Journal of the American Planning Association

ISSN: 0194-4363 (Print) 1939-0130 (Online) Journal homepage: http://www.tandfonline.com/loi/rjpa20

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To cite this article: Mahbubur Meenar, Alfonso Morales & Leonard Bonarek (2017) Regulatory Practices of Urban Agriculture: A Connection to Planning and Policy, Journal of the American Planning Association, 83:4, 389-403

To link to this article: http://dx.doi.org/10.1080/01944363.2017.1369359

Published online: 12 Oct 2017.

Regulatory Practices of Urban Agriculture

A Connection to Planning and Policy

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Problem, research strategy, and findings: Municipalities across the United States are gradually recognizing urban agriculture as an integral part of planning, land use, and zoning ordinances. We review the literature on the regulation of urban agriculture at a moment when policy and regulatory vacuums exist and the acceptance and integration of urban agriculture is uneven. We review the current regulatory practices of 40 metropolitan and 40 micropolitan municipalities in the 4 U.S. Census regions. We find that municipalities are filling policy vacuums by adopting enabling ordinances (zoning ordinances, land use designations, resolutions), regulations on urban agriculture production (backyard animals, built structures, practitioner responsibility), and fiscal policy instruments (restrictions on sales of agricultural products, tax abatement, urban agriculture fees). Our findings support local planning practitioners in filling regulatory gaps, practitioners of urban agriculture in seeking how it's done elsewhere, and researchers in discerning new applied and basic research projects. We identify 3 principal knowledge gaps: Planners need a complete typology of regulatory possibilities; a better understanding of how local, state, and federal legislations constrain or enable urban agriculture; and empirical evidence of the economic, social, and environmental impacts of urban agriculture.

Takeaway for practice: Planners should assess existing urban agricultural practices and consider which regulatory frameworks best support multiple local goals, incorporating a concern with urban agriculture into ongoing activities, deploying existing or innovative land use tools, facilitating institutional cooperation, and promoting inclusive decision making and community engagement.

Land use and municipal regulatory challenges, as well as concerns about community food security, make urban agriculture a key component of urban planning. We view urban agriculture as the nonindustrial practices and systems of growing, processing, and distributing or selling food or food products through intensive plant cultivation or animal husbandry in urban areas. Urban agriculture can take various forms and occupy a variety of places. Urban agriculture often goes unregulated, which creates policy vacuums that lead to conflicts between practitioners, regulators, and politicians. Many U.S. municipalities have begun to identify regulatory vacuums or the need to reconstruct their urban agriculture regulations to mitigate conflict or respond to pressure from urban agriculture advocates and proponents of community food security. Some municipalities recognize that urban agriculture is an integral part of planning and zoning practices and create policies to facilitate urban agriculture. These policies and regulations, however, may in practice impede as well as support urban agriculture. The process of integrating urban agriculture into planning and land use practices remains uneven; practitioners would benefit from the review of current regulatory trends and best practices we undertake here.

We explore the current regulation of urban agriculture production, focusing primarily on community gardens and market farms. We begin with a brief overview of current debates on the benefits, drawbacks, and challenges of urban agriculture. We next explore local policy and regulatory vacuums by discussing the intersection of urban agriculture planning, practice, and regulations, focusing on three policy areas: general zoning regulations, land tenure and regulation, and animal regulation. We then review regulatory practices in 80 U.S. municipalities that fall into three categories: enabling legislation, urban agriculture production regulations, and fiscal policies. We next suggest needed research in three areas: understanding the range of regulatory possibilities; how different levels of government affect urban agriculture; and the economic, social, and environmental

Keywords: land use planning, public policy, regulation, urban agriculture, zoning

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Journal of the American Planning Association,
Vol. 83, No. 4, Autumn 2017
DOI: 10.1080/01944363.2017.1369359

impacts of urban agriculture. We conclude by recommending that planners and policymakers assess existing local regulations and policies to determine how to appropriately regulate urban agriculture to develop its full potential in their communities; planners should also consider ways to promote urban agriculture and to address the land tenure issues that are so problematic for practitioners while facilitating active community engagement in these efforts.

Synthesizing the Literature on Urban Agriculture Practice and Regulations

The contemporary reinvigoration of urban food production has sparked significant research around the country by scholars of planning and related disciplines such as architecture, economics, environmental studies, geography, landscape architecture, law, and public health. We present our multidisciplinary literature review in two sections.

First, we summarize the current literature on the benefits and drawbacks of urban agriculture; we then discuss the connection between urban planning and the regulation of urban agriculture. We present our review of more than 200 documents—largely peer-reviewed research or review articles with some gray literature—including books; planning and policy journals; relevant social science journals; law journals; interdisciplinary journals on health, food, and agriculture; and reports, policy briefs, and specialty publications from national organizations (e.g., the American Planning Association, Lincoln Institute of Land Policy). Most original research articles use qualitative methods, including interviews, participant observation, and surveys, to identify the pros and cons of urban agriculture. Other articles are exploratory, theoretical, or based on quantitative methods.

Second, we explore the current state of urban agriculture regulatory practices in major U.S. municipalities, providing examples of best practices. Figure 1 shows the locations of the 80 municipalities across the four U.S. Census regions (Northeast, South, Midwest, West); Table 1 lists all of the municipalities we sampled in 36 states. We focus on major municipalities in metropolitan areas (containing a core urban area of 50,000 or more population) and in micropolitan areas (those containing an urban core of at least 10,000 but less than 50,000 population). Forty of the municipalities we sampled are in the most populated metropolitan areas in the four regions, 10 per region. The other 40 are in the most populous micropolitan areas in the four regions, again 10 per region.

We identified and examined zoning ordinances, zoning resolutions, land use designations, and relevant documents from these 80 municipalities between September and November 2015. A common source for municipal ordinance searches was the municode.com/library website (Municode). The metropolitan municipalities that did not use Municode shared their ordinances via official websites or other online platforms. Our key search terms included *urban agriculture, urban farm, urban garden, market garden*, and *community garden;* we also used these terms in conjunction with other search terms, including *backyard*

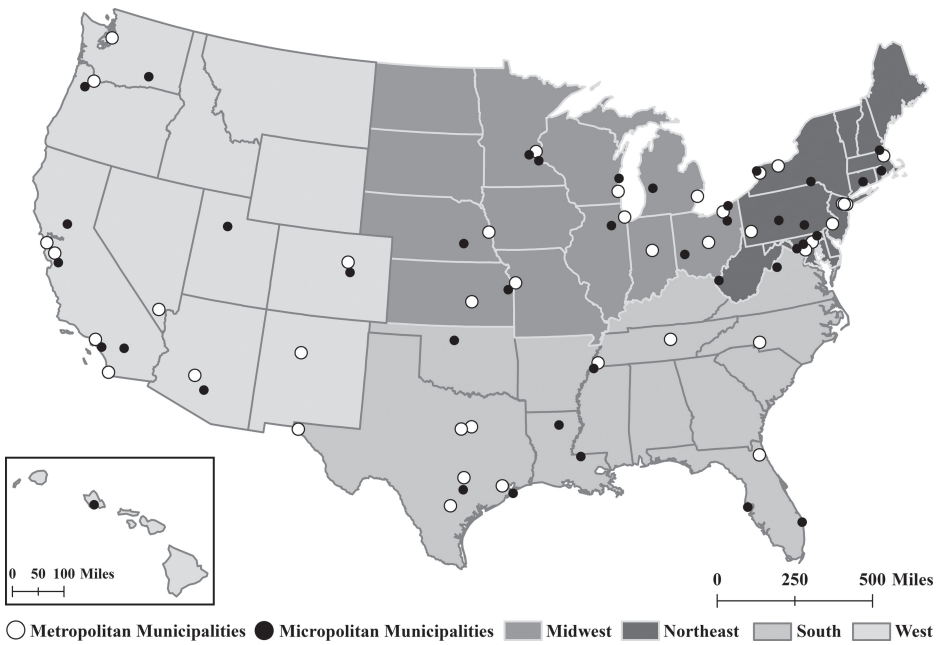

Figure 1. Locations of metropolitan and micropolitan municipalities studied (N = 80).

Table 1. List of metropolitan and micropolitan municipalities studied in four U.S. Census regions.

Metropolitan municipality	Micropolitan municipality
Northeast region	
New York, NY	Niagara Falls, NY
Philadelphia, PA	Harrisburg, PA
Boston, MA	Huntington, WV
Baltimore, MD	Wheaton CDP, MD
Washington, DC	Methuen Town, MA
Pittsburgh, PA	Middletown, CT
Newark, NJ	East Providence, RI
Buffalo, NY	Binghamton, NY
Jersey City, NJ	Bel Air South CDP, MD
Rochester, NY	Altoona, PA
South region	
Houston, TX	Harrisonburg, VA
San Antonio, TX	Southaven, MS
Dallas, TX	Enid, OK
Austin, TX	Pinellas Park, FL
Jacksonville, FL	Monroe, LA
Fort Worth, TX	Wilson, NC
Charlotte, NC	Palm Beach Gardens, FL
El Paso, TX	McLean CDP, VA
Memphis, TN	San Marcos, TX
Nashville-Davidson, TN	Galveston, TX
Midwest region	
Chicago, IL	Apple Valley, MN
Indianapolis, IN	Cuyahoga Falls, OH
Columbus, OH	Grand Island, NE
Detroit, MI	Kentwood, MI
Milwaukee, WI	Sheboygan, WI
Kansas City, MO	Downers Grove Village, IL
Omaha, NE	Lenexa, KS
Cleveland, OH	Middletown, OH
Minneapolis, MN	Edina, MN
Wichita, KS	Euclid, OH
West region	
Los Angeles, CA	Castle Rock, CO
Phoenix, AZ	Richland, WA
San Diego, CA	Lehi, UT
San Jose, CA	Gilroy, CA
San Francisco, CA	East Honolulu CDP, HI
Seattle, WA	Cerritos, CA
Denver, CO	Palm Desert, CA
Portland, OR	West Sacramento, CA
Las Vegas, NV	Tigard, OR
Albuquerque, NM	Casa Grande, AZ

Note: CDP = Census-designated place.

animals, chickens/goats/bees/pigs, ordinance/resolution/law, regulation, zoning, land use, building/structure/greenhouse/hoophouse, tax, abatement, sales, liability, insurance, and *fees/permits.* We conducted brief phone interviews with municipal officials in cases when information was unavailable, contradictory, or confusing.

We present our findings on regulatory practices and examples in three categories: enabling practices or those regulations permitting urban agricultural practices, such as zoning ordinances and land use designations; urban agriculture production regulations that address specific activities (e.g., animal husbandry, built structures, practitioner responsibility); and finally fiscal policies or regulations that we consider economic in nature (e.g., restrictions on sales of agricultural products, tax abatement, urban agriculture fees).

Urban Agriculture Practice and Regulations: The Planning Connection

The Socioeconomic–Environmental Benefits, Drawbacks, and Challenges of Urban Agriculture

The benefits of urban agriculture may be direct or indirect and can accrue to households, organizations, and institutions; benefits can also be measured in terms of their contribution to ecological objectives such as the sustainability of the food supply chain. Many researchers recognize the social, environmental, and economic benefits of urban agriculture, but some also identify drawbacks (see reviews by Horst, McClintock, & Hoey, 2017; Santo, Palmer, & Kim, 2016). Many benefits of urban agriculture are not widely quantified or analyzed because it is much easier to enumerate benefits and costs than to measure them (Schmelzkopf, 2002).

Most literature on the social benefits and drawbacks of urban agriculture focuses on the topics of community food security, human/social capital, community development, public health, and race relations (for a thorough review of social benefits and drawbacks, see Horst et al., 2017). Scholars find that urban agriculture supplies fresh food in areas lacking proper access to grocery stores and contributes to community food security by donating produce to neighbors, food pantries, and soup kitchens (Levkoe, 2011; Meenar, 2012; Meenar & Hoover, 2012; Vitiello & Nairn, 2009). Urban agriculture also catalyzes neighborhood revitalization, creates venues for community organizing, and offers opportunities for exercise and therapy for residents (Meenar, 2014, 2015). Two quantitative research studies report social benefits associated with urban agriculture,

including reduced crime (Kuo & Sullivan, 2001), greater property maintenance and values, fewer abandoned buildings, higher rates of home ownership, adaptive reuse of vacant lots, brownfield remediation, development of leadership and technical skills, and an improved sense of community and place (Tranel & Handlin, 2006).

A number of quantitative and qualitative studies report a positive correlation between participation in urban agriculture and a balanced diet consisting of more fruits and vegetables (see Alaimo, Packnett, Miles, & Kruger, 2008; Johnson & Smith, 2006; Lackey & Associates, 1998); as a result, participants showed improvements in academic performance and health (Berezowitz, Bontrager, & Schoeller, 2015). Community gardening, one component of urban agriculture, is positively associated with individual health (Clatworthy, Hinds, & Camic, 2013; Wang & McMillian, 2013).

Researchers connect urban agriculture, community involvement, and life satisfaction (Blair, Giesecke, & Sherman, 1991; Meenar, 2014). Teig et al. (2009) report that community gardening increases or improves social connection, reciprocity, mutual trust, collective decision making, adherence to social norms set by the community, civic engagement, community building, and key social processes (e.g., volunteering, leadership, neighborhood organizing). Alaimo, Reischl, and Allen (2010) find that community gardening increases social capital at both the individual and neighborhood levels; the increase in social capital is especially important in distressed urban neighborhoods. Macias (2008) reports that urban agriculture promotes three objectives: increasing food equity through the low cost of entry, creating an environment in which participants share tools and responsibilities, and developing natural human capital as gardeners learn how to grow their own food.

A diverse group of populations practice urban agriculture. Scholars discuss the potential for urban agriculture to address a multitude of challenges facing inner-city, poor, minority, and immigrant communities in a cost-effective manner (see Gottlieb, 2006; Saldivar-Tanaka & Krasny, 2004; University of California, Los Angeles, 2004). Some urban agriculture projects, however, have faced criticism for their conscious or unconscious practice of social and racial exclusion; critics cite evidence that they disproportionately benefit young, nonpoor, and White practitioners (see qualitative studies by Cohen & Reynolds, 2014; Cohen, Reynolds, & Sanghvi, 2012; Lyson, 2014; Meenar & Hoover, 2012). Reynolds (2015) observes race and class disparities along with White privilege in the municipal allocation of land, grants, and other resources.

The outsider status of some farmers or market farm employees can challenge the community engagement process (Poulsen, 2017). These farms sometimes face other criticisms: They may not sell produce to local residents at an affordable price (see the review by McCormack, Laska, Larson, & Story, 2010; see also Poulsen, 2017), or they may not attract enough clients for their community-supported agriculture programs (see the case study by Kato, 2013). Both community gardens and market farms may face challenges due to vandalism or difficulty sustaining community organizing; some residents lack urban agriculture knowledge and skills (Brown, 2002).

Few studies attempt to quantify the economic value of urban agriculture (see Blair et al., 1991), and evidence is uneven; many scholars question whether urban agriculture production is robust or economically viable (Kaufman & Bailkey, 2004; Thibert, 2012; Vitiello & Wolf-Powers, 2014; see also the review by Santo et al., 2016). Some researchers study the ability of urban agriculture to attract financial capital, create jobs, and increase property values for higher value development. Urban agriculture projects promote community food security, supplement household incomes, and develop human and social capital (Meenar, 2015; Vitiello & Wolf-Powers, 2014), but Vitiello and Wolf-Powers (2014) find, in a study of gardens and farms in six communities, that such activities cannot provide a significant number of livable-wage jobs. Voicu and Been (2008), however, find that properly maintained community gardens have significant positive economic effects, especially in the poorest neighborhoods; a garden in New York City (NY) can raise neighboring property values by as much as 9.4 percentage points within 5 years of initial operation.

The significant time commitment necessary for urban agriculture may discourage people with multiple jobs and/or children from fully participating, which may decrease food justice (Horst et al., 2017; Macias, 2008). Other economic challenges include the expense of growing and marketing, seasonal limits, and constrained access to markets (Brown, 2002; Horst et al., 2017).

Some of the most important economic planning questions about urban agriculture have not yet been asked partially because of the lack of reliable data. In 2016 the U.S. Department of Agriculture released data from a recently executed local food marketing survey to complement the Census of Agriculture conducted every 5 years; however, these data incompletely measured urban agriculture, especially among people of color (Thilmany et al., 2016).

The environmental benefits of urban agriculture are similar to those created by other urban green spaces, which

are discussed by many researchers. Urban agriculture functions as green infrastructure (Lovell & Johnston, 2009), which helps to purify air, control noise and temperature, create and preserve fauna and flora habitats, and improve a sense of community and place (Tranel & Handlin, 2006). Scholars have connected urban agriculture's potential contribution to increasing ecosystem services (Santo et al., 2016), biodiversity (Taylor & Lovell, 2014), and stormwater drainage (Wortman & Lovell, 2013); reducing air pollution (Janhäll, 2015) and the urban heat island effect (Wolf & Robbins, 2015); and recycling organic waste (Brown & Jameton, 2000).

Some scholars note, however, that agricultural production methods (e.g., soil amendment, water and fertilizer use) may not always be ecologically sound (Guitart, Pickering, & Byrne, 2012; Taylor & Lovell, 2014). Some authors are not convinced that all backyard gardeners are cognizant of the potential danger of soil contamination or that they possess the resources to test or remediate soil, potentially spreading foodborne illnesses and increasing exposure to toxic substances such as lead (Taylor & Lovell, 2014; see also the review by Specht et al., 2014). These risks can be particularly pronounced in low-income communities with a history of disinvestment and contamination (Horst et al., 2017). Pesticide use, if not regulated, poses another health and environmental challenge (Brown, 2002).

Urban agricultural practices are associated with both increasing greenhouse gas emissions (McWilliams, 2009) and reducing them (Kulak, Graves, & Chatterton, 2013; see also the discussion in Suerth & Morales, 2014, about zoning-related aspects of composting and associated greenhouse gas emissions).

There are ways for urban agriculture practitioners to alleviate many of these problems; practitioners may address socioeconomic–environmental challenges by being more inclusive socially and encouraging more racially and economically diverse participants (Meenar & Hoover, 2012; Reynolds, 2015). Practitioners can better understand economic impact through the use of newer tools and data sets, such as the Local Foods Measurement toolkit developed by an expert team contracted by the U.S. Department of Agriculture (Thilmany et al., 2016) to improve the quality of economic analysis of urban agriculture. Practitioners could modify their daily operations to address environmental concerns. Soil contamination and associated health challenges are active research topics; practitioners may take up various initiatives to address this problem, including raised beds (Brown, 2002; Witzling, Wander, & Phillips, 2011) or applying imported soil, mulch, lead abatement, low-cost or free soil testing, and sheltered production (e.g., greenhouses, indoor production, hydroponic growing mediums) to avoid contact with contaminated soil and air (Brown, 2002).

These concerns about urban agriculture production, however, are rooted in a more fundamental question: Have municipalities adequately addressed the policy vacuum regarding urban agriculture production?

Policy and Regulatory Vacuums and the Problem of Regulating Urban Agriculture Production

Urban agriculture production has emerged unregulated, and the subsequent policy vacuum creates conflicts, including land tenure challenges (Brown & Jameton, 2000); debates on land use designations and zoning (Meenar, 2015; Thibert, 2012); sociolegal conflicts (Covert & Morales, 2014); and contrasting judgments about the suitability, commercial viability, and/or connection of urban agriculture to a community's comprehensive plan (LaCroix, 2010).

Planning education, practice, and research still afford urban agriculture relatively marginal attention (Thibert, 2012). Many planners and municipal officials do not have a comprehensive understanding of the benefits and challenges of urban agriculture or of the planning and policy implications of urban agricultural practices. It is crucial therefore to understand how planners and municipal officials regulate urban agriculture to address operational and socioeconomic–environmental challenges.

We summarize our current knowledge of regulatory practices across municipalities in three policy areas: general zoning regulations, land tenure and regulation, and animal regulation.

Urban Agriculture and Zoning Regulations. Scholars from planning and related fields began identifying policy and regulatory innovations for urban agriculture in the 2000s. Kaufman and Bailkey (2000) study 70 nonprofit and private sector entrepreneurial urban agriculture projects, identify their obstacles, and recommend that local governments alter land use plans and zoning ordinances to address these challenges. Other studies on the regulatory practices surrounding urban agriculture follow (see Felsing, 2001; Mougeot, 2000; Raja, 2000; Schukoske, 2000). Many municipalities across the nation identified their policy needs and drafted land use policies and zoning ordinances or revised existing policies to reflect increasing interests in urban agriculture (Mukherji & Morales, 2010; Thibert, 2012). The 2020 Citywide Plan of Cleveland (OH), for example, committed to reserve land for community gardens—temporarily and permanently—in every neighborhood throughout the city (Krumholz & Brown,

2009). Sometimes state-level legislation supersedes local ordinance or zoning regulations. Detroit (MI), for example, needed an exemption from the Michigan Right to Farm Act to create more permissive urban agriculture regulations and policies and adopt the city's first urban agriculture zoning ordinance recognizing agriculture as a legitimate land use (Ignaczak, 2013).

Practitioners may seek a regulatory framework to provide or remove political legitimacy in communities with policy vacuums (Oswald, 1997; Wade & Bunting, 2007). Some municipalities, recognizing the benefits of urban agriculture, actively promote it by funding a variety of programs, donating land, or establishing protective zoning. Other cities, however, adopt restrictive zoning and create barriers through prohibitive policies (Mukherji & Morales, 2010). Some regulations, for example, may prohibit even basic farming activities. Other cities adopt regulations that may be opaque, poorly defined, or documented in piecemeal fashion, which leads to confusion and discourages urban agriculture practitioners (Voigt, 2011). Policy vacuums and conflicting policy positions can be sources of ambiguity for practitioners who are seeking clear regulations and stable places to farm (Masson-Minock & Stockmann, 2010).

Land Tenure and Regulations. Long-term access to land for urban agriculture is critical because urban agriculture production requires regular interaction with the land where food is grown or livestock is raised. (Aquaponics and hydroponics are the exception.) Some municipalities view urban agriculture as integral to planning and zoning practices, proposing policies that grant gardeners permission to use public land or purchase surplus/vacant land (Hodgson, Campbell, & Bailkey, 2011). Urban agriculture, however, is usually treated as a placeholder: a temporary/interim and informal land use (Cahn, 2015; Horst et al., 2017; Nordahl, 2009; Wachter, Scruggs, Voith, & Huang, 2010). Planners need to find a way to reconcile these two views of the land available for or used for urban agriculture.

Issues of land tenure are particularly relevant for community gardens established on vacant lands that are vulnerable to redevelopment. Urban agriculture practitioners often use empty land or locations that planners regard as nuisances. Community garden groups often revitalize these properties—a practice commonly known as *guerrilla* or *squatter gardening*—with or without legal permission. Municipalities, however, do not see the long-term utility of urban agriculture for abandoned land (Nordahl, 2009). Many cities want the opportunity to sell such properties—as soon as those properties assume economic value attractive to real estate developers—without recognizing that many decades-old urban agriculture projects have a positive impact on residents and the local environment (see Cahn, 2015; Christensen, 2011; Guitart et al., 2012; Horst et al., 2017; Lawson, 2007). Case studies in New York City (Schmelzkopf, 2002) and Los Angeles (CA; Irazábal & Punja, 2009) show how the demolition of long-term urban agriculture projects negatively affects marginalized populations and raises questions of environmental justice and planning ethics. Horst et al. (2017) conclude that issues of land tenure and availability for urban agriculture can differentially affect certain population groups; racial and ethnic minorities generally have less long-term access to land for agriculture production.

Some municipalities try to avoid land tenure conflicts with community groups or community-based organizations by providing temporary leases to grow food on vacant lots; some cities even entice private landowners to do the same by offering them tax incentives (Mendes, Balmer, Kaethler, & Rhoads, 2008; Santo et al., 2016). Short-term leases remain problematic for urban agriculture practitioners, however, because it takes a long time to establish a garden and engage the community (Lawson, 2007; Saldivar-Tanaka & Krasny, 2004). These leases usually forbid permanent changes to the site, which limits the long-term scalability and sustainability of urban agriculture (Mogk, Wiatkowski, & Weindorf, 2010; Pfeiffer, Silva, & Colquhoun, 2014).

Many scholars have urged municipalities to recognize the benefits of urban agriculture and grant practitioners long-term leases or incorporate community gardens into public park infrastructure (Santo et al., 2016). Long-term leases can be effective for urban agriculture; the Detroit Black Community Food Security Network's D-Town farm, for example, has a 10-year license agreement with the city, which has helped the farm develop strong ties with community and youth groups, promoting social and economic self-sufficiency (Wey, 2012). Urban agriculture within city parks and next to recreation centers has also proven effective: Philadelphia's (PA) Schuylkill River Park Community Garden has 70 garden plots leased to residents. A number of other public agencies in Philadelphia have offered opportunities for urban agriculture on public lands for longer periods but without adopting any overarching policies to support urban agriculture (Meenar, Featherstone, Cahn, & McCabe, 2012).

Private entrepreneurs usually own the land on which they operate market farms. The owners of Greensgrow Farm—one of the most successful market farms in Philadelphia—purchased and developed a vacant brownfield and started hydroponic farming (Meenar et al., 2012). Community garden owners, in contrast, rarely own the

land they cultivate. Some gardens, however, can operate for a long time through long-term leases from land trusts, such as the Neighborhood Gardens Trust in Philadelphia or the Trust for Public Land in New York City.

Land ownership issues may become even more problematic because of bureaucratic challenges (Ackerman, 2011). Nonprofit organizations that practice urban agriculture on multiple vacant lots with different owners—either private or public, including different public agencies with little interagency coordination—may face different policies, procedures, and business arrangements, even if all lots are within the same municipality (Meenar, 2015).

Regulations on Animal Husbandry. Municipalities historically prohibited animal husbandry because of concerns about public health, nuisances (e.g., odors, noise, messiness), or differing views of rural and urban/suburban life. Typical municipal ordinances regulating animal husbandry include banning urban agriculture outright; requiring permits or neighbor consent; limiting the types and numbers of livestock; and establishing design, size, and setback requirements for livestock shelters. The emerging scholarship on animal husbandry is primarily focused on backyard animals kept at private residences (see Butler, 2012; Hodgson et al., 2011; McClintock, Pallana, & Wooten, 2014; Voigt, 2011). Butler (2012) studies 22 municipalities that revised their animal control ordinances and/or zoning codes, analyzing codes regulating livestock by prohibiting certain types of animals, using zoning to establish where animals can be raised, adopting site-level restrictions required to keep animals, and requiring accessory structures on the property. Butler finds that each municipality's approach was unique in placing limits on raising livestock through some combination of regulatory land use tools. Some municipalities (e.g., San Francisco [CA] and Oakland [CA]) did not include animals in ordinance updates or are debating the pros or cons of animal husbandry in urban areas (see McClintock, Wooten, & Brown, 2012, for a case study on Oakland). Animal welfare activists in some urban centers have lobbied planners to constrain livestock ownership and outlaw backyard slaughter (Kauffman, 2012; McClintock et al., 2012; Tian, 2011).

Scholarly literature on chicken regulations is most prevalent. Bouvier (2012) finds that 84 of the 100 largest U.S. cities allow chicken ownership to some extent; 13 cities only allow chickens in agricultural zones or larger than typical residential lots, and the remaining three cities ban chicken ownership altogether. LaBadie (2008) reviews the chicken ordinances of 25 cities and finds that the details of the ordinances vary widely. McClintock et al. (2012) study 48 municipalities, 33 of which have chicken regulations. The researchers find that some cities have specific zoning restrictions for raising chickens (e.g., not allowing them in multifamily residential zones); other cities establish a minimum lot size or setback requirements and/or impose animal care standards such as permissible shelter and minimum space to roam. Still other cities require participants to control odors, limit the number of chickens, and ban roosters.

Few studies attempt to characterize regulations on backyard animals, ownership, and management (see Bartling, 2012; Blecha & Leitner, 2014; McClintock et al., 2014). McClintock et al. (2014) survey 134 livestock owners across the country and find that many owners were knowingly or unknowingly in violation of chicken regulations. The researchers find a gap between the opinions of livestock owners of the content of local regulations and their adherence to those regulations, although 87% of respondents viewed some form of regulation as important. Only 20 municipalities surveyed by McClintock et al. (2014) reported any complaints against chicken owners, and none reported additional burdens on city services (Bartling, 2010). McLoughlin (2013) finds that media concerns are more common than actual complaints about livestock being raised in urban areas.

Historical restrictions on animal husbandry and subsequent policy vacuums produce operational issues and challenges for urban agriculture production. Emerging literature discusses zoning ordinances and land use policies on urban agriculture in selected urban areas (see Goldstein, Bellis, Morse, Myers, & Ura, 2011; Hendrickson & Porth, 2012; Hodgson, 2012; McClintock et al., 2012; Mukherji & Morales, 2010). We are learning about how individual municipalities fill policy vacuums, but we have few comprehensive reviews of regulatory responses.

The principal controversies in urban agriculture production are typically between practitioners within a jurisdiction (Thrasher, 2016), between practitioners and nonpractitioners (Covert & Morales, 2014), between practitioners and regulators or between jurisdictions (Horst, Brinkley, & Martin, 2016), or between regulatory agents seeking to balance competing goals (Suerth, 2016; Suerth & Morales, 2014). Many jurisdictions find urban agriculture production of interest, debate its merits, and are moving to fill policy and regulatory vacuums to reduce conflict and shape urban agriculture practice. Much of the research we review here describes local studies of the local regulation of urban agriculture production, which reflect local norms, goals, and plans. We lack a national cross-section of the ways in which urban agriculture production is regulated; thus, we are limited in our ability to reliably compare regulatory activities and meaningfully compare

the outcomes of different regulatory regimes and approaches.

Planners lack a thorough understanding of applicable regulatory regimes for urban agriculture production; without that knowledge we cannot clearly comprehend two important factors currently absent from the scholarly literature and professional practice. First, the benefits claimed for urban agriculture production must be grounded in a firm understanding of regulatory context so that we can specify and compare the outcomes and challenges of urban agriculture. Second, we need to enrich professional practice by developing, testing, and disseminating regulatory innovations across municipalities and regions.

In the next section, we review how some municipalities across the United States are addressing policy and regulatory vacuums and how they are regulating different aspects of urban agriculture production.

An Overview of Current Urban Agriculture Regulations in the United States

We studied 80 metropolitan and micropolitan municipalities across all four U.S. Census regions, attempting to add additional data to the existing knowledge of how municipalities regulate various aspects of urban agricultural practice and the programs or policies that they adopt to promote urban agriculture. Municipalities in our sample in the Northeast region have the highest number of regulations, followed by those in the Midwest, the West, and the South. Every metropolitan municipality in our study, regardless of region, has at least one ordinance regulating backyard animals, and many have multiple ordinances. Municipalities in micropolitan areas have far fewer urban agriculture regulations than municipalities in metropolitan regions, particularly in the West; most micropolitan municipalities primarily regulate animals.

The vernacular of policies reveals changing perspectives on urban agriculture: Contrast Cleveland's use of *garden* in enabling legislation (2007) with *urban agriculture* in Philadelphia (2012) and *smart growth* in Boston (MA; 2013).

Examples of Municipal Regulatory Practices

Enabling Legislation, Urban Agriculture Zones, and Land Tenure. Many municipalities in our sample have included provisions in recently revised zoning codes permitting or forbidding certain urban agriculture activities, often treating urban agriculture as a district or land use category. Some ordinances are simple in size, scope, and language. Philadelphia, which completed a comprehensive zoning reform in 2012, created a new urban agricultural land use category and four subcategories: animal husbandry, community garden, market or community supported farm, and horticulture nurseries (City of Philadelphia, 2012). The code defines these categories and subcategories and outlines a few standards for urban agriculture operations. Philadelphia allows community gardens in almost every residential and commercial zone. Boston's Article 89 rezoning regulation, in contrast, sets restrictions and limitations on many aspects of urban agriculture, including runoff, soil quality, and food safety (City of Boston, 2013a). Boston's Olmsted Green Smart Growth Overlay Zone has a land use category for urban agriculture, but Article 89 specifies which urban agriculture uses can occur in particular zones.

Some community gardens—developed on lands with absentee owners—can obtain title to the land through a quiet title action based on adverse possession, but this is a difficult, lengthy, and costly legal battle. Philadelphia's South Central Club won this battle, but the garden was subsequently saddled with the tax burden of the original owners.

Some municipalities directly promote urban agriculture through innovation zones and overlay districts. Cleveland's Urban Agriculture Innovation Zone is a 26-acre area consisting primarily of city land bank and tax-delinquent properties. The Cleveland City Council created the first urban garden zoning district in the country in 2007, an ordinance that allowed the city to reserve land exclusively for urban agriculture. Cleveland subsequently passed ordinances permitting urban agriculture as a principal use in all vacant residential zones and created an urban agriculture overlay district allowing large-scale urban farming and raising of livestock.

Some municipal planners and policymakers are experimenting with certain tools—land banks, conservation easements—to address land access issues, particularly in disinvested neighborhoods. The Philadelphia Land Bank, for example, acquires vacant, tax-delinquent properties at tax foreclosure sales and offers opportunities for redevelopment in recognition of the fact that community gardens are a highly productive use of vacant land. The bank has partnered with Neighborhood Gardens Trust in assessing more than 400 requests for land to be used as community gardens; 34 parcels have been identified as preservation ready (Philadelphia Land Bank, 2017). Conservation easements, in contrast, establish agreements between a land bank and a property owner, which determines what can and cannot be done on the land.

Land banks cannot preserve all community gardens, but they can offer leases. The Michigan Land Bank's Garden for Growth program offers 1- and 3-year leases to nonprofit gardens without any opportunity for land tenure, which echoes the recent trend of municipalities allowing multiyear leases for urban agriculture. The Philadelphia Redevelopment Authority has introduced a path to permanence program for projects demonstrating stability; the city also launched a program for homeowners to purchase vacant lands adjacent to their properties for a dollar. Cleveland, in partnership with the Cleveland and Cuyahoga County land trusts, provides 1-year or longer term licenses to hundreds of community gardens.

Urban Agriculture Production Regulations: Animal Husbandry. Of our 80 sample municipalities, 77 allow or do not expressly forbid the raising at least one of the following: chickens, bees, small livestock (e.g., goats, Vietnamese potbellied pigs), or large livestock (e.g., cows, bison, large pigs). Municipalities can restrict animal husbandry (Horst et al., 2017), but these regulations also originate at the county or state level. The Florida Apiary Act, for example, allows backyard beekeeping—subject to registration and inspection—superseding restrictions on backyard beekeeping that Florida municipalities may have had in the past (State of Florida, 2012).

Regulations on raising chickens vary widely across our sample, which supports the existing literature (see McClintock et al., 2014). Some municipalities promote backyard chicken ownership, but others do not allow poultry in residential zones; other municipalities in our sample permit ownership of chickens but restrict participants from selling meat and eggs. Seattle (WA), for example, allows the keeping of farm animals as an accessory use but imposes conditions on selling animal products (as Barth, 2014, also reports). Some municipalities promote beekeeping, whereas Fairfax County (VA)—which includes one of our sample municipalities, McLean CDP—requires prospective beekeepers to testify at public meetings, where a single member of the community in opposition can veto the practice, even if that person's property is not affected by the prospective beekeeping site (County of Fairfax, 2016). Municipalities often technically permit animals but require minimum setbacks and lot sizes uncommon to urban areas; others mandate lengthy and expensive permit processes, effectively excluding most residents from the practice. Columbus (OH) requires a minimum of 5 acres of land to keep livestock (City of Columbus, n.d.); Washington, DC, requires 250-foot setbacks (City of Washington, DC, 1979). These types of policies amount to de facto bans on animal husbandry in urban areas.

Municipalities such as Pittsburgh (PA) and Indianapolis (IN), in contrast, have created frameworks for practitioner compliance that prevent any single individual or interest group from vetoing the practice. Some municipalities allow considerable latitude in production practices. Indianapolis, for instance, allows not only chickens but roosters (which must be kept in an enclosure at night), turkeys, goats, alpacas, llamas, miniature horses, and more (larger animals require a minimum of 0.25 acre and up). Indianapolis permits the slaughter of personal animals on site (City of Indianapolis, 2015), a rare right among the municipalities in our study. Homeowners in Jersey City (NJ) can keep up to 50 chickens with no minimum lot size and only a 25-foot setback (City of Jersey City, 1971). Chicago (IL) is one of the few larger metropolitan municipalities that has never banned livestock or limited the number of animals permitted.

Urban Agriculture Production Regulations: Built Structures. We find urban agriculture–related built-structure regulations in 17 municipalities (including nine metropolitan municipalities in the Northeast and five in the Midwest) in which municipalities delineate heights and structure setbacks and indicate whether permits are required for structures such as greenhouses, hoophouses, and high tunnels. Regulations on the construction and maintenance of these structures vary widely. Pennsylvania's Act 157 allows the construction of certain structures without requiring a building permit; conversely, Seattle limits the size of an urban agriculture structure to 1,000 square feet and 12 feet high, with a 15-foot allowance for rooftop installations on greenhouses. In Seattle, practitioners must obtain a building permit for any structure larger than 120 square feet (City of Seattle, 2010). Cleveland, in contrast, requires permits for all structures, including small sheds (City of Cleveland, 2010). Cleveland's Urban Garden District allows farming, onsite sales of agricultural products, greenhouses, and hoophouses but has restrictions on accessory structure height and lot coverage (City of Cleveland, 2007).

Urban Agriculture Production Regulations: Practitioner Responsibility. We find that 22 municipalities in our sample have regulations on the responsibility of practitioners, which includes requirements to test soil, reduce chemical use, provide setbacks, control runoff, carry liability insurance, and pay for water access. Setback requirements generally address backyard animals, beekeeping, built structures (discussed earlier), and even crops.

Detroit, for example, requires a 5-foot setback from property boundaries for all crops (City of Detroit, 2013).

The requirement to test soil for new urban agriculture projects is a common regulatory practice designed to address environmental and health concerns. Boston requires that independent companies perform an environmental site assessment to certify the safety of all soils on a site (including imported soil; City of Boston, 2013b). Pittsburgh, in contrast, does not mandate soil testing but recommends it (Pittsburgh Department of City Planning, 2015). Most of our sample municipalities do not mandate but recommend soil testing.

Only two municipalities in our sample directly address chemical use; we anticipated more given the proximity of many urban agriculture sites to residential development. Austin (TX) states that no synthetic inputs can be used on any urban agriculture site and requires practitioners to develop an integrated pest management practice (City of Austin, 2013). Seattle requires that proposed chemical use be listed in the site management plan (City of Seattle, 2010). The Seattle site management plan is a one-stop shop of regulatory compliance for urban agriculture practitioners, who can check off every box in one plan for one fee.

Only a handful of municipalities in our sample specifically regulate or restrict potential urban agriculture runoff. Kansas City (MO), for example, has design and landscaping guidelines to mitigate runoff (City of Kansas City, 2015). Most of the other municipalities in our study do not allow runoff but leave compliance to practitioners; Seattle, for example, requires that practitioners address these issues in their site management plan but allows them to decide on the methods used to meet the requirements (City of Seattle, 2010).

Few of the sample municipalities require liability insurance for urban agricultural sites. Some municipalities do require that the leases for community gardens include liability insurance and acknowledge that the lessor will not be responsible for providing compensation for any improvements made to the land. In New York City, however, any site that is registered through the city-sponsored Green Thumb program is automatically covered by the liability insurance of the Parks and Recreation department (NYC Parks & Recreation, 2006). Cleveland requires all urban agriculture sites to carry $1 million in liability insurance in addition to naming the city as a party covered by the policy (City of Cleveland, 2015).

We do not find wide use of water access–related regulations. New York City allows any urban agriculture site free use of fire hydrants after it obtains a free permit (NYC Parks & Recreation, 2015), whereas Cleveland provides reduced water rates to urban agriculture sites (City of Cleveland, 2015).

Fiscal Policy and Regulations: Sales. Some municipalities regulate the sale of vegetables, eggs, milk, or value-added products such as pickles, jams, or cheeses that urban agriculture practitioners raise or produce. Larger municipalities allow vegetable sales only onsite or at farmers' markets. Six of our municipalities, including Nashville-Davidson (TN), Harrisburg (PA), Monroe (LA), and Methuen (MA), prohibit the sale of agricultural products grown or created by practitioners. Most municipalities in metropolitan areas (n = 37) do not explicitly prohibit where and how agricultural products may be sold. Denver's (CO) sales regulations are by far the most permissive of those cities that actually discuss allowable or restricted sales of agricultural products, thanks to Colorado's Cottage Food Act (City and County of Denver, 2012). Colorado residents may sell a large variety of homegrown agricultural products by paying a one-time $20 permit fee.

Fiscal Policy and Regulations: Tax Abatements. Some municipalities (n = 13) offer full abatement of the property taxes on urban agriculture sites: Such sites are completely exempt from property tax. Some municipalities offer partial abatement of property tax (n = 7), giving such sites a partial reduction on prevailing property tax rates in their zoning districts. Some municipalities (n = 17) tax urban agriculture at the same rate that large-scale agriculture is taxed elsewhere in the region or state. New York City, for example, offers full tax abatement to urban agriculture properties that are registered with its Green Thumb program (City of New York, 2010), whereas Pittsburgh taxes urban agriculture at the same rate that conventional agriculture is taxed in the rest of Allegheny County.[1] Partial abatements range from 10% to 90%, with most cities offering higher rates of tax relief.

Fiscal Policy and Regulations: Urban Agriculture Fees. Nearly all municipalities that allow practitioners to raise animals require the site or the practitioner to pay some sort of registration fee. In San Francisco, for example, a prospective urban agriculture site must first pay $350 for a change of use permit (SFEnvironment, n.d.). In Kansas City, urban agricultural ventures can operate without permits in low-density residential districts on the city's outskirts but must obtain a special use permit for $104 in other zones if onsite sales are planned. This special use permit fee is significantly less than other fees that the city imposes for other uses, most of which start at more than $800.[2]

Needed Research: Connecting Regulatory Reviews With Practice

Municipalities differ in their response to various practices in urban agriculture production; this lack of uniformity can be of empirical interest. Recognizing how uneven the local regulation of urban agriculture is constitutes an important first step in new research that systematically compares regulations and outcomes across jurisdictions. Municipalities are filling the urban agriculture production policy vacuum in a variety of enabling statutes. We find that many jurisdictions around the country are reconstructing regulations on animal husbandry, for example, in keeping with a growing interest in urban agriculture production. Some municipalities have chosen to seriously rethink previous public health and sanitation concerns about urban agriculture in general and raising animals in particular. We also believe that municipalities may associate urban agriculture production with economic activity, creating ordinances aimed at the economic potential of urban agriculture. Existing literature, however, has relatively little to say about the economics of urban agriculture.

We see three principal knowledge gaps about urban agriculture that planning scholars might address. First, we need a complete typology of regulatory possibilities, complemented by examples of existing regulations and how they are interpreted, implemented, or enforced, along with a description of how they enable or constrain urban agriculture activities. Such a typology could be a living document responsive to regulatory innovation in changing contexts. Students could learn possible innovations they might advance as planning practitioners from scholars whose research efforts could identify connections between such ordinances, community practices, and the subsequent impacts on the number and type of people involved in urban agriculture, community social capital, health, and community wellbeing. Planning scholars could use the typology to help localities discover or adopt models that lead to successful implementation of urban agriculture policies and programs linked to desired outcomes.

The second gap in our knowledge is the need to understand how local, state, and federal laws constrain or enable urban agriculture practices and how local, state, and federal agencies can advance or limit urban agriculture.

Third, planning practitioners need a more complete picture of the social, economic, and environmental outcomes and impacts of urban agriculture. We need to understand the actual economic inputs and outputs of urban agriculture policies along with the net benefits. Planners need to understand production practices and how they vary across production modalities (i.e., soil, aquaponics, hydroponics). Planners also need to know the impacts of various land use tools that address the land tenure challenge facing many urban agriculture projects. Future research may investigate whether successful planning projects result from collaborative and multidisciplinary efforts.

Planners and Urban Agriculture

Our review of 80 metropolitan and micropolitan municipalities across the United States reveals the various ways in which different jurisdictions are regulating urban agriculture, showing how and where regulatory regimes are taking root and changing. Many U.S. municipalities, recognizing the benefits of urban agriculture, are creating new urban agriculture regulations and programs, reconstructing their existing regulations to remove or reduce conflict and standardize practices. Regulations may encourage or impede different activities; some grant legitimacy and encourage urban agriculture, whereas others delegitimize and discourage those practices. Some regulatory practices we find directly correspond to the array of socioeconomic–environmental and operational challenges discussed earlier, such as soil contamination and land tenure.

Planners and policy analysts can play an important role in making urban agriculture a legitimate and formalized urban land use. They can begin by assessing existing legal practices and policies and considering the kind of regulatory frameworks that might support a variety of urban agricultural activities that advance multiple goals. Planning professionals simply doing their job diligently, assessing unused public land, or conducting zoning and land use reviews can consider redeveloping underused spaces for urban agricultural uses when appropriate. Planners might also consider how to use newer tools such as the Local Foods Measurement toolkit to recognize the tight and necessary relationship between regulation and economic activity as well as the various societal benefits that planners might advance with appropriate regulation of urban agriculture.

Planners can address the land tenure problems that challenge many urban agricultural activities by deploying existing land use tools or experimenting with new ones, such as land banks, transferable development rights, and/or conservation easements, particularly in disadvantaged communities. Planners can help bridge the gap between public agencies and diverse users to promote the interorganizational cooperation that makes contextually sensitive urban agriculture possible. Planning practitioners can also

promote inclusive decision making and community engagement, both of which are crucial to addressing racial exclusion in urban agriculture.

Planning academics and scholars can promote actionable knowledge to practitioners based on the experiences of communities across the United States. We need more basic research, however, especially on the economics of urban agriculture and the relationship between various categories of urban agriculture benefits, to actualize the promise of urban agriculture for people in cities large and small around the country.

Acknowledgments

We would like to thank the anonymous reviewers for their thoughtful comments and suggestions on earlier drafts of this article. We also thank Jason Hachadorian and Kyle Hearing for providing additional research assistance and Amy Laura Cahn, J.D., for her valuable feedback on an earlier draft.

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Notes

1. Phone interview with S. Danko-Day, open space specialist, Department of City Planning, City of Pittsburgh, Pennsylvania, on November 10, 2015, by L. Bonarek.

2. Phone interview with J. Peterson, planner, Development Management Division, City Planning and Development, Kansas City, Missouri, on November 25, 2015, by L. Bonarek.

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