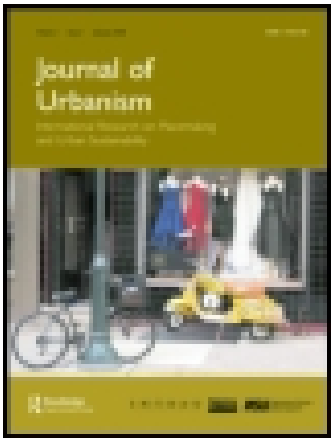

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Complexity in urban agriculture: the role of landscape typologies in promoting urban agriculture's growth

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Complexity in urban agriculture: the role of landscape typologies in promoting urban agriculture's growth

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This research identifies the potential shortcomings of local initiatives to encourage urban agriculture projects by comparing citywide efforts with existing community projects. It investigates how more effectual policy might be developed to accommodate a fuller range of urban agriculture projects, and how urban agriculture stakeholders might use clearer promotion processes to meet stated goals. It hypothesizes the important role of clear urban agriculture definitions, typologies, and links to associated benefits towards meeting the stated goals of policy-makers. Utilizing San Francisco in California as a case study, this paper investigates recent efforts at citywide urban agriculture promotion.

Keywords: urban agriculture; city land audit; environmental design; landscape typology; San Francisco; landscape architecture

Introduction

This research seeks to identify the potential shortcomings of local initiatives designed to support urban agriculture projects by investigating the processes of citywide promotion in comparison with existing grassroots' efforts at individual projects. It coincides with the mounting interest in urban agriculture in cities throughout North America. The paper investigates how more effectual urban agriculture policy might be developed to accommodate a fuller range of urban agriculture projects, and how urban agriculture stakeholders might use clearer promotion processes to meet stated goals. It hypothesizes the important role of clear urban agriculture definitions, typologies, and links to associated benefits that would assist in meeting the stated goals of policy-makers.

Utilizing San Francisco in California as a case study, the first part of this paper examines the city's current efforts at promoting urban agriculture at two scales: the citywide inventory process, conducted by multiple departments with jurisdiction over city property; and a site-specific analysis of pilot urban agricultural site on San Francisco Public Utilities Commission (SFPUC) land. It compares these efforts against the processes undertaken by community-based organizations to promote individual urban agriculture projects. Secondly, this paper evaluates the terms and priorities utilized by both the city and community organizations to develop a comprehensive list of urban agriculture landscape typologies. It evaluates the role these landscape typologies play in impacting decision-making in San Francisco's urban agriculture promotion processes by tracing the links between stated goals, typological definitions of urban agriculture, and associated benefits. Lastly, this paper theorizes an alternative 'goal-based' approach to local governmental urban

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agriculture promotion through land inventory and site analysis, by promoting a greater awareness of the complexity inherent of defining urban agriculture, and by introducing a new framework for balancing landscape forms, programs, and needs within a community.

While San Francisco's process for promoting urban agriculture has included public land inventory for urban farming site suitability and the selection of pilot sites for community involvement, these pilot projects have been slow to receive support from local communities. This paper argues that the 'available land' method does not provide the most effective means of meeting both city and community goals through urban agriculture. In particular, variations in the priorities between community and city efforts have interfered with the effectiveness of current efforts to promote urban agriculture, while connections are lacking between the stated goals of urban agriculture and the landscape typologies associated with those benefits. Ultimately, this paper seeks to encourage continuation of the systematized involvement of city agencies in the promotion of urban agriculture; however, it suggests an alternative model for its advocacy that requires recognition of the complexity in urban agriculture landscape typologies in meeting city and community needs.

A significant body of research has been conducted to advocate the role of urban agriculture in promoting numerous social and environmental benefits. From food security (Rees 1996; Burke 2010) to waste management (Smit and Nasr 1992; UNDP 1996; Girardet 2005), increased health and nutrition (Mougeot 2006) to the provision of thriving public space (Lawson 2005; Hou, Johnson, and Lawson 2009; Francis 1987), urban agriculture is touted as an answer to many conditions plaguing urban environments. For this reason, urban farming is fast becoming an important land use in post-industrial American cities and is increasingly included within city planning and visioning efforts, as demonstrated in the cities of Seattle (Washington) (Hou, Johnson, and Lawson 2009), Portland (Oregon) (Mendes et al. 2008), New York City (Design Trust for Public Space 2012), and San Francisco (Office of the Mayor, City and County of San Francisco 2009), to name a few. Environmental designers, including landscape architects, urban designers, and city planners, are utilizing techniques at multiple scales to address the physical planning and design of agriculture integrated into an urban metropolis with support from community groups, master gardeners, and local farmers. Meanwhile, many city municipalities are working to assess and revise current policies to promote urban agriculture's growth while conducting inventories of available urban land for potential farming sites. Examples include Portland's Diggable City Project, Vancouver's (Canada) Food Action Plan, and San Francisco's Healthy and Sustainable Food Initiative (Mendes et al. 2008; Office of the Mayor, City and County of San Francisco 2009). Within San Francisco, recent initiatives to systematize local governmental support of urban agriculture include local zoning amendments, public land audits, and pilot projects on public utility-owned land. Thus, the foundation of the San Francisco's urban agriculture organizational infrastructure is being laid, and the city stands to establish an important system for promoting the social and environmental benefits attributed to urban agriculture, as do many other US cities striving to rise to the demands of local communities.

Drawing on the American Planning Association's (APA) definition, 'the production, distribution and marketing of food and other products within the cores of metropolitan areas (comprising community and school gardens; backyard and rooftop horticulture; and innovative food-production methods that maximize production in a small area) […],' (p. 2) urban agriculture has been defined to include community and private gardens, private and public edible landscapes, fruit trees, aquaculture, farmers' markets, small-scale market farming, animal husbandry, and food composting (Hodgson, Campbell, and Bailkey 2011). While providing an exciting opportunity for large-scale social and

environmental change, the broad description and catch-all list of urban agricultural landscape types and benefits can leave many cities and environmental designers unsuccessful at achieving an appropriate and successful approach to urban agricultural planning and design. Unfocused efforts without clear goals and approaches for promoting urban agriculture have left several inventory efforts ineffectual at promoting new urban agriculture projects or attaining the multitudinous social and environmental benefits attributed to its presence. While Portland's Diggable City Project has been successful at promoting public support and awareness for urban agriculture integrated with sustainability goals, the number of actual urban agriculture projects directly resultant from the project effort still remains small. Challenges to the process likely include the lack of definable goals within city agencies, and thus a lack of measurable outcomes for its success (Mendes et al. 2008). Mendes et al. (2008) have also hypothesized that Vancouver's Food Action Plan has faltered from a lack of clarity in goals, principles, or targets, the result of which has led to very broad descriptions of urban agriculture within the inventory process and a lack of engagement with local communities. Despite these potential shortcomings in recent citywide promotion efforts, individual urban agriculture projects at the local level thrive throughout these and many other North American cities. Significant urban agriculture projects initiated include the multiple P-Patch Community Gardens throughout Seattle (Beacon Food Forest 2012) and the Alemany Farm and Garden for the Environment projects in San Francisco (Alemany Farm 2012; Garden for the Environment 2012). Often initiated on a grassroots level, these urban agriculture projects exemplify the many social, economic, and health benefits associated with community-based urban agriculture.

Methodology

This paper represents a qualitative comparative review of the City of San Francisco's current citywide urban agriculture promotion efforts against the prior grassroots, community-based project initiation. It utilizes an extensive literature review of city documents related to the city's recent efforts to support urban agriculture, including review of Mayor Gavin Newsom's Executive Directive on Healthy and Sustainable Food issued in 2009, meeting agendas from the Food Policy Council from 2009 to 2011; meeting agendas from the SFPUC from 2009 to 2012 regarding secondary use permitting for urban agriculture; public presentation materials related to pilot projects developed by the SFPUC and Office of the Mayor; and amendments to the city's administrative ordinance regarding urban agriculture, as authored by the San Francisco Board of Supervisors (2012). Literature related to community-based urban agriculture projects that was reviewed includes meeting agendas and memoranda authored by the San Francisco Urban Agriculture Alliance (SFUAA), an organization that seeks to provide a collective voice for the dozens of individual non-profit and community-based urban agriculture projects throughout San Francisco. In addition, key informant interviews were held with Jessica Cassella, Office of the Mayor, Legislative Affairs Division; and Juliet Ellis, SFPUC, Assistant General Manager, External Affairs, regarding the city's current promotion efforts and urban agriculture pilot projects. Directors and managers of several community-based urban agriculture projects were also interviewed regarding the community project initiation processes, including: Blair Randall, Director of the Garden for the Environment; Ken Litchfield, Master Gardener for Alemany Farm; David Cody and Kevin Bayuk, Directors for the 18th and Rhode Island Permaculture Garden; Jay Rosenberg, Director of the Hayes Valley Farm; and Eli Zigas, Food Systems and Urban Agriculture Program Manager at the San Francisco Planning and Urban Research (SPUR) Association (2012).

In addition to a review of literature pertinent to San Francisco's efforts, a review of the literature related to urban agriculture definitions and associated benefits was conducted from an academic overview of the literature and academic environmental design literature. These definitions provided criteria for determining comprehensive spatial and programmatic landscape typologies of urban agriculture, which were then compared with the definitions and priorities associated with San Francisco's city and community-based promotion efforts. Comparisons between landscape typologies of urban agriculture and the forms and definitions utilized by both the city and community-based projects were drawn to assess shortfalls and misalignments between citywide efforts and the needs and priorities established by the community.

Literature review

Academic literature related to urban agriculture can be found in various disciplines, including public health, community development, agronomy, and soil sciences. For the purposes of this research, the review was limited to texts related to overview articles regarding urban agriculture definitions, typologies, and associated benefits, as well as literature related to the disciplines of environmental design, including planning and design of urban agriculture in North American cities. A substantial amount of information related to urban agriculture exists outside the sphere of academia, but has also been omitted from this review.

Several key texts provided important overviews related to the advocacy of urban agriculture, including Jac Smit and Joe Nasr's 'Urban Agriculture for Sustainable Cities: Using Waste and Idle Land and Water Bodies as Resources' (1992); the United Nations Development Programme's (UNDP) *Urban Agriculture: Food, Jobs, and Sustainable Cities* (1996); William Rees' 'Cities Feeding People' (1996); Bakker et al.'s *Growing Cities, Growing Food: Urban Agriculture on the Policy Agenda* (2000); Rene van Veenhuizen's *Cities Farming for the Future* (2006); and Charles Lester's 'Urban Agriculture: Differing Phenomena in Differing Regions of the World' (2006). Each of these texts provides a general framework for understanding the role of urban agriculture in promoting sustainable cities and introduces the multiple economic, social, health, and environmental benefits associated with its practice. In addition, each text takes a global approach to the definitions and benefits associated with urban agriculture, providing international case studies of urban agriculture in practice from Asia, Africa, South America and the Caribbean, and North America. More than anything, these texts reveal a collective sense that 'Urban Agriculture has almost as many definitions as locations' (Lester 2006, 5). The most comprehensive of these texts is the UNDP's 1996 report on Urban Agriculture, which discusses an overview of the topic, but also differentiates typologies and approaches by region and dedicates a chapter to the city policies impacting the inclusion of urban agriculture. One of the more recent of these texts, Lester's review of materials related to urban agriculture, includes an assessment of the current research being conducted on urban agriculture, noting that the disciplines of environmental design, including city planning, urban design, architecture, and landscape architecture, have been slow to address the role urban agriculture can play in urban development. He states, 'the inability of urban agriculture advocates to place their activities into the infrastructure vocabulary of urban planners is a major hindrance to its evolution' (Lester 2006, 55).

Since Lester's evaluation of the status of urban agriculture within the disciplines of environmental design, research within the discipline has steadily mounted, as general awareness and advocacy for urban agriculture has grown in many North American cities.

While several early academic texts highlight the important role urban planning must play in promoting urban agriculture (including Paul Sommers and Jac Smit's 'Promoting Urban Agriculture: A Strategy Framework for Planners in North America, Europe, and Asia' (1994); Soonya Quon's 'Planning for Urban Agriculture: A Review of Tools and Strategies for Urban Planners' (1999); Axel Drescher's 'Urban and Peri-Urban Agriculture and Urban Planning' (2000); Beacon Milda and Rene van Veenhuizen's 'The Integration of Urban and Peri-Urban Agriculture into Planning' (2001); and Marielle Dubbeling and Gunther Merzthal's 'Sustaining Urban Agriculture Requires the Involvement of Multiple Stakeholders' (2006), these texts focus primarily on the role of governmental policy-making (not physical planning) as applied to the generalized urban condition. Quon (1999) provides the most comprehensive analysis of local planning and policy-making endeavors to promote urban agriculture, including specific case studies in Asian and African cities. With regard to the physical and spatial considerations in planning and designing for urban agriculture, architects Andre Viljoen and Katrin Bohn are two of the first advocators for including urban agriculture within the lexicon of environmental designers, and their publication *Continuous Productive Urban Landscapes* (2005) represents one of the first general texts on urban agriculture geared towards architects, landscape architects, and urban designers. This work, however, focuses specifically on the physical forms of urban agriculture, providing design scenarios for urban agriculture's inclusion in the UK, and neglects some of the important policy and planning considerations for its promotion. A more recent publication by Bohn and Viljoen, 'The CPUL City Toolkit: Planning Productive Urban Landscapes for European Cities' (2012), addresses the connection between environmental designers and policy-makers in promoting urban agriculture. Through European city case studies, their paper argues that local urban agriculture practice has outpaced policy. The paper introduces a framework for the implementation of urban agriculture that employs four tools of action: bottom up and top down, visualizing, inventories of urban capacity, and research. The authors argue the consideration of spatial criteria alone is insufficient to promote urban agriculture, and stakeholder capacity is as important as the availability of the land.

Landscape architects have also conducted spatial evaluations of urban agriculture as design criteria while relating it to zoning and policy considerations; previous work predominantly evaluates a single typology of urban agriculture. In particular, community gardens have been commonly addressed by landscape architecture scholars, including Mark Francis's 'Some Different Meanings Attached to a City Park and Community Gardens' (1987); Laura Lawson's *City Bountiful: A Century of Community Gardening in America* (2005); Jeffrey Hou, Julie Johnson, and Laura Lawson's *Greening Cities, Growing Communities: Learning from Seattle's Urban Community Gardens* (2009); and Lee-Anne S. Milburn and Brooke Adams Vail's 'Sowing the Seeds of Success: Cultivating a Future for Community Gardens' (2010).

More recently, the APA released a planning advisory publication, authored by Kimberley Hodgson, Marcia Caton Campbell, and Martin Bailkey, entitled *Urban Agriculture: Growing Healthy, Sustainable Places* (2011). This publication provides a general overview of the terms, typologies, and benefits associated with urban agriculture. It also synthesizes policy considerations with the spatial criteria relevant to urban agriculture, specific to North American cities. As such, this text became integral to developing a spatial and programmatic set of typologies for this inquiry. In addition, the work of Mendes et al. (2008), which compares the site inventory processes utilized in Portland and Vancouver, provided a useful precedent in evaluating citywide promotion techniques by highlighting different strengths and weaknesses to a top-down approach to the promotion of urban agriculture.

Urban agriculture on San Francisco's public land

The presence of food production within North American cities is not a new story, as the victory gardening movements during World War I and World War II exemplify. In San Francisco, farming on publicly owned land has existed continuously since 1973 – although Victory Gardens were planted in Golden Gate Park during World War II (Lawson 2005). Throughout the 1970s, generous Housing and Urban Development (HUD) grants and support from the city's Department of Public Works (DPW) and Recreation and Parks Department (SFRPD) helped grow the presence of community gardens and other forms of urban agriculture on city-owned land in San Francisco. Following funding losses associated with Proposition 13 in the 1980s, the non-profit organization San Francisco League of Urban Gardeners (SLUG) was formed to help assist the SFRPD with operations and maintenance of community gardens and urban farming on public land until the late 1990s (The Trowel 1994). This included support for the creation of urban agriculture projects such as the Alemany Farm in 1994, a hybrid market and demonstration farm which still operates on SFRPD owned land in Bernal Heights (K. Litchfield, Master Gardener, Alemany Farm, personal communication, July 20, 2011) (Figure 1). SLUG was dissolved in the late 1990s following political scandals regarding administrative mismanagement of funds; despite that, many urban agriculture projects continued to persist and thrive with the initiation and support of multiple non-profit and community-based organizations. In fact, the number of urban and peri-urban agricultural sites on San Francisco and surrounding public lands has grown significantly in the past 10 years.

This is a result, in part, of the efforts of the SFPUC, which owns and manages the majority of public land within San Francisco City and County to maintain utilities and utility easements (B. Randall, Executive Director, Garden for the Environment, personal communication, August 15, 2011). Garden for the Environment and Sunol Agricultural Park are just two of the many urban agricultural projects operating as secondary uses on SFPUC lands (Figure 2). The SFPUC has encouraged secondary uses of their land, where

Figure 1. Alemany Farm on San Francisco Recreation and Parks Department land.

Figure 2. Garden for the Environment on San Francisco Public Utilities Commission (SFPUC) land.

appropriate, in mutually beneficial arrangements that provide open space for a range of programmatic activities that meet community needs, and reduce the costly maintenance requirements for the SFPUC. Up until now, urban agriculture projects on SFPUC land have been initiated by community groups on a grassroots level, typically the result of local residents identifying available and suitable growing land, pursuing lease agreements with the SFPUC, and seeking funding sources independently (J. Cassella, City Hall Fellow, Legislative Division, personal communication, June 11, 2012). Oftentimes this required establishing community-based and non-profit organizations to organize funding strategies and manage these projects. As a result, a myriad of community-based and non-profit organizations exist to support individual urban agriculture projects on public and private land throughout San Francisco and the Bay Area. These projects range from community gardens, demonstration farms, edible schoolyards, and market farms. In 2009, SFUAA was established to help organize the efforts between multiple urban farming projects, non-profits, and community groups into a collective voice, catalyzed by Mayor Gavin Newsom's *Executive Directive on Healthy and Sustainable Food* (E. Zigas, SPUR, Food Systems and Urban Agriculture Program Manager and SFUAA board member, personal communication, July 10, 2011). SFUAA provides opportunities for the sharing of resources and the development of a unified voice for advocating and directing urban agriculture's growth within the city, on both public and private land (SFUAA 2009).

For the first time since the HUD-funded efforts in the 1970s, San Francisco is endeavoring systematically to push the promotion of urban agriculture projects throughout the city, organized through the collaboration of city land-owning agencies. Mayor Gavin Newsom's *Executive Directive on Healthy and Sustainable Food* issued in 2009, declared the city's commitment to increasing healthy and sustainable food through the development of a Food Policy Council; investigation of local nutrition guidelines, food businesses, and school lunch programs; and a host of other initiatives aimed at assessing the current food

health of the city. This included two directives related to urban agriculture: an audit of all city-owned land to be carried out by various departments with jurisdiction over public land, and coordination by the SFRPD and the Department of the Environment (DOE) to advocate increased food growing within the city (Office of the Mayor, City and County of San Francisco 2009). Following the completion of the audit, a summary report was released in December 2010 that detailed the process for land audits conducted by the city (Office of the Mayor, City and County of San Francisco 2010). Two sites located on SFPUC (2011) land identified by the audit are currently under investigation as pilot projects (SFPUC 2012).

In May 2011, another citywide effort to promote urban agriculture was adopted that included revisions to zoning ordinance 66–11, which permits 'neighborhood agriculture,' limited to 1 acre in size or less, in all zoning districts of the city. The zoning ordinance also defines several physical and operational standards, and permits the sale of products from 'neighborhood agriculture' on-site between 6 a.m. and 8 p.m. (SFUAA 2011a). This amendment to zoning regulations has supported the growth of for-profit urban farms within San Francisco, including the Little City Gardens, a commercial urban farming business operating in the Bernal Heights neighborhood. Little City Gardens sells produce via an on-site farm stand, a Community Supported Agriculture (CSA) farm box, and directly to local area restaurants (Little City Gardens 2011). In addition, legislation pertaining to the establishment of an urban agricultural program unanimously passed the city's Land Use and Economic Development Committee in June 2012. Amendments to sections 53.1 of the city's administrative code, if passed by the Board of Supervisors in forthcoming months, will formally establish an urban agriculture program 'to oversee and coordinate all of the City's Urban Agriculture activities; and adopt goals for the City related to Urban Agriculture' (Board of Supervisors, City of San Francisco 2012). This will be the first formal adoption of an urban agricultural ordinance; it will provide a framework for the administrative infrastructure to support citywide projects on public and private land.

San Francisco public utility's strategy for urban agriculture on public land

The mayor's executive directive to pursue an audit of public lands required the establishment of necessary criteria for the site selection process. The San Francisco Food Policy Council (SFFPC), a working group consisting of the mayor's Director of Greening, and members of the Department of Planning, Department of Public Health, and DOE, established the following criteria for assessing site suitability of land for urban agriculture: type and size, site availability, slope, surface treatment, light exposure, water access, public transit, vehicle access, riparian zone, and other considerations (Office of the Mayor 2010). Utilizing these criteria, 55 vacant city-owned parcels were identified, of which 13 sites were deemed suitable for urban agricultural use. Of those 13 sites, two were selected to be pilot projects based on their relative sizes and qualities of space, and were deemed to be the most likely for a 'successful urban agriculture project.' These two sites were selected, in part, due to their ownership by the SFPUC, which has experience conducting secondary use agreements. Individuals from the real estate and external affairs divisions at the SFPUC are currently assigned to manage the current efforts at these pilot sites.

The city's and the SFPUC's efforts to promote urban agriculture on public land have included the support and collaboration from the SFUAA. The SFUAA has played a significant role in defining the goals, processes, and criteria for urban agriculture itself, serving as the collective voice of multiple community groups. Members of the SFUAA drafted a memo to SFPUC, identifying the major priorities of urban agriculture stakeholders. These

priorities include: increasing public land access; increasing access to materials such as mulch, compost, and tools; inclusion of educational programming as a component of urban agriculture; and inclusion of distribution and processing as components of urban agriculture. Aside from addressing priority urban agricultural land uses, the memo also recommended implementation and funding plans for the expansion of local food production (SFUAA 2010). In December 2011, following the completion of the city's comprehensive land audit, SFUAA drafted an additional memo to the SFFPC detailing recommendations on the SFPUC's Urban Agriculture Pilot Projects (SFUAA 2011b). These recommendations included a description of application processes and procedures for community members to gain access to identified sites, and more importantly, a comprehensive list of urban agriculture landscape typologies for consideration on pilot sites (Table 1). Both the community application process and the urban agriculture landscape typologies are being utilized by SFPUC to help systemize the process of partnering community groups with available public utility land.

The Garden for the Environment, a long-time SFPUC secondary-use collaborator and member of SFUAA, was solicited to help further the development of the pilot urban agriculture projects by conducting a site analysis and feasibility study of each of the selected pilot sites. Criteria for consideration were similar to the criteria used in the initial audit, and included: sun exposure; microclimate; average rainfall; slope; current and prior use of site; availability of water; suitability of raised or in-ground beds, animal husbandry, fruit tree orchard; maintenance considerations; access; neighboring properties; and neighborhood context (Garden for the Environment 2011). One pilot site is located on existing lawn at the Southeast Waste-water Treatment Plant in the Bayview neighborhood; the other is located alongside the existing College Hill reservoir in the Bernal Heights neighborhood of San Francisco (SFPUC 2012). The Southeast Treatment Plant pilot site is temporarily on hold for development, as community interest has been limited given its location in a predominantly industrial-use neighborhood. Other urban agricultural uses, such as a food distribution center, are being considered as alternatives to a community-based food growing program. The College Hill pilot site is still in consideration as an urban agriculture site, following its site assessment. Given the proximity of four public elementary schools within walking distance to the site, preliminary proposals are being developed for an educational garden at that site (J. Ellis, SFPUC Executive Director of External Affairs, personal communication, June 11, 2012).

Table 1. San Francisco Urban Agriculture Alliance (SFUAA), list of urban agricultural forms.

1.	Community garden – plot-based allotment
2.	Community garden/farm – communally managed
3.	Demonstration garden/farm
4.	Market garden
5.	Orchard
6.	Animal husbandry
7.	Aquaponics
8.	Large greenhouses
9.	Rooftop garden/farm
10.	Resource centers
11.	Food retail
12.	Food processing facility

Source: San Francisco Urban Agriculture Alliance (SFUAA 2011b).

Analysis of priorities and urban agriculture typologies

San Francisco's urban agriculture priorities

It is important to distinguish the priorities as stated by the mayor's executive directive in 2009, the SFPUC's on-going citywide urban agriculture promotion, and lastly SFPUC's efforts specifically within the pilot site, as there are variations within the efforts at all three levels. The mayor's directive states its overall urban agriculture promotion and land audit priority as 'the long-term provision of sufficient nutritious, affordable, culturally appropriate, and delicious food for all San Franciscans' (Office of the Mayor, City and County of San Francisco 2009). The SFPUC's stated priorities include the promotion of water conservation, pollution prevention, and community benefits. SFPUC adheres to a policy of sustainability, including the promotion of community benefits, and was the first public utility to develop an Environmental Justice Policy in 2009. Specifically, at the College Hill pilot site, SFPUC's stated priorities include developing a partnership with the San Francisco Unified School District (SFUSD) to promote an educational urban agriculture secondary use, integrated with neighborhood public school curriculum (J. Ellis, SFPUC, Executive Director of External Affairs, personal communication, June 11, 2012). At all levels, these priorities share an alignment with the literature-based benefits of urban agriculture as determined by the recent Planning Advisory Service Report developed by APA entitled *Urban Agriculture: Growing Healthy, Sustainable Places* (2011). Benefits include a range of health, social, economic, and environmental outcomes related to urban agriculture (Hodgson, Campbell, and Bailkey 2011) (Table 2). From the city scale to the site scale, an appropriate narrowing of the priorities of urban agriculture occurs, but subtle shifts also occur. While the mayor's executive directive touches upon sustainability issues and environmental health, its primary focus includes the health benefits associated with urban agriculture. The SFPUC's priorities more specifically address environmental benefits associated with urban agriculture, and in particular resource management goals related to water. This is likely due to the SFPUC's primary function in managing public utilities, including the provision of clean water and wastewater treatment. The SFPUC also addresses the social benefits attributed to urban agriculture through its prioritization of community benefits at the city scale. This occurs most notably at the site scale, where the College Hill pilot project is planned for integration with local public schools. On a whole, the three scales of urban agriculture promotion, while narrowing in priorities, also shift efforts from health-related goals, to environmental, and lastly social and community-based needs (Figure 3). This shift in priorities has a direct impact on the range of analysis types utilized from citywide audits to specific site analysis. At the citywide scale, site selection was driven primarily from an analysis of 'available land,' drawing on literature related to the minimal spatial constraints for food growing. The available land approach, while producing 13 sites, has already faltered in one of the pilot sites chosen, as the Southeast Treatment Facility has failed to gain community interest. The College Hill site, while addressing site context through its programmatic relationship to neighborhood schools, approached this condition only following the assessment at site scale. The citywide audit did not take into consideration the location of existing schools in developing potential urban agriculture sites, and as such, the College Hill sites program was only developed following its selection. Furthermore, it is unclear whether the site is located in a neighborhood most in need of the program being proposed. In short, by selecting programmatic endeavors for sites following the 'available land' selection process, it is unclear whether the stated goals of the mayor's executive directive, the SFPUC, or community groups are being met to the fullest potential.

Table 2. American Planning Association (APA), urban agriculture typologies and elements.

(a) Urban agricultural types

Noncommercial:

(1) Private garden
(2) Community garden
(3) Institutional garden
(4) Demonstration garden
(5) Edible landscape
(6) Guerilla gardening
(7) Hobby bee-keeping
(8) Hobby chicken-keeping

Commercial:

(1) Market farm
(2) Urban farm
(3) Peri-urban farm
(4) Bee-keeping

Hybrid urban agriculture

(b) Urban agricultural elements

Accessory structures and materials:

(1) Growing
(2) Irrigation
(3) Compost
(4) Bees, poultry, animals
(5) Fish
(6) Storage
(7) On-site sales
(8) Other (benches, shade structures, restrooms, tables, etc.)

Processing facilities:

(1) On-site facility
(2) Community kitchen
(3) Community processing center

Distribution:

(1) Food hub

Retail destinations:

(1) Farm stand
(2) Farmer's market
(3) Community supported agriculture
(4) Farm-to-institution
(5) Food cooperative
(6) Other (restaurants, catering businesses, food carts, grocery stores, etc.)

Source: Hodgson, Campbell, and Bailkey (2011).

San Francisco's formal urban agriculture typologies

In order to achieve the goals stated by the city and agency, the SFPUC has relied on the direction from the SFUAA to determine the potential landscape forms of the urban agriculture projects. SFUAA urban agriculture landscape typologies include: community gardens (plot or allotment based), community farm (communally managed), demonstration

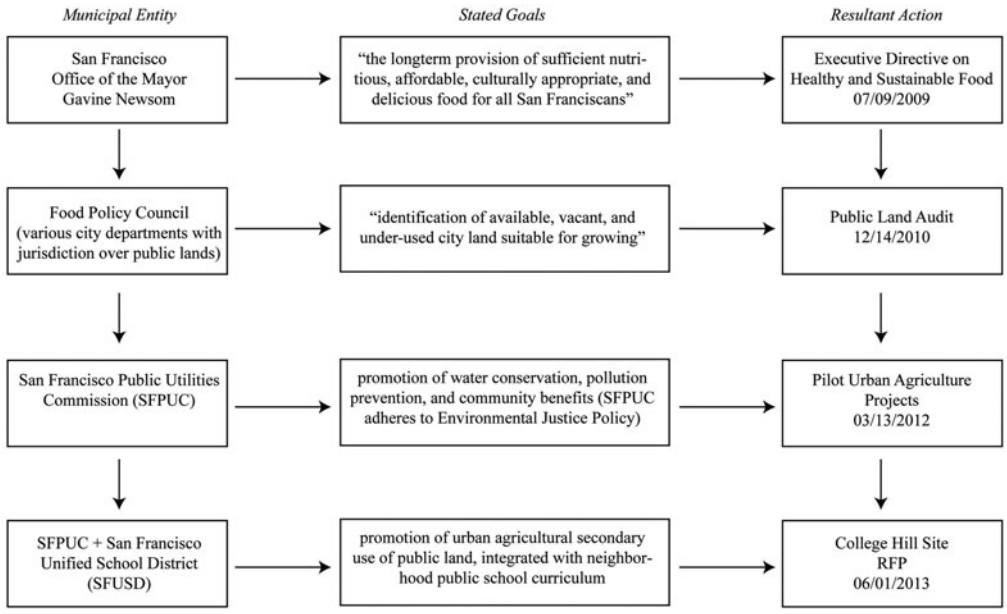

Figure 3. San Francisco's citywide urban agriculture promotion process.

garden or farm, market garden, orchard, animal husbandry, aquaponics, large greenhouses, rooftop garden or farm, resource centers, food retail, and food processing facility (SFUAA 2011b) (Table 1). These urban agriculture landscape typologies share similarities with the landscape types and elements defined by the Planning Advisory Service Report, which include: private garden, community garden, institutional garden, demonstration garden, edible landscape, guerilla gardening, hobby bee-keeping, hobby chicken-keeping, market farm, urban farm, peri-urban farm, and bee-keeping (Hodgson et al. 2011) (Table 2). The APA's report also includes a list of urban agricultural elements, including: accessory structures and materials, distribution, and retail destinations. The SFUAA's typology list includes terms that are defined by the APA as UA elements (Table 3). Urban agriculture landscape elements are defined as a landscape component that can be found in any number of urban agriculture typologies, but does not constitute a typology in and of itself. Similarly, urban agriculture location or context is a descriptive criterion inherent of all urban agriculture projects, but does not define a specific typology. The APA's urban agriculture landscape typologies include a distinction between typologies and elements, but also separates typologies by programmatic goals (commercial or non-commercial), utilizing the term 'market' to refer to commercial urban farming and 'garden' to refer to non-commercial urban farming. The APA's typology list also includes urban contextual criteria, drawing a distinction between urban farms and peri-urban farms. The SFUAA also makes a distinction between programmatic goals, differentiating between 'farm' and 'garden' within their landscape typology list. They do not, however, take into account the urban context of urban agriculture typology, but list a rooftop garden/farm as a distinct type based off differentiation of garden/farm located on buildings.

At both the scale of the citywide land audit and the pilot site analysis, selection criteria relied predominantly on spatial characteristics of the site – including scale, slope, and other physical forms (Office of the Mayor, City and County of San Francisco 2010). In

Table 3. American Planning Association (APA), listed benefits associated with urban agriculture.

Health benefits:
(1) Increase accessibility to fruits and vegetables
(2) Provide opportunities for public health programming
(3) Therapeutic benefits of gardening
(4) Food security
Social benefits:
(1) Opportunity for community involvement
(2) Social interaction between ethnically and age-diverse communities
(3) Connection between farmers and consumers
(4) Community economic security
(5) Vacant property reuse strategy and catalyst for community development
Economic benefits:
(1) Provides volunteer-based maintenance
(2) Increase local employment opportunity or training
(3) Generates income
(4) Capitalizes on underused resources
(5) Increase property values
(6) Reduces food expenditures to free larger portion of household income
Environmental benefits:
(1) Contribution to environmental management and productive reuse of contaminated land
(2) Decreased storm-water run-off
(3) Improved air quality
(4) Increase urban biodiversity and species preservation

Source: Hodgson, Campbell, and Bailkey (2011).

addition, the SFPUC has relied on the predominantly spatial urban agriculture typology list developed from the SFUAA. By removing programmatic considerations (commercial versus non-commercial, farm versus garden), urban context or location (urban versus peri-urban, rooftop versus vacant lot), and landscape elements (orchard, tool shed, aquaponics, etc.), thereby analyzing solely on their physical form, the urban agriculture landscape types as defined by the SFUAA and APA can be condensed into six predominant spatial types. These spatial forms – kitchen garden, allotment farming, edible landscape, small urban farm, large urban farm, and retail or distribution site – specifically define urban agriculture landscape typologies through formal patterns, and do not address programmatic goals, or contextual site considerations (Table 4). Kitchen gardens are defined as small-scale product-producing landscapes adjacent to an existing building with related program activities (such as a kitchen or classroom), typically employing raised beds in an enclosed space. Allotment farming is a plot-based product-producing landscape with individually managed and divided plots, also typically enclosed with raised beds, with community gardens being the most prevalent example. Edible landscapes are food-producing landscapes integrated within existing landscape design and programs, including integration with non-edible plants and non-food related programs; enclosed and unenclosed examples exist. Small-scale farms are product-producing landscapes, occasionally integrated with alternative programs. Large-scale farms are product-producing landscapes, typically designed for productive output and occasionally balanced with alternative programs. Lastly, retail,

Table 4. Programmatic and spatial typologies of urban agriculture.

Spatial typologies	Programmatic typologies
1. Kitchen garden	1. Ornamental plant use
2. Allotment farming	2. Recreational gardening
3. Edible landscape	3. Demonstration/education
4. Small-scale farm	4. Gleaning/foraging
5. Large-scale farm	5. Personal consumption
6. Retail, distribution, and support sites	6. Subsistence
	7. Commercial market farming
	8. Retail and product distribution

Note: Generated by the author.

distribution, and support sites are temporary or permanent structures housing programs related to the retail and distribution of urban grown products, with the most prevalent example being farmer's markets. By comparing the condensed list of urban agriculture landscape types against the lists provided by the SFUAA and APA, it is clear the condensed list addresses all types presented by both, except guerilla gardening. Guerilla gardening is defined as the growing of plants on vacant private or public land without permission or lease agreements (Hodgson, Campbell, and Bailkey 2011). It can occur in abandoned city lots, parking and street medians, and even within cracks in the sidewalk. Given guerilla gardening's insurgent nature and lack of discernible spatial patterns, the implications of the city's land audit plays little role in the presence of guerilla gardening. Interestingly, one form of urban agriculture within the condensed list is not addressed by the SFUAA's typology list: edible landscapes (Figure 4). There are implications to the SFUAA's neglect of this landscape typology. San Francisco's recent land audit does not include consideration of dual programmatic uses of the site, as edible landscapes suggest. For example, edible streetscapes (the utilization of fruit and nut bearing trees in public streetscape right-of-ways) or edible public parks (the utilization of food-producing plants in public parks) would not be a consideration within the current efforts for increasing localized food production on public landscapes. Successful examples of this urban agriculture landscape typology exist in other cities, including the City of Davis' use of fruit-bearing olive trees for street trees, which supply the for-profit UC Davis Olive Center with fruit for oil, lotions, and table olives (D. Flynn, University of California, Davis Olive Center, personal communication, April 16, 2012) and Seattle's use of edible woodland plants within an existing public park, which will provide foraging opportunities for park users when completed (Beacon Hill Food Forest 2012).

San Francisco's programmatic urban agriculture typologies

While San Francisco's current land audit and site analysis approach relies predominantly on determining available and suitable growing space based on spatial and physical constraints, programmatic considerations are implicitly present in the typological lists utilized. As such, urban agricultural landscape typologies can be categorized programmatically, as well as spatially. When removing spatial conditions from the above list and addressing typologies based solely off their programmatic function, an alternative set of landscape types is created (Table 4). These typologies address the programmatic intent of urban agriculture; for example, recreational gardening, demonstration or education purposes, or the production of food for personal consumption, subsistence, or commercial sale. This list

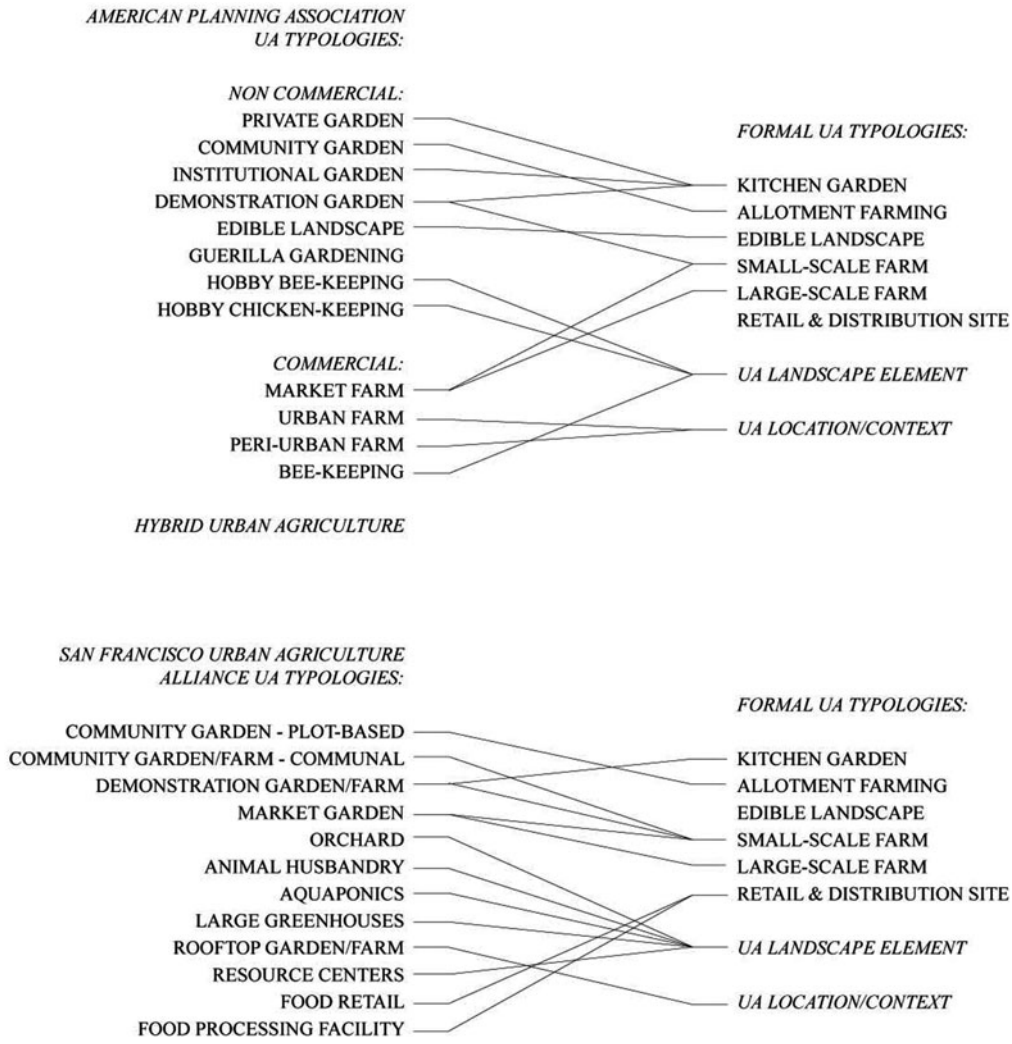

Figure 4. American Planning Association (APA) defined, San Francisco Urban Agriculture Alliance (SFUAA) defined, and formally defined urban agriculture typologies.

addresses the commercial and non-commercial distinctions made by the APA, and the distinctions suggested by the SFUAA via 'market' and 'garden' typologies. Hybrids, as suggested by the APA, exist for any of the two or more programmatic typology listed. However, this paper omits consideration of hybrid typologies.

This list is significant when considering the approach currently being undertaken by the SFPUC, since it is not discussed within city or planning commission literature. Although programmatic functions are touched upon in the mayor's executive directive and subsequent reports, the criteria for land audit and site analysis focus primarily on the spatial opportunities and constraints related to urban food growing (Figure 5). The range of programmatic possibilities, from utilizing edible plants for ornamental purposes to the growing of food for demonstration and education purposes, separates urban agriculture

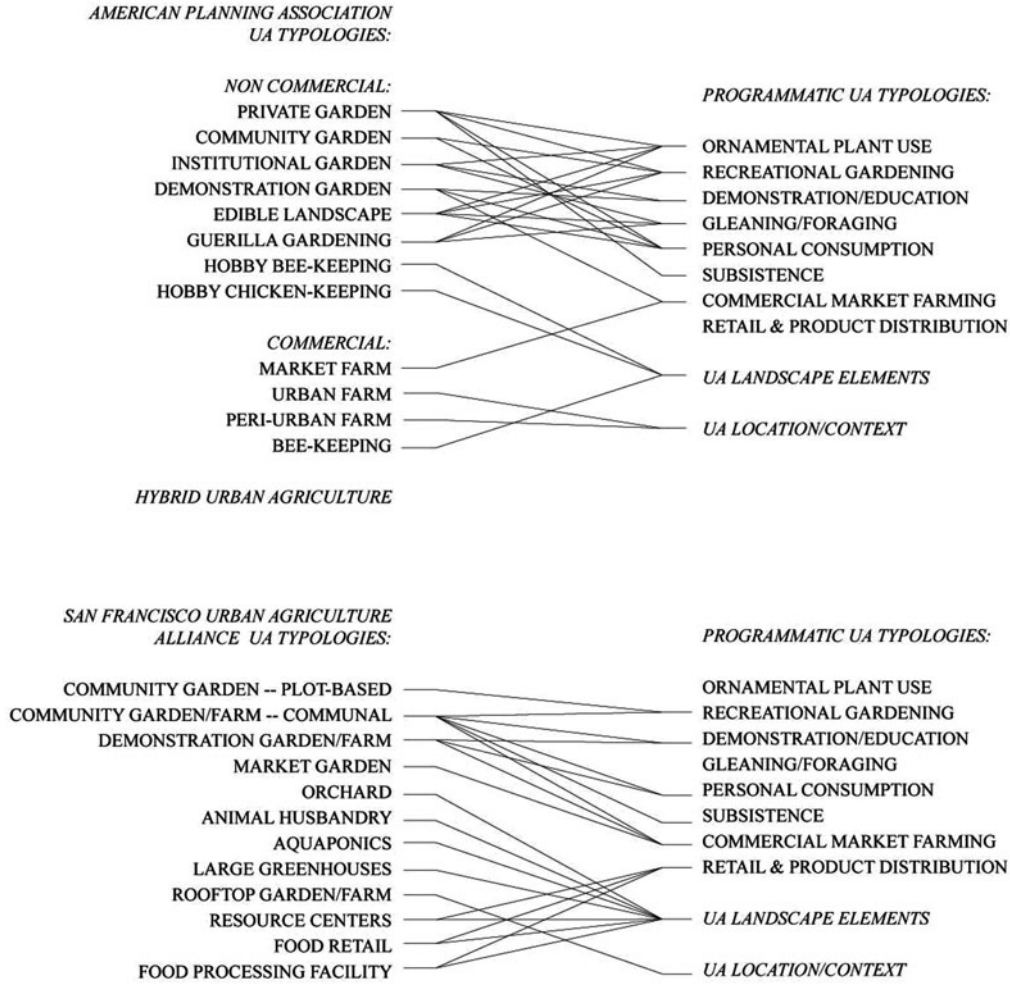

Figure 5. American Planning Association (APA) defined, San Francisco Urban Agriculture Alliance (SFUAA) defined, and programmatically defined urban agriculture typologies.

typologies from traditional agricultural programs. This sentiment is best stated in the feasibility study conducted by Garden for the Environment on the College Hill pilot site, which states:

> urban agriculture is different in significant ways from rural agriculture, where the singular goal is the agricultural harvest. This difference is essential to consider in the process of making SFPUC land available for urban agriculture in San Francisco because allotments of land which would be utterly unusable from the perspective of rural agriculture, will be useable for urban agriculture [*sic*]. (Garden for the Environment 2011)

Thus, a fuller recognition of the range of urban farming typologies might alter the criteria utilized for land audit and site analysis, thereby identifying additional or alternative sites for consideration. In addition, as with the omission of the edible landscape typology in SFUAA's definition, the programmatic typologies of gleaning or foraging, as well as

ornamental edible plant use, are also neglected – although the practice of gleaning from ornamental fruit trees within streetscapes already occurs in San Francisco (SFDPW 2012).

Addressing these programmatic typologies is important, as the programs suggest a greater link to the literature-based benefits associated with urban agriculture and the priorities established by city agencies and community groups. By identifying whether urban food-growing might be accomplished to demonstrate best management practices, produce market-value products, or beautify public streetscapes provides greater direction for city agencies, environmental designers, and community groups towards meeting mutual goals. For example, the difference between goals such as increased availability of nutritious foods versus developing community-based entrepreneurial opportunities could impact whether a project is designed for edibles versus non-edible products. Thus, addressing these programmatic typologies within the auditing process might yield a different range of sites within San Francisco than merely what is 'available, vacant, or under-utilized'.

New framework for citywide urban agriculture promotion

Recognizing the range of goals that occur within the mayor's executive directive, the SFPUC, and the community, it is important to recognize discrepancies between the city's 'top down' approach and grassroots initiatives to promote urban agriculture. While city officials address nutrition and affordability of healthy food, the SFPUC focuses primarily on environmental resource management, and the goals of local community groups vary from recreational gardening to commercial farming, all of these groups agree that urban agriculture can accomplish these goals and more. This is a result of the range of landscape typologies that exist within the definition of urban agriculture itself. In order to achieve a greater success rate in attaining the goals of urban agriculture, it will become necessary for city agencies and community groups to identify appropriate typologies, both spatially and programmatically, determined by their needs (Figure 6). It is also important to understand that these typologies operate as a network, in which demonstration gardens provide training for private residential kitchen gardens, and farmer's markets and other local retail sites provide a venue for local urban farmers. Additional study to address these local urban agriculture community networks is needed. This author theorizes that utilizing programmatic as well as spatial typologies to inform the land audit process will provide greater success in meeting both city and community goals. While efforts to promote urban agriculture as a land-use will inevitably need to address the physical constraints related to food-growing – including scale, microclimate, and land-use – alternative typologies suggest possible opportunities to diversify the site selection criteria and alter the land audit process currently employed in San Francisco. Spatial typologies, such as edible landscapes, suggest broadening physical site selection criteria; programmatic typologies, such as edible schoolyard suggest citywide mapping of existing school locations; and specific community needs, such as affordable, nutritious foods, suggest a citywide demographic or food-desert mapping.

On a whole, the diverse range of spatial and programmatic urban agriculture typologies suggests a greater diversification of efforts to meet the multiple goals within the city, and not relying on a single public land audit to achieve these goals. It is also important for policy-makers and community groups to recognize that no individual typology or project can accomplish every goal associated with urban agriculture. Rather, a range of urban agriculture projects defined spatially and programmatically, are necessary to achieve the ambitious sustainability goals of the city, its agencies, and community groups.

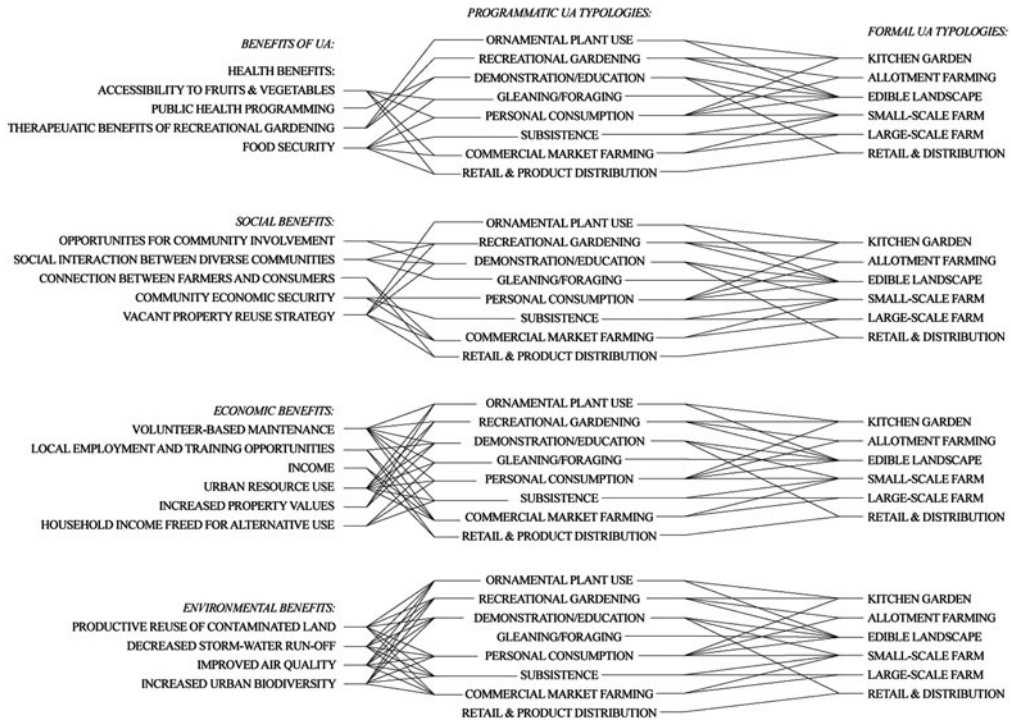

Figure 6. A framework for considering programmatic and formal urban agriculture typologies and their potential benefits.

Conclusion

This paper is not intended to denounce the use of a land-audit in promoting citywide urban agriculture, nor is it meant to diminish the importance of formal considerations in conducting audits or analyzing sites. Rather, this paper aims to reveal a greater complexity in defining urban agriculture, whether by formal or programmatic typology, and encourage a greater recognition of the city and community goals for promotion. By examining San Francisco's efforts at promoting urban agriculture within the past three years, it is unclear whether the specific goals within city agencies and community groups will all be attained. San Francisco is not alone in its efforts to pursue citywide promotion via an 'available land' approach to auditing; both the cities of Portland and Vancouver have also approached land audits similarly (Mendes et al. 2008). These cities represent some of the leaders of integrating urban agriculture into city planning and policy efforts in North America, with other cities likely to follow. Being critical of the initial processes employed by these cities is necessary, as the conversation regarding urban agriculture's definitions and associated benefits are complex and unclear. In examining current urban agriculture efforts in San Francisco, the author argues that greater recognition of the full list of urban agriculture typologies, both spatially and programmatically, provides greater links between landscape type and associated benefits. This will allow cities to plan, environmental designers to design, and communities to pursue the appropriate urban agriculture project to meet the greatest city and community needs.

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References

Alemany Farm. 2012. "Alemany Farm." Last modified February 20. Accessed March 1. http://www.alemanyfarm.org/

Bakker, N., M. Dubbeling, S. Guendel, U. Sabel Koschella, H. de Zeeuw, eds. 2000. *Growing Cities, Gowing Food: Urban Agriculture on the Policy Agenda*. Accessed November 2011. http://www.ruaf.org/publications/growing-cities-growing-food-urban-agriculture-policy-agenda

Board of Supervisors, City of San Francisco. 2012. *Administrative Code – Urban Agriculture Program*. Ordinance No. 120404, Sections 53.1 to 53.4.

Bohn, K., and A. Viljoen. 2012. "The CPUL City Toolkit: Planning Productive Urban Landscapes for European Cities." In *Sustainable Food Planning: Evolving Theory and Practice*, edited by A. Viljoen and J. Wiskerke, 478–494. Wageningen, The Netherlands: Wageningen Academic Publishers.

Burke, Ellen. 2010. "Farm Plus: Hybrid Agricultural Landscapes." In *Bracket: On Farming*, edited by M. White and M. Przybylski, 88–91. Barcelona: Actar Birkhauser.

Design Trust for Public Space. 2012. "Five Borough Farm." Accessed June25. http://www.designtrust.org/

Drescher, A. 2000. *Urban and Peri-Urban Agriculture and Urban Planning*. Discussion paper for RUAF electronic conference: "Urban and Peri-Urban Agriculture on the Policy Agenda," University of Freiburg, Germany, August 21 – September 30. Accessed October 21, 2011. http://www.fao.org/urbanag/Paper3-e.doc.

Dubbeling, M., and G. Merzthal. 2006. "Sustaining Urban Agriculture Requires the Involvement of Multiple Stakeholders." In *Cities Farming for the Future: Urban Agriculture for Green and Productive Cities*, edited by Rene van Veenhuizen, 20–51. Ottawa: International Institute of Rural Reconstruction and ETC Urban Agriculture.

Forest, Beacon Hill Food. 2012. "Beacon Food Forest." Last modified March 23. Accessed March 24. http://beaconfoodforest.weebly.com/index.html

Francis, M. 1987. "Some Different Meanings Attached to a City Park and Community Gardens." *Landscape Journal* 6 (2): 102–112.

Garden for the Environment. 2011. *Urban Agriculture Pilot Sites Feasibility Study for SFPUC*. Provided by Juliet Ellis, Director of External Affairs, San Francisco Public Utilities Commission, June 11.

Garden for the Environment. 2012. "Garden for the Environment." Last modified March 3. Accessed March 24. http://www.gardenfortheenvironment.org/

Girardet, H. 2005. "Urban Agriculture and Sustainable Urban Development." In *Continuous Productive Urban Landscapes: Designing Urban Agriculture for Sustainable Cities*, edited by A. Viljoen, K. Bohn, and J. Howe, 32–39. Amsterdam: Elsevier.

Hodgson, K., M. C. Campbell, and M. Bailkey. 2011. *Urban Agriculture: Growing Healthy Sustainable Places*. American Planning Association, Planning Advisory Service Report No. 563, January 2011, 1–34.

Hou, J., J. Johnson, and L. Lawson. 2009. *Greening Cities, Growing Communities: Learning from Seattle's Urban Community Gardens*. Seattle, WA: University of Washington Press.

Lawson, L. 2005. *City Bountiful: A Century of Community Gardening in America*. Berkeley: University of California Press.

Lester, R. 2006. "Urban Agriculture: Differing Phenomena in Differing Regions of the World." Accessed October 11, 2011. http://community-wealth.org/_pdfs/articles-publications/urban-ag/report-lesher.pdf

Little City Gardens. 2012. "Little City Gardens." Accessed March 22. http://www.littlecitygardens.com/

Mendes, W., K. Balmer, T. Kaethler, and A. Rhoads. 2008. "Using Land Inventories to Plan for Urban Agriculture." *Journal of American Planning Association* 74 (4): 434–449.

Milda, B., and R. van Veenhuizen. 2001. "The Integration of Urban and Peri-Urban Agriculture into Planning." *Urban Agriculture Magazine* 4 (1): 1–6. Accessed November 1, 2011. http://www.ruag.org/

Mougeot, L. 2006. *Growing Better Cities: Urban Agriculture for Sustainable Development*. Ottawa: International Development Research Centre.

Office of the Mayor, City and County of San Francisco. 2009. "Executive Directive 09–03, 'Healthy and Sustainable Food for San Francisco'."Accessed December 12, 2010. http://www.sfgov3.org/index.aspx?page=753

Office of the Mayor, City and County of San Francisco. 2010. *Summary Report on the Executive Directive on Healthy and Sustainable Food*. Accessed January 23, 2011. http://www.sfgov3.org/index.aspx?page=753

Quon, S. 1999. "Planning for Urban Agriculture: A Review of Tools and Strategies for Urban Planners." In *Cities Feeding People, Report #28*. Ottawa: International Development Research Centre. Accessed October 20, 2011. http://web.idrc.ca/en/ev-6549-201-1-DO_TOPIC.html

Rees, W. 1996. *Cities Feeding People: A Growth Industry*. Notes for IDRC Development Forum on Cities Feeding People. Accessed October 17, 2011. http://www.cityfarmer.info

San Francisco Department of Public Works (SFDPW). 2012. "Urban Gleaning Program." Accessed June 24, 2012. http://sfdpw.org/index.aspx?page=1243

SFPUC (San Francisco Public Utilities Commission). 2011. "Agenda Item regarding Resolution No. 15. "Authorize the General Manager to Establish an Urban Agriculture Pilot Program on SFPUC Lands in San Francisco and Conduct a Feasibility Assessment on Proposed Pilot Sites." Provided by Juliet Ellis, Director of External Affairs, San Francisco Public Utilities Commission, June 11, 2012.

SFPUC (San Francisco Public Utilities Commission). 2012. "SFPUC Urban Agriculture Pilot Program." Last modified March 13, 2012. Accessed March 24. http://infrastructure.sfwater.org/

SFUAA (San Francisco Urban Agriculture Alliance). 2010. "Memo to the San Francisco Food Policy Council, Re: Recommendations on Implementation of Urban Agriculture Objectives of the Executive Directive." Provided by Juliet Ellis, Director of External Affairs, San Francisco Public Utilities Commission, June 11, 2012.

SFUAA (San Francisco Urban Agriculture Alliance). 2011a. "Overview of San Francisco's Urban Agriculture Zoning Ordinance." Accessed July 25, 2011. http://www.sfuaa.org/urban-ag-zoning-proposal.html

SFUAA (San Francisco Urban Agriculture Alliance). 2011b. "Memo to the San Francisco Public Utilities Commission, Re: Recommendations on SFPUC Urban Agriculture Pilot Projects." Provided by Juliet Ellis, Director of External Affairs, San Francisco Public Utilities Commission, June 11, 2012.

SPUR (San Francisco Planning and Urban Research). 2012. "Public Harvest: Expanding the Use of Public Land for Urban Agriculture in San Francisco." Accessed April 15, 2012. http://spur.org/

Smit, J., and J. Nasr. 1992. "Urban Agriculture for Sustainable Cities: Using Waste and Idle Land and Water Bodies as Resources." *Environment and Urbanization* 4 (2): 141–152.

Sommers, P., and J. Smit. 1994. "Promoting Urban Agricturlture: A Strategy Framework for Planners in North America, Europe, and Asia." In *Cities Feeding People*, Report #9, The Urban Agriculture Network (TUAN). Accessed October 20, 2011. http://idrc.ca/en/ev-2124-201-1-DO_TOPIC.html

The Trowel: San Francisco's Community Garden Newsletter. 1994. "San Francisco's Community Gardens." Accessed February 15, 2012. http://foundsf.org/index.php?title=San_Francisco's_Community_Gardens

UNDP (United Nations Development Programme). 1996. *Urban Agriculture: Food, Jobs and Sustainable Cities*. Blue Ridge Summit, : United Nations Pubns.

van Veenhuizen, R. 2006. "Cities Farming for the Future." In *Cities Farming for the Future: Urban Agriculture for Green and Productive Cities*, edited by Rene van Veenhuizen, 20–51. Ottawa: International Institute of Rural Reconstruction and ETC Urban Agriculture.

Viljoen, A., K. Bohn, and J. Howe, eds. 2005. *Continuous Productive Urban Landscapes: Designing Urban Agriculture for Sustainable Cities*. Amsterdam: Elsevier.