Systems Institute 1982, 5). Many countries, such as the USA, had already embarked on multiyear farm commodity subsidy programmes to keep food prices low and national production high (The Food and Agricultural Act of 1965, Pub. L. 89 321, 79 Stat. 118).

Like many countries, the USA made federal food aid programmes permanent food system fixtures in the 1970s (H.R. 10222), though federal programmes in the USA could not support the entire food budget for a family. With the rise in hunger over the 1980s, reactionary private charities sought to fill food shortages by creating food banks, food pantries, and soup kitchens. At the same time when hunger rose in America, obesity percentages continually increased from the 1970s onwards. These dual problems of rising

rates of hunger and obesity were part of larger urban problems of poverty and disinvestment as housing and land-use policies favoured suburban development over urban revitalization (Daniels and Bowers 1997; Irwin and Bockstael 2007). Suburban development also came at the expense of local farmland. The green revolution in agriculture, international trade, and urbanization has all contributed to altered rural–urban dynamics worldwide, and a subsequent surge in urban planning interest in food policy (Marsden et al. 1993; Ward 1993; Murdoch et al. 2003).

As hunger and obesity were seen as market failures (Rocha 2007), social and environmental justice scholars banded together around the issue of food to create a food justice movement (Campbell 1996; Gottlieb and Fisher 1996, 1998). Sociologists Poppendieck (1986, 1994, 1997) and Allen (1999, 2007, 2008, 2010) in conjunction with planners Campbell (2004), Gottlieb and Fisher (1996, 1998), Gottlieb and Joshi (2010), and food activist Winne (2008) began to simultaneously address hunger and environmental concerns. Their conclusions, while largely specific to the USA, are often shared worldwide. The modern food system's low prices have failed to alleviate hunger, and the authors go so far as to charge that current farm subsidies and permanent-emergency food relief policies *create* rising numbers of hunger and obesity by pushing unhealthy food onto the poorest. Food justice advocates define the following problems with the modern food system: slavery and unfair wages for farmer workers, food safety failures such as harmful chemical use, environmental degradation associated with industrial agricultural practices, animal cruelty, and lack of food access for the poor in terms of few stores, high-priced food, or non-healthy food options (Gottlieb and Joshi 2010). Environmental justice scholars also warn of the unsustainable practices of rapidly urbanizing periurban farmland (Daniels and Bowers 1997; Marsden 1999; Wilson and Rigg 2003); farming dependence on oil (Neff et al. 2011), large phosphorous inputs (Cordell, Drangert, and White 2009), and modern agriculture's contribution and vulnerability to climate change (Rosenzweig and Parry 1994). In combination, these real and perceived threats have forced food systems onto the planning agenda as matters of national security (Morgan 2009). Food insecure cities are 'politically combustible', and their civil unrest has broad political ramifications as rich but food-stressed countries, such as China, Saudi Arabia, and South Korea, buy up fertile land in Africa and Asia, potentially provoking large-scale land conflicts (Morgan and Sonnino 2010).

Planners: The Last to the Table

Though planners had long been involved with food systems design (Atkins 2007; Donofrio 2007), a comprehensive and conscious assessment of their role and impact started only in the last decade when planners Pothukuchi and Kaufman (1999, 2000) heralded planning's foray into food system research, and identified areas of planning interest based not only on food system flaws, but also on the prominent role of the food system in the work of planners. Food sector establishments are a large portion of any urban economy and make extensive use of transportation, waste, water, and land systems while directly impacting the health of any citizen. Pothukuchi and Kaufman's sentiments were echoed and enshrined in the American Planning Association (APA's) Community and Regional Food Planning Policy Guide (2007) and Advisory Report (Raja et al. 2008) which called planners' attention to how food systems impact the economic, environmental, and physical health of communities.

The last few decades have seen a surge in articles aimed at educating planners about their own role in the food system (Sonnino 2009b). Food planning courses are now offered and food planning is being embedded in planning theory, practice, and education on economic development, public health, quality of life, land use, transportation, and natural resource management (Hammer 2004; Cohen 2010). The Association of European Schools of Planning has held an annual ‘Sustainable Food Planning’ conference since 2008. Planning academics have also engaged in outreach to institutionalize learning in the broader planning community (Pothukuchi 2009) with food policy councils (APA 2007; Clancy et al. 2007; Raja et al. 2008 Schiff 2008). Simultaneously, planning practitioners have incorporated food into the urban plans of numerous cities: Belo Horizonte, Rome, Philadelphia, Toronto, Kampala, and Dar es Salaam.

Though these initial efforts by food justice scholars and planners have embedded themselves in the appropriate scale of food system policy, identified problem areas and paid attention to the links to supportive regional and local land-use and economic policy, inquiries lack a dialogue with allied fields of study as well as inter-disciplinary collaboration between planning sub-fields. For example, rarely do farmland preservation scholars reference or draw from literature pertaining to urban agriculture (UA) or food access. This review draws parallels between the various avenues of planning study and describes their development of theory, practice, and process.

Foodshed Studies and Farmland Preservation

The study of foodsheds, or the region necessary to feed an urban population, is one of the oldest avenues of inquiry used by the planning profession (Donofrio 2007). Borrowing from the concept of a watershed, Hedden coined the term foodshed in his (1929) book, *How Great Cities Are Fed*. Though geographers continued the specific study of milksheds since the 1900s (Brinkley and Vitiello forthcoming; Durand 1964), the concept of a foodshed died out until Getz (1991) revived it to describe regional food systems. Since then, the foodshed concept has been expanded for its usefulness in transportation and land-use studies.

Foodsheds are largely measured by systems ecologists (Billen et al. 2009; Peters et al. 2009a, 2009b; Swaney et al. 2011), for the study of emergy (Odum 1996) and ‘urban metabolism’ (Wolman 1965) to explain the interplay between population growth, resource constraints, and solutions to overcome them. Though urban metabolism has been discussed in a variety of disciplines (Kennedy, Cuddihy, and Engel-Yan 2007), including the Chicago school of urban sociology (Burgess and others), ironically, it has only recently come to specifically evaluate food. A ‘food print’, derived from the Waker Nagel and Rees (1996) ecological footprint, is closely analogous to a foodshed. From these studies, geographers and economists have generally concluded that regional farms cannot fully support most urban populations in a nutritionally comprehensive manner even with major dietary changes (Gerbens-Leenes and Nonhebel 2002; Cowell and Parkinson 2003; Johansson 2008; Peters et al. 2009b; Desjardins, MacRae, and Schumilas 2010; Giombolini et al. 2011). Nonetheless, planners and sociologists welcome foodshed and urban metabolism studies as useful tools in urban planning to help focus attention on system-wide patterns of consumption and waste generation (Kloppenburger, Hendrickson, and Stevenson 1996;

Decker et al. 2000; Codoban and Kennedy 2008; Kennedy, Pincetl, and Bunje 2011; Agudelo-Vera et al. 2011).

A few studies look at urban metabolism and foodshed dynamics historically as consumption patterns and land-uses change (Charruadas 2011). While New York City outgrew state-produced agriculture in the 1850s and now only 2.2% of the City's food demand would be met by in-state sources (Peters et al. 2009b; Swaney et al. 2011), Paris has a thousand-year history of dependence on its local foodshed and meets half of its modern food demand from sources within 200 km of the city (Atkins 2007; Barles 2007; Billen et al. 2009, Billen 2011). Billen (2011) speculates that continental cities such as Vienna, Madrid, and Moscow with limited historic access to maritime trade may rely more on localized foodsheds. Such examples illustrate that provisioning from distant sources is not an inevitable result of urbanization and global trade. These studies also allow insight into the various geographic and metabolic changes in foodsheds as nitrogen is no longer recycled back to farms through animal agriculture (Billen 2011; Brinkley and Vitiello forthcoming) and artificial fertilizers allow foodshed shrinkage with more commodity production on less land (Neset and Lohm 2005; Neset, Bader, and Scheidegger 2006; Neset et al. 2008; Billen et al. 2009; Kastner and Nonhebel 2010).

Foodshed studies have spurred alternate modes of inquiry in farmland adaptation, farmland preservation, and food networks. Historically based ecological foodshed studies have validated older theories of peri-urban agricultural morphology. Urban historians (Cronon 1992; Keene 2011) note the interplay between peri-urban agricultural and urban development as each influences the other creating rural–urban spatial interdependencies (Sorokin and Zimmerman 1929; Jacobs 1984). Railroad lines have historically been dictated by the requirements of urban food markets and the supply of the city's hinterland. In turn, the outgrowth of the city influences the morphology of peri-urban farming, first noticed by agricultural economist Von Thünen (1826). Von Thünen's work is the basis of bid-rent curves in central place theory, and describes the type of agriculture occurring near an urban area based on the commodity and land value, beginning with market gardening and dairy farming nearest the urban centre, followed by forestry, cereal production, and finally cattle. Geographers and agricultural economists have built upon the Von Thünen theory, showing that as urbanization drives up agricultural land rents, farmers switch to high-value commodity production. The von Thünen model is supported by numerous data-driven studies from agricultural economists, showing that farms near urbanized areas produce more valuable products on less land with more diverse ownership (Heaton 1980; Hart 1991; Heimlich and Barnard 1992, 1997; Barnard and Heimlich 1993; Losada et al. 1998; Heimlich and Anderson 2001). When the values of peri-urban crops are high enough, they can deter lower value residential developments thus constraining sprawl (Thomas and Howell 2003; Angel et al. 2005; Sheppard 2011).

Rural sociologists are exploring the process, typologies, and rate of agricultural adaptation to expanding urbanization, also known as diversification (Gasson 1988), pluriactive (Shucksmith et al. 1989; Fuller 1990; Evans and Ilbery 1993; Jervell 1999) or multifunctional farming (Van der Ploeg et al. 2000; Renting and Van der Ploeg 2001; Van der Ploeg and Roep 2003; Renting et al. 2009; Zasada 2011). Agricultural economists

Barnard and Heimlich (1993) and rural sociologists Van der Ploeg and Roep (2003) suggest that the increasing pressure for farms to adapt results in incentives to develop new activities for urbanites to valorize the multifunctional nature of agricultural farms, such as pick-your-own fruits and farmers market participation. Peri-urban farms have come to be valued for more than their foodshed qualities and are home to a vast array of ecological and social amenities (Bergstrom and Ready 2009; Green, Deller, and Marcouiller 2005; Brinkley 2012). Where agricultural zoning does not allow this mixed-use development, planning becomes one of the main impediments to farm adaptation, and hence survival (Chick, Scrase, and Allen 1990; Jenkins, Hall, and Troughton 1998; Marsden and Sonnino 2008).

Planners have harnessed the high productivity of peri-urban farms and their role in urban growth management as a platform for farmland preservation programmes and urban growth boundaries (Daniels 1991, 1999; Nelson 1992; Daniels and Bowers 1997; Duke and Lynch 2007; Marin 2007). Planning studies in farmland preservation do not, however, focus on food produced in peri-urban farms, but instead focus on farm acres preserved, sprawl prevention, and economic value of farmland amenities (Lapping 1980; Daniels and Nelson 1986; Lockeretz 1987; Daniels 1991, 2010; Bergstrom and Ready 2009; Brinkley 2012). While many planners involved in this work do not identify directly with food systems work, by preserving local farms they are automatically affiliated with local food planning. That said, agricultural economists argue that loss of these small peri-urban farms is not going to impact urban food supply significantly (Heimlich and Anderson 2001), and planners readily admit that food is not the main thrust of farmland preservation programmes (Brinkley 2012).

Go Big or Go Home: Alternatives to Conventional Food Systems

Foodshed studies also fit into the larger debate on re-localizing food supplies in an effort to decrease 'food-miles', the total transport distance covered by foodstuffs from their production to their consumption sites (Pretty et al. 2005; Smith et al. 2005). In the face of a largely conventional food production and distribution system, the local food movement triumphs direct marketing such as farmers' markets, farm shops, box schemes, community-supported agriculture, home deliveries, and urban gardening (Ilbery and Maye 2005). This proximity is expected to create the potential for personal relationships between producers and consumers (Sage 2003) and as a consequence should raise the awareness about social, economic, and environmental external effects of food consumption by tightening feedback loops (Sundkvist, Milestad, and Jansson 2005). Planners have added that comprehensive anti-hunger campaigns that emphasize local food have had a successful track record in Canada (Power 1999) and Brazil (Rocha 2001, 2009; Rocha and Lessa 2009).

Though eating seasonally and locally saves on transportation, packaging, and energy (Carlsson-Kanyama 1998), engineers have shown that transportation contributes only 11% to lifecycle greenhouse gas (GHG) emissions, where agricultural production contributes to 84% and would be more significantly influenced by dietary changes that de-emphasize animal products (Steinfeld et al. 2006; Weber and Matthews 2008). Nonetheless, numerous planners (Getz 1991; Starr 2000, Starr et al. 2003; Campbell 2004), environmental scientists (DuPuis and Goodman 2005), and sociologists (Kloppenborg, Hendrickson, and Stevenson 1996; Feenstra 1997; Hinrichs 2003; Cowell and Parkinson 2003; Wiskerke 2009; Allen

2010) use food ethics as an argument for re-localizing food systems based on ecological sustainability, social justice, civic engagement, food security, safety, quality, and freshness.

Geographers and sociologists are testing the tangential benefits of an alternative, local food system that has a short-distribution chain and is regionally embedded in the local economy. They find that while local food may have lower food miles and generate local socio-economic opportunities, local food is not necessarily socially just (fair wage, fair-trade, and affordable), environmentally just (low fertilizer input and organic), nutritive (fresh, high quality, and safe), or 'alternative' (Ilbery and Kneafsey 1998; Murdoch, Marsden, and Banks 2000; Bellows and Hamm 2001; Parrott, Wilson, and Murdoch 2002; Renting, Marsden, and Banks 2003; Winter 2003; Goodman 2004; Ilbery and Maye 2005; Whatmore, Stassart, and Renting 2003; Winter 2003; Roep and Wiskerke 2006; Maye, Holloway, and Kneafsey 2007). Ilbery and Maye (2005) emphasize that there is no straightforward division between production for local and nonlocal markets, nor between quality food and conventional food. Skeptical sociologists warn that policies that unfairly favour local farms can be as destructive as the current policies that favour large-scale, industrial farming (Ballingall and Winchester 2008). The 'go local' discourse within food planning often amounts to blind advocacy which distracts from more productive conversations about sustainable farming, food access, and food cost (Born and Purcell 2006; Lang 2010; Ladner 2011).

Many planning scholars argue for local food with compensatory food justice policies that simultaneously call for environmental stewardship and affordability (Born and Purcell 2006; Morgan and Sonnino 2008, 2010). Planners are examining the rise of farm-to-school programmes to support local farmers and provide school-aged children with fresh, local foods, and agricultural education (Vallianatos, Gottlieb, and Haase 2004; Winne 2005; Morgan and Sonnino 2008; Sonnino 2009b). While these programmes must be crafted with special attention to the added cost of procurement for quality foods with nutritive content (Sonnino 2009b), the synergies of endorsing local farms while educating children about nearby food go beyond local economic networking to rebuilding knowledge and social capital for local farming (Vallianatos, Gottlieb, and Haase 2004; Vogt and Kaiser 2006; Izumi, Wright, and Hamm 2010).

Rosenfeld (2010) demonstrates that as local farm-to-city networks are being lost, there are fewer future farmers and civic engagement in the regional agricultural economy. His findings are echoed in advocacy calls for civic agriculture from planners and sociologists (Dahlberg 1993; Lyson 2004, Vitiello 2008). Interestingly, most studies on local food neglect to align themselves in transportation or land-use planning, the logical underpinnings of a regional food system.

In summary, though foodshed studies demonstrate that most urban areas must depend on import from distant agro-industry farms, many planners and sociologists call for some degree of re-localization based on sustainability, resiliency, or regional socio-economic gains. Localized foodsheds may not be more environmentally sustainable, socially just or provide better economic returns from the land, but they do have tangible benefits in supporting local communities, deterring sprawl, and restoring the link between cities and

their rural hinterland. These benefits are expected to out-weigh the economic costs of re-localizing (Grewal and Grewal 2012). The ecological and geographical foodshed studies demonstrate with nitrogen flow data, the most destructive part of delocalized foodsheds is not the GHG emissions from food transport, but the nitrogen flows lost in sewage systems which pollute water supplies and are never recaptured on farmland (Barles 2007).

Food waste is often mentioned, but rarely directly assessed in planning literature (Losada et al. 1996; Birley and Lock 1998; Pearson, Pilgrim, and Pretty 2010). The waste component of the food system is also left out of ‘comprehensive food system’ theories. Sobal, Khan, and Bisogni (1998) do not include waste in their integrated food system model. In low-income countries, planners have noted the important role that peri-UA can and does play in absorbing organic urban waste through animal feeding, anaerobic digestion, and constructed wetlands (Smit and Nasr 1992; Assaad 1996; Furedy, Maclaren, and Whitney 1999; Lydecker and Drechel 2010; Njenga et al. 2011). In high-income countries, particularly within the European Union, engineers have successfully closed the organic waste loop with anaerobic digestion and incineration to produce clean energy on periurban farms (Hoggart 2005, 85; Brinkley forthcoming). Though planners regularly oversee ordinances and citations for waste management facilities, scholarly planning has contributed very little to the theory and practice that has promoted these peri-urban organic waste management systems which serve to reduce GHG, close nitrogen loops, and generate clean energy.

As noted by planning scholars, an important component in modernized food waste and nitrogen flows has been reliance on sewer systems over recycling through animal agriculture in peri-urban farms. Lack of attention to animal agriculture in food planning literature is puzzling as livestock is the largest global land-use (Naylor et al. 2005), has traditionally occurred close to cities (Brinkley and Vitiello forthcoming) and meat demand is expected to grow (Steinfeld et al. 2006). Numerous planners have pointed to animals in the city as the missing link in organic waste management as animals can process leftover food waste and return the manure to high value peri-urban croplands, such as orchards (Losada et al. 1996, 1998; Meares 1999; Brinkley and Vitiello forthcoming). Animal agriculture is still common peri-urban areas (Prain and Lee-Smith 2010), and its presence is considered more compatible with the surrounding land-use than it would be in urban areas (Losada et al. 1998). Many American cities have begun to reverse their anti-animal ordinances (Butler 2012).

UA: A Self-Limiting Policy?

Perhaps, the most developed avenue into the food system is UA literature which has its roots in solving food security for the developing world. Planner Jac Smit is often cited as the ‘father of urban agriculture’, with his seminal book, *UA: Food, Jobs, and Sustainable Cities* (Cheema et al. 1996). The history and theory behind using UA as a developmental tool lives in the introduction sections of numerous articles from economic development planners (Egziabher et al. 1994) and allied fields of geography (Freeman 1991; Atkinson 1995; Drakakis-Smith, Bowyer-Bower, and Tevera 1995; Binns and Lynch 1998; Foeken 2006; Hovorka, Zeeuw, and Njenga 2009), architecture (Prain and Lee-Smith 2010), and agronomy (Maxwell 1999; Altieri et al. 1999). In wealthy countries, environmental

engineers (Hynes 1996), planners (Martin and Marsden 1999), and landscape architects (Lawson 2004, 2005; Helphand 2006) have pioneered the history and theory behind using UA to supply food during times of economic stress or for community and economic development in beautifying neighborhoods, engendering higher property values, or promoting civic engagement. Urban designers are heavily invested in this area of the food system for its ability to enhance urban aesthetics while generating ecosystems and social benefits (Viljoen, Bohn, and Howe 2005). Though well established in planning, many food scholars do not view UA as a robust section of the food system because of its limited ability to supply food (Theibert 2012). Instead, UA is relegated to social planning due to its numerous benefits in community development and neighbourhood improvement.

Because much of UA literature is advocacy-driven (Egziabher et al. 1994; Koc and International Development Research Centre (Canada) 1999; Bakker et al. 2000; Mougeot 2005; Mougeot and International Development Research Centre (Canada) 2006; van Veenhuizen 2006), it is not critical in its nature, reporting positively that households engaged in food production achieve greater food security and their nutritional status tends to be better than that of non-farming urban households of the same socio-economic status. In addition, production for consumption and sale generates revenue and reduces monthly household expenditures on food, leaving more cash available for other basic household needs (such as health, housing, education, and clothing). Prain and Lee-Smith (2010) summarize the extent and type of UA practices in African cities, the relative involvement of women, and the degree to which production occurs for subsistence or commercial ends. Studies in the 1980s and early 1990s documented increasing rates of UA participation in Africa (Briggs 1991; Freeman 1991; Smith 1998). These studies conclude that given the right policy environment, UA could significantly increase food security for the urban poor (Binns and Lynch 1998; van Veenhuizen and Danso 2007).

These claims are justified in that politically supported UA with economic incentive and community involvement has a history of significantly feeding economically stressed cities and greening commercially prosperous cities (Lawson 2005; Schmidt 2007). In Havana, UA substantially and rapidly transitioned a 90% food import country into a largely food sovereign country, reliant more on organic agriculture (Rosset and Benjamin 1994; Rosset 1997a, 1997b; Altieri et al. 1999; Moskow 1999; Diaz and Harris 2005). Similarly, the transformation of the Russian economy from the early 1990s led to 40% of food produced for self-sufficiency in 1995 (Seeth et al. 1998; Caskie 2000; Pallot and Nefedova 2003). In economically stressed Bulgaria, over half the consumption of major agricultural products is provided from self-sufficient small production units (Kostov and Lingard 2004; Mathijs and Noev 2004).

Because UA is so common in food-stressed countries, many economists see UA and subsistence farming as a symptom of poverty and sub-optimal land and labour use instead of a transitional welfare policy to alleviate poverty and hunger (Davidova 2011). Even recognizing that UA can play an economically stabilizing role in food security when the resources it employs are unwanted by the commercial sector (Seeth et al. 1998; Armar-Klemesu and Maxwell (2000); Caskie 2000; Kostov and Lingard 2004), tensions occur when policy-makers see UA as holding back economic growth. Moreover, UA alone is not a

viable food security policy for the poorest who lack land access for adequate UA (Tevera 1999; Crush et al. 2011). Well-intentioned plot allocations or improved security of tenure for UA should be treated with caution as such policies are difficult to retract and prone to capture by the not-so-poor (Ellis and Sumberg 1998, 221). Planners who advocate UA as a food welfare mechanism must weigh this land-use policy with economic development potential and policies that go beyond UA in addressing hunger for the urban poor. In the absence of rapid growth of the formal economy, the welfare of the urban poor is best served by permitting them the widest possible range of opportunities to piece together their livelihoods, and this includes sanctioning UA.

Planners are also leveraging UA in urban revitalization — not only on the basis of food production, but also on the basis of social capital and quality of life (Stocker and Barnett 1998; Martin and Marsden 1999; Schukoske 2000). In the UK and USA, the concept of gardens established to feed the city during war has been repurposed with a new emphasis on UA for community involvement and neighbourhood greening — not necessarily food production (Lawson 2005). That is not to say that wartime gardens themselves were repurposed. Many were commercially developed.

The major impediment for UA in high-income countries is the same for low-income countries

Despite its ability to provide food and social benefits, few cities include UA in their comprehensive plans (Hou, Johnson, and Lawson 2009) because many authorities view endorsing UA as a practice that unfairly entrenches public commons on private land and sanctions nuisances, such as animal agriculture (Brinkley and Vitiello forthcoming). Communities, on the other hand, so value UA even when they are not dependant on it for food; and they resist the privileges of gardening being taken away when land is to be developed to 'higher uses' (Schukoske 2000; Bryld 2003). Authorities become hesitant to sanction 'commons' for gardening for fear of political resistance when the commons are reappropriated. Successful UA policies would do well to remove barriers to gardening (Schukoske 2000), use vacant lot land inventories to target supportive programmes (Mendes 2008), authorize land-use for terms long enough to elicit commitment by gardeners (recommended: five years, Schukoske 2000), and develop transitional policies if UA is desired only as an interim land-use. Planners could assist with research on how to successfully transition gardens to development, though few UA researchers would want to be associated with such practices.

Access: You Are Where You Eat

Planners have dealt with the form and function of food access and markets by zoning and citing food stores throughout planning history (Donofrio 2007; Black et al. 2010; Morales 2010). Studies into the most efficient and appropriate methods for food access are, however, a recent development in reaction to the growing numbers of hungry and obese people in urban centres. This bifurcation of health is conceptualized by planners and epidemiologists as having a root cause in poverty and modern food policy that displaces local food retailers and makes high-energy processed foods relatively less expensive and more prevalent than healthy foods (Dixon et al. 2007). Teasing out factors that contribute to obesity has ranged

from studies on walkability to food store type and prevalence, with the conclusion from planners that the food environment is more influential than the built environment for food-related health outcomes like obesity (Walton, Pearce, and Day 2009; Raja et al. 2010). Scholars are noting that the food access environment can be characterized by ‘oases’ (healthy food hotspots), ‘swamps’ (fastfood and corner stores), and ‘deserts’ (lack of healthy food access) (Short, Guthman, and Raskin 2007).

Food oases refer to healthy food outlets, but also to smaller, niche retailers that serve local or organic food. In general, healthy food outlets decrease body mass index (Rundle et al. 2009) and are a welcome addition to any foodscape. Planners, sociologists, and geographers are exploring the degree to which oases generate a creative economic draw to cities by serving local or high quality food (Starr et al. 2003; Donald and Blay-Palmer 2006; Neal 2006; Inwood et al. 2009; Weingaertner and Barber 2010). These food access points are exalted as harbingers of urban revitalization and investment in local foodsheds, but they are also charged with catering to urban elitism with prices that are beyond the reach of most urbanites (Guthman 2011). This accusation is emblematic of the many racial and socio-economic dimensions of local food movements and modern food policy such as the United States Department of Agriculture’s historic discriminatory against black farmers as well as supermarkets that charge less in majority Caucasian, suburban settings (Alkon and Agyeman 2011).

In contrast, the majority of food access studies focus on food deserts and swamps. Food deserts refer to areas devoid of healthy food options (Caraher et al. 1998), but are more grossly defined as any area not near a supermarket (Larson, Story, and Nelson 2009; Beaulac, Kristjansson, and Cummins 2009). Explored primarily by public health scholars, increased distance to supermarkets is associated with obesity (Liu, Wilson, and Ying 2007), while proximity to supermarkets is associated with increased fruit and vegetable intake (Morland et al. 2002). In response to these findings, some planners are organizing methods to attract supermarkets to under-served neighbourhoods (Poethukuchi 2005). Others caution that forcing supermarkets into neighbourhoods that cannot support viable financial outcomes is not a sustainable development policy, and that planners should consider interventions on an individual basis (Boarnet et al. 2005). Moreover, planners have demonstrated that corporate supermarket chains displace local food retailers — which may drive the creation of food deserts in the first place (Dixon et al. 2007, 124–125; Short, Guthman, and Raskin 2007). Improving cost-effective and time-efficient transportation to food outlets is another proposed planning intervention (Clifton 2004; Coveney and O’Dwyer 2009; Pérez et al. 2010).

Public health scholars also trace obesity to fastfood venue prevalence (Cummins and Macintyre 2002, 2006; Prentice and Jebb 2003; Perdue, Stone, and Gostin 2003; Maddock 2004; Powell et al. 2007; Sparks, Bania, and Leete 2011). Fastfood restaurants are more prevalent in low-income neighbourhoods (Reidpath et al. 2002), where unhealthy food generally costs less (Cummins and Macintyre 2002; Wrigley 2002). The use of planning instruments to control fast food outlets remains rare (Ashe et al. 2003; Black et al. 2010) as are broad policies to differentially price healthy foods less than unhealthy food.

In response to the complexity of food access, planners have offered a variety of foodscape measurements in Community Food Assessment (Pothukuchi 2004) and whole food measures. Whole measures are important to investigating the price, availability and types of stores associated with healthy food in any given location. The premise of these studies is that smaller healthy food access points may be more adept at solving problems of obesity. Corner stores can be retrofitted to carry fruits and vegetables (Dunkley, Helling, and Sawicki 2004; Short, Guthman, and Raskin 2007; Raja et al. 2008, 2010; Cannuscio, Weiss, and Asch 2010). Public health officials are just beginning to study the impact of smaller, diffuse, healthy food retailers such as more mobile, transient interventions like farmers markets (Larsen and Gilliland 2009), healthy street vending (Tester et al. 2010; Tester, Yen, and Laraia 2010; Leggat et al. 2012), and curbside fresh produce trucks (Brinkley, Chrisinger, and Hillier forthcoming). Motivated by these findings, a broad range of stakeholders have proposed and implemented numerous responses, including financing for food retailers in under-served areas (New Market Tax Credits, Fresh Food Financing Initiative, California FreshWorks Fund), incentives for existing stores to stock more healthful foods (healthy corner store initiatives) and 'pop-up' food retail (mobile produce trucks and farmers' markets) (Dunkley, Helling, and Sawicki 2004; Short, Guthman, and Raskin 2007; Larsen and Gilliland 2009; Cannuscio, Weiss, and Asch 2010; Raja et al. 2008, 2010). These smaller, more mobile food distribution models require little start-up, service a large proportion of the urban population (Bhowmilk 2005; Vallianatos 2009) can easily target schools and food deserts (Tester et al. 2010), and circumvent the need to own real estate. While not evaluated in terms of healthy food and urban nutrition, planners are pioneering efforts to understand these diffuse, informal networks with the finding that planning land-use regulations often severely impinge on their function (Bhowmilk 2005; Yasmeen 2006; Tester, Yen, and Laraia 2010; Devlin 2011; Brinkley, Chrisinger, and Hillier forthcoming).

Conclusion: Bottom-Up and Top-Down

Food planning research is being led by neighbourhood and regional planners who have drawn extensively from the work of sociologists, geographers, engineers, economists, agronomists, and medical professionals. Cross-disciplinary collaboration is important as planners continue to study and make policy recommendations in a field that is new to planning — but not necessarily to other professions.

Though planners are readily drawing from other fields, there is still much collaboration that could occur between planning sub-fields. In 2007, the APA identified sub-fields of planning that were not involved in food system studies, with real estate development and historic preservation being the least involved. This review adds that scholarly planners in land-use and transportation are also under-represented in comparison to their counterparts in urban design, environmental planning and community, and economic development. Similarly, there are opportunities for further practitioner involvement in food system planning. The APA juxtaposed the stages in food system life cycles with practitioner involvement, finding that planners have the least involvement in food safety, hunger prevention, healthful foods in schools, culturally appropriate food access, design of food outlets, grocery retail development, environmentally friendly disposal of food waste, locally owned food business

support, engaging in local food policy (APA 2007, 29; Raja et al. 2008). In five short years, scholarly planners have significantly engaged with hunger prevention, school food, and grocery retail development (Pothukuchi, Mohamed, and Gebben 2008; Morgan and Sonnino 2010). Inquiries into food systems have also shaped other areas of planning, with some urban designers using food as the unifying theme for city plans (Revi et al. 2006). Waste management remains an unpopular planning topic both in practice and in scholarly planning literature.

The literature reveals that the farmland preservation and UA avenues of inquiry share many similarities though there is little cross-pollination of ideas. Both UA and peri-urban farming pertain to important food production spaces that are under extreme development pressure. Food production on these lands is not the main benefit of UA and farmland preservation policies. Most urban areas have outgrown their foodsheds, and few cities could truly feed themselves. Yet, foodshed research has shown that there is a need to re-localize some aspects of the food system on the bases of waste management, sprawl prevention, socio-economic networking, and decreased GHG input where local food can sustainably take the place of globally sourced food. Likewise, the benefits of UA go far beyond food supply to neighbourhood and social and economic development benefits. It is these later benefits that make UA policies hard to retract once a community has established a garden. In sum, the farmland preservation and UA avenues of inquiry have successfully tied food planning to broader themes in planning theory and practice though scholars are often reluctant to admit that localizing food production is not the same as providing local food access. As such, farmland preservation and UA policies only chew at the edges of perceived flaws in the greater food system, but may find more traction in promoting local economic strategy while simultaneously achieving incremental adjustments to food planning practice. Indeed, incremental adjustments to local food policy may prove more desirable when influencing an intricately connected system that touches all parts of the economy, environment, and community.

All avenues of food planning inquiry emphasize broad policies that allow for diffuse, bottom-up, local change; this is especially true for food access. Bottom-up policies are in direct tension with a larger planning meta-narrative of discomfort with informal systems (Assaad 1996; Morales 2010; Devlin 2011) particularly with regard to street vending (Bhowmilk 2005; Tester et al. 2010) and informal waste management (Assaad 1996). In food-stressed cities, the literature indicates that the informal food sector and waste-collection sector is large and capable but not legitimized by planners (Assaad 1996; Leybourne and Grant 1999; Bhowmilk 2005; Vallianatos 2009). Diffuse food systems appear to play significant roles in urban resiliency as indicated by wartime Berlin, which turned from import to self-sufficiency. ‘The fact that craft, small business, and decentralized structures still strongly characterized the food industry, was a certain advantage for the provision of the city’ (Schmidt 2007, 67). Planners wield enormous power over small businesses by siting or permitting retail stores, street vendors, farmers markets, processing facilities, composting facilities, community gardens, and farm-related businesses—as well as transportation options to these sites. It is, therefore, troubling that so many avenues of inquiry have suggested centralized, top-down solutions — such as supermarket construction — which run countercurrent to smaller, local businesses that may have higher penetration

power into food deserts and swamps alike. Many planning advocates have put forth grey literature on these diffuse, local, often informal networks and are investigating ways to strengthen ‘bottom-up’, community-driven programmes. One example is ‘food hubs’, internet-based portals where local growers can directly connect with retailers (Morley, Morgan, and Morgan 2008). To this end, scholarly food systems research has been adept at navigating the grey literature, its activist role, and the push-and-pull of theory and practice as each informs the other.

Research Agenda

A future research agenda for planning would do well to see more input from the land-use and transportation planners as well as cross-discipline joint-author research from the fields of public health, engineering, and earth sciences. As scholars begin to tease apart the processes that underscore food-related health and land-use changes, relying on cross-disciplinary skill sets will better create multifaceted theories and practices. To this end, planners must come to terms with the distinct outcomes from research in the above three avenues, particularly the ideological struggle to differentiate the importance of place in food production studies versus the importance of place in food access studies. Paradoxically, local food production does not equate with local food access, and all too often these principles are conflated in planning literature. As such, food production scholars in the fields of UA and farmland preservation should continue to connect their work with the field of economic development, and pioneer the theory and practice of transitional methodologies that will simultaneously assess the social and economic conversion of food production lands to and from urban land-uses instead of pinning ‘successful outcomes’ only on farmland preservation or garden retention. Planners should aim to view the functions of urban and food production land in tandem spatially and temporally in order to scout effective theories and practices for the placement of each in relation to the other (Wilson 2008).

Because food planning so heavily influences and is influenced by food advocacy, there is also a need for planners to pilot and develop methods to evaluate the success and progress of various food system interventions as well as the organizational structure of effective food policy councils (Glantz and Mullis 1988; Lucan and Chambers 2013). With so much case-based research already in the literature, planners can now begin to focus on an aggregate of cases to determine broadly successful policies, with particular attention paid to policy transferability and ability to scale up. Throughout intervention-based research, planners must be mindful to focus on the entire foodscape and consumer patterns within it. This includes evaluating purchasing patterns and more mobile and informal food vendors that are often overlooked, but are relied upon as much as stationary food outlets, such as bricks and mortar grocery stores (Bhowmilk 2005; Tester, Yen, and Laraia 2010; Karpyn et al. in review).

Finally, planners should engage with engineering and waste management literature to develop practices that will close the rural–urban nutrient loop and create safe and effective food waste management strategies. These latter policies can be tied to broader research agendas within planning, such as sustainability and mitigating climate change (Sonnino 2009a).

If food planning continues to solidify as a planning sub-discipline, it may prove a useful prism through which to explore and influence the processes that govern land-use and human health. As such, food planners, advocates, scholars, and researchers in affiliated fields are transitioning from traditional inquiries into mapping place-based foodscape typologies (foodsheds, UA, and food deserts) to system-based inquiries into the foodscape's affect on rural development, urban revitalization, and health outcomes.

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